SystemManager

Release 7.0

User Guide

Manual Part No. 28-0030
June 2018
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TIP: The Tip symbol indicates parenthetical information that is not necessary for performing a given procedure, but which, if followed, makes the procedure easier, smoother, or more efficient.

In addition to these symbols, this guide may use the following text conventions:

Convention	Explanation
`Typed Command`	Indicates the text that you type in at the keyboard prompt.
Ctrl, **Ctrl** + **Shift**	A key or key sequence to press.
http://www.harmonicinc.com	The italics in blue text to indicate Cross-references, and hyperlinked cross-references in online documents.
Bold	Indicates a button to click, or a menu item to select.
`Screen Output`	The text that is displayed on a computer screen.
Emphasis	The italics text used for emphasis and document references.

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Introduction

The SystemManager application provides management capabilities for the Spectrum™, the Harmonic MediaGrid, and the Media Application Server (MAS) systems.

The SystemManager acts as the administrative hub of an Spectrum media server installation. The SystemManager has a streamlined and an intuitive browser-based user interface that lets you make rapid adjustments to system configurations, integrate additional components, and identify fault conditions.

The SystemManager's fault reporting and alerting capabilities can head off issues before they become critical. The SystemManager provides facility wide control, active monitoring, and alerts.

SystemManager documentation suite

SystemManager documentation and software updates are available from the Harmonic website.

Contact Harmonic technical support for login information.

Documents are available in .pdf, and are packaged in the **SystemManager-v<version#>-Documentation.exe** file.

Adobe® Acrobat Reader is needed to view the product documentation. Download the application for free from

http://www.adobe.com

This document...	Provides this information...
SystemManager User Guide and Online Help System	• system configuration procedures • system operation procedures
SystemManager Installation Guide (this document)	• platform and software installation, and upgrade details
SystemManager Release Notes	• new features in the SystemManager release • last minute information regarding a product release

IMPORTANT: To find instructions for configuring legacy Spectrum video servers including MediaDirector 2100 and 2200 series, ProXchange, ProBrowse, and using ClipTool, refer to the 6.4 version of the *SystemManager User Guide*.

Terms

Harmonic uses a range of terms to describe product components and the functionality of product solutions.

Audio Profile	A set of audio down-mix and voice-over parameters that can be mapped to a Spectrum X or ChannelPort channel source
Audio Profile Group	A group of eight audio profiles.
Balancing	The process of distributing disk space evenly across ContentServers in a cluster.
ChannelPort	A channel playout platform that provides integrated clip playback, branding, master control switching, and support for Emergency Alert Systems
Cluster	For Harmonic MediaGrid, this refers to a collection of one or more volumes and groups, and their associated ContentDirectors and ContentServers.
ContentBridge	An optional server that provides standard interfaces to the Harmonic MediaGrid for clients that do not have the OCL File System Drive (FSD) installed or an FSD is not available. The interfaces provided are CIFS and FTP.
ContentDirector	The device that manages operation on the Harmonic MediaGrid, including load balancing. It is the primary point of contact for clients and determines the ContentServer availability.
ContentServer	An intelligent storage system that actively monitors the slices stored on it. ContentServers present content (data) to clients and manage the actual data on hard drives.
DV	Refers to Digital Video, a compressed digital video format for sound and picture.
Embedded	Refers to two different concepts in this guide: • The first usage is the embedding of audio data in SDI video streams. The Spectrum system can input and output audio data either separately (on AES/EBU connections), or embedded within the SDI video stream. • The second usage pertains to the recording of VBI data. The Spectrum system gives the option of embedding VBI data within an MPEG file, or recording the VBI data in a separate file
Enhanced Channel mode	A licensed feature that combines the resources of two Spectrum X or ChannelPort channels into one channel.
UHD mode	A licensed feature that uses both SDI cards on the Spectrum X to play out one channel of Ultra HD video.

Frame or Chassis	Both refer to the specific hardware component of a Spectrum device such as a Spectrum X or a MediaDeck 7000.
Group	In the context of Harmonic MediaGrid, refers to a collection of one or more ContentServers and ContentDirectors in a Harmonic MediaGrid system.
Hot Swappable	Refers to an electronics board or component (such as a fan or disk drive) that can be removed from or installed in a chassis while system power is on.
Independent Branding	A licensed feature for the ChannelPort and the Spectrum X, which allows you to brand Primary and Secondary channel outputs independently.
Input	Refers to an audio or video signal that is connected to a Spectrum I/O module. Input also refers to the physical input connectors on the I/O module or SDI I/O card.
Interleaved	Refers to audio that is recorded within the DV (video) file itself.
MediaPort	Refers to an interface adapter for video, audio, timecode and control. In this documentation, use of the term MediaPort refers to the I/O module installed in the MediaDeck 7000.
Mount Point	For Harmonic MediaGrid, this refers to the physical location in the directory structure where a computer puts the files in a File System.
Output	Refers to an audio or video signal that is connected from a Spectrum I/O module to a destination digital device. Output also refers to the physical output connectors on the Spectrum I/O module or SDI I/O card.
Playout Channel	On the Spectrum video server, a process that controls player functions and the previewing of graphics.
Polaris Play: Playlist Control (Polaris Play: Playlist Control)	An optional, licensed Spectrum system feature that provides unattended playout of clips and graphics driven by a channel's traffic schedule.
SDI	Refers to Serial Digital Interface, a system whereby uncompressed digital component video signals are distributed using coaxial cable. An SDI signal can include embedded audio.
SDTI	Refers to a protocol for transporting data at high bit rates (up to 270 Mbps) over a serial transmission line. The protocol is defined in the SMPTE 305.2M-200 specification. SDTI may carry different types of data, including various forms of compressed video.
SDTI-CP	Refers to a Sony variation of SDTI for carrying IMX MPEG video at 50 Mbps
Source	Refers to an audio/video device whose output signals are connected to one or more Spectrum X, ChannelPort, or MediaPort inputs.
System	Refers to an entire Spectrum system and all of its components.
VC-3	A video format defined by the SMPTE 2019-1 standard.

VANC	Refers to the Vertical Ancillary data in the active portions of lines in the vertical interval.
Volume	For Harmonic MediaGrid, this refers to a collection of one or more groups and their associated ContentServers and ContentDirectors.

Abbreviations

Find abbreviations used to identify components of the product solution.

ACE	Access Control Entry (Harmonic MediaGrid)
ACL	Access Control List (Harmonic MediaGrid)
A-D	Analog-to-Digital
AES	Audio Engineering Society
AP	Application Process
AUX	Auxiliary
CBR	Constant Bit Rate
CG	Character Generator
CIFS	Common Internet File System
D-A	Digital-to-Analog
DAT	Digital Audio Tape
DDR	Digital Disk Recorder
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DV	Digital Video
DVTR	Digital Video Tape Recorder
EAS	Emergency Alert System
E-E	Electronics to Electronics
EFS	Extended File System
FC-AL	Fibre Channel Arbitrated Loop
FCP	Apple Final Cut Pro
GOP	Group of Pictures
bps	Megabits per second
MCP	Media Control Processor
MCS	Master Control Switcher
MIP	MediaPort
MPEG	Motion Picture Experts Group

MXF	Media eXchange Format
NAS	Network Attached Storage
NLE	Non Linear Editor
RU	Rack Unit
SAN	Storage Area Network
SDI	Serial Digital Interface
SDTI	Serial Data Transport Interface
SMB	Server Message Block
SNMP	Server Message Block
VBI	Vertical Blanking Interval
VDCP	Video Disk Control Protocol
VTR	Video Tape Recorder
VCR	Video Cassette Recorder

Part I

SystemManager

- *SystemManager configuration*

Chapter 1

SystemManager configuration

SystemManager configuration settings affect the entire system managed by the SystemManager application.

NOTE: The procedures outlined in this section are written for *qualified technical personnel*, skilled at advanced networking procedures. If you have any questions, please consult with your facility's Information Service staff or contact Harmonic technical support.

- *Logging in to the SystemManager application*
- *About SystemManager functionality*
- *About the SystemManager database and file details*
- *Setting the Discovery Interval*
- *Setting the database configuration*
- *Setting the facility name*
- *Monitoring hot spares*
- *Setting the GUI refresh interval*
- *Controlling track tags on players*
- *Configuring the player resource check*
- *Configuring player case sensitivity*
- *Configuring players to stop recording when the disk is full*
- *Configuring players to stop recording when an input error occurs*
- *Configuring players to use 704 up/down conversion by default*
- *Configuring players to ignore RP186 (chroma LSB) AFD*
- *Changing the preferred primary Harmonic component to be monitored*
- *Changing firmware version source files*
- *Logging off the SystemManager*
- *About environment variables*
- *Adding custom Help and custom configuration notes*
- *Viewing SystemManager software version information*
- *Accessing the SystemManager online help*
- *User management*
- *Diagnostics and troubleshooting*
- *SNMP configuration*

Logging in to the SystemManager application

Log on to SystemManager using the Internet Explorer browser to control Harmonic devices from both local and remote computers.

Before you begin

A valid license is required to operate the SystemManager application on either a SystemManager platform or a customer-supplied PC. Refer to *Obtaining and installing a SystemManager License File* for more information. You should have already installed the license file before logging on to the SystemManager application.

The SystemManager application does not have to be installed on the local or remote PC in order to log on.

1. From your SystemManager platform or client PC, double click the **Internet Explorer** icon to launch Internet Explorer.
2. If the **SystemManager Login** dialog does not appear automatically, there are two different ways to log in, depending upon the computer's location:
   - For the SystemManager platform or client-PC itself: In the address bar, type: http://localhost/, and then press **Enter**.
   - For any other PC: In the address bar type the name (or IP address) of the SystemManager platform, and then press **Enter**. This name (or address) can be obtained from your system administrator. For example, http://Managerpc/
3. Press **Enter** to display the SystemManager Log In window.
4. From the Log In window, click **Log In** to display the **Enter Network Password** dialog.
   a. Enter the user name: **Administrator**
   b. Enter the password (case sensitive): **omneon**
5. Click **OK** to display the **Configuration** tab. The **Spectrum - System Diagram** page is displayed by default.).

Result:

If a valid SystemManager License file is not installed and available for the SystemManager, the following message appears, "License not available. Please go to the **Home** > **Options** page, and update the license server information." Refer to the *SystemManager Installation Guide* for instructions on obtaining and installing a SystemManager license file and configuring FLEXlm License Server Data.

About SystemManager functionality

The SystemManager application provides a user interface for monitoring and configuring Harmonic components, including Spectrum, Harmonic MediaGrid, and Media Application Server (MAS) system components.

The SystemManager consists of a service (Manager service) that launches when the SystemManager Platform boots up. This service includes a web server and integrated libraries which communicate with the Spectrum and ProBrowse components using TCP/IP and UDP/IP over Ethernet.

The SystemManager also provides a library that integrates into the Microsoft SNMP Agent (SNMP Service). This library serves as a proxy SNMP agent, allowing other network management system products to access a subset of information about the Harmonic equipment from enterprise or workgroup management products (for example, HP OpenView).

The SystemManager application is the system's Network Management Server. The SystemManager runs as a web server that communicates with MediaDirectors over Ethernet.

Using the SystemManager, the capabilities and performance of each SystemManager tool can be configured, monitored or updated as follows:

- Configuration management deals with network topology, the "state" of the network, device names, "Player" configuration, end-to-end connections, bandwidth and other related network configuration tasks.
- Fault management handles detection and correction of network problems through error detection processes and diagnostic testing.

Note the following important SystemManager navigation caveats:

- The application contains many hyperlinks. Internet Explorer allows you to right-click on a hyperlink and select "Open Link In New Window" or "Open In New Window" (depending upon the type of link) from the pop up menu. This, however, results in an error message. Thus, the recommended method to open a new browser window is to click **File** > **New** > **Window**, or simply to press **CTRL + N**.
- Within the application, the browser's **Back** button functions erratically. The recommended method is to use the navigation icons in SystemManager.

Related information

Viewing the components of a Spectrum system

SNMP configuration

About the SystemManager database and file details

Find information about SystemManager database parameters.

The SystemManager's database is saved by default every two minutes to the D:\Omneon\manager\omdb directory. The database filename is manager.oda. The user can change the filename by editing the D:\Omneon\apache\conf\httpd.conf configuration file and changing:

```
OmneonManagerDatabasePath "D:\Omneon/manager/omdb/manager"
```

Note that the line includes the filename but without any extension. The SystemManager will automatically add ".oda" to the filename.

The database is backed up by default every 20 minutes to the D:\BackupOmdb directory. The backup filename is always the same as the original saved database. The user can change the backup directory by editing the D:\Omneon\apache\conf\httpd.conf configuration file, and changing:

```
OmneonManagerDatabaseBackupPath "D:/Backupomdb/manager"
```

This line contains the directory name and the filename, without any extension.

An additional line in the configuration file can be modified by the user:

```
OmneonManagerUpgradesPath "D:/Upgrades"
```

This line specifies where the SystemManager looks to find firmware upgrade files.

When making changes to the httpd.conf file, the user should shut down the SystemManager before editing the file. The SystemManager will use the new settings when it starts the next time.

NOTE: Harmonic recommends that you leave the settings for the “Save” directory and filename, and the “Upgrade” directory as they are. However, if you have a central server which your Information Systems department archives on a regular basis, Harmonic recommends that you mount a shared drive from your central server on the SystemManager platform, and then modify the SystemManager’s “Backup” directory path to point to the mounted share. This ensures that the database is archived on a regular basis.

Setting the Discovery Interval

The **Discovery Interval** determines how often the SystemManager sends out an Ethernet broadcast to find newly connected Harmonic devices. You may change this interval as needed.

Disabling device discovery will prevent the SystemManager from finding Harmonic devices. This may be of benefit in some circumstances (for example, when running multiple SystemManagers). Note that when device discovery is disabled, SystemManager will still discover Harmonic MediaGrid clusters and Spectrum extended file systems (EFS).

NOTE: Leaving auto-discovery enabled on shared networks may result in slowed network access. To reduce packet traffic on your Ethernet network, you may wish to completely disable device discovery by setting the interval to 0.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under **Device Auto-Discovery Configuration**, click in the **Discovery Interval** field, and then enter the desired value (in seconds). Values include 0 (discovery off) or between 3 and 86400 (24 hours). The default value is 30 seconds.
3. Click **Update** at the bottom of the page to accept the new value.

   NOTE: If the SystemManager is having trouble discovering or connecting to devices and the devices seem to be working correctly otherwise, try closing the Internet Explorer window and starting a new one. If the problem continues, stop the SystemManager in the Services window, then restart it.

Setting the database configuration

You may configure how often the SystemManager saves the database, and how often the database is backed up.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. To change the database save interval, under **Database Configuration**, click in the **Save Interval** field and enter the desired value (in minutes). Values range from 2 minutes to 1440 minutes (24 hours).
3. To change the database backup interval, under **Database Configuration**, click in the **Backup Interval** field and enter the desired value (from 2 to 1440).
4. Click **Update** at the bottom of the page to accept the new values.

Setting the facility name

You may set the facility name that appears at the top headers of the SystemManager pages. The facility name also identifies the system when being accessed remotely for Harmonic technical support functions.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the heading **Miscellaneous Parameters** click in the text box following the label **Facility Name**.
3. Type in your desired facility name.
4. Click **Update** at the bottom of the page. In order to view the new facility name setting, you must log off of the SystemManager and then log back in.

Monitoring hot spares

SystemManager monitors hot spare drives in Spectrum RAID sets and sends an alarm when a hot spare is lost.

For Spectrum RAID sets that don't include hot spares, you may disable hot spare monitoring.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Scroll down to the **Monitor Hotspare** field and configure as follows:
   - **Enable:** Select to specify that an alarm is reported when a RAID set first loses a hot spare.
   - **Disable:** Select if you do not have hot spares for RAID sets.

   IMPORTANT: Harmonic strongly recommends you upgrade to systems with hot spares. Contact Harmonic technical support for upgrade information.
3. Click **Update** to accept the new setting.

   Note the following important points:

   - When upgrading to a new version of the SystemManager application software, Monitor Hotspare is *disabled by default* if a SystemManager database (Manager.oda) is detected on system startup.
   - If the SystemManager database (Manager.oda) is renamed, or for all new systems, Monitor Hotspare is *enabled by default.*

Setting the GUI refresh interval

You may specify how frequently the GUI is refreshed with new information.

Setting a longer refresh interval is useful for slow network connections when the default interval of 30 seconds is too short.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. In the **Miscellaneous Parameters** section, scroll to **GUI Refresh Interval** and enter a value in seconds from 10 to 86400 (24 hours).
3. Click **Update** to save the new setting.

Controlling track tags on players

By default, track tags are allowed for any Player. You may disable or enable this setting.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Player Track Tagging** field and configure as follows:
   - **Enable:** Select to allow track tags on Players.
   - **Disable:** Select to disallow track tags on Players. Track tag configuration controls no longer appear on the Edit Player page, however, you can still edit the Track Tag file from the Edit Player Track Tags page.
3. Click **Update** at the bottom of the page to accept the new setting.

Configuring the player resource check

The player resource check makes sure that there is sufficient bandwidth available whenever a player is activated. This check is enabled by default but can be disabled.

CAUTION: The steps in this section should only be performed if you are setting up automation control of players. If you wish to configure your system for automation control of players, contact Harmonic technical support for assistance.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Player Resource Safety Checking** field and configure as follows:
   - **Enable:** Select to enable player resource checking (default state).
   - **Disable:** Select to disable player resource checking. If **Disable** is selected, a warning message appears.
3. Click **OK**.
4. Click **Update** at the bottom of the page to accept the new setting.

Configuring player case sensitivity

You can enable or disable player case sensitivity as needed.

Player case sensitivity is disabled by default, which means that when you attempt to play a clip with an extension in either lower case (for example, .mov or .mxf) or upper case (for example, MOV or .MXF), the player will be able to find and open the clip.

If player case sensitivity is enabled, a player will ONLY be able to find clips with lower case extensions (for example, .mov or .mxf).

IMPORTANT: Harmonic recommends that you leave the default setting.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.

2. Under the **Player Parameters** heading, locate the **Player Case Sensitivity** field and configure as follows:
   - **Enable:** Select to enable player case sensitivity.
   - **Disable:** Select to disable player case sensitivity (default).

   The change will take affect once the affected player is activated. If the player is already activated, it must be deactivated and then activated again.

Configuring players to stop recording when the disk is full

You can configure Spectrum to stop recording when there is no available disk space.

By default, the players in a Spectrum system will continue to record regardless of whether there is available disk space. You may change the default behavior so that players stop recording when there is no available disk space.

NOTE: For players created prior to SystemManager 5.23 and Spectrum 6.4.2, use the **Stop recording when disk is ful1** check box on the Edit Player page.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Stop recording when disk is full** field and configure as follows:
   - **Enable:** Select if you wish players to stop recording when there is no disk space.
   - **Disable:** Select to allow players to continue recording even when there is no disk space (default).

   The change will take affect once the affected player is activated. If the player is already activated, it must be deactivated and then activated again.

Configuring players to stop recording when an input error occurs

You can configure Spectrum to stop recording when an input error occurs.

By default, Spectrum players continue to record regardless of errors with the input SDI video signal (for example, if an SDI cable is disconnected). You may change the default behavior so that players stop recording when there is an SDI video input error.

NOTE: For players created prior to SystemManager 5.23 and Spectrum 6.4.2, use the **Stop recording when Input error occurs** check box on the Edit Player page.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Stop recording when input error occurs** field and configure as follows:
   - **Enable:** Select if you wish players to stop recording when there is an input error.
   - **Disable:** Select to allow players to continue recording even when an input error occurs (default).

   The change will take affect once the affected player is activated. If the player is already activated, it must be deactivated and then activated again.

Configuring players to use 704 up/down conversion by default

You can configure Spectrum to use 704 up/down conversion by default.

By default, the Spectrum down-converter scales 576i video to an output width of 720 samples. You may change the default setting for new players so they are configured to up-convert or down-convert video to 704 samples wide.

The following diagram shows conversion setting and that Spectrum supports 8 black samples on each side of the screen, resulting in a picture width of 704 samples. Note that this option applies only to video with a frame rate of 25 Hz, and only to players attached to the MediaPort 7000 series, ChannelPort or Spectrum X.

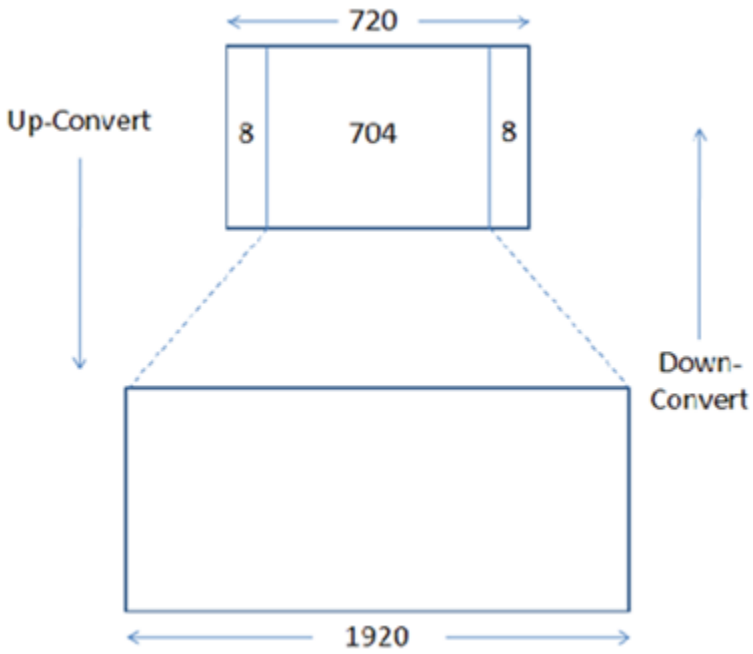


Figure 1-1: Up-convert and down-convert options

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Use 704 Up/Down Conversion** field and configure as follows:
   - **Enable:** When selected, the Edit Player page for any new player that is configured to Play Only or Play and Record, configured to 25 Hz, and is attached to an I/O module that supports up/down conversion will display a selected check box for **Use 704 Up/Down Conversion**.
   - **Disable:** When selected, players will continue to use the default of 720 samples for up/down conversion (default). For players that meet the conditions described in the previous bullet, the Edit Player page will display the Use 704 Up/Down Conversion check box, but it will be deselected by default.
3. On the **Edit Player** page, make sure **Mode** is set to **Play Only** or **Play and Record**. Make sure the **Frame Rate** is set to **25** Hz. And make sure the player is attached to an I/O module that supports up/down conversion.

4. The **Use 704 Up/Down Conversion** check box on the **Edit Player** page will be selected by default.

   NOTE: The change will take affect once the affected player is activated and enabled. If the player is already activated, it must be deactivated and then activated again.

Configuring players to ignore RP186 (chroma LSB) AFD

You can configure players to ignore RP186 (chroma LSB) AFD.

In some cases, you may want your Spectrum system to ignore RP186 (chroma LSB) AFD values resulting from recorded chroma noise. You may change the default setting for new players attached to an I/O module so that RP186 (chroma LSB) AFD values are ignored.

Note that this setting does not ignore the AFD bits that come from data packets elsewhere in the file.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Player Parameters** heading, locate the **Ignore clip RP-186 AFD** field and configure as follows:
   - **Enable:** When selected, the Edit Player page for any new player that is configured to Play Only or Play and Record will display a selected check box for **Ignore clip RP-186 AFD**.
   - **Disable:** When selected, players will continue to play RP186 (chroma LSB) AFD values. For Play Only or Play and Record players, the Edit Player page will display the **Ignore clip RP-186 AFD** check box, but it will be cleared by default.
3. On the **Edit Player** page, make sure **Mode** is set to **Play Only** or **Play and Record**.
4. The **Ignore clip RP-186 AFD** field check box on the Edit Player page will be selected by default.

Changing the preferred primary Harmonic component to be monitored

You may configure which component view will appear in the main window when you first open the application. The default view is Spectrum.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Under the **Preferred Primary Harmonic Component to be Monitored** heading, select one the following components:
   - Spectrum
   - Harmonic MediaGrid
   - ProBrowse
   - ProXchange
   - MAS
3. Click **Update** for the changes to take effect.

Changing firmware version source files

You can select a particular *directory* from which Spectrum firmware upgrade (source) files will be selected.

The selection does *not* perform the upgrade — that function is performed on a device's individual **Properties** page or on the global **Upgrade Firmware** page.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Click the Firmware Selection icon in the left-hand column to display the **Firmware Version Selection** page.
3. Click the radio button for the desired firmware version. The red check mark indicates the selected version.
4. When the confirmation dialog appears, click **OK** to accept.
5. Perform the upgrades on the global **Upgrade Firmware** page. For Spectrum devices, you can also use the **Upgrade Firmware** button on the device's **Properties** page.

   Refer to "Upgrading Spectrum Firmware" in the *Spectrum System Installation Guide* for instructions.

Logging off the SystemManager

Use the **Log Off** button to log off from any SystemManager page.

1. Click the **Log Off** button at the top of the application window to display the **Log Off Confirmation** page. A dialog appears, asking you to confirm closing the browser window.
2. Click Yes to log off and close the browser window.

   NOTE: If you do not click Yes, the browser window remains open and you will still be logged on to the SystemManager.

About environment variables

SystemManager provides some advanced settings, which can be used by Harmonic technical support for diagnostic purposes.

IMPORTANT: The settings on the Environment Variables page are for Harmonic technical support only. Do not modify these settings unless directed by Harmonic technical support.

To access the Environment Variables page, from the **Home** tab, under **Advanced**, click **Environment Variables**.

Adding custom Help and custom configuration notes

You can add a custom help file to the **Help** tab.

These files may be useful for documenting a facility's local Harmonic system configuration.

1. Click the **Help** tab to display the **Help** page.
2. In the left-hand column, click the Custom hyperlink (or icon) to display the **Custom** page. After SystemManager installation, this page displays information on how to modify its content.
3. Using your preferred HTML editor or word processor, create an HTML file that contains system configuration information, such as rack layouts, Fibre Channel wiring, IEEE 1394 wiring, and device names.
4. Save the file with the name "index.htm."
5. Copy this file onto the SystemManager platform. Place it in the following directory:

   ```
   D:\Omneon\Apache\htdocs\local\
   ```

6. To verify that the file has been properly placed, click the **Help** tab and then the **Custom Hyperlink** (or icon). Your customized file should replace the Custom page.
7. You can add or change this information simply by editing the "index.htm" file as required.

Viewing SystemManager software version information

From the Help tab, click the **Version Information** icon in the left-hand column to display information about the SystemManager version and supported web browsers.

Accessing the SystemManager online help

To access the SystemManager Online Help System, click the **Help** tab, and then, in the left-hand column, click the link for **Launch Online Help**.

The Help system opens in a separate browser window, and allows you to select topics from a table of contents or perform a search of help topics.

This chapter provides configuration instructions for managing SystemManager users.

User management

The **Security** tab in SystemManager is where you can manage system users.

Viewing users

You can see a list of all current system users, including the **Administrator**, by viewing the **View/Edit/Delete Users** page.

Click the **Security** tab to display the **View/Edit/Delete Users** page.

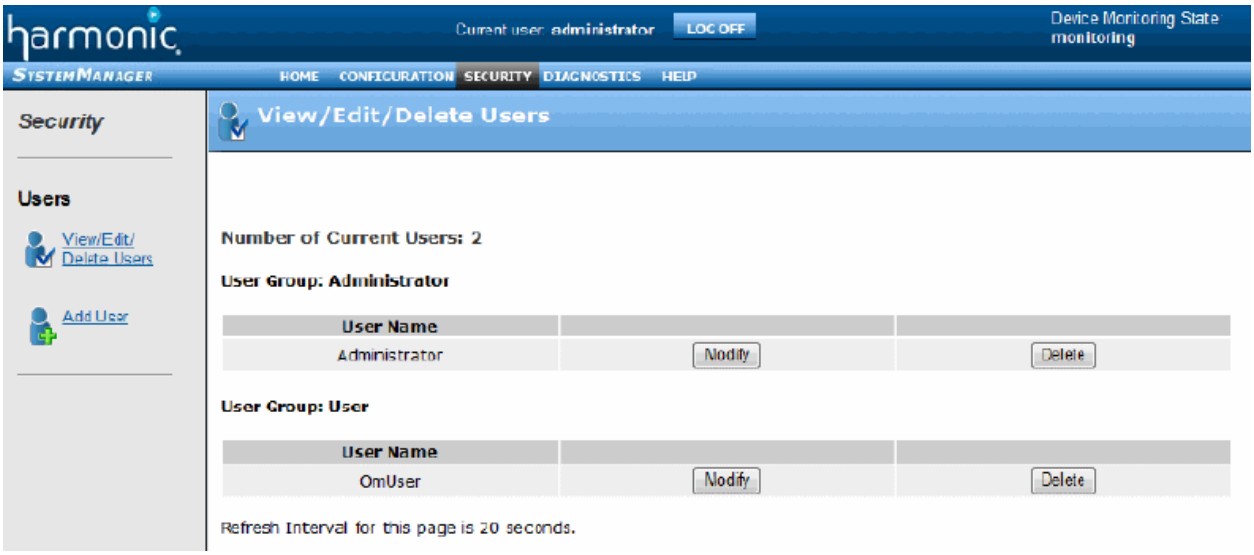


Figure 1-2: View/Edit/Delete Users

Modifying users

You can edit a system user's individual e-mail address, user group, and password the **View/Edit/Delete Users** page.

1. Click the **Security** tab to display the **View/Edit/Delete Users** page.
2. Click **Modify** adjacent to the user (or Administrator) name that you wish to modify. The **Modify User Setting** page appears.
3. To change the user's User Group, click the **User Group** drop-down box and select either **Administrator** or **User**.
4. To change (or enter) the user's e-mail address, type the desired e-mail address in the **Email Address** field. Click the **Update** button in the top section to accept the new address. You will now be notified of selected alarms, if e-mail notification is properly set up on the **Options** page, and the desired alarm filters are set.
5. To change a user's password, enter the old password in the **Old Password** field, type the new password in the **New Password** field, then confirm in the **Confirm Password** field. Click the **Update** button in the bottom section to complete the procedure. If the new password is accepted, you will be prompted to login again with the new password (only if you are changing the current user's password).

   NOTE: The password used on the page is for accessing SystemManager via the SystemManager Login.

Related information

Diagnostics and troubleshooting

Deleting users

From the **View/Edit/Delete Users** page, you can delete a user from the system.

IMPORTANT: Harmonic recommends that you do not delete the Administrator as it is an essential user to have on a Harmonic system, most notably to send SNMP traps, if enabled. The Administrator's settings configured on the Edit Filter page control the forwarding of alarms using e-mail as well as the sending of SNMP Traps as alarms.

1. Click the **Security** tab to display the **View/Edit/Delete Users** page and the view the current users.
2. Click **Delete** adjacent to the user that you wish to delete. The **Delete Confirmation** dialog box appears.
3. Click **OK** to delete the user, or **Cancel** to cancel the procedure safely, without deleting.

Adding users

Use the Add User feature to create a new user for the SystemManager application.

Note that the alarm filter settings in SystemManager apply only to the user that sets them. If you add a new user, make sure that the new user logs in to SystemManager and sets the desired alarm filters.

NOTE: If a user does not set an appropriate alarm filter level or if the filter level is off, and the **Send email notifications to all users?** setting on the **Options** page is set to **yes**, the user will receive email notifications for ALL alarms.

1. Click the **Security** tab to display the **View/Edit/Delete Users** page.
2. In the left-hand column, click the **Add User** icon to display the **Add User** page.
3. In the **User Name** field, type the name of the new user.
4. In the **Security Group** drop-down box, choose **User** or **Administrator**.
5. In the **Password** field, enter the new password. Confirm the password in the **Confirm Password** field.
6. Click **Create**. The system returns to the **View/Edit/Delete Users** page, with the new user listed.

   NOTE: The “users” created on the Add User page are for the SystemManager application only.

Related information

Setting email alarm notifications

Diagnostics and troubleshooting

The **Diagnostics** tab in SystemManager provides system diagnostics and tools for troubleshooting.

Viewing system status

On the **System Status** page you can view system status data used for SystemManager troubleshooting.

NOTE: This page is intended for use by Harmonic technical support only.

On the **Diagnostics Tab**, click the **View** System Status Icon in the left-hand column to display the **View System Status** page.

Viewing and clearing alarms

You can check the nature and source of any alarm that appears in the upper-right corner of the user interface.

Note that you can also click the **Alarm** icon from any SystemManager page to access the **View Alarms** page.

Alarms are color coded for display as follows:

- Red indicates a critical error condition requiring immediate attention.
- Orange indicates a failed component requiring attention.
- Yellow indicates a warning requiring action to avert additional error situation.
- Blue alarms are informational in nature and usually do not require any action to be taken.

Alarms are raised when the disk space in an EFS system falls below threshold values as follows:

- When space available is less than one percent, a critical alarm (red) is raised.
- When space available is between one and five percent, an error alarm (orange) is raised.
- When space available returns to more than five percent, a new informational alarm (blue) is raised

1. Click the **Diagnostics** tab to display the **Diagnostics** page.
2. In the left-hand column, click the **View Alarms** icon to display the **View Alarms** page. This page lists specific alarm events as detected by the SystemManager. The list is displayed in reverse order, with the most recent alarm at the top. Columns are provided for the alarm **Level**, **Time**, **Device** (alarm source), **Event**, **Info**, and for **Clear** (check mark icon) and **Delete** (garbage icon) buttons as well.

   NOTE: You can also access View Alarms page by clicking on the flashing **Alarms** icon in the upper right-hand corner. The flashing Alarms icon appears any time there are alarms, which have not been cleared.

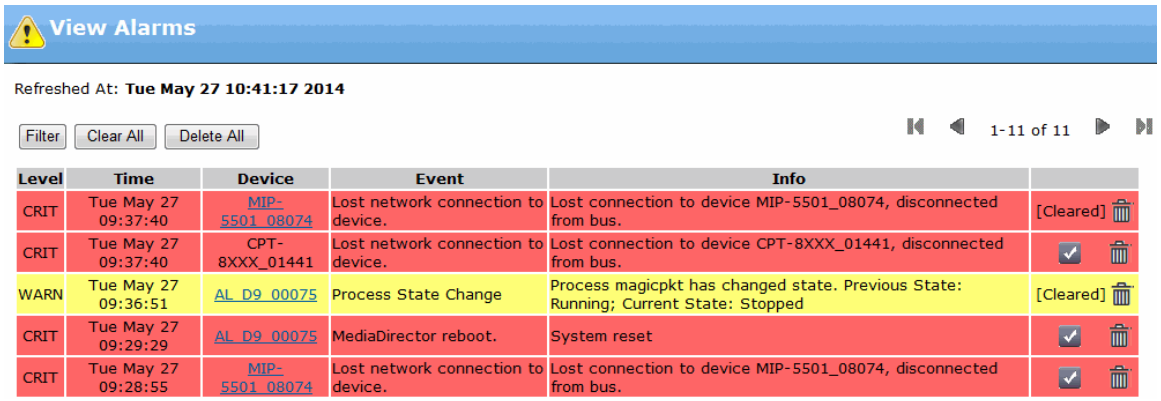


Figure 1-3: View Alarms

3. In the **Device** column, use the hyperlink to access each device's **Properties** page.
4. If desired, click **Turn Filter On** to apply the alarm filter, which is defined by using the **Edit Filter** check box. Once clicked, the filter is applied and the button changes to **Turn Filter Off**.

5. Events are shown from the most recent alarms to the earliest alarms. A maximum of 100 alarms are shown at any given time using the page navigation buttons. If desired, you can perform the following actions:
   - Click the "end" icon to see the last 100 alarms.
   - Click the "next" icon to see the next 100 alarms.
   - Click the "previous" icon to the previous 100 alarms.
   - Click the "beginning" icon to the first 100 alarms.
   - Click **Clear All** to clear all alarms in the list, but retain the individual events. This action also clears the Alarm icon from the upper right corner of the user interface.
   - Click **Delete All** to remove all alarms from the list and clear the Alarm icon.
   - Click **Clear** to clear an individual event alarm and retain the event in the list. This action clears the Alarm icon for that event, but the icon may continue to blink if other alarms are active.
   - Click **Delete** to delete the event from the list and clear that event's Alarm icon. The icon may continue to blink if other alarms are active.

Filtering alarms

The **View Alarms** page allows you to filter the alarms that are displayed by using the **Edit Filter** check box.

Note that alarm filter settings apply only to the user that sets them. To set alarm filters for multiple users, each user must log in to SystemManager and set the alarm filters as desired.

NOTE: If a user does not set an appropriate alarm filter level or if the filter level is off, and the **Send email notifications to all users?** setting on the **Options** page is set to **yes**, the user will receive email notifications for ALL alarms.

1. From the **Diagnostics** tab, in the left-hand column, click the **View Alarms** icon to display the **View Alarms** page.
2. Click the **Filter** button to open the Filter menu options, as shown in the following figure.

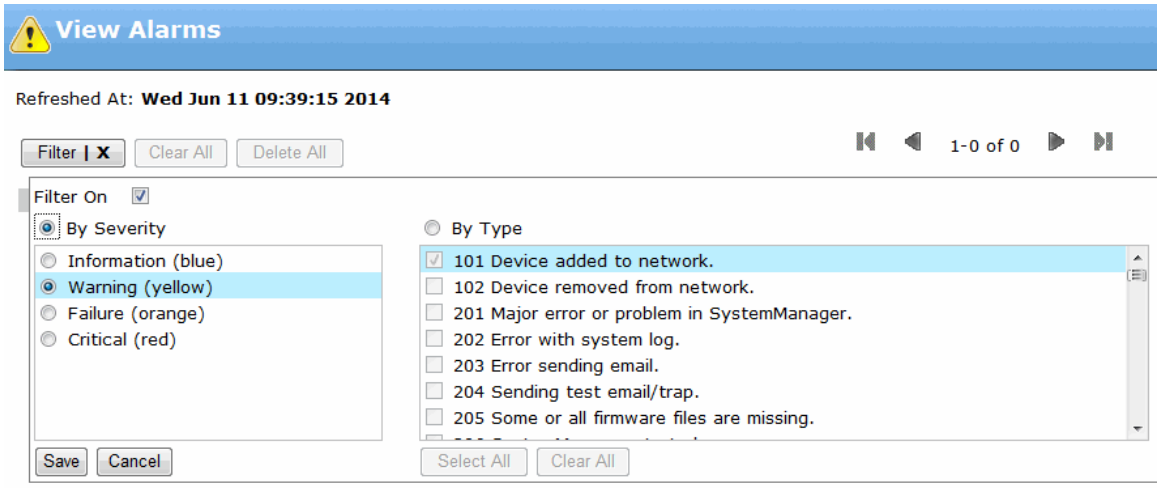


Figure 1-4: Edit filter

3. Click **By Severity** to filter the alarms according to alarm level, or click **By Type** to filter the alarms according to alarm type.

- If you click **By Severity**, select from the following alarm levels: **Information**, **Warning**, **Failure**, or **Critical**.
  - If you click **By Type**, select the types of alarms you wish to view. To select multiple alarm types, you can either press the **CTRL** key and click one type at a time, or press the **SHIFT** key and use the scroll bar to click and select a group of types. Note the following points:
  - After upgrading to newer versions of the SystemManager application software, review the available alarms and select or deselect as appropriate; in some releases, new alarms will be available. Harmonic recommends that you enable all new alarms unless you are sure you do not want these new alarms.
  - Some events listed in the **View Alarms** page are prefaced with the word, **[deprecated]**. Although listed and selectable here, these events will never appear in the **Events** column of the **View Alarms** page. However, for each “deprecated” event, other comparable events can be selected for monitoring and notification on the **View Alarms** page.

4. Once you have selected the options for the alarm filter, click **Save**. You must click Save to enable the new settings.

   NOTE: While the Filter On check box is checked, SystemManager does not auto-refresh. Once you click Save, auto-refresh restarts.

5. If you wish to receive e-mail notifications of alarms that pass your indicated filter, you can configure SystemManager to send such notifications. From the **Home** tab, click **Options** icon to open the **Options** page, and then use the **Send email notifications to all users?** drop-down box to indicate, by selecting **Yes** or **No**, whether or not you wish to receive e-mail notifications of alarms.

Result:

E-mails will be sent to the e-mail address that is specified on the **Modify User Setting** page. You will only be notified of selected alarms when e-mail notification is properly set up on the **Options** page and your individual e-mail address is setup on the **Modify User Setting** page.

NOTE: SystemManager sends e-mail notifications to the specified mail server using the standard SMTP port - Port 25.

Related information

Setting email alarm notifications
Modifying users

Editing alarm thresholds

The **Edit Thresholds** page allows you to modify the threshold limits for various SystemManager alarms.

This would allow you, for example, to lower the percentage of file system utilization required to generate an alarm.

1. Click the **Diagnostics** tab to display the **Diagnostics** page.
2. In the **Diagnostics** column, click the **Edit Thresholds** icon to display the **Edit Thresholds page**.

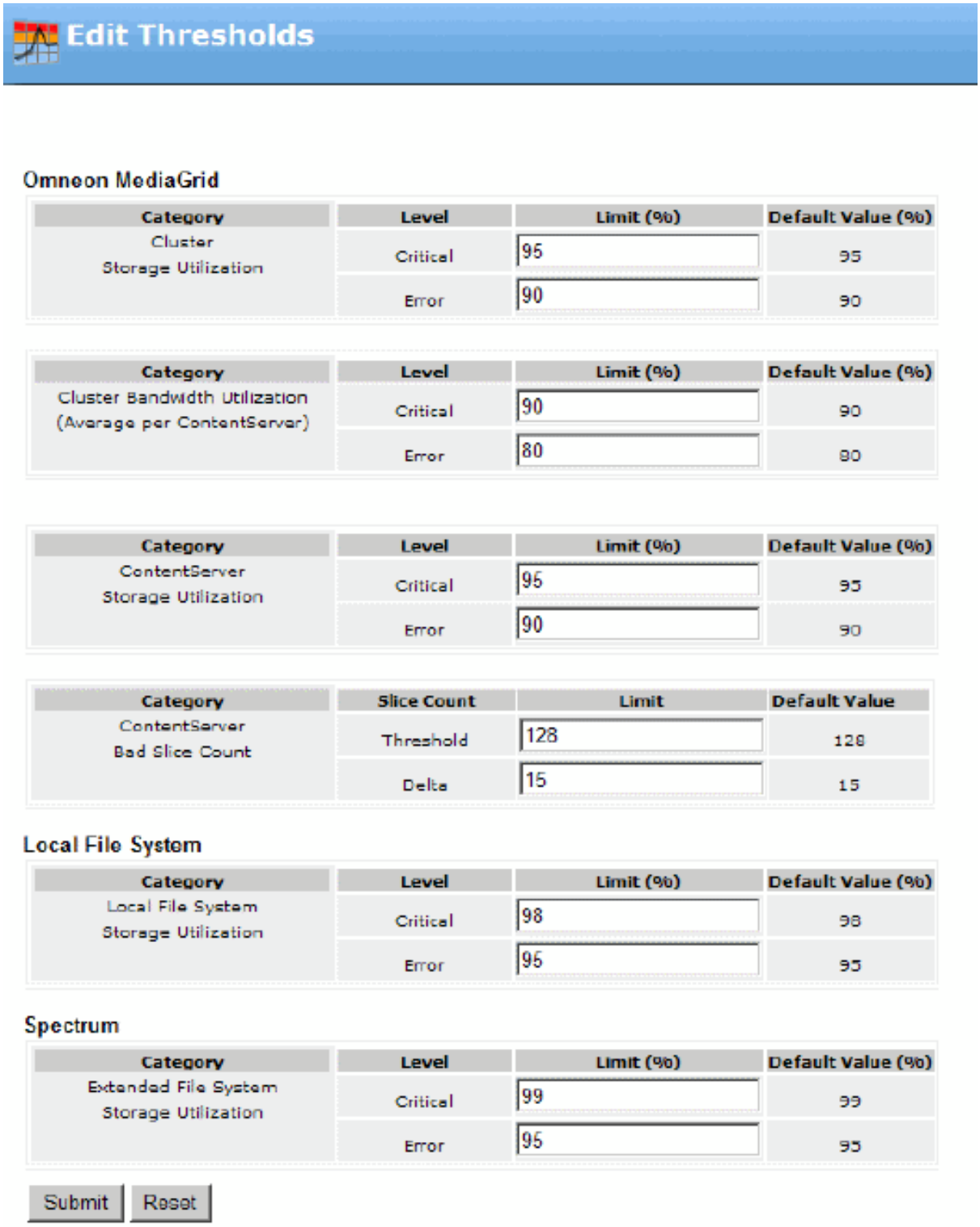


Figure 1-5: Edit Thresholds

3. For **Harmonic MediaGrid** systems, you can view or modify the threshold limit for the following:

- The percentage of **Storage Utilization** in a **Cluster**. The limit for Critical or Error alarms can be modified.
- The average **Cluster Bandwidth Utilization per ContentServer**. The limit for Critical or Error alarms can be modified.
- The percentage of **Storage Utilization in a ContentServer**. The limit for Critical or Error alarms can be modified.
- The number of **Bad Slices** in a **ContentServer**. The limit for Threshold or Delta alarms can be modified.

For a **Local File System**, which may include a customer-supplied system, you can view or modify the threshold limit for the percentage of **Storage Utilization**. The limit for Critical or Error alarms can be modified.

For a **Spectrum** system, you can view or modify the threshold limit for the percentage of **storage utilization**. The limit for Critical or Error alarms can be modified.

NOTE: Editing thresholds for MediaDeck alarms is not supported.

4. Change the value shown in the **Limit** column.
5. Click the **Submit** button at the bottom of the page. The changes take effect automatically.

   To return to the default values shown in the **Default Value** column, click the **Reset** button at the bottom of the page.

Setting email alarm notifications

Set up alarm notifications via email for users that request it.

Before you begin

It is recommended that you consult with your System Administrator for details on IP addresses and SMTP servers and authentication.

Note that the alarm filter settings in SystemManager apply only to the user that sets them. If you add a new user, make sure that the new user logs in to SystemManager and sets the desired alarm filters from the View Alarms page.

NOTE: If a user does not set an appropriate alarm filter level or if the filter level is off, and the **Send email notifications to all users?** setting on the **Options** page is set to **yes**, the user will receive email notifications for ALL alarms.

1. From the **Home** tab, click the **Options** icon to display the **Options** page.
2. Scroll to the **Email Notification of Alarms** section of the page.
3. In the **Send email notifications to all users?** drop-down box, select Yes.
4. In the **SMTP Server** field, enter the IP address or server name of your facility's mail server.
5. In the **Reply Address** field, enter the user name which the SystemManager should place in the **from** field of any e-mail notification.
6. If your facility does *not* require SMTP (Simple Mail Transport Protocol) authentication, continue to the next step. If it does, consult with your System Administrator for SMTP details, and do the following:
   a. In the **Use SMTP server Authentication?** drop-down box, select **Yes**, and then click **Update** at the bottom of the page.

b. A new group of **SMTP Authentication** fields appears. In the **SMTP User** field, enter a user name given to you by your System Administrator. This user name is the account that the SystemManager will use when sending e-mail notification.
c. In the **Password** field, enter the associated password for the account, and then confirm the password in the **Confirm Password** field.
d. Click **Update** to save your settings.

7. Click the **Security** tab, click the **Modify** button adjacent to your user name, and then set up your individual e-mail address on the **Modify User Settings** page.
8. Click the **Diagnostics** tab, and then click the **View Alarms** con in the left hand column to access the **View Alarms** page, and set up the type of e-mail notification that you want.
9. Click the Home tab to display the **Options** page.
10. Click the Send Test Email/Trap button at the bottom of the page to send a test message to the e-mail address of the currently logged in user. If an e-mail message is not received within a few minutes, check the settings that you have entered in the previous steps.

    Note the following:

    - You must provide a valid SMTP server value and a Reply Address in the form “abc@wxy.zzz as in mgrReplies@domain.com
    - Before sending test e-mails, you must first designate the destination email address for one or more users using the **Modify** button on the **View/Edit/Delete Users** page under the **Security** tab.

11. Repeat steps 7 and 8 for each user.

Result:

The SystemManager now has the appropriate information to send e-mails, if the proper settings are entered on the **View/Edit/Delete Users** and **View Alarms** pages. The e-mail *setup* procedure only needs to be performed once. If new users are added, perform steps 7 and 8 for those users.

Related information

Modifying users
Filtering alarms

Connecting a device from a different IP network

The Connect Device feature allows you to connect to a Harmonic device that is not in the same IP network as your Harmonic system.

Before you begin

Before connecting a device to SystemManager, make sure that device monitoring is on. To check device monitoring, click the **Home** tab to open the **Options** page, and view the “Current state of Device Monitoring” field at the top of the page. If the “Current state of Device Monitoring” field displays **NOT monitoring**, then click **Start Monitoring** and wait for the state to change to **monitoring** before continuing to connect the device. This may take a few minutes depending on the number of devices in your system. Also, note the status of devices may show **Not Responding** for a brief interval after monitoring has been turned on

1. From the **Diagnostics** tab, click the **Connect Device** icon in the left-hand column. The **Connect Harmonic Device** page appears, as shown in the following figure.

2. Enter the device IP address or device name in the associated field, and then click **Connect**.

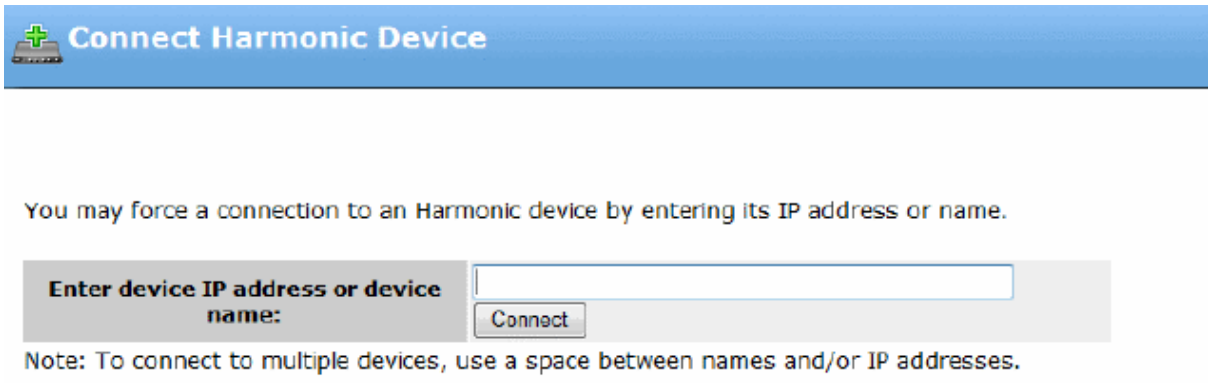


Figure 1-6: Connect to a Harmonic device

Removing devices

You may remove a device that is no longer part of your Harmonic system:

1. Click the **Diagnostics** tab to display the **Diagnostics** page.
2. In the left-hand column, click the **Remove Device** icon to display the **Remove Devices** page.
3. Click **Stop Monitoring** to stop device monitoring. Once the “Current state of Device Monitoring” field displays **NOT monitoring**, continue to the next step. Note this may take a few minutes depending on the number of devices in your system.
4. Select one or more devices from one of the menus on the page.
5. Click the **Remove** button at the bottom of the menu, and then click **OK** to confirm. After a brief pause, a message appears indicating that the device has been removed (it has also been removed from the System Diagram).
6. Click **Start Monitoring** to resume device monitoring. Make sure the “Current state of Device Monitoring” field changes to **monitoring**.

NOTE: Device status may show **Not Responding** for a brief interval after monitoring has been turned back on.

About the system log

SystemManager provides an application system log, which shows a record of the SystemManager’s operation.

This log requires Harmonic technical support to view and interpret. For assistance, contact Harmonic Harmonic technical support.

This section describes SNMP settings that allow you to monitor Spectrum and Harmonic MediaGrid components.

SNMP configuration

SystemManager provides support for SNMP (Simple Network Management Protocol) management of Spectrum or Harmonic MediaGrid components.

NOTE: The procedures outlined in this section are written for *qualified technical personnel*, skilled at advanced networking procedures. If you have any questions, please consult with your facility's Information Service staff or contact Harmonic technical support.

About SNMP support

SNMP support allows you to monitor components in a Spectrum System and components in a Harmonic MediaGrid system using third-party SNMP (Simple Network Management Protocol) managers.

Harmonic SNMP support consists of:

- SNMP Agents on Harmonic MediaGrid and Network Switches
- SystemManager Proxy Agent
- SNMP integration into enterprise/workgroup SNMP Managers
- SNMP Trap notification for SystemManager Alarms
- SNMP MIBs for monitoring of SNMP Agents

Manager Proxy Agent	In a Spectrum System, MediaDirectors and MediaPorts do not run SNMP agents. Instead, the SNMP Service on the SystemManager acts as an SNMP proxy agent for the rest of the Spectrum system, summarizing and distilling key information about the network. The proxy agent is a subagent of the Microsoft SNMP agent.
Harmonic MediaGrid SNMP Agents	The Harmonic MediaGrid SNMP agents are based on the open source package NET-SNMP (*http://www.net-snmp.org*). The SNMP agent also utilizes Dell OpenManage Server Assistant, which works with NET-SNMP to provide additional management features (*http://www.dell.com*). OpenManage provides the ability to monitor the power supplies and RAID arrays on the ContentDirectors using the SystemManager application.
SNMP Integration into Enterprise/ Workgroup SNMP Managers	These features also enable the use of enterprise/workgroup network management products to monitor additional aspects of Harmonic equipment. The SystemManager monitors the state of Harmonic equipment by communicating on a regular basis with each video server. As the SystemManager detects changes and items of interest, it posts alarms to internal queues. The Alarm List UI feature allows active monitoring of such alarms with options for filtering. In addition, the SystemManager allows you to send alarm notifications to e-mail addresses to send alarms as SNMP traps to enterprise/workgroup SNMP managers.
Harmonic MIBs	If you have HP OpenView or a similar product, you can load MIBs (omneon.mib and omneon-trap.mib) to enable OpenView's discovery to distinguish the Generators from other systems in the network. The SystemManager appears as a Windows PC but can be modified in OpenView so it can be distinguished from other PCs (see Registration section of omneon.mib). By loading MIBs, you can also view SystemManager alarms through OpenView's Event Browser.

	The Trap MIB includes hooks to help OpenView display the traps concisely with SNMP varbinds decoded.
Harmonic MediaGrid MIBs	The NET-SNMP and Dell OpenManage MIBs can also be loaded into third-party managers and used for monitoring system, network, and storage components. Omneon-mds.mib and omneon-ss.mib show the Harmonic SNMP extensions for the ContentDirector (MDS) and ContentServer (SS). Queries for MIB data in the ContentDirector MIB should be sent to ContentDirectors only (similarly for the ContentServer MIB data).

Related information

About setting up the Manager Proxy Agent
About setting up Harmonic MediaGrid SNMP agents

About setting up the Manager Proxy Agent

When you install the SystemManager application, SNMP and Manager services are installed and set to start automatically on reboot of the SystemManager Platform for Spectrum Systems, and the Harmonic MediaGrid.

In a Spectrum System, by default, the SNMP community string for reading information is "public" and can be changed using the **Control Panel**. Typically with a Microsoft SNMP agent, no write community string is configured. Refer to *Windows* documentation for more information on community strings.

In Harmonic MediaGrid Systems, the SNMP community string for reading information is "omneon". A read/write community string is not configured on these systems.

About setting up Harmonic MediaGrid SNMP agents

The NET-SNMP agent is configured to start automatically on ContentServers and ContentDirectors.

The agents are configured with the string “omneon” as the read only community string. A read/write community string is not enabled on Harmonic MediaGrid systems.

The SystemManager automatically registers its own IP address as a trap destination for SNMP traps sent by Harmonic MediaGrid SNMP agents. This allows the SystemManager to integrate such traps into the Manager Alarm list. As an extension of the Alarm notification feature, Manager alarms for important Harmonic MediaGrid traps can then be sent to enterprise/workgroup managers in the form of SNMP traps, as well as in the form of e-mails to system administrators.

NOTE: Traps sent to the SystemManager by Harmonic MediaGrid are converted into alarms that display as warning alarms (yellow), rather than informational alarms (blue). By default, warning alarms display in the Manager Alarm list; informational alarms do not.

Setting up alarm notification with SNMP traps

SystemManager alarms can be sent to enterprise/workgroup managers to enable the use of NMS platform tools for analyzing alarms.

1. Load omneon.mib and omneon-trap.mib into the NMS software. For HP OpenView, this option is the Load/Unload MIBs menu item. Load omneon.mib first, followed by omneon-trap.mib. These MIB files and others are found in the D:\Omneon\manager\mibs directory on the SystemManager Platform.

2. Enable trap sending for Manager alarms and place the IP address of the enterprise/workgroup manager PC in the trap destination list on the **Options** page.
   a. Use the **Send Test Email/Trap** button to send out a test trap (and e-mail if so configured).
   b. Then verify the trap was received on the third party NMS system. For HP OpenView, use the Event Browser application, and search for the most recently received traps. HP OpenView decodes the SNMP trap into text that looks similar to the Manager Alarm list.

About SystemManager alarm status colors

Note the colors for alarm status messages.

SystemManager alarms sometimes use a single alarm type for both bad news and good news. In the SystemManager Alarm List, the default level will cause it to display as warning (yellow), error (orange), or critical (red) for the bad news occurrence of the alarm. A non-default severity will be used to display it as informational (blue) for good news (the resolution of an issue). Alarms which use this model do not display with the good new (blue) color in HP OpenView. To deal with this issue, the varbinds include the actual severity, and this is displayed in the Event Browser. So, while the bad news occurrence might display as orange with the string FAIL (for example), the good news occurrence still displays as orange but with the string INFO to show the issue has resolved.

About troubleshooting SNMP queries

If SNMP queries fail, refer to the checklist for basic troubleshooting guidance.

- Verify that the correct read community string is being used, and that the right IP Address is being used.
- For the Manager Proxy Agent (SystemManager Platform), the read community string is “public”. For the ProBrowse SNMP agents, the community string is “omneon”.
- Verify (using a tool like PING) that the SystemManager Platform is reachable on the network.
- On the SystemManager Platform:
  - Verify (from **Settings** > **Control Panel** > **Administrative Tools** > **Services** or using the “net start” command) that the SNMP Service is running.
  - Be sure that it is the SNMP Service that is running, not the SNMP *Trap* Service.
  - Verify that the SystemManager service is running.
  - Look for any unexpected SNMP messages in the Event Viewer. When the SNMP Service is started (for example when you boot up), the following message is added to the System Event Log: “The SNMP Service has started successfully.”

Monitoring Spectrum system components with SNMP

Monitor Spectrum components using SNMP.

NOTE: Many third-party SNMP monitoring tools are available. Please refer to your individual tool’s documentation for specific instructions.

1. Import and compile the Harmonic MIB (Management Information Block) file into your third-party SNMP monitoring tool.

   On the SystemManager Platform, this file may be found in the directory D:\Omneon\manager\mibs.

   Note the following:

   - Harmonic MIB objects are located in the overall tree of MIB definitions, at 1.3.6.1.4.1.11141, where 11141 is the enterprise number for Harmonic products as shown in the figure below.

- A MIB is an object or set of objects that represent various types of information about a device, used by Simple Network Management Protocol (SNMP) to manage the device. Harmonic MIB objects are not configurable and do not send SNMP traps (messages) to SNMP managers. See the example in the following figure.

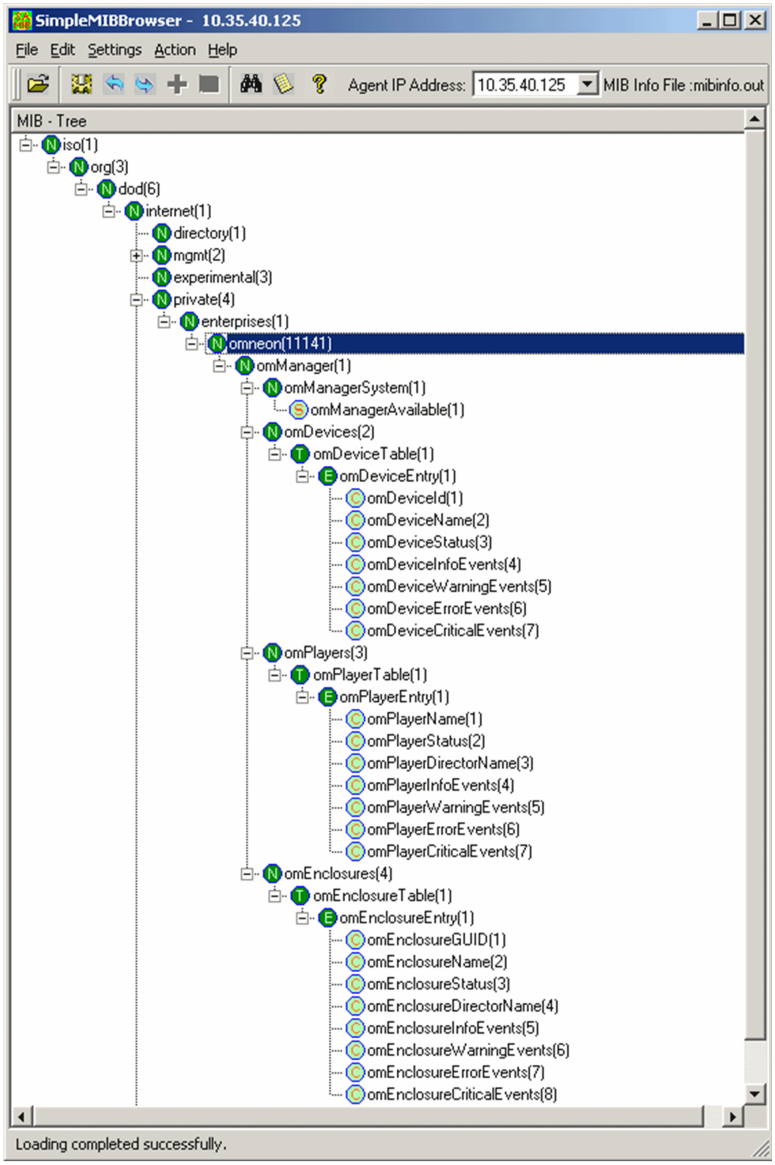


Figure 1-7: MIB browser window

2. Enter the SystemManager's IP address in your third-party SNMP monitoring tool. This allows you to monitor the SystemManager's status.
3. Within the SystemManager's MIB, the status of devices, enclosures (MediaStores), and Players is carried as MIB values and displayed in tabular format.

   Note the following:

- By setting up individual values in your monitoring tool (based on the Harmonic MIB), you can monitor the status of devices, enclosures (MediaStores), and Players. Refer to your monitoring tool documentation for more information.
- Information on all devices and players is proxied through the SystemManager, so use the SystemManager Platform's IP address (not those of any MediaDirector host). Thus, you can configure the SNMP monitoring tool such that when a state change occurs for an active enclosure (MediaStore) for example, an alarm is generated.
- Each host of a MediaDirector shows up as a separate device in third party NMS products. Since they do not implement SNMP agents, third party products find them using PING (ICMP) and do not get information to show they are part of the same system.
- Keep in mind that this feature provides monitoring capabilities only. It does not allow control.

NOTE: For Network Management Services integration purposes, Harmonic provides a Harmonic logo file in.bmp format. This can be found at D:\Omneon\manager\icons.

Related information

About SystemManager proxy agent MIB content

Monitoring Harmonic MediaGrid components with SNMP

Monitor Harmonic MediaGrid components using SNMP.

NOTE: Many third-party SNMP monitoring tools are available; please refer to your individual tool's documentation for specific instructions.

1. Navigate to: D:\Omneon\manager\mibs and import and compile the following Management Information Blocks (MIBs) and associated files:
   - omneon.mib
   - omneon-trap.mib
   - net-snmp-mibs
   - omsa-mibs
   - omneon-mds.mib
   - omneon-ss.mib
   - procurve-mibs
2. In your third-party SNMP monitoring tool, enter the SystemManager's IP address of each of the Harmonic MediaGrid components you wish to monitor.

   Refer to your SNMP monitoring tools documentation for additional information.

About SystemManager proxy agent MIB content

MIB content is displayed in tables for SystemManager Platforms monitoring MediaDirectors, MediaStores, I/O modules, and Players (within MediaDirectors) in a Spectrum system.

In addition, OmManagerAvailable MIB Object provides information on SystemManager Platform availability. This scalar MIB object can be used to find out if the Manager service is running. If not then the three tables that follow will be reported as empty.

The following tables display data for SystemManager Platforms monitoring ContentServers and ContentDirectors in a Harmonic MediaGrid:

- OmSliceServerTable

- OmMetadataServerTable

Consult your SNMP Monitoring tool documentation for information on how to access the MIB tables.

Example: OmDeviceTable

The following figure is an example of an OmDeviceTable showing the devices (MediaDirectors and MediaPorts) registered with the SystemManager.

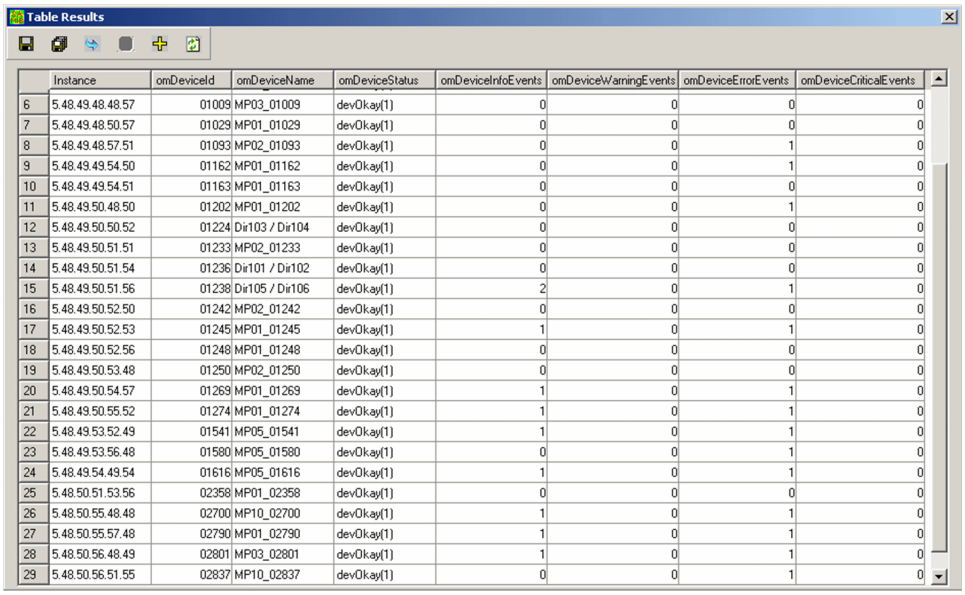


Table Results

	Instance	omDeviceId	omDeviceName	omDeviceStatus	omDeviceInfoEvents	omDeviceWarningEvents	omDeviceErrorEvents	omDeviceCriticalEvents
6	5.48.49.48.48.57	01009	MP03_01009	devOkay(1)	0	0	0	0
7	5.48.49.48.50.57	01029	MP01_01029	devOkay(1)	0	0	0	0
8	5.48.49.48.57.51	01093	MP02_01093	devOkay(1)	0	0	1	0
9	5.48.49.49.54.50	01162	MP01_01162	devOkay(1)	0	0	1	0
10	5.48.49.49.54.51	01163	MP01_01163	devOkay(1)	0	0	0	0
11	5.48.49.50.48.50	01202	MP01_01202	devOkay(1)	0	0	1	0
12	5.48.49.50.50.52	01224	Dir103 / Dir104	devOkay(1)	0	0	0	0
13	5.48.49.50.51.51	01233	MP02_01233	devOkay(1)	0	0	0	0
14	5.48.49.50.51.54	01236	Dir101 / Dir102	devOkay(1)	0	0	0	0
15	5.48.49.50.51.56	01238	Dir105 / Dir106	devOkay(1)	2	0	1	0
16	5.48.49.50.52.50	01242	MP02_01242	devOkay(1)	0	0	0	0
17	5.48.49.50.52.53	01245	MP01_01245	devOkay(1)	1	0	1	0
18	5.48.49.50.52.56	01248	MP01_01248	devOkay(1)	0	0	0	0
19	5.48.49.50.53.48	01250	MP02_01250	devOkay(1)	0	0	0	0
20	5.48.49.50.54.57	01269	MP01_01269	devOkay(1)	1	0	1	0
21	5.48.49.50.55.52	01274	MP01_01274	devOkay(1)	1	0	1	0
22	5.48.49.53.52.49	01541	MP05_01541	devOkay(1)	1	0	1	0
23	5.48.49.53.56.48	01580	MP05_01580	devOkay(1)	0	0	1	0
24	5.48.49.54.49.54	01616	MP05_01616	devOkay(1)	1	0	1	0
25	5.48.50.51.53.56	02358	MP01_02358	devOkay(1)	0	0	0	0
26	5.48.50.55.48.48	02700	MP10_02700	devOkay(1)	1	0	1	0
27	5.48.50.55.57.48	02790	MP01_02790	devOkay(1)	1	0	1	0
28	5.48.50.56.48.49	02801	MP03_02801	devOkay(1)	1	0	1	0
29	5.48.50.56.51.55	02837	MP10_02837	devOkay(1)	0	0	1	0

Figure 1-8: OmDeviceTable

Example: OmPlayerTable

The following figure is an example of an OmPlayerTable showing the Players registered with the SystemManager.

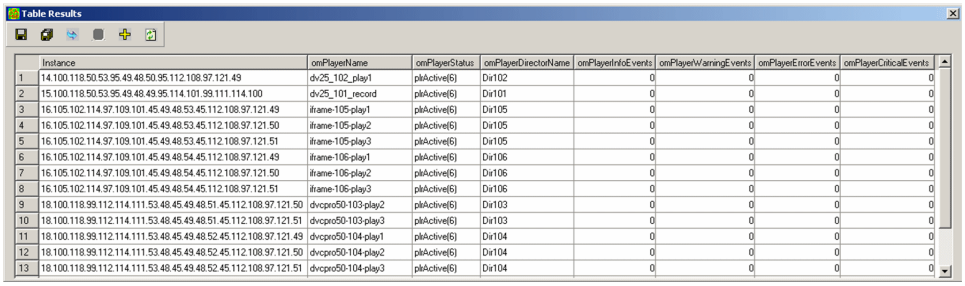


Table Results

	Instance	omPlayerName	omPlayerStatus	omPlayerDirectorName	omPlayerInfoEvents	omPlayerWarningEvents	omPlayerErrorEvents	omPlayerCriticalEvents
1	14.100.118.50.53.95.49.48.50.95.112.108.97.121.49	dv25_102_play1	plrActive(6)	Dir102	0	0	0	0
2	15.100.118.50.53.95.49.48.49.95.114.101.99.111.114.100	dv25_101_record	plrActive(6)	Dir101	0	0	0	0
3	16.105.102.114.97.109.101.45.49.48.53.45.112.108.97.121.49	iframe-105-play1	plrActive(6)	Dir105	0	0	0	0
4	16.105.102.114.97.109.101.45.49.48.53.45.112.108.97.121.50	iframe-105-play2	plrActive(6)	Dir105	0	0	0	0
5	16.105.102.114.97.109.101.45.49.48.53.45.112.108.97.121.51	iframe-105-play3	plrActive(6)	Dir105	0	0	0	0
6	16.105.102.114.97.109.101.45.49.48.54.45.112.108.97.121.49	iframe-106-play1	plrActive(6)	Dir106	0	0	0	0
7	16.105.102.114.97.109.101.45.49.48.54.45.112.108.97.121.50	iframe-106-play2	plrActive(6)	Dir106	0	0	0	0
8	16.105.102.114.97.109.101.45.49.48.54.45.112.108.97.121.51	iframe-106-play3	plrActive(6)	Dir106	0	0	0	0
9	18.100.118.99.112.114.111.53.48.45.49.48.51.45.112.108.97.121.50	dvcpro50-103-play2	plrActive(6)	Dir103	0	0	0	0
10	18.100.118.99.112.114.111.53.48.45.49.48.51.45.112.108.97.121.51	dvcpro50-103-play3	plrActive(6)	Dir103	0	0	0	0
11	18.100.118.99.112.114.111.53.48.45.49.48.52.45.112.108.97.121.49	dvcpro50-104-play1	plrActive(6)	Dir104	0	0	0	0
12	18.100.118.99.112.114.111.53.48.45.49.48.52.45.112.108.97.121.50	dvcpro50-104-play2	plrActive(6)	Dir104	0	0	0	0
13	18.100.118.99.112.114.111.53.48.45.49.48.52.45.112.108.97.121.51	dvcpro50-104-play3	plrActive(6)	Dir104	0	0	0	0

Figure 1-9: OmPlayer table

Example: OmEnclosureTable

The following figure is an example of an OmEnclosureTable showing the Enclosures (MediaStores) registered with the SystemManager.

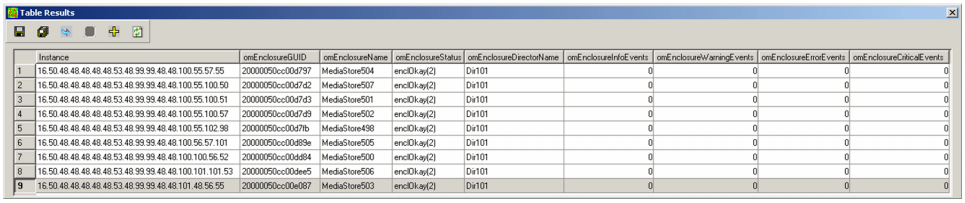


Figure 1-10: OmEnclosure table

Example: OmManagerAvailable MIB Object

The following figure an example of the OmManagerAvailable object reporting that the Manager service is running and providing management information through the Manager Proxy Agent. If the Manager service is not running, this scalar MIB object will report the value notAvailable(0).

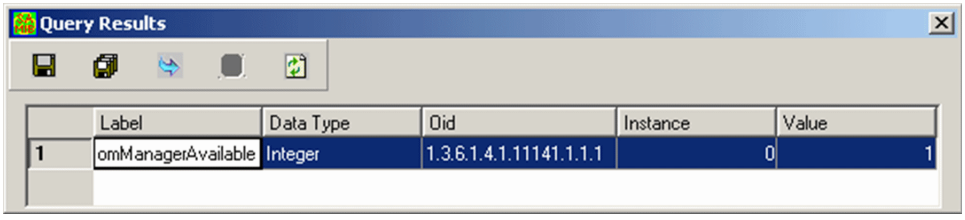


Figure 1-11: OmManagerAvailable MIB object

Part II

Spectrum

- *Spectrum video server configuration*
- *Spectrum file system configurations*
- *Spectrum storage and file system maintenance*
- *Spectrum I/O module configuration*
- *Spectrum I/O channel configuration*
- *Player configuration*
- *Playout channel configuration*
- *Spectrum client configuration*
- *Spectrum system monitoring an troubleshooting*

Chapter 2

Spectrum video server configuration

Find configuration instructions for Spectrum video servers in a Spectrum system.

IMPORTANT: The procedures outlined in this section are written for qualified technical personnel, skilled at advanced networking procedures. If you have any questions, please consult with your facility's Information Service staff or contact Technical Support.

- *Viewing the components of a Spectrum system*
- *Changing a Spectrum video server host name*
- *Configuring network settings*
- *Configuring watch folders*
- *Configuring Auto-export to Harmonic MediaGrid*
- *Configuring SMPTE 2022-6*
- *Configuring transport stream ingest*
- *Previewing material from a Harmonic MediaGrid or NAS*
- *Changing a Spectrum video server description*
- *Viewing character sets associated with Spectrum video servers*
- *Editing track tags*
- *Changing the Spectrum video server time zone*
- *Changing the Spectrum video server wink state*
- *Rebooting the Spectrum video server*
- *Powering down the Spectrum video server*
- *Upgrading the Spectrum video server license*
- *Viewing licensed features for a Spectrum video server*
- *Configuring access control settings for video servers*
- *Installing a DDC file*
- *Connecting to a Harmonic MediaGrid from the Spectrum video server*
- *Changing network and file system performance settings*
- *About file types*

Viewing the components of a Spectrum system

Use the **System Diagram** page in SystemManager to see a visual overview of the components in a Spectrum System.

1. Click the **Configuration** tab, and then click the **System Diagram** icon in the left-hand column to display the **System Diagram** —essentially a “tree” of each Spectrum System device.
2. In the upper-right corner of the System Diagram page, click the **Click here for list of devices by type** link to display the **Video Area Network** page.

   The System Diagram is sorted by video servers and hosts. Each video server is shown to the left and above, with individual hosts directly below (second level).

About the System Diagram user interface

The **System Diagram** page provides current device status and other important component information.

Devices are arranged in categories such as video servers, I/O modules and "Other Devices."

NOTE: SystemManager must poll for device status, which results in some delay based on the configured discovery interval.

Each heading and icon is a hyperlink that takes you to a different location where the devices can be monitored and configured. Note the following:

- Each video server is displayed as an icon. This icon is a hyperlink that takes you to the **Properties** page for that video server.
- Under each server, specific device connections are shown—devices that are physically attached to that server (such as MediaPorts, third-party devices, and other MediaDirectors in dubbing configurations).
- A red question mark will be shown for unrecognized devices.
- The legend at the top of the data section indicates two types of warning boxes (or highlights) that can appear behind a MediaDirector or I/O module icon:
  - Amber = indicates a warning alarm, or if the device is configuring.
  - Red = indicates if the devices has an error, a critical alarm, or if the device is not responding.

  In both cases, you can click the icon to see the alarms for that specific device.
- For a single host device, such as the MediaDeck 7000, the host can be named, and it has its own individual IP address and attached devices. On the **System** diagram, the naming convention for the overall Spectrum video server is a single host name.
- For multiple host devices, such as the MediaDirectors 2101, 2102, and 2102B, special conventions are used for each host on the **System** diagram. Each host can be named separately, and each has its own individual IP address and attached devices.
  - The naming convention for the overall MediaDirector 2101 (including both hosts) is *both* host names separated by a slash (E.g., DIR101/DIR102).
  - The naming convention for the overall MediaDirector 2102 or 2102B is *all* host names separated by a slash (E.g., DIR101/DIR102/DIR103/DIR104).
- Each MediaPort is listed by the label MIP followed by a 5-digit **Unit ID**, which electronically identifies the MediaPort. This ID is coded at the factory.

  NOTE: A Spectrum X will appear differently in the System Diagram view depending on whether it is in internal storage mode or shared storage mode.

- Each MediaDeck Module for the MediaDeck is listed by the label MDM followed by a 5-digit **Unit ID**, which electronically identifies the MediaDeck Module. This ID is coded at the factory.
- Hosts and devices can be renamed using the SystemManager, thus your diagram can be customized according to your system configuration. The MediaDirector name is generated automatically, based on the combination of the host names.
- The device labels on the **System** diagram are designed as placeholders initially, with the assumption that the user will change them to something more meaningful (for example, names that reflect the actual use of the devices).

  NOTE: The Unit IDs cannot be changed, but the labels can be changed on the **Properties** pages for the individual MediaDirector, MediaPorts, and Third-party Devices.
- I/O module names are used only within the SystemManager, while Spectrum video server names can also be used from Windows machines for other purposes, as described in **System Configuration**.
- In the upper-right corner of the System Diagram page, click the **Click here for list of devices by type** link to display the **Video Area Network** page. The **Video Area Network** page is a scrolling list of all components that comprise your network, including Spectrum servers and I/O modules.
  - Click a Spectrum server icon to go to the Physical Configuration page for that device.
  - Click an I/O module icon to go to the Properties page for that device.
  - Click a Third-party Device icon to go to the Device Properties page.

Related information

Setting the Discovery Interval

About Spectrum X configurations

Default names for Spectrum video servers

By default, Spectrum servers appear with a numerical identifier in the System Diagram.

- The default name for the MediaDirector 2102 or 2102B is **D4_nnnnnHm**, where:
  - The first 5 n's are the MediaDirector's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
  - Hm = Host 0 -3
- The default name for the MediaDeck is **D7_nnnnnHn**, where:
  - The first 5 n's are the MediaDeck's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
  - Hn = Host 0 or 1
- The default name for the MediaDirector 2202 or 2201 is **D8_nnnnn**, where:
  - The first 5 n's are the MediaDirector's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
- The default name for the MediaCenter is **D9_nnnnn**, where:
  - The first 5 n's are the MediaCenter's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
- The default name for the MediaDeck 7000 is **D11_nnnnn**, where:
  - The first 5 n's are the MediaDeck's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
- The default name for the MediaDirector 2252 or 2251 is **D12_nnnnn**, where:

  - The first 5 n's are the MediaDirector's 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.
- The default name for the Spectrum X is **D13_nnnnn**, where:
  - The first 5 n's make up the 5-digit unit ID, which electronically identifies the unit. This ID is coded at the factory.

Changing a Spectrum video server host name

Renaming a Spectrum video server may help you locate a particular video server host throughout the SystemManager application.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click an individual host icon (not the dual host icon) to display the **Physical Configuration** page for the selected Spectrum video server host.
3. Click the Spectrum video server picture to display the host's **Properties** page.
4. In the **Host Name** field, click **Change** to display the **Change Spectrum Server Name** page.
5. Type the new name in the text box. Refer to "About Naming Files and System Elements" for proper naming conventions.
6. Click **Save** to return to the **Properties** page.

   The new host name now appears in the **System** diagram, in various page titles and in other video server-related fields throughout the application.

Related information

About naming files and system elements

Configuring network settings

Configure network settings for your Spectrum video server.

This section applies to the following Spectrum video servers:

- Spectrum X
- MediaDirector 2252B, 2251B, 2252, 2202, and 2201
- MediaCenter 2200B and 2200 series
- MediaDeck 7000

CAUTION: Consult your network administrator before modifying the Ethernet settings on your Spectrum video server. If you incorrectly configure any of the Ethernet settings on your Spectrum video server, you risk losing communication with that device. This may require that you contact Harmonic technical support.

About Ethernet failover and bandwidth

Spectrum video servers allow you to configure your Ethernet interfaces in failover pairs to provide added reliability in the event of a hardware failure.

When a pair of Ethernet interfaces are configured in failover mode and one of the interfaces experiences a failure, the remaining interface takes over the Ethernet traffic of the failed interface in addition to its own packets. Note the following:

- If both interfaces in a failover pair are up, they will provide two interfaces worth of incoming and outgoing bandwidth.
- Once a failover has occurred, the total bandwidth (both the incoming and outgoing bandwidth) is limited to one interface worth of packets.

Note that Spectrum video servers do not ship with Ethernet interfaces configured for failover. Interface failover must be configured using SystemManager.

For the MediaDeck 7000, both I/O modules must be installed in order to enable failover.

Planning your network settings

Plan your network settings before configuring.

IMPORTANT: Please review the following points when planning your Ethernet network.

- To maximize bandwidth, you must connect to the Spectrum video server in such a way that each client computer points to a different interface on the Spectrum video server. If multiple clients are connected to all the different Ethernet interfaces on the Spectrum video server, then bandwidth can be distributed across the different interfaces. Whereas, if all clients are connected to one interface, bandwidth is limited by that one interface. Therefore, distributing the network traffic is your responsibility when setting up the network.
- You can assign multiple Ethernet interfaces on your Spectrum video server to the same IP subnet. To a great extent, you can use those interfaces independently and the maximum bandwidth will be limited by the number of interfaces.
- If you initiate a file transfer from a given Ethernet interface on a client computer to a specific interface on the Spectrum video server, it will always use the same interface to return packets, and will send them directly to the same interface on the client computer that initiated the transfer.

Configuring your network settings

Configure network settings for your Spectrum video server.

1. From the **System Diagram**, click a Spectrum video server heading (or icon) to reach the **Physical Configuration** page, and then click the picture of the Spectrum video server to display the **Properties** page.
2. In the **Host Properties** section of the page, in the **Change Settings** filed, click **Network Settings** to open the **Network Settings** page.

   The **DNS/NTP Settings** section allows you to enter information about your DNS and NTP servers.

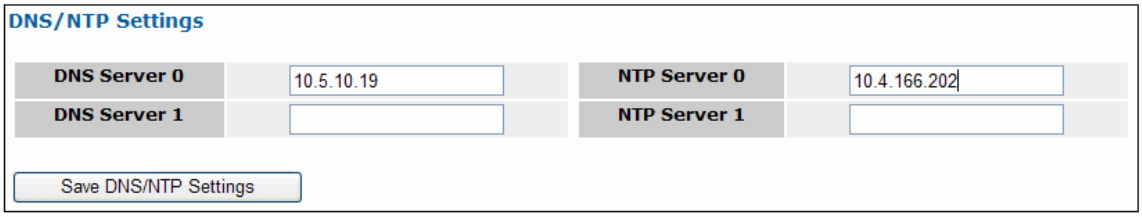


Figure 2-1: DNS/NTP Settings

IMPORTANT: You must designate a fully-functioning and properly-configured NTP server for the Spectrum video server. Failure to do so will result in video disruption.

3. To configure DNS or NTP settings, in the **DNS/NTP Settings** section of the page, enter the appropriate IP addresses for the following DNS or NTP servers:

   - **DNS Server 0**
   - **DNS Server 1**
   - **NTP Server 0**
   - **NTP Server 1**

   NOTE: If you enter DNS information, make sure that you also define the name and IP address of the Spectrum video server in the DNS server. Failure to do so will result in CIFS connection delays of up to 30 seconds or more.

4. The **DNS Search Settings** section, allows you to enter up to four static DNS search domain names to be used by DNS when resolving network domain names in more complicated networks.

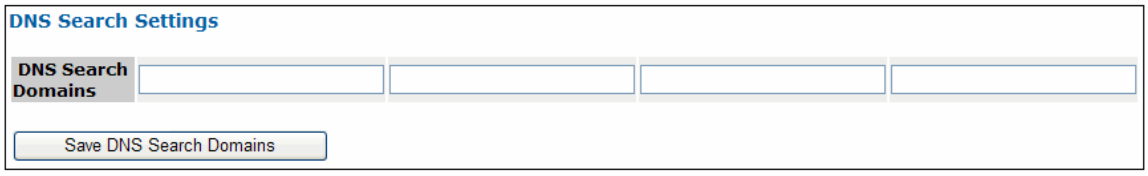


Figure 2-2: DNS Search Settings

To configure, enter the DNS Search Domain name (for example, **acme.local**), and then click **Save DNS Search Domains**.

5. The **I/O Module IP Address Range Settings** section displays the default IP address range that the video server uses for assigning IP addresses to the connected I/O modules. The IP addresses of those I/O modules are shown in the **Private Ethernet Interfaces** section of the **Properties** page.

   IMPORTANT: Do not modify this field unless instructed by Harmonic technical support.

   NOTE: This feature does not apply to the Spectrum X or MediaDeck 7000.

   If, for some reason, you need to change this default IP address range, enter the new IP address range in the **I/O Module IP Base Address** field, and then click **Save I/O Module Base Address**. Once the new range is set, you must restart both the Spectrum video server and all the attached I/O modules in order for the new IP addresses to take effect.

6. The **Ethernet Interface Settings** section, shown below, allows you to configure network settings for each Ethernet Interface.

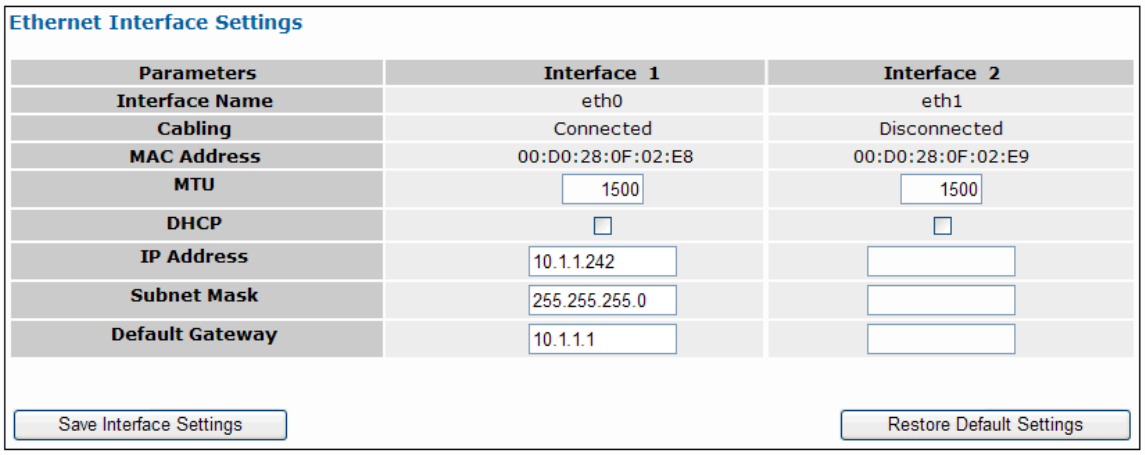


Figure 2-3: Ethernet Interface Settings

Configure the following fields as necessary:

- **MTU**: This field may be used to change the maximum size of Ethernet packets.

  NOTE: At this time, Harmonic does not recommend changing the default packet size of 1500 bytes.
- **DHCP**: Select or clear to enable or disable DHCP.
- **IP Address**: When DHCP is disabled, this field may be used to enter a static IP address.

  IMPORTANT: Changing the primary IP address for the Spectrum video server will cause SystemManager to lose connection with it. If you wish to change the primary IP address, follow the instructions in “Changing the Primary IP Address.” Note that the primary IP address is displayed next to the name of the Spectrum video server host on the **System Diagram** page.
- **Subnet Mask**: When DHCP is disabled, this field may be used to enter a subnet mask.
- **Default Gateway**: When DHCP is disabled, this field may be used to enter a default gateway.

7. Click **Save Interface Settings** to save the current settings. If you wish restore the default settings at any time, click **Restore Default Settings**.

   NOTE: Once you have configured the Ethernet interfaces on your Spectrum video server, Harmonic recommends that you ping each interface to verify that it is configured properly.

8. Modify the **Configure Additional Routes** section if necessary. This section allows you to specify routing configurations for individual Ethernet interfaces other than the default route. This is only necessary for more complex network configurations.

9. Modify the **Ethernet Interface Failover Settings** section if necessary. This section allows you to configure failover settings for the Ethernet interfaces.

10. Once you have finished configuring your network settings, click **Done** to save your settings.

Related information

Changing the primary IP address
Configuring additional routes
Configuring Ethernet interfaces for failover

Examples of basic Ethernet interface configurations

See examples of some standard network configurations for a Spectrum video server.

Example: Static IP address

In this example, only one Ethernet interface, eth0, is connected. This interface is configured with a static IP address. No expansion cards are installed in this example.

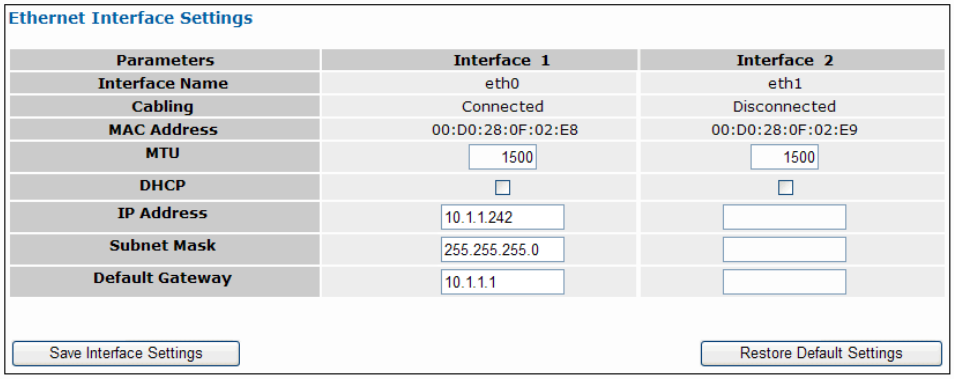


Figure 2-4: Example of one interface, static IP

Example: DHCP

In this example, only one Ethernet interface, eth0, is connected. This interface is configured for DHCP. No expansion cards are installed in this example.

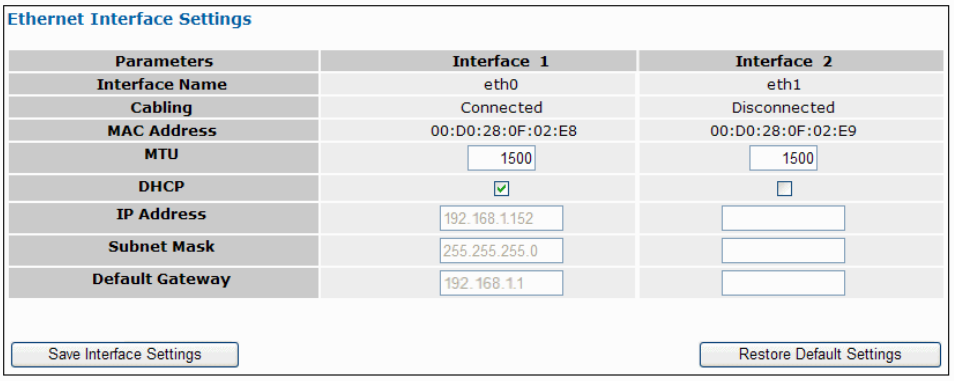


Figure 2-5: Example of one Interface, DHCP

Example: Static IP address and DHCP with expansion card

In this example, a 10 Gb dual port expansion card is installed in the MediaDirector 2202/2201, and three interfaces are connected. Two are configured with static IP addresses, and one is configured for DHCP.

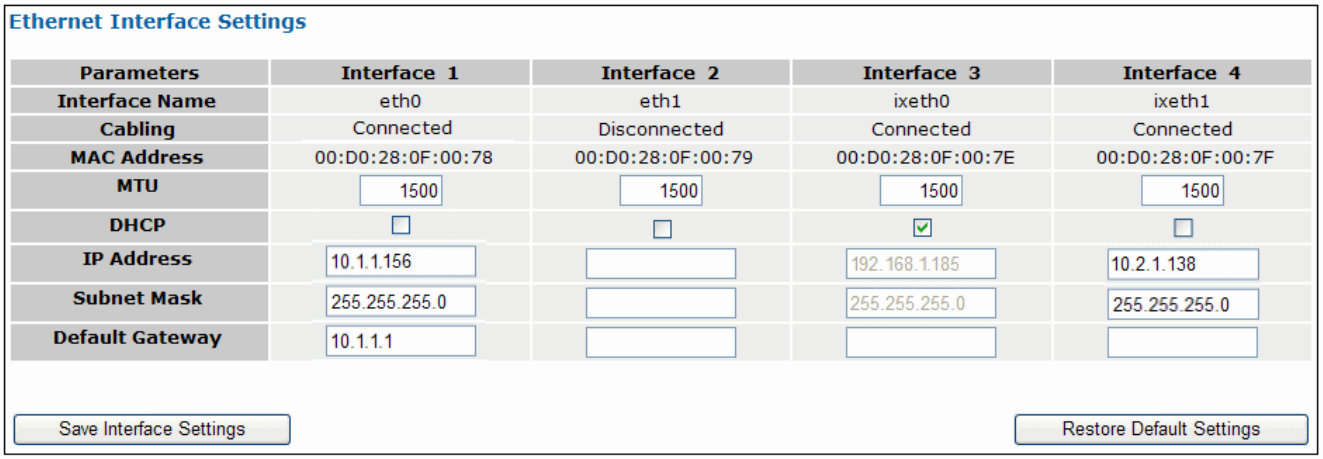


Figure 2-6: Example of three interfaces using static IP addresses and DHCP

Note that in this example, each interface provides access to a separate subnet.

Example: Static IP addresses with expansion card

In this example, a 1 Gb quad port expansion card is installed in the MediaDirector 2202/2201, and five interfaces are connected. One interface on the main board is configured for DHCP, while all four interfaces on the expansion card are configured with static IP addresses

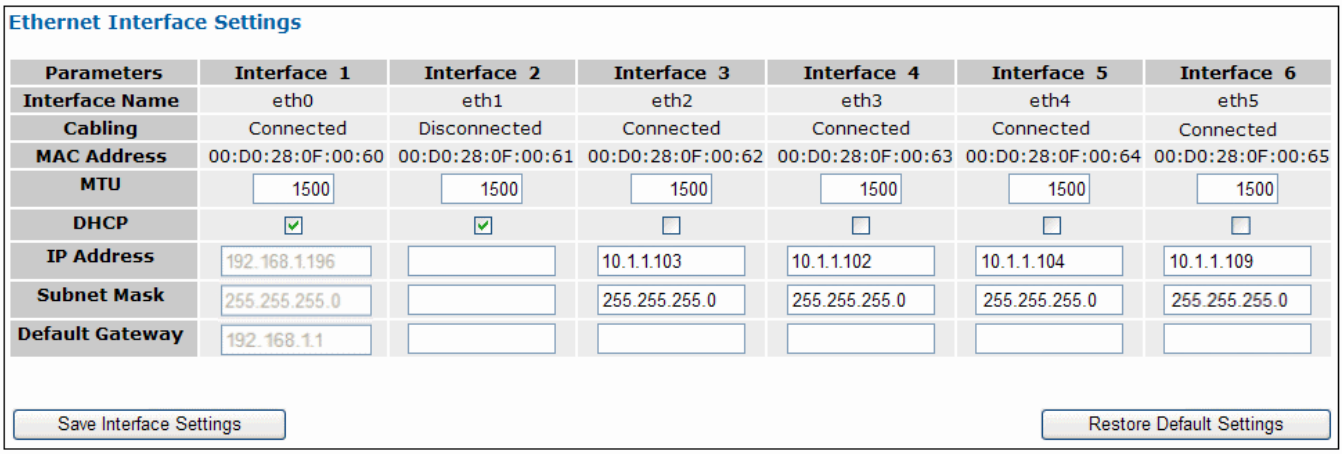


Figure 2-7: Example of five interfaces: one DHCP and four static IP addresses

Note that in this example, you can maximize bandwidth for FTP transfers by connecting a separate client computer to each of the different Ethernet interfaces to distribute the load.

About Ethernet interface failover

Note some important points regarding Ethernet interface failover.

For the MediaDirectors 2252B, 2251B, 2252, 2251, 2202, and 2201, failover may be configured only between the following pairs of Ethernet interfaces:

- **eth0** and eth1 (the main public Ethernet interfaces on the MediaDirector 2202 and 2201)
- **ixeth0** and **ixeth1** (For the MediaDirectors 2252, 2251, 2202, and 2201, these include the interfaces on the dual port expansion card. For the MediaDirector 2252B and 2251B, these are the ports for system management)
- **eth2** and eth3 (interfaces on the quad port expansion card)
- **eth4** and eth5 (interfaces on the quad port expansion card)

For the MediaCenter 2200 and 2200B series, failover may be configured between the following pairs of Ethernet interfaces:

- **eth0** and **eth1** (the main public Ethernet interfaces on the MediaCenter)
- **eth2** and **eth3** (only available on the MediaCenter 2200 series if you have configured the MIP 4 and MIP 5 interfaces for public networking. See “Configuring Ethernet interfaces on the MediaCenter ” for details.)
- **xeth0** and **ixeth1**(Only available on the MediaCenter 2200B series. These are the ports for system management.)

For the Spectrum X and MediaDeck 7000, failover may be configured between the **eth0** and **eth1** Ethernet interfaces. For the MediaDeck 7000, these are the interfaces on the installed MediaPort modules.

TIP: The interface names in the above lists are found in the **Interface Name** field of the Ethernet Settings page.

For all Spectrum servers:

- Failover pairs must be cabled and assigned to the same IP subnet.
- IP addresses for failover pairs must be statically assigned (that is, DHCP should be disabled).
- There can be one or more failover pairs per IP subnet.

Related information

Setting Ethernet interfaces on a MediaCenter 2200 or 2200A as public ports

Configuring Ethernet interfaces for failover

Configure Ethernet interfaces on a Spectrum server for failover.

1. From the **System Diagram**, click any Spectrum video server heading (or icon) to reach the **Physical Configuration** page.
2. Click the picture of the Spectrum video server to display the **Properties** page.
3. In the **Host Properties** section of the page, in the **Change Settings** filed, click **Network Settings**. The **Network Settings** page for your Spectrum video server appears.
4. Scroll to the **Ethernet Interface Settings** section of the page.
5. Make sure that each pair of interfaces you are configuring for failover are configured with static IP and are on the same subnet.

6. If you have made changes in the **Ethernet Interface Settings** section of the page, save your settings by clicking **Save Settings**.
7. In the **Ethernet Interface Failover Settings** section of the page, select the interface pairs for which you want to enable failover mode, and then click **Enable Failover Mode**.
8. Verify that the text in the **Status** column changes to **Failover Enabled.**

Examples of failover configurations

Find some examples of possible failover configurations.

Example: One failover pair

In this example, a 1 Gb quad port expansion card is installed in the MediaDirector 2202/2201, and three interfaces are connected. The eth2 and eth3 interfaces are configured for failover. Note that these interfaces are configured with static IP addresses and are assigned to the same IP subnet.

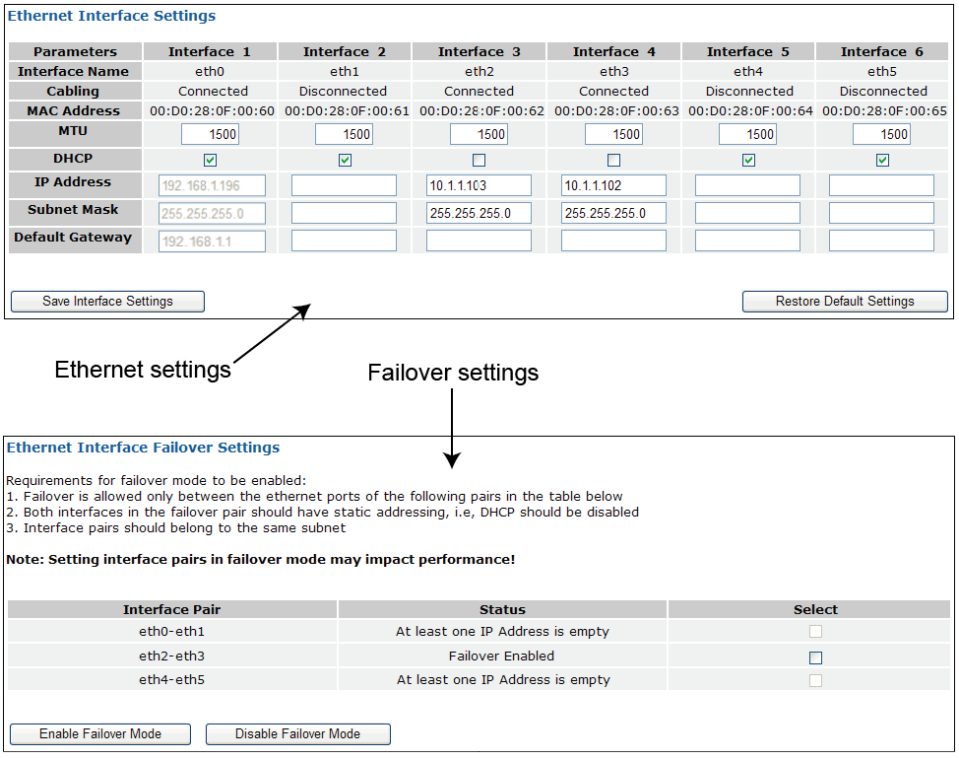


Figure 2-8: Example of one failover pair

Example: Multiple failover pairs

In this example, a 1 Gb quad port expansion card is installed in the MediaDirector 2202/2201, all six interfaces are connected, and every failover pair is configured for failover. Note that every interface is configured with static IP addresses, and that each failover pair is assigned to the same IP subnet.

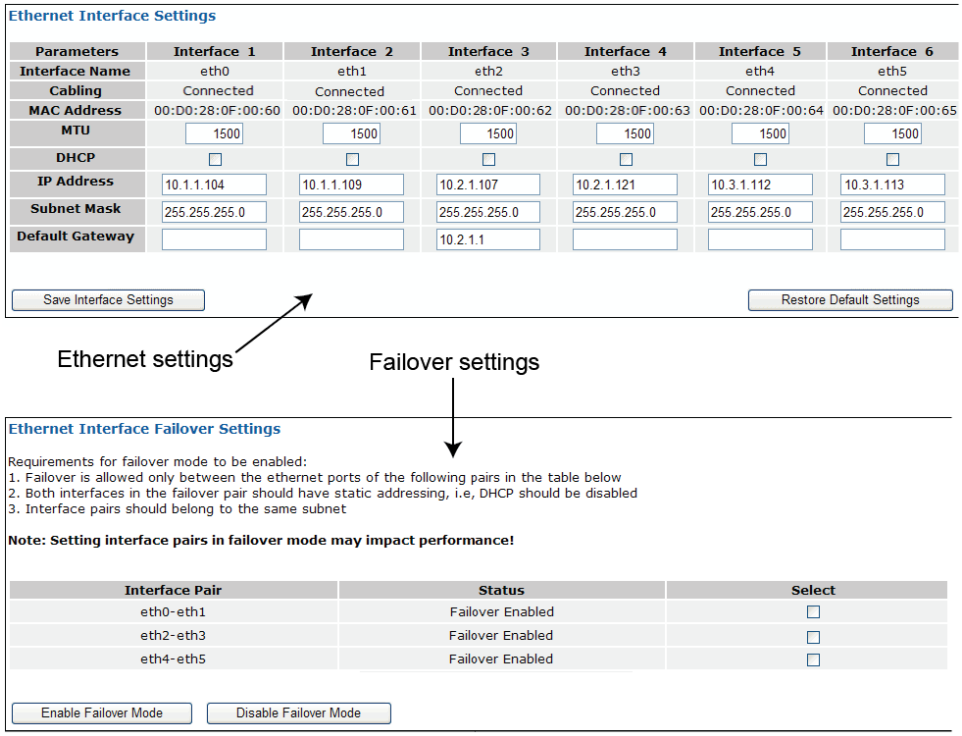


Figure 2-9: Example of three failover pairs

Configuring additional routes

In the unusual circumstance that you need to configure a network route in addition to the route specified for a given interface in the Ethernet Interface Settings section of the Network Settings page, you may use the Configure Additional Routes feature to add a route.

CAUTION: The procedure in this section is intended for qualified technical personnel, skilled at advanced networking procedures. If you are unsure of any steps, consult with your network administrator or contact Harmonic technical support before proceeding.

The following figure shows an example of an additional route.

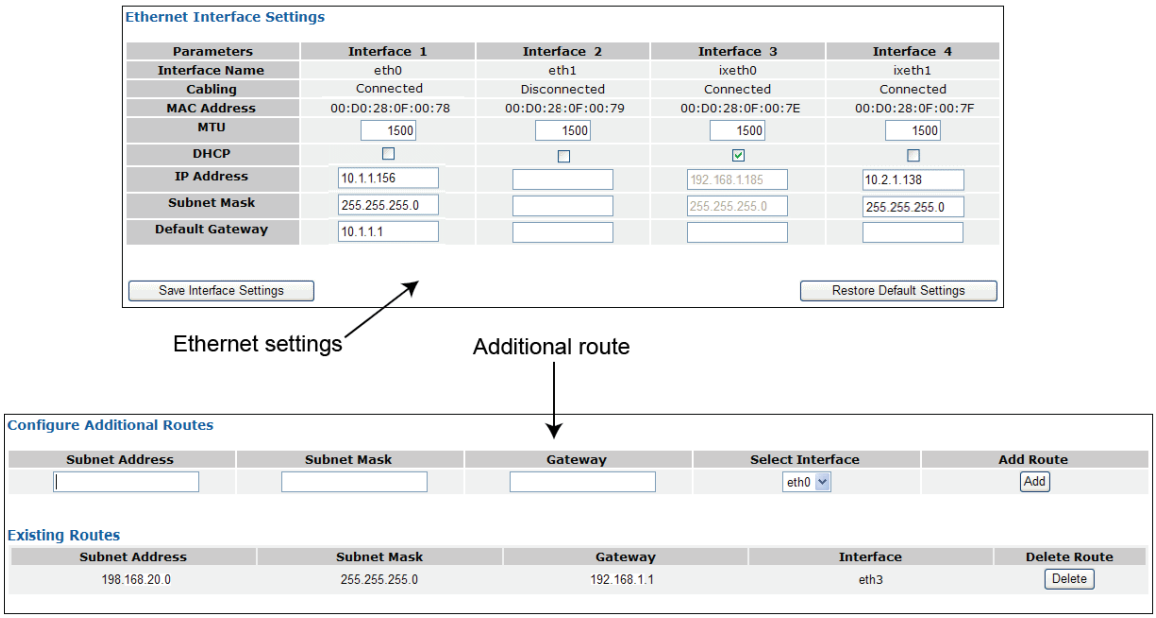


Figure 2-10: Example of additional route

1. In the **Configure Additional Routes** section, select an interface from the **Select Interface** drop-down menu. Note that you may only select interfaces which are connected. Configure the following fields as necessary:
   - **Subnet Address**
   - **Subnet Mask**
   - **Gateway**
2. In the **Add Route** column, click **Add**.

   Once the new route has been added, the details of that route appear in the **Existing Routes** section.

   Note that for each interface, you may add as many additional routes as you wish.

   Once you have configured an additional route, a **Delete Route** column will appear in the **Existing Routes** section. To delete an existing route, click the **Delete** button for the route you wish to delete.

Changing the primary IP address

If instructed by Harmonic technical support, you can change the primary IP address of a video server.

CAUTION: The procedure in this section is intended for qualified technical personnel, skilled at advanced networking procedures. If you are unsure of any steps, consult with your network administrator or contact Harmonic technical support before proceeding.

The primary IP address is the first Spectrum video server IP address that is discovered by the SystemManager, and is used to communicate with SystemManager. If you wish to change this IP address, follow the procedure below.

IMPORTANT: Changing the primary IP address for the Spectrum video server will cause SystemManager to lose connection with it. Note that the primary IP address is displayed next to the name of the Spectrum video server host on the **System Diagram** page.

1. Navigate to the **Network Settings** page, and then scroll to the **Ethernet Interfaces** section of the page.
2. Identify the Ethernet Interface used for the primary IP address.
3. For the Ethernet Interface, which uses the primary IP address, make sure **DHCP** is not selected, enter the new values in the **IP Address**, **Subnet Mask**, and **Default Gateway** fields, and then click **Done**. This will cause SystemManager to lose connection with the Spectrum video server.
4. Remove the Spectrum video server from SystemManager using the Remove Devices feature. Refer to the instructions in “Removing devices” to select the Spectrum video server that contains the primary IP address you wish to change, and remove it.
5. Use the Connect Harmonic Device feature to connect to the new primary IP address. Refer to the instructions in “Connecting a device from a different IP network” and use the new primary IP address in the field for **Enter device IP address or device name**.
6. Once you have connected to the new primary IP address, view the System Diagram on the **Configuration** tab to verify that you are connected to the Spectrum video server.

Related information

Removing devices

Connecting a device from a different IP network

Configuring watch folders

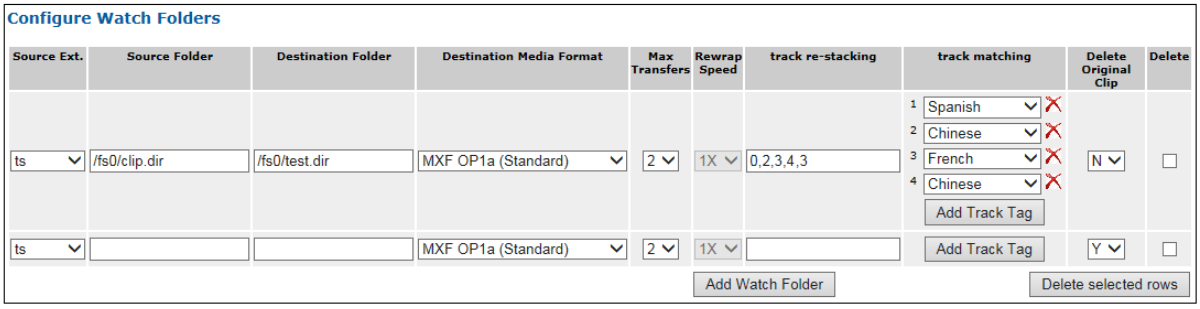
With the Watch Folder feature, you can configure Spectrum to demultiplex PitchBlue® transport stream files or MPEG-2 program stream files, or re-wrap LXF files that are transferred via FTP or Samba to a specified “watch folder” on your Spectrum video server.

Spectrum outputs the resulting files to a specified destination folder on your video server. For demultiplexed transport stream files, the resulting AVC/H.264 files can be played out with a Spectrum I/O module licensed for AVC/H.264. For MPEG-2 program streams, the resulting files will have the same video format as the original, and compressed audio will be decoded to the PCM format.

NOTE: Spectrum does not support *native* playout of MPEG-2 program streams.

IMPORTANT: When using the Watch Folder feature to re-wrap LXF files, SystemManager automatically changes the bandwidth limits on your video server to improve the LXF re-wrap performance. If you wish to restore the default bandwidth limits, see “Changing network and file system performance settings” for details.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page, and then click the icon of the Spectrum video server to display the **Properties** page.
2. From the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Watch Folder** to open the Harmonic Watch Folder page for your Spectrum video server.

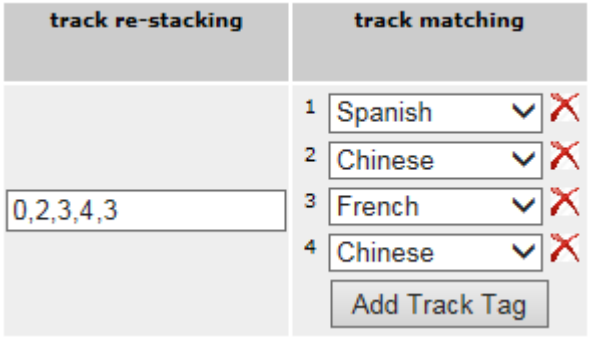


3. Click **Add Watch Folder**, and configure as follows:
   - **Source Ext**: Spectrum supports the .ts, .ps, and LXF formats. Select one of the following:
     - **ts**
     - **ps**
     - **lxf**. Note that this option may be used for LXF files with or without an extension.
   - **Source folder**: Enter the complete path of the folder on your Spectrum video server that you wish to specify as your watch folder. The source folder must exist before you configure it as a watch folder.

     IMPORTANT:
     - Harmonic recommends that you *never* configure clip.dir, or any folder that experiences high traffic, as your Source watch folder.
     - Multiple Watch Folder entries cannot use the same Source Folder. Make sure to enter a unique Source Folder for each Watch Folder entry.
   - **Destination Folder**: Enter the complete path of the directory to which the demultiplexed or re-wrapped files will be written.
   - **Destination Media Format**: Select the desired wrapper type for the destination media.
   - **Max Transfers**: Select the maximum number of files that may be transferred at one time.
   - **Rewrap Speed**: This option allows you to change the maximum speed of the file re-wrap in relation to real-time. For example, **2x** would be up to twice as fast as real-time. Harmonic recommends that you leave the default value for your source format unless instructed otherwise by Harmonic technical support.

     NOTE: For PitchBlue .ts or MPEG-2 .ps entries, Spectrum supports a re-wrap speed no higher than 3x.
   - **track re-stacking**: This option allows you to re-order the tracks in the destination file. Enter the track numbers, separated by commas, in the order you want them to appear in the destination file.
   - **track matching**: This option allows you to match the tracks in the destination file with track tags specified in the TrackKeyValueDefs.txt configuration file on the Spectrum server.
     - Make sure you have edited the track tags as needed. See "Editing track tags" for details.
     - Click **Add Track Tag**, and then select a tag from the drop-down list. The selected tag will override any source tags for that track once the clip is transferred to the destination file.
     - To delete a track tag, click the adjacent **X**.
   - **Delete Original Clip**: Select whether you want the original files to be deleted after they are demulitplexed or re-wrapped. Note that the source file will only be deleted upon success of the operation.

Example: Note that the **track matching** and **track re-stacking** options work together so that the tags indicated in the **track matching** column apply to the re-ordered tracks in the destination folder. The following table shows how the re-ordered tracks would correspond to the tags in the destination folder.



Track	Tag
0	No tag, video source
2	Spanish
3	Chinese
4	French
3	Chinese

4. Add additional watch folders as needed. At this time, Spectrum supports two watch folders per Spectrum video server. These watch folders may use different source types (.ts, .ps, or LXF) or two of the same source type.
5. Once you have configured the watch folder, click **Apply** to apply your changes, and then click **Done**. If you wish to delete a watch folder, select the **Delete** check box, click **Delete selected rows**, and then click **Apply**

Result:

NOTE: For watch folder configuration guidelines specific to your Spectrum video server type, refer to the configuration guidelines section of the Spectrum release notes.

Related information

Changing network and file system performance settings
Creating an AVC-Long GOP player
Editing track tags

About LXF support

Note the default settings for LXF support.

When you add an LXF watch folder, SystemManager automatically configures the Network/File System Performance settings to improve performance.

Performance settings are changed as follows:

- MediaDirector 2252B, 2251B, 2252, 2251, 2202, and 2201
  - Low Priority Bandwidth Limit (FTP & SAMBA): 300 MB/s
  - Low+ Priority Bandwidth Limit (AFP): 200 MB/s

  For 50 Mbps material, Spectrum supports *two* LXF imports with a re-wrap speed no higher than 3x. For 100 Mbps or 150 Mbps LXF material, the re-wrap speed must be set no higher than 1x.
- MediaCenter 2200B and 2200
  - Low Priority Bandwidth Limit (FTP & SAMBA): Default setting (185 MB/s)
  - Low+ Priority Bandwidth Limit (AFP): 200 MB/s

  For 50 Mbps material, Spectrum supports *two* LXF imports with a re-wrap speed no higher than 3x. For 100 Mbps or 150 Mbps LXF material, the re-wrap speed must be set no higher than 1x.
- Spectrum X and MediaDeck 7000
  - Low Priority Bandwidth Limit (FTP & SAMBA): Default setting (100 MB/s)
  - Low+ Priority Bandwidth Limit (AFP): 100 MB/s

  For 50 Mbps material, Spectrum supports *one* LXF import with a re-wrap speed no higher than 3x. For 100 Mbps or 150 Mbps LXF material, the re-wrap speed must be set no higher than 1x.

Configuring Auto-export to Harmonic MediaGrid

With the auto-export license, you can configure Spectrum to record directly to a directory on the Spectrum video server, and then automatically transfer the files to one or more destination folders on your Harmonic MediaGrid or to another location via FTP.

IMPORTANT: Auto-Export watch folders are intended specifically for use with content that is recorded directly from a player to the watch folder. Harmonic does not support manually copying files into the watch folder.

For guidelines regarding active transfers on your Spectrum video server, refer to the “Configuration Guidelines” section for your video server in the Spectrum Release Notes.

Although the simplest configuration of the of the Auto-Export to Harmonic MediaGrid feature is to configure one watch folder on your Spectrum system, you may wish to create multiple folders for use with different content. For example, you may create one watch folder entry for SD content and another watch folder entry for HD content and configure these to transfer to separate locations on your Harmonic MediaGrid file system. In this case, note that you must configure your SD and HD Record players to save to the SD and HD watch folders respectively.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
2. Click the picture of the Spectrum video server to display the **Properties** page.
3. In the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Auto Export to Grid**. The Watch Folder page appears.
4. Click **Add Watch Folder** and configure as follows:
   - **Source Path**: Enter the path of the source folder on the Spectrum file system. For example: /fs0/watch/

CAUTION: Harmonic recommends that you *never* configure clip.dir, or any folder that experiences high traffic, as your Source watch folder.

- **Destination URL**: Enter the URL or path of the destination folder on the Harmonic MediaGrid or other location. Use one of the following formats:
  - For a folder on the *Harmonic MediaGrid* , use the following: mgfs://<IP address or network name of Harmonic MediaGrid system>/<file system path>. For example: mgfs://my_mediagrid/fs/dropbox/
    If you used a Harmonic MediaGrid *IP address* on the “Harmonic MediaGrid Accounts” page for your Spectrum video server in SystemManager, you must enter that IP address in the Destination URL field. Likewise, if you used a Harmonic MediaGrid *network name* on the Harmonic MediaGrid Accounts page, you must enter that network name in the Destination URL field. For details on configuring Harmonic MediaGrid accounts, see “Connecting to a Harmonic MediaGrid from the Spectrum Video Server.”
  - For a location via *FTP*, use one of the following:
    - ftp://<IP address of networked device>/file system path/
    - ftp://username:password@<IP address>/file system path/
- **Max Transfers**: Enter the number of files that may be exported from this watch folder at one time.
- **Delete Original Clip**: If yes, the file being exported will be deleted from the source folder once it is successfully transferred. If, for some reason, the transfer fails, the file will not be deleted.
- **Replace file on destination**: If yes, the file being exported will overwrite any existing file with the same name in the destination folder.
- **Rewrap**: If yes, Spectrum will rewrap the file using the wrapper format selected from the **Rewrap Style** drop-down menu.
- **Rewrap Style**: Select the wrapper format to be used for the file being exported.

  NOTE: For FTP transfers, Harmonic supports transfers of the following low latency formats only: MXF OP1a (Standard, Low Latency), MXF OP1a (Internal-EVTR, Low Latency), and MXF OP1a (SMPTE RDD9).

IMPORTANT: Multiple Watch Folder entries cannot use the same Source Folder. Make sure to enter a unique Source Folder for each Watch Folder entry.

The following images show two examples of watch folders, one (on the left) that exports to a Harmonic MediaGrid system, and one (on the right) that exports to a location via FTP.

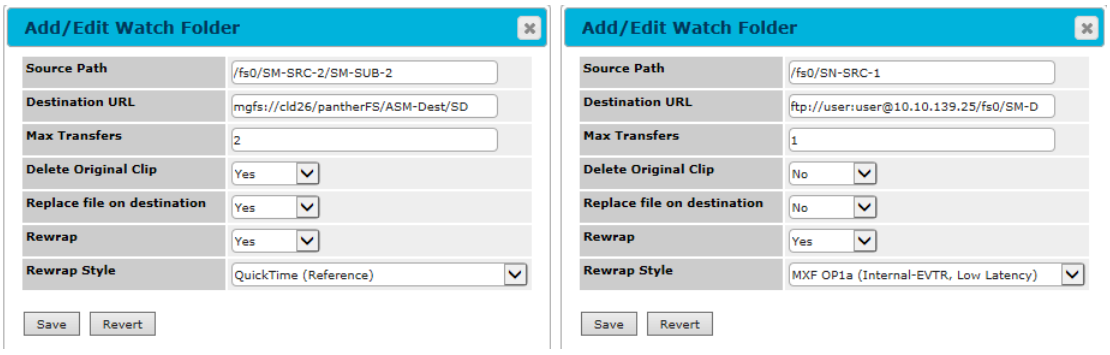


Figure 2-11: Auto-export examples

5. Once you have configured the watch folder, click **Save** to apply your changes, and then click **Done**.
6. Configure additional watch folders as needed.

7. Make sure to configure your Record players to save directly to the watch folder by modifying the **Default Clip Directory** field for the player accordingly.

Related information

Connecting to a Harmonic MediaGrid from the Spectrum video server

Configuring Auto-Export for Proxy Files

Note the procedure to configure auto-export for proxy content.

1. Follow steps 1-5 of “Configuring Auto-export to Harmonic MediaGrid” to create a watch folder for your high-resolution content.
2. Create a second watch folder, which includes the source path of the original watch folder modified to add a proxy.dir sub folder for your proxy content. When a player is configured to record proxies, it will simultaneously write a proxy file to the proxy.dir directory.

   For example, if the source path of the original watch folder is **/fs0/MyDir**, the source path of the second watch folder for proxy files would be **/fs0/MyDir/proxy.dir**.

   The following figure shows a watch folder for proxy files, which uses the source path of the first watch folder for high resolution content.

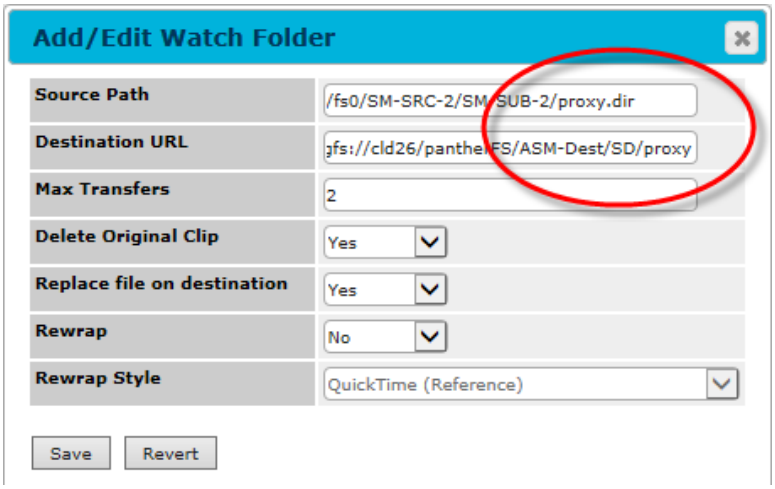


   Figure 2-12: Example of auto-export folder for proxy

3. Make sure to configure your Record players to save directly to the first watch folder by modifying the **Default Clip Directory** field for the player accordingly.

Related information

Edit Player options

Configuring SMPTE 2022-6

Follow the procedures in order to enable and configure your system for SMPTE 2022-6.

Before configuring your system, make sure your Spectrum X is connected to a SMPTE 2022-6 network according to the instructions in the *Spectrum System Installation Guide*. Also make sure your system is licensed for SMPTE 2022-6.

The following is an overview of the configuration procedures for SMPTE 2022-6.

1. Verify that a SMPTE 2022-6 license is installed on your system.
2. Enable SMPTE 2022-6 for the I/O module. Note that enabling or disabling SMPTE 2022-6 requires a restart of the Spectrum X.
3. Configure network settings for the 10 Gb I/O module Ethernet interfaces. If you are using PTP for reference, enable PTP for the 10 Gb I/O module Ethernet Interfaces.
4. (Optional) Configure RouteTables for your system, which include parameters such as source IP address and port number.
5. Configure the Spectrum X channel settings for 2022-6 and map the inputs and outputs to the Spectrum X I/O to start the 2022-6 streams.

Related information

Viewing licensed features for a Spectrum video server

Enabling SMPTE 2022-6 for the I/O module

Before you can configure SMPTE 2022-6 settings on your Spectrum X,you must enable SMPTE 2022-6 on the system.

1. Navigate to the **I/O Module Properties** page for a Spectrum X SDI I/O card, and select **IP Transport Protocol**: **SMPTE 2022-6**.

   NOTE: Enabling or disabling SMPTE 2022-6 requires a restart of the Spectrum X.

2. A confirmation message appears. Click **OK** to proceed and restart the Spectrum X.

Configuring network settings for the 10 Gb I/O modules

The 10 Gb I/O module on the Spectrum X is required in order to use SMPTE 2022-6. Configure the network settings for your 10 Gb Ethernet interfaces.

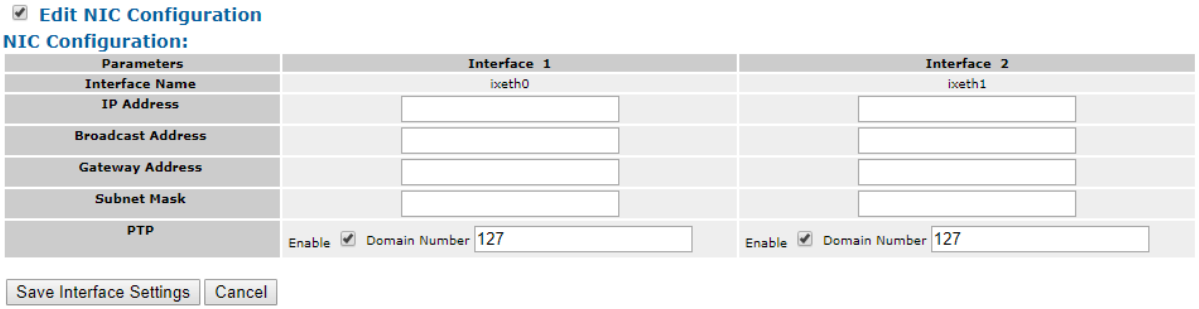
When configuring the 10 Gb I/O module, you can open the properties page for either SDI card in the Spectrum X. The network settings for the 10 Gb NIC apply to the entire Spectrum X. Once you have configured the network settings, they will be visible from the properties page for either SDI card.

1. Navigate to the **I/O Module Properties** page for a Spectrum X SDI I/O card, and scroll to the **NIC Configuration** section.

   Select the **Edit NIC Configuration** check box and note the confirmation message.

NOTE: If you want to change network settings for a 10 Gb NIC after 2022-6 has already been configured, make sure to first stop any 2022-6 streams on the Spectrum X. To do this, from the Channel Properties page, in the **I/O Mapping** section, under **Stream Type**, change all selections to **SDI**.

To continue, click **OK**.



IMPORTANT: The orientation of the interfaces on the rear panel differs between the optical and copper 10 Gb I/O modules:

- For the *optical* 10 Gb I/O module: when facing the rear panel, **ixeth0** is the interface on the *right*-hand side and **ixeth1** is the interface on the *left*-hand side.
- For the *copper* 10 Gb I/O module: when facing the rear panel, **ixeth0** is the interface on the *left*-hand side and **ixeth1** is the interface on the *right*-hand side.

2. In the **IP Address** fields, enter the static IP address for each interface. Modify the remaining fields as needed
3. If you wish to use PTP for reference, in the **PTP** section for that NIC, click **Enable**, and then enter the **Domain Number** specified by your PTP grandmaster clock.
4. Click **Save Interface Settings**.

Configuring RouteTables

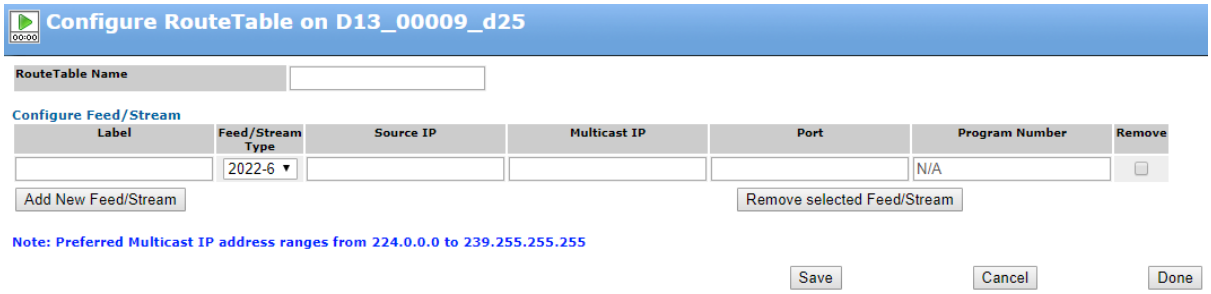
With SystemManager 6.7 and later, you can configure RouteTables to contain parameters for your SMPTE 2022-6 or transport stream networks.

Once you have configured a RouteTable, you can map Spectrum X channel inputs and outputs to it from the Channel Properties page, or use it to configure a compressed stream player. You can configure multiple RouteTables for one Spectrum X.

Once you have created a RouteTable, you can export it as an .XML file to a location on your SystemManager client. You can also import a RouteTable from your SystemManager client to your Spectrum server.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page, and then click the icon of the Spectrum video server to display the **Properties** page.
2. From the **Host Properties** section of the page, in the **Change Settings** field, click **RouteTables** to open the **RouteTables** page for your Spectrum video server.

3. Under **RouteTables List**, click **Create New RouteTable** to open the **Configure RouteTable New** page.



4. In the **RouteTable Name** section, type a name for the RouteTable. The name should start with an alphanumeric character, can include letters, numbers, and spaces, and can include the following special characters:

   - ^ ' @ { } [ ] , $ = ! ( ) + ~ _

5. Click **Add New Feed/Stream**.

6. Configure the following parameters.

Label	Enter a label for the feed/stream.
Feed/Stream Type	Select either **2022-6** or **TS/IP** for transport stream ingest.
Source IP	Enter the source IP address for the stream or feed.
Multicast IP	Enter the multicast address to be used for the 2022-6 Input/Output or the transport stream.
Port	Enter the UDP port number to be used for the 2022-6 Input/Output or the transport stream. Note that, for 2022-6, the value should be greater than or equal to 2000.
Program Number	(For transport stream ingest) Enter the program number (not PID) that identifies the program within the compressed stream.

7. Add or remove Feeds or Streams as needed, and then click **Save** to save the RouteTable.

8. Click **Done** to return to the RouteTable page. The new RouteTable will appear under **RouteTables List**.
   If you wish to export the RouteTable as an .XML file, click the **Select** check box for the RouteTable, and then click **Export RouteTable** to download the .XML file to your SystemManager client.

   If you wish to import an .XML file RouteTable, under **Import RouteTable** heading, click **Choose File**, navigate to the RouteTable file, and select it. Once it's selected. click **Import RouteTable**.

   The imported RouteTable will appear in the **RouteTables List**.

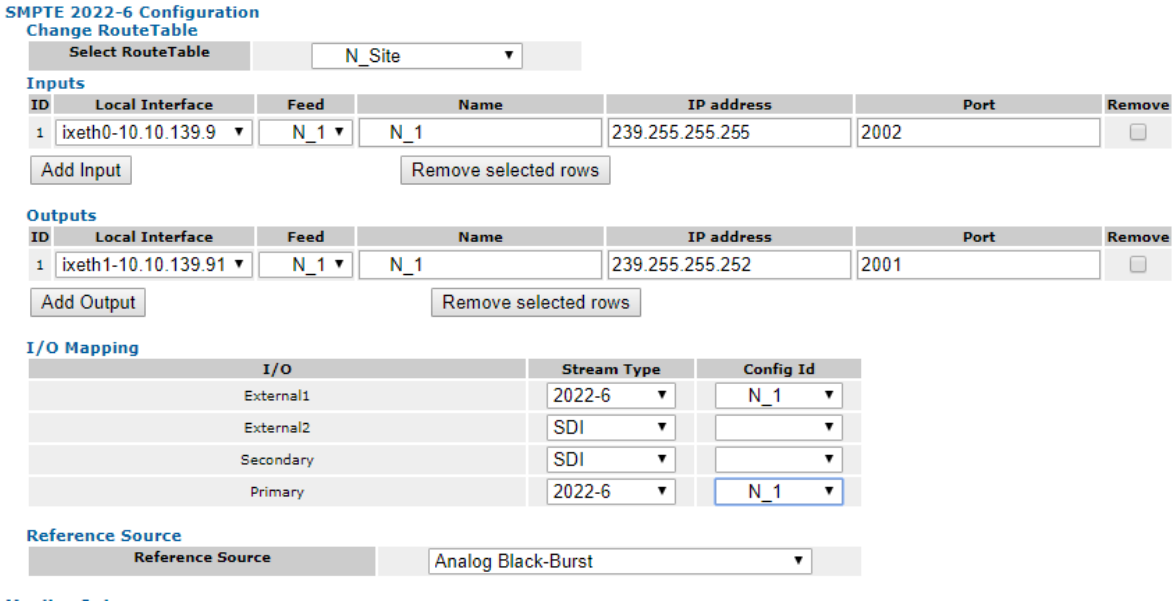
   .

   NOTE: SystemManager can import a RouteTable with up to 1000 feeds.

Configuring 2022-6 settings for a Spectrum X channel

Configure 2022-6 inputs and outputs and map them to your Spectrum X channel I/O.

1. Navigate to the I/O Module Properties page for your Spectrum X by clicking its link or icon in the System Diagram, and then click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
2. Under **Master Control Switcher Configuration** > **Default Source Type**, for the I/O to be used with 2022-6 click the drop-down menu, and select **SMPTE 2022-6**.
3. In the **SMPTE 2022-6 Configuration** section, configure the following settings.



a. For **Change RouteTable**:

Select RouteTable	If you have configured a RouteTable for your 2022-6 network, select it from the drop-down menu.

b. For **Inputs** and **Outputs**, click **Add Input/Output**, and configure as follows:

NOTE: Changing Input and Output settings from this page does not change the RouteTable settings.

Local Interface	Select the 10 Gb Ethernet interface to be used. If no 10 Gb NICs are configured, the drop-down menu will be empty.
Feed	Select a feed from the drop-down menu. Note that the remaining fields will be populated with the settings specified in the RouteTable entry for that feed.
Name	Enter a name for the Input/Output.
IP address	If using a different address than the one specified in the RouteTable, enter the multicast address to be used for the 2022-6 Input/Output.
Port	If using a different port than the one specified in the RouteTable, enter the port to be used for the 2022-6 Input/Output.

c. For **I/O Mapping**, map the channel I/O to 2022-6 streams as needed.

IMPORTANT: Mapping an I/O to a 2022-6 stream and applying the configuration automatically starts the stream. Mapping the I/O back to SDI stops the stream.

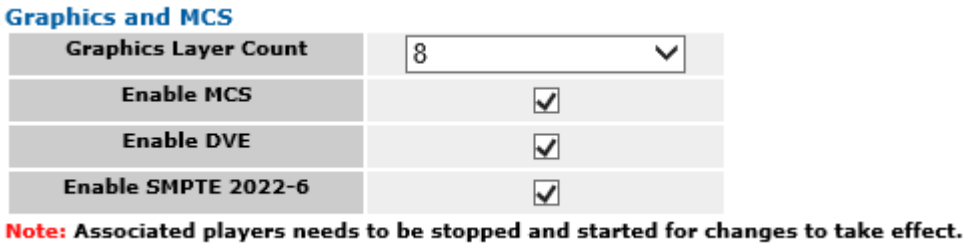
Stream Type	Select the **SDI** or the **2022-6** stream.
Config ID	Select the name of the 2022-6 feed.

d. For **Reference Source**, select from the following.

- **Analog Black-Burst**: The default selection.

- **PTP-AutoSelect**: Available when PTP is enabled. When selected, Spectrum automatically selects a NIC for PTP reference. In the event one NIC fails, Spectrum switches to the second NIC.
- **PTP-Eth0, PTP-Eth1**: Available when PTP is enabled. Spectrum will use the PTP reference from the selected NIC.

4. In the **Graphics and MCS** section, select **Enable SMPTE 2022-6** to enable the standard for the channel.



5. Click **Apply** to save the settings and start any 2022-6 mapped streams.

Starting and stopping 2022-6 streams

Mapping a Spectrum X I/O to a 2022-6 input or output using either SystemManager or FXTool starts the 2022-6 stream. Mapping the I/O back to SDI stops the 2022-6 stream.

- **To start a 2022-6 stream using SystemManager**: From the **Stream** menu of the **I/O Mapping** section of Channel Properties page, select **2022-6** for the Spectrum X channel I/O. To stop the 2022-6 stream for that I/O, select **SDI**. Click **Apply** for the change to take effect.
- If you are using FXTool with Spectrum X, and have configured 2022-6 Inputs and Outputs for a Spectrum X channel in SystemManager, you can configure FXTool to use 2022-6 sources for that channel. For details on mapping I/O using FXTool, see "Configuring FXTool to Use 2022-6 Sources" in the *Spectrum Tools User Guide*.

Configuring transport stream ingest

Configure your system for transport stream ingest.

The following is an overview of transport stream ingest configuration procedures.

1. Review the "Spectrum X Configuration Guidelines" section of the *Spectrum System Release Notes* before configuring your system for transport stream ingest.
2. Verify that the transport stream ingest license is installed on your system.
3. Configure the network settings for any Ethernet port that you plan on connecting to your transport stream network. For the Spectrum X, the **eth2**, **eth3**, **eth4**, and **eth5** interfaces can be used for transport stream ingest.

4. Connect the Ethernet interfaces from your Spectrum video server to a VLAN or switch dedicated to transport streams, as described in "Connecting to your transport stream network" in the *Spectrum System Installation Guide*.
5. (Optional) Configure one or more RouteTables to specify the parameters for your transport stream network and program.
6. Configure a Compressed Stream Player to record a selected program from a network transport stream.

Related information

Viewing licensed features for a Spectrum video server
Configuring network settings
Configuring RouteTables
Creating a Compressed Stream Player

Previewing material from a Harmonic MediaGrid or NAS

With Spectrum 8.3, and later, a Spectrum X can be used to Preview content for Automation by mounting an external Harmonic MediaGrid or NAS file system and directly accessing clips.

Configure your system as follows:

1. Make sure your Spectrum X is set to "diskless" mode as described in "Setting the Spectrum X to 'diskless' mode" in the *Spectrum System Installation Guide*, and includes the NAS-MOUNT and FW-MIP-9000-MDM (MediaDeck Mode) licenses.
2. Mount the Spectrum X to a Harmonic MediaGrid or NAS file system as described in "Configuring a Harmonic MediaGrid or NAS file system mount."
3. Configure a Player for playout as described in "Creating a player." Make sure to specify the Harmonic MediaGrid or NAS file system in the default clip directory as specified in "About the Harmonic MediaGrid or NAS file system path and the player 'Default Clip Directory.'"

   IMPORTANT: Players configured to Preview material from a Harmonic MediaGrid or NAS are intended for Preview only and are not for on-air usage. Note that the quality of the Preview video depends on good performance from the network to the Spectrum server, as well as performance of the NAS servers.

Related information

Mounting a Harmonic MediaGrid or NAS file system
Creating a player

Mounting a Harmonic MediaGrid or NAS file system

With Spectrum 8.3, and later, and the NAS-MOUNT license, Spectrum X can mount to a Harmonic MediaGrid or NAS file system.

A Spectrum X can be used to Preview content for Automation by mounting an external Harmonic MediaGrid or NAS file system and directly accessing clips. The Spectrum X must be in "diskless" mode and include the NAS-MOUNT and FW-MIP-9000-MDM (MediaDeck Mode) licenses. For instructions

on setting diskless mode, see "Setting the Spectrum X to 'diskless' mode" in the *Spectrum System Installation Guide*.

A Spectrum X in internal storage mode, and mounted to Harmonic MediaGrid or NAS, can use Delay Service to record material to the Harmonic MediaGrid or NAS and playback with a specified delay. Note that Delay Service mounts the Spectrum X to Harmonic MediaGrid or NAS automatically when Delay Service is set up for "grid" mode. See "Configuring Delay Service" for details.

Related information

Configuring Delay Service

Configuring a Harmonic MediaGrid or NAS file system mount

Configure the mount parameters.

Before you begin

For the external file system that you plan on mounting (either Harmonic MediaGrid or NAS), the Spectrum server must be able to create subfolders on the file system. Make sure permissions on the Harmonic MediaGrid or NAS allow for the Spectrum server to create the necessary subfolders.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page, and then click the icon of the Spectrum video server to display the **Properties** page.
2. From the **Host Properties** section of the page, in the **Change Settings** field, click **Mount NAS/Grid File System** to open the **NAS/Grid Filesystem mount** page for your Spectrum video server.
3. Click **Add OMFS/CIFS Mount**.

4. Configure the mount parameters as follows.

Mount Type

- **omfs**: Select if your Harmonic MediaGrid system does *not* include a ContentBridge, or if you prefer an omfs connection to the Harmonic MediaGrid.
- **cifs**:
  - Select if your Harmonic MediaGrid system *includes* a ContentBridge, and you prefer to use it.
  - Select if you are connecting to a NAS.

Server Address

- If using omfs, enter the IP address of your ContentDirector.
- If using a ContentBridge, enter the IP address of your ContentBridge.
- If using a NAS, enter the IP address of the NAS.

Path

Enter the file system path for your mount. This value must include the name of the root file system, and may include subfolders separated with a forward

	slash, as in, *<root fs>/<subfolder>*. For details on how the file system path relates to the default clip directory, see "About the "file system path" and the player "Default Clip Directory.""
User Name	Type the user name for your Harmonic MediaGrid system or NAS.
Password	Type the password for your Harmonic MediaGrid system or NAS.
Options: mode	(For omfs mount type only) ◦ **Minimal**: Optimized for use with Delay Service. ◦ **Write**: Optimized for use with Transport Stream Ingest. ◦ **Linear**: Optimized for previewing clips. ◦ **Random**: Not optimized. Can be used for scrubbing.

5. Add any additional mounts as needed, and then click **Apply** to save the changes.
6. Restart the Spectrum X for the changes to take effect. Note that adding or removing a mount requires a restart of the Spectrum X.

Related information

About the "file system path" and player and channel directories

About the "file system path" and player and channel directories

When configuring a player to preview from Harmonic MediaGrid or NAS, note the relationship between the file system path for the mount, the default clip directory for the player, and the primary effects folder.

The **Path** field on the **Configure OMFS/CIFS Mount** page specifies the file system path for your mount. This value must include the name of the root file system, and may include subfolders.

When configuring the preview player, in the **Default Clip Directory** field, you must specify the name of the clip directory that exists within the path you specified for your mount, and enter it as follows:

- for omfs mounts: file:///mnt/nas/omfs/<*clip directory*>
- for cifs mounts: file:///mnt/nas/cifs/<*clip directory*>

Depending on the path you specify for your mount, you may specify a subfolder in the **Default Clip Directory** as well as the clip directory.

If you have configured effects on the **Channel Properties** page, in the **Primary Effects: Folder** field, make sure to specify the graphics folder on the omfs or cifs mount as follows:

- For omfs mounts: /omfs/gfx.dir
- For cifs mounts: /cifs/gfx.dir

Example: Mounting to the root file system on Harmonic MediaGrid

In this example, the root file system for your Harmonic MediaGrid is "mg0." To mount to the root file system:

- On the **Configure OMFS/CIFS Mount** page, in the **Path** field: enter **mg0**.

To preview clips from a clip directory named "clip.dir" on the root file system:

- On the **Edit Player** page for your preview player, in the **Default Clip Directory** field, enter: **file:///mnt/nas/omfs/clip.dir**

The player will preview from /mg0/clip.dir.

To use graphics on the Harmonic MediaGrid root file system when using an omfs mount:

- On the **Channel Properties** page for your channel, in the **Primary Effects: Folder** field, enter: **/omfs/gfx.dir**

Example: Mounting to a subfolder on Harmonic MediaGrid

In this example, there is a subfolder named "joe." To mount to /mg0/joe:

- On the **Configure OMFS/CIFS Mount** page, in the **Path** field: enter **mg0/joe**.

To preview clips from a clip directory named "clip.dir" that exists in the "joe" subfolder:

- On the **Edit Player** page for your preview player, in the **Default Clip Directory** field, enter: **file:///mnt/nas/omfs/clip.dir**

Alternatively, you could specify only the root file system path in the mount parameters, and then specify the "joe" subfolder in the player parameters. In that case:

- On the **Configure OMFS/CIFS Mount** page, in the **Path** field: enter **mg0**
- On the **Edit Player** page for your preview player, in the **Default Clip Directory** field, enter: **file:///mnt/nas/omfs/joe/clip.dir**

In both cases, the player will preview from /mg0/joe/clip.dir.

To use graphics that are stored on the "joe" subfolder:

- On the **Channel Properties** page for your channel, in the **Primary Effects: Folder** field, enter the following: **/omfs/joe/gfx.dir**.

Example: Mounting to a subfolder on a NAS system

For a NAS system, the relationship between the mount path and the player clip directory works the same way. However, you must indicate that it is a cifs mount type. In this example, the NAS root file system is named nas0, and it contains a subfolder named "joe." To mount to /nas0/joe:

- On the **Configure OMFS/CIFS Mount** page, in the **Path** field: enter **nas0/joe**.

To preview clips from a clip directory named "clip.dir" that exists in the "joe" subfolder:

- On the **Edit Player** page for your preview player, in the **Default Clip Directory** field, enter: **file:///mnt/nas/cifs/clip.dir**

Alternatively, you could specify only the root file system path in the mount parameters, and then specify the "joe" subfolder in the player parameters. In that case:

- On the **Configure OMFS/CIFS Mount** page, in the **Path** field: enter **nas0**
- On the **Edit Player** page for your preview player, in the **Default Clip Directory** field, enter: **file:///mnt/nas/cifs/joe/clip.dir**

In both cases, the player will preview from /nas0/joe/clip.dir.

To use graphics that are stored on the "joe" subfolder when using a cifs mount:

- On the **Channel Properties** page for your channel, in the **Primary Effects: Folder** field, enter the following: **/cifs/joe/gfx.dir**.

Changing a Spectrum video server description

The Spectrum video server description is useful in clarifying a particular Spectrum video server's (or host's) role in your Spectrum System.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a dual host or individual host's Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server or host.
3. Click the Spectrum video server's picture to display the **Properties** page.
4. Scroll down to the **Spectrum Server Description** field.
5. Click **Change Desc** to display the **Change Spectrum Server Description** page.
6. Type the new description in the text box.
7. Click **Save** to save the description and return to the **Properties** page. The new description appears in the **Spectrum Server Description** field.

Viewing character sets associated with Spectrum video servers

View the character sets associated with a Spectrum video server.

1. Click the **Home** tab to display the **Home** page.
2. Click the **Character Set** icon in the left-hand column to display the **Set Character Sets** page.

This page displays the currently selected character sets associated with a Spectrum video server and according to protocol and file format.

Specifying character sets to use with certain protocols and QuickTime

Although Unicode is supported on a Spectrum System, certain protocols and QuickTime, which are supported by a Harmonic system, do not directly support Unicode.

For FTP, BVW, VDCP protocols or the QuickTime file wrapper format, in the situations specified in the following table, you must specify which character set to use.

Table 2-1: Specific Protocol and QuickTime Character Set

When using this protocol/wrapper...	You need to specify the character set because/if...
FTP	The FTP (archive system, windows) application being used does not support UTF8 filenames.
BVW/VDCP	The automation system using one of these protocols may not be able to specify or read strings in the UTF8 format.
QuickTime	The QuickTime .mov file contains strings specifying the location of media files. Currently QuickTime does not support the Unicode format. This means that the format of the string is dependent on the language and OS that the clip was generated on. The MediaDirector must be told in advance what format is being used in the mov file.
	Instances when the Character Set must be specified include: • Clips created or modified by applications such as NLE's will store a particular character set in the mov file. The MediaDirector needs to know the format of the string in order to find the associated media files. • Clips accessed directly over the network or copied off of the MediaDirector may be imported into third party applications. The MediaDirector needs to know in advance what format to use so third party application will be able to read the strings in the mov file. • Clips with foreign names created with previous versions of the MediaDirector will use the format used by the application driving the server. The MediaDirector needs to know how to read the strings in order to find the media files.

1. With a legacy File System updated, launch the SystemManager application.
2. From the **Home** tab, click the **Character Set** icon to open the **Character Set** page. Check the box(es) in the **Select** column to identify the Spectrum servers to which you want to apply a new character set.
3. Using the previous table as a reference, check the appropriate protocols and wrapper format check boxes as shown in the following figure.

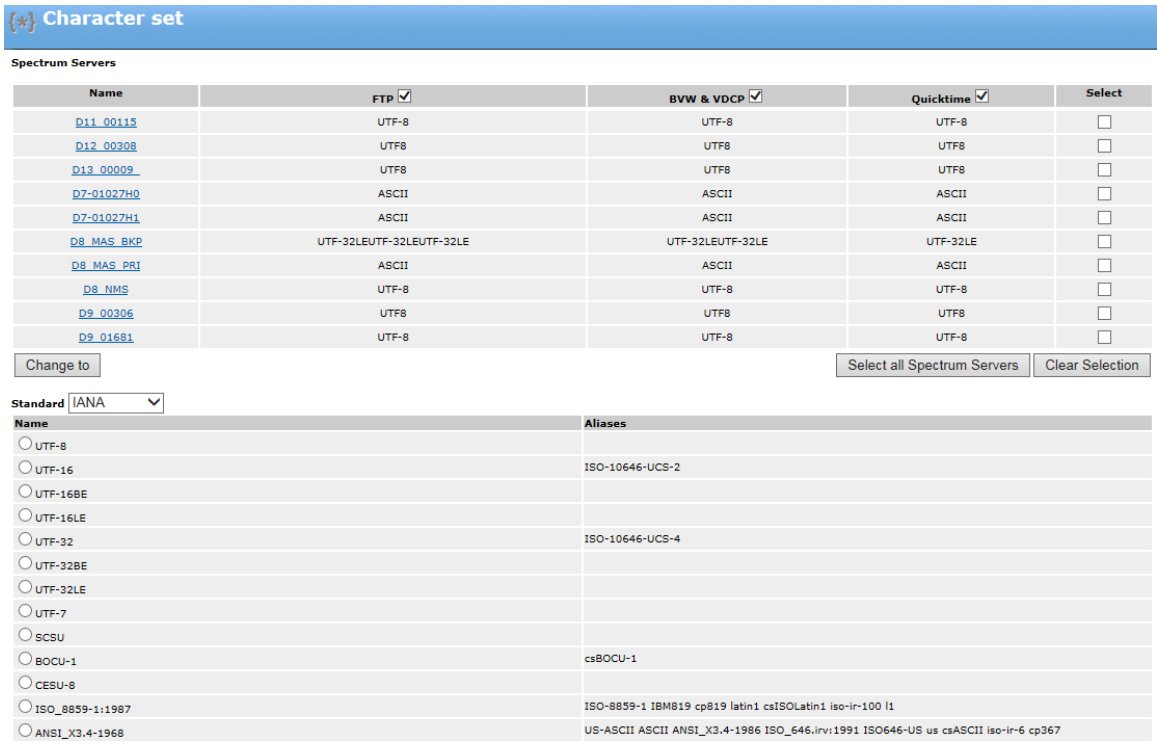


Figure 2-13: Specifying the Character Set

4. From the **Standard** drop down list, select the general standard to use. A subset of standards within the selected standard appears as shown in part in the previous figure.
5. Select the standard subset to apply. The **Change to** button in the Spectrum Servers section reflects the subset chosen.
6. Click **Change to <new character set>** to apply the character set to the selected Spectrum servers.

Editing track tags

On the **Spectrum Server Properties** page, the **Edit Track Tags** function allows you to edit the contents of a **Track Tag File** for a Spectrum video server.

A Track Tag File contains the language labels used in your facility for track tagging. By using a consistent set of labels throughout your facility, a Spectrum video server can read the labels and automatically route the audio to the appropriate channels. The TrackTool application (which allows you to add and rearrange tracks in a clip as well as tag them with language labels), refers to the Track Tag File to ensure that the tracks attached to media clips are the same ones used in the configuration of Spectrum video server players.

Refer to the *TrackTool User's Guide* or the TrackTool help system for more detailed information about the TrackTool application.

By default, the Track Tag File (**TrackKeyValueDefs.txt**.) is located on the Spectrum video server's file system at: **fs\config\TrackKeyValueDefs.txt**. where fs is the actual File System name.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.

2. Click a Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server.
3. Click the Spectrum video server's picture to display the **Properties** page.
4. Scroll down and click **Edit Track Tags**.

   The **Edit Player Track Tags** page appears.
5. Edit the contents of the **Track Tag File** as necessary.
6. Click **Save File** to save the file to the Spectrum video server's file system.

   The edited file is now available for reference when, or if, you wish to configure Players using the SystemManager application, or, if you wish to configure clips using the TrackTool application.

   NOTE: Once you create a Player and start to configure an audio track, verify that all tags created in the Track Tag File are acceptable by clicking on the down arrow in the language tag section and checking that all tags are available for selection. If a tag is unavailable, review the rules in step 5 to identify any syntax errors with the tag.

   Refer to the *TrackTool User's Guide* or the TrackTool help system for information on how to configure clips using TrackTool.

Related information

Configuring track tag rules for an audio track

About Track Tag files

Note some important points when editing track tag files.

Each file can include these items on separate lines:

- Optional comment lines, which start with a hash character # followed by any comment text. For example:

```
# This is a comment and will be ignored.
```

- A mandatory key code line indicating the key being configured. This item must be included once in the file, just before the track tag code mentioned below. The line starts with the letter K followed by a colon, followed by the key code. For track tags, the key code is "ovn_trackmatch". For example:

```
K:ovn_trackmatch
```

- Optional track code lines. The line starts with the letter A followed by a colon, followed by the language code, which may be any US-ASCII character sequence. For example:

```
A:French
```

In addition:

- Tag names must not exceed twenty characters in length and must not include a comma, slash, or ampersand (&). A tag name with an ampersand will be saved but will not be selectable.
- Adding silence1 through silence8 inserts 1-8 channels of silence on the next channel(s.) Choose the number of "silence" tags required by your facility, up to a maximum of eight.
- Adding tracknum0 through tracknum7 causes play of the audio track whose position in the clip's track stack matches the number specified in the tag. Choose the required number of "tracknum" tags, up

to a maximum of eight. Note that since the numbering scheme for tracknum tags starts with zero, tracknum0 would match the first audio track in the clip's track stack.

- The strings "NONE" and "None" are reserved. Do not use in this file.
- "silence" and "tracknum" tags should not be assigned to tracks in TrackTool.
- Track tagging rules are applied to non-tagged clips if the rules contain any "tracknum" tags.

An example of a complete file is as follows:

```
# Harmonic clip and player track-tagging file.
#
# Comment lines start with #
# The first non-comment line should always be 'K:ovn_trackmatch'
# Remaining lines start with A: followed by the name of the language tag.
# Tag names must not exceed 20 characters, and must not contain comma or slash.
# 'silence<n>' inserts <n> channels of silence.
# 'tracknum<n>' selects numbered track to be played on the next channel(s).
K:ovn_trackmatch
A:English
A:Spanish
A:French
A:Chinese
A:silence1
A:silence2
A:silence3
A:silence4
A:silence5
A:silence6
A:silence7
A:silence8
A:tracknum0
A:tracknum1
A:tracknum2
A:tracknum3
A:tracknum4
A:tracknum5
A:tracknum6
A:tracknum7
```

Copying the track tag file to Spectrum video servers outside an EFS

You can use the **Track Tag File** with Spectrum video servers outside an Extended File System.

1. In your Windows Explorer User Interface, navigate to the **Track Tag File** on video server A.

   By default, the **Track Tag File** (**TrackKeyValueDefs.txt**.) is located on the Spectrum video server's file system at: **fs\config\TrackKeyValueDefs.txt**. where fs is the actual File System name.

2. Right-click and select **Copy** file.
3. Open a window for the video server B and paste the file in an appropriate folder.

   The **Track Tag File** is now available for track tagging from video server B.

Changing the Spectrum video server time zone

You can select the international time zone in which your facility is located.

This ensures that the “date” stamp on recorded clips is correct, and provides assistance for Harmonic technical support for remote troubleshooting.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server.
3. Click the Spectrum video server’s picture to display the **Properties** page.
4. Scroll down to the **Time Zone** line.
5. Using the drop-down box, select the time zone in which the Spectrum video server is located.

Changing the Spectrum video server wink state

You can change the wink state for a video server.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server.
3. Click the Spectrum video server’s picture to display the **Properties** page.
4. Scroll to the bottom of the page, and check the **Wink State** line.
5. Change the Spectrum video server’s wink state as desired:
   - If On, click **Wink Off** to stop winking the blue light bar on the front panel.
   - If Off, click **Wink On** to start winking the blue light bar on the front panel.

Rebooting the Spectrum video server

On the **Properties** page, the “reboot” function is a local function that is not associated with the firmware upgrade process.

Reboot the Spectrum video server when it is experiencing problems, or if you do not want to reboot the Spectrum video server immediately after a firmware upgrade.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server.
3. Click the Spectrum video server’s picture to display the **Properties** page.
4. Scroll to the bottom of the **General Properties** section of the page and click **Reboot**.
5. When the **Confirmation** dialog appears, click **OK**. The Spectrum video server’s status changes to **Rebooting**, then **Not Connected**, then **Configuring**, and finally to **Connected**. The complete

process takes approximately two minutes though it may take longer for SystemManager to display the status once the unit is up and running.

NOTE: You can also reboot one or more Spectrum video servers on the Upgrade Firmware page. Refer to “Upgrading MediaDirector and MediaCenter Firmware” in the *Spectrum System Installation Guide* for details.

Powering down the Spectrum video server

Power down a Spectrum video server:

NOTE:

In certain circumstances, powering down one MediaDirector in an EFS configuration may cause video disruption to channels on other MediaDirectors.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a Spectrum video server icon to display the **Physical Configuration**page for the selected video server.
3. Click the Spectrum video server’s picture to display the **Properties** page.
4. Scroll to the bottom of the **General Properties** section and click **Shutdown Spectrum Server**.
5. When the **Confirmation** dialog appears, click **OK**.
6. Verify that Spectrum video server’s status changes to **Not Responding**.

   For instructions on powering down your entire Spectrum system or for power up instructions, refer to the Spectrum System Installation Guide.

Upgrading the Spectrum video server license

Every Spectrum video server includes a license file. If you have purchased a new license file from Harmonic, upgrade your Spectrum video server license using SystemManager.

If you have purchased a new license, Harmonic will provide you a license file. The format of the license file will vary depending on your system.

IMPORTANT: For systems with Spectrum X, the license file must include the full serial number of the Spectrum video server (with no dashes), and have a .txt extension in order for SystemManager to recognize it. Otherwise the **Upgrade License** button will not be available.

For other Spectrum systems, the file name may have a .hex extension. Also, note that the file name of the license file will typically include serial number information for the Spectrum product.

NOTE: Spectrum systems may include a mix of .hex and .txt license files.

1. Locate the Spectrum video server license file provided to you by Harmonic.
2. Copy the license file to the SystemManager hard drive under **<install drive>:\Licenses**.

   NOTE: The drive letter for <install drive> depends on which drive was selected when installing SystemManager.

3. From the **Configuration** tab in SystemManager, navigate to the **Properties** page for the Spectrum video server that you are upgrading. Once SystemManager identifies the new license file, the **Upgrade License** button will be available. Click **Upgrade License**.
   Note that the status displayed in the **Host Status** field on the Properties page will change to "upgrade queued," "upgrading," and then "needs reboot."
4. Reboot the Spectrum video server by clicking the **Reboot** button.

Related information

Rebooting the Spectrum video server
Viewing licensed features for a Spectrum video server

Viewing licensed features for a Spectrum video server

With Spectrum 8.2 and later, licensed features for Spectrum systems with Spectrum X are installed on the Spectrum video server. Open the **Licensed Features** page to view all installed licenses.

NOTE: For MediaPorts and ChannelPorts, licenses are installed on the I/O module and will not be displayed on the Licensed Features page.

NOTE: With SystemManager 6.7 and later, license enforcement is enabled at all times.

- From the **Spectrum Server Properties** page, under **General Properties**, click **View Licensed features** to open the Licensed Features page.

  NOTE: If a "demo" license is installed, SystemManager displays the expiration date for the demo license.

  NOTE: "BASIC-GFX" refers to four graphic layers. "MAX-GFX" refers to eight graphic layers.

Features of Spectrum Server	This section includes details on general licenses that are not associated with a channel.
Features of I/O Module	This section includes details on channel-based licenses. The "Owners Detail" section includes the names of I/O modules and players that are using the licenses.
Features	This column displays the license name
Number of licenses installed	This column displays the number of licenses installed on the server.
Number of licenses in use	This column displays the number of licenses that are currently being used.
Owner's Detail	When a license is being used by an I/O module, this column displays the name of the I/O module using the license.
Expires on Date	

Related information

Upgrading the Spectrum video server license

About demo licenses

If a demo license is installed on the Spectrum video server and license enforcement is enabled, SystemManager will display a message in red on the **Licensed Features** page to indicate that the demo license is present and to show the license expiration date.

NOTE: When a demo license is installed, SystemManager will generate one alarm per day to indicate when the license expires.

Configuring access control settings for video servers

The Spectrum Access Control Settings feature in SystemManager allows you to configure authentication settings for your video server, which can be used to connect to a Lightweight Directory Access Protocol (LDAP) server or a SAMBA domain.

IMPORTANT: Consult your network administrator before modifying the settings on the Access Control Settings page.

NOTE: The following instructions apply only to the MediaDirector 2252B, 2251B, 2252, 2251, 2202, and 2201, MediaCenter 2200 and 2200B, Spectrum X, and MediaDeck 7000.

Access control settings can be configured on a system-wide level, saved as a template, and applied to specific Spectrum video servers in your Spectrum system. These settings can be configured separately for each Spectrum video server and apply to the root level of the Spectrum video server file system.

NOTE: LDAP is an industry standard protocol. For information on LDAP terminology and concepts used in this section, you can refer to several online resources including Wikipedia or the Microsoft Windows Support website.

Configuring access control settings for multiple video servers

You can configure access control settings for multiple video servers.

1. From the **Configuration** tab, in the left-hand column, under Spectrum, click the Access Control icon. The **Access Control Settings for Spectrum Devices** page appears, as shown in the following figure.
2. Under **Local User Settings**, type the password for your video server. The default password is: user
3. In the field for **Authentication Type**, select from the following:
   - **LDAP**: select if you are connecting to an LDAP server.
   - **Local**: select if the only authentication required is the user name and password. If you select this option, the fields for LDAP Settings and SAMBA Settings will be grayed out.
   - **User-defined**: this option is provided for diagnostics purposes only.
4. In the field for **Guest Allowed**, select from the following:
   - **Yes**: if selected then no password is required to access the Spectrum video server file system.
   - **No**: if selected then a password is required to access the Spectrum video server file system.
5. Under **LDAP Settings**, enter the LDAP settings that apply to your network. Refer to Figure 9–5 for an example.
   - **LDAP Schema**: select from ActiveDirectory for Windows-based LDAP or OpenLDAP for the open source version of LDAP.

- **LDAP Server**: the DNS name of the server.
- **LDAP Base**: the string passed to the server to perform a search.
- **LDAP Base Pw**: the string passed to the server to search for users.
- **LDAP Bind Dn**: the string that identifies the user performing the search.
- **LDAP Bind Pw**: the password required for the search.

6. Under **SAMBA Settings**, enter the SAMBA settings that apply to your network.
   - **SMB Security**: Select from Domain or Non-domain. If you select Non-domain, then only the local user name and password are required.
   - **Domain Server**: name of the domain server.
   - **SMB WorkGroup**: name of the SMB workgroup.
   - **SMB Username**: user name required to join the SMB domain. Note that this setting is not saved as part of a template. It is only used when joining the SMB domain.
   - **SMB Password**: password required to join the SMB domain. Note that this setting is not saved as part of a template. It is only used when joining the SMB domain.
   - **SMB Address**: the DNS name of the domain controller.

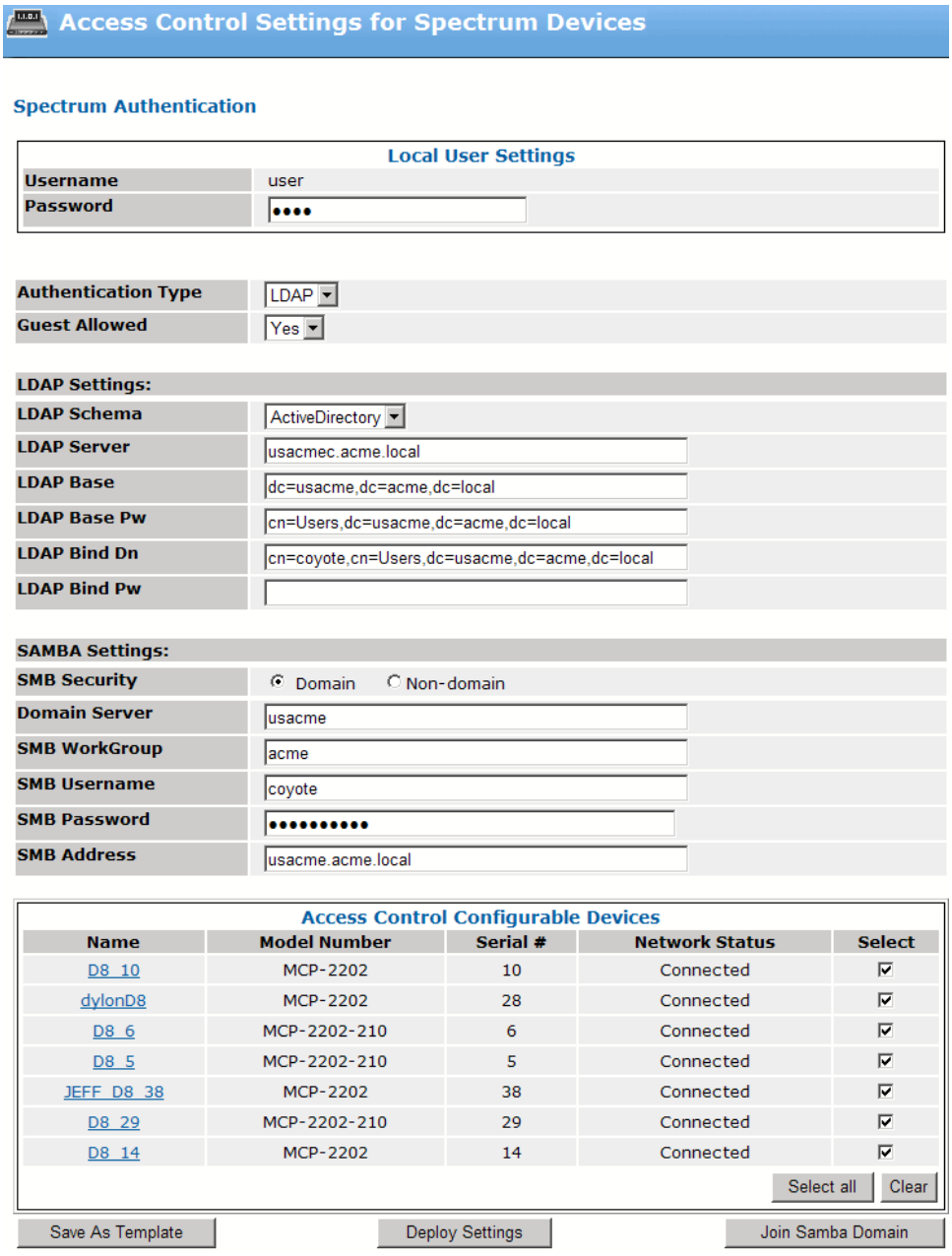


Figure 2-14: Access Control Settings

7. Once you have entered all the necessary settings, click **Save as Template** to save the settings as a template.
8. In the **Access Control Configurable Devices** section, select the video servers to which you want to apply the template.
   - **Select All**: click to select all the Spectrum video servers listed.
   - **Clear**: click to clear the check boxes.
9. To apply the settings to the selected Spectrum video servers, click **Deploy Settings.**

NOTE: The Deploy Settings button also saves the current settings as a template.

10. If you have entered SAMBA domain information, click Join SAMBA Domain to apply the SAMBA settings and join the SAMBA domain.

Configuring access control settings for CIFS

For Harmonic applications that mount the Spectrum video server file system (such as MAS), enter CIFS authentication credentials.

If LDAP authentication is selected for your Spectrum video server and the file system is password protected (with guest access set to No), then the user name and password in the CIFS Authentication section of the Access Control Settings page can be used to access the file system.

1. From the **Configuration** tab, in the left-hand column, under Spectrum, click the **Access Control icon** to open the **Access Control Settings** for **Spectrum Devices** page.
2. Scroll down to the **CIFS Authentication** section (see the following figure).

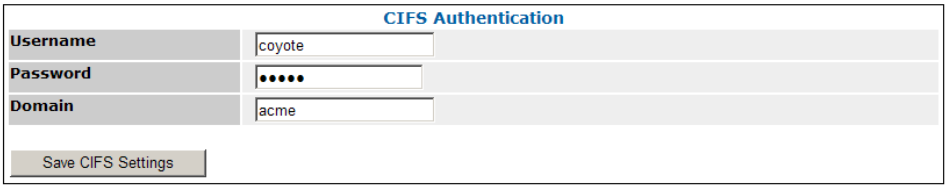


Figure 2-15: Configuring CIFS authentication

3. Enter your CIFS domain information as follows:
   - **Username**: Specify a user name in this field.
   - **Password**: Specify a password in this field.
   - **Domain**: This field displays the domain name.

   IMPORTANT: Make sure to select a user name and password, which do not expire, unlike passwords for some directory services.
4. Click **Save CIFS Settings** to save the settings. The authentication settings are saved locally on the SystemManager.

Configuring access control settings for a single video server

Configure access control settings for an individual Spectrum video server.

1. From the **Configuration** tab, on the **System Diagram** page, click the icon or heading for the Spectrum video server for which you want to configure access control settings. The **Physical Configuration** page appears.
2. Click the icon of the Spectrum video server to display the **Properties** page.
3. Under **Host Properties**, in the **Change Settings** field, click the **Access Control Settings** button. The **Access Control Settings** page for that Spectrum video server appears.
4. Under **Local User Settings**, type the password for your Spectrum video server. The default password is: user
5. In the field for **Authentication** Type, select from the following:

- **LDAP**: select if you are connecting to an LDAP server.
- **Local**: select if the only authentication required is the user name and password. If you select this option, the fields for LDAP settings and SAMBA Settings will be grayed out.
- **User-defined**: this option is provided for diagnostics purposes only.

6. In the field for **Guest Allowed**, select from the following:
   - **Yes**: if selected then no password is required to access the Spectrum video server file system.
   - **No**: if selected then a password is required to access the Spectrum video server file system.
7. Under **LDAP Settings**, enter the LDAP settings that apply to your network. Refer to the following figure for an example.
   - **LDAP Schema**: select from ActiveDirectory for Windows-based LDAP or OpenLDAP for the open source version of LDAP.
   - **LDAP Server**: the DNS name of the server.
   - **LDAP Base**: the string passed to the server to perform a search.
   - **LDAP Base Pw**: the string passed to the server to search for users.
   - **LDAP Bind Dn**: the string that identifies the user performing the search.
   - **LDAP Bind Pw**: the password required for the search.
8. Under **SAMBA Settings**, enter the SAMBA settings that apply to your network.
   - **SMB Security**: Select from Domain or Non-domain. If you select Non-domain, then only the local user name and password are required.
   - **Domain Server**: name of the domain server.
   - **SMB WorkGroup**: name of the SMB workgroup.
   - **SMB Username**: user name required to join the SMB domain. Note that this setting is not saved as part of a template. It is only used when joining the SMB domain.
   - **SMB Password**: password required to join the SMB domain. Note that this setting is not saved as part of a template. It is only used when joining the SMB domain.
   - **SMB Address**: the DNS name of the domain controller.

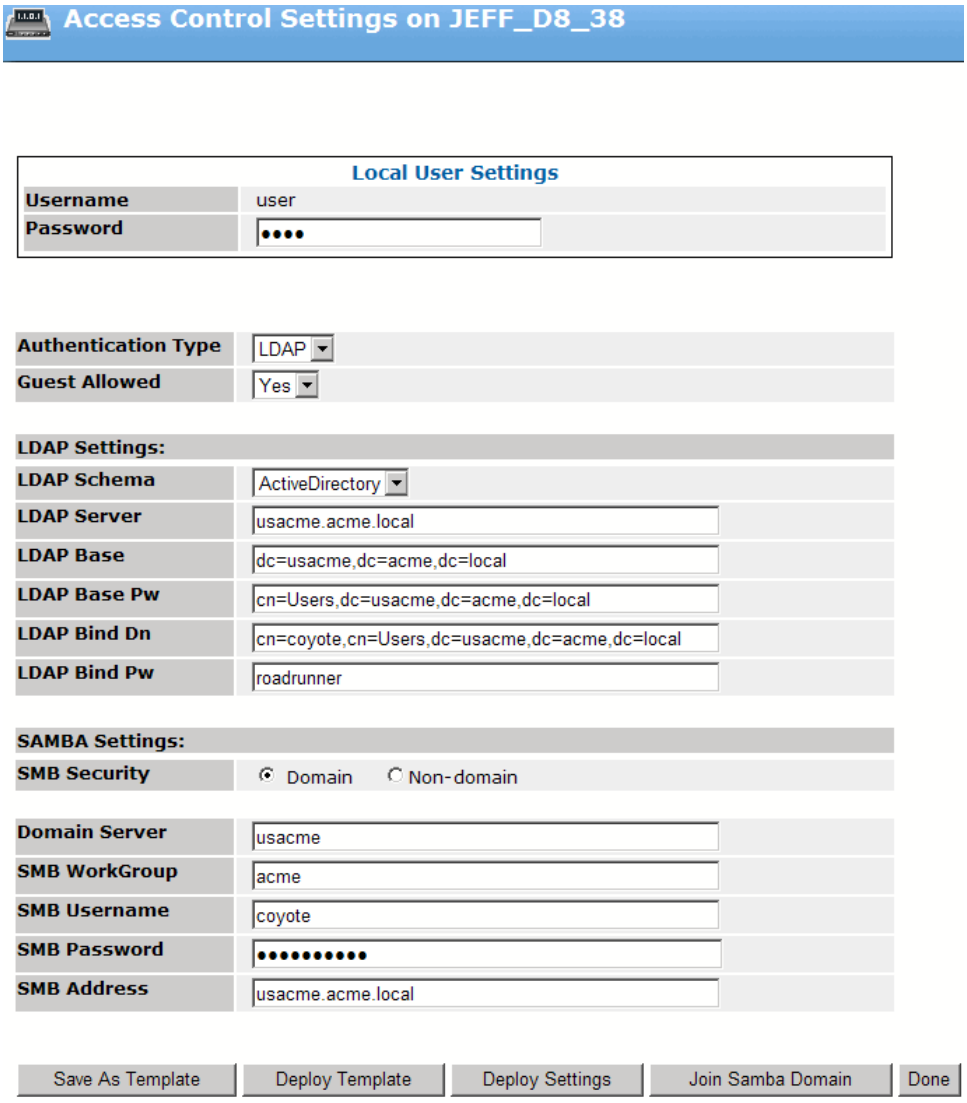


Figure 2-16: Access Control Settings for a single Spectrum video server

9. Once you have entered all the necessary settings, you can perform the following operations:
   - **Save as Template**: Click this button to save the settings as a template. Once the settings are saved as a template, they can be applied to other Spectrum video servers in your network. Refer to step 8 in “Configuring Access Control Settings for Multiple Video Servers” for instructions on applying a template to other Spectrum video servers.
   - **Deploy Template**: Click this button to apply the saved template to the Spectrum video server.
   - **Deploy Settings**: Click this button to apply the settings to the Spectrum video server.
   - **Join Samba Domain**: Click this button to apply the SAMBA settings and join the SAMBA domain.
   - **Done**: Click this button to revert to the saved settings and return to the **Properties** page.

Related information

Configuring access control settings for multiple video servers

Installing a DDC file

With Spectrum 7.7 and later, if you wish to install a Harmonic-supplied drive that is newer than your current Spectrum firmware, you may use SystemManager to install a “DDC” configuration file to your video server, which enables you to install and use the new drive.

Once you receive the new drive from Harmonic, contact Harmonic technical support to request the DDC file and save it to a location on your SystemManager platform or client computer. Then use the “Install DDC File” page in SystemManager to install the DDC file to your video server. Note that if you install the DDC file on a video server in an EFS configuration, the file will automatically be installed on all the video servers in the EFS.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
2. Click the image of the Spectrum video server to display the **Properties** page.
3. In the **Host Properties** section of the page, in the **Change Settings** field, click **Configure DDC File**. The **Configure DDC File** page for your Spectrum video server appears.
4. Make sure to leave **Use default credentials** selected.

   If you believe the credentials for your video server operating system have changed, you may clear this option and then enter the user name and password, or contact Harmonic technical support for assistance.
5. Click **Browse** to browse to the DDC file on your SystemManager platform or client computer. If you have not received a DDC file from Harmonic, contact Harmonic technical support to request one, and then save it to your SystemManager.
6. Click **Apply**. The Status field will show the status of the installation.
7. Verify that the Status field displays “Successfully configured DDC. Done”
8. If SystemManager does not successfully install the DDC file, contact Harmonic technical support for assistance.

Connecting to a Harmonic MediaGrid from the Spectrum video server

Using SystemManager, you can connect a Spectrum video server to one or more Harmonic MediaGrid systems.

NOTE: This section applies to the MediaDirector 2252B, 2251B, 2252, 2251, 2202, and 2201, MediaCenter 2200B and 2200, Spectrum X, and MediaDeck 7000

1. Navigate to the **Properties** page for your Spectrum video server.
2. Click the **Harmonic MediaGrid Accounts** button to display the **Harmonic MediaGrid Accounts** page as shown in the following figure.

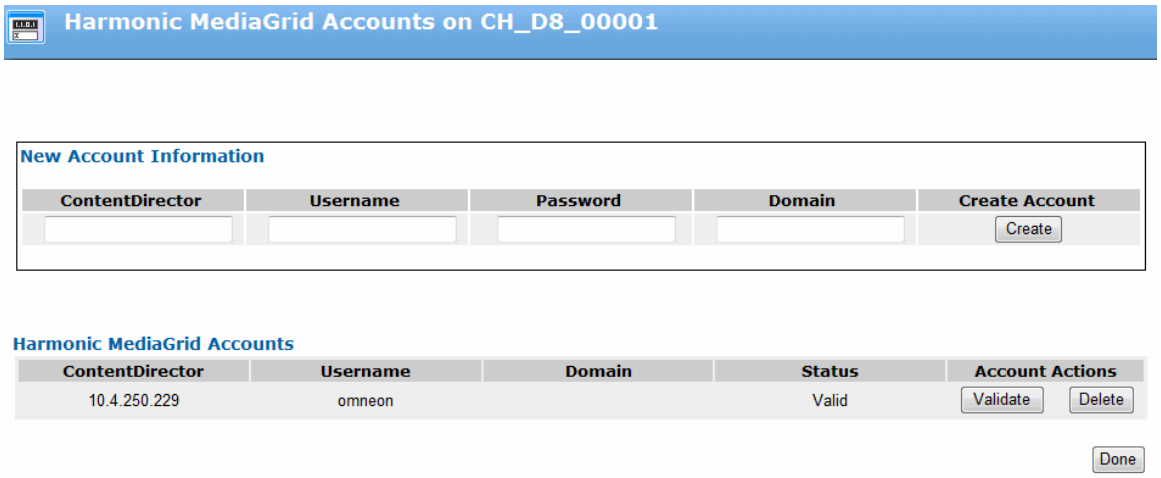


Figure 2-17: Harmonic MediaGrid Accounts page

3. In the **New Account Information** section of the page, enter the following information:
   - **ContentDirector**: IP address or DNS name of the ContentDirector
   - **Username**: Harmonic MediaGrid username.
   - **Password**: Harmonic MediaGrid password.
   - **Domain**: domain of the Harmonic MediaGrid
4. Click **Create**. The new account appears in the Harmonic MediaGrid Accounts section of the page.
5. Verify that the Status of the new account shows **Valid**.
6. To connect to another Harmonic MediaGrid, repeat steps 1-5 entering the appropriate information for the second Harmonic MediaGrid.
7. To validate a Harmonic MediaGrid account at any time, click **Validate**. The Status of the account will show **Valid** or **Invalid**.
8. To delete a Harmonic MediaGrid account at any time, click **Delete**.

Changing network and file system performance settings

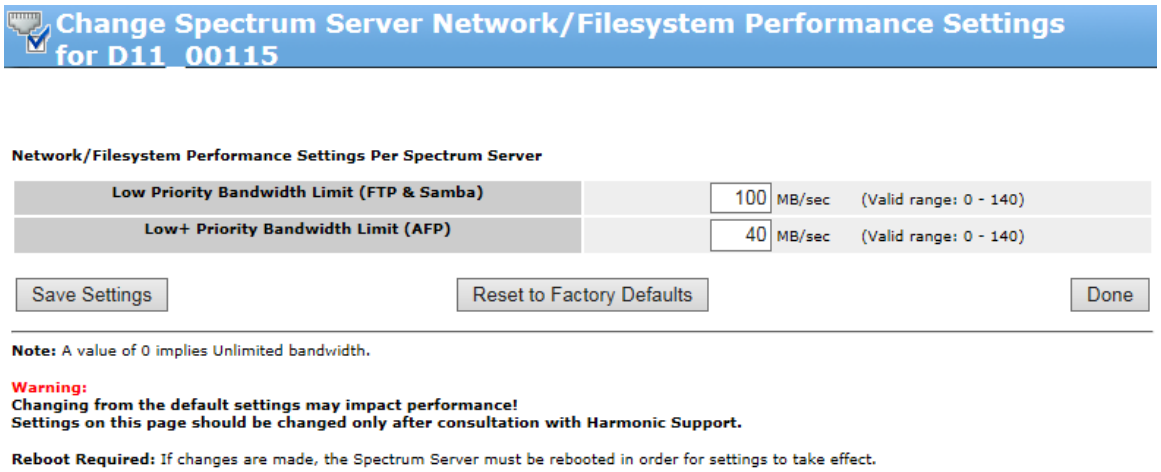
If instructed by Harmonic technical support, you can change performance settings for your Spectrum video server.

IMPORTANT: Do not change the settings on this page unless directed by Harmonic technical support.

This section applies to the following Spectrum video servers:

- MediaDirector 2252B, 2251B, 2252, 2251, 2202, and 2201
- MediaCenter
- Spectrum X
- MediaDeck 7000

1. On the **Properties** page for your Spectrum video server, click **Low Priority Bandwidth Settings** to display the **Change Spectrum Server Network/File System Performance** page.



2. You can edit the following settings:

Low Priority Bandwidth Limit (FTP & SAMBA)

Configures the low priority bandwidth limit for File System reads and writes of clips over FTP and SAMBA.

- For the MediaDirectors 2252 and 2252B, the default is 560 MB/sec. and the total valid range is 0-600.
- For the MediaDirectors 2251 and 2251B, the default is 280 MB/sec. and the total valid range is 0-600.
- For the MediaDirector 2202, the default is 560 MB/sec. and the total valid range is 0-600.
- For the MediaDirector 2201, the default is 260 MB/sec. and the total valid range is 1-299.
- For the MediaCenter 2200B, the default is 185 MB/sec. and the total valid range is 0-225.
- For the MediaDeck 7000, the default is 100 MB/sec and the total valid range is 0-140.
- For the Spectrum X, the default is 100 MB/sec and the total valid range is 0-140.

IMPORTANT: For the MediaDeck 7000, Harmonic recommends that you leave the default setting. Changing this setting may affect performance.

Low+ Priority Bandwidth Limit (AFP)

Configures the low priority bandwidth limit for File System reads and writes of clips over AFP.

- For the MediaDirector 2252 and 2252B, the default is 40 MB/sec. and the total valid range is 0-600.
- For the MediaDirector 2251, the default is 40 MB/sec. and the total valid range is 0-600.
- For the MediaDirector 2202, the default is 40 MB/sec. and the total valid range is 0-600.
- For the MediaDirector 2201,the default is 40 MB/sec. and the total valid range is 1-299.
- For the MediaCenter 2200B, the default is 40 MB/sec. and the total valid range is 0-225.

- For the MediaDeck 7000, the default is 40 MB/sec and the total valid range is 0-140.
- For the Spectrum X, the default is 40 MB/sec and the total valid range is 0-140.

IMPORTANT: For the MediaDeck 7000, Harmonic recommends that you leave the default setting. Changing this setting may affect performance.

For the MediaDirector 2201, note the following restrictions when configuring the performance settings:

- The total networking bandwidth, the sum of the Low Priority Bandwidth Limit and the Low + Priority Bandwidth Limit, is limited to 300 MB/s and cannot be increased.
- Neither the Low Priority Bandwidth Limit nor the Low + Priority Bandwidth Limit can be disabled entirely by setting the value to zero. The minimum for both settings is 1 MB/ sec.
- Any values outside the valid range will not be accepted.

  For the MediaCenter and MediaDeck 7000, neither the Low Priority Bandwidth Limit nor the Low + Priority Bandwidth Limit can be disabled entirely by setting the value to zero. The minimum for both settings is 1 MB/ sec.

3. Click **Save Settings** to save the changes.
4. To return to the default settings at any time, click **Return to Factory Defaults**.

About file types

Note how Spectrum handles different file types.

About file types used on a Spectrum video server

Note the file extensions recognized by the Spectrum system.

Clips recorded by Spectrum video server "Players" are (by default) stored in a folder called clip.dir with the clip files (or “headers”) having the .mov (QuickTime movie) type. The corresponding media files are stored in clip.dir/media.dir. When copying (or creating) media files from a PC to a Spectrum video server, it is important to have the correct file extensions. The Spectrum video server uses known file extensions to determine how to store files efficiently for playback. The following table lists the file extensions recognized by the Spectrum video server with the corresponding file types. These files are handled "in a special manner" by the Spectrum video server.

Table 2-2: File Extensions Supported by Spectrum video servers

Extensions	Corresponding File Types
.mov	Clips that can be loaded into Players
.dv	Digital Video media file
.601	10-bit SDI media file

Extensions	Corresponding File Types
.aiff	Audio Interchange File Format media file
.hdcam	Sony HDCAM media file
.vbi	Vertical Blanking Interval media file
.mpg	MPEG-2 elementary stream file (includes MXF files)
.mpeg	Alternate MPEG formats
.au, .aud, .aif, .wav	Alternate audio formats
.avi	Audio Video Interleaved
.rm	Real Media Format
.wmv, .wma, .asf	Windows Media File Formats
.dif	Alternate Digital Video file format (Pinnacle purple.)
.data	Data file, typically containing DVB/ASI transport streams

Review the following important points regarding the listed file formats:

Only .mov files referenced in the following table can be played successfully by the Spectrum video server.

Table 2-3: File Types Referencing .mov Files Supported by Spectrum video servers

.dv	.mpg	.vbi
.aiff	.data	.wav
.601	.hdcam	.dif

Of these file types, the only ones that can typically be generated (or read) by a PC or Macintosh are DV 25 (stored in .dv files), .aiff and .wav. While some of these other extensions may be used for media files on the PC or Macintosh, in general their codecs are not compatible with Harmonic codecs.

Files with media types not listed in the table can still be copied to the Spectrum video server (using CIFS, AFP or FTP). They will however be stored in a format optimized for small files, and cannot be played back through MediaPorts.

NOTE: No locking or security functions are performed in the current release.

About Support for MXF eVTR

Note some important points regarding the implementation of MXF eVTR for Spectrum.

NOTE: Spectrum supports many variations of MXF. For detailed information about supported track and wrapper formats, refer to Spectrum Media and Wrapper Formats included in the Spectrum documentation suite.

Note the following:

- MXF eVTR currently supports IMX 30, 40 and 50 4:2:2 accompanied by 8 channels of 24-bit AES3 audio. Note that the SystemManager application will allow you to create an IMX 30, 40, and 50-only recorder (I.e., without audio), but you will not be able to record with a video only Player. Be sure to specify IMX 30, 40, or 50 and 8 channels of 24-bit AES3 audio for MXF eVTR recorders.

- MXF eVTR clips recorded on a Spectrum System and transferred to an eVTR will lose structural and descriptive metadata not recognized by the E-VTR. Examples of lost metadata include default in and out points, language labels for audio tracks, and other descriptive tags set with the Player API. This is not an issue unless you plan on transferring the clip back to the Spectrum System.
- MXF eVTR clips recorded on a Spectrum System and transferred to an eVTR will have all dark metadata quietly dropped by the eVTR. This is not an issue unless you plan on transferring the clip back to the Spectrum System since the dark metadata is not preserved by the eVTR.
- MXF eVTR and QuickTime clip names are distinguished by extension (.mxf vs. .mov), however, applications that access clips using the Player API, or VDCP protocol cannot see these extensions. Therefore, mixing clips of the same name but different extensions (e.g.foo.mxf and foo.mov) in the same directory will lead to unpredictable results.
- QuickTime Players cannot playback 24-bit AES3 MXF audio. If you intend to operate your system using both QT and MXF eVTR files, you should change all Players to MXF eVTR including playback Players. MXF eVTR playback Players allow the playback of both MXF eVTR and QuickTime audio.
- Windows ClipTool version 3.1 and later versions support MXF eVTR. Previous versions of this application do not recognize MXF eVTR.
- When using the MXF eVTR format, you must configure a video and an audio track.
- The current implementation of MXF eVTR does not support HD output

Refer to Spectrum Media and Wrapper Formats included in the Spectrum documentation suite for detailed information about supported track and media wrapper formats.

About Spectrum video server striping for files transferred over Ethernet

Spectrum uses different file striping schemes for performance reasons.

Many files, including ".mov" files, are recorded as "nostripe" files to save space, but nostripe files cannot contain media for real time playback. The Spectrum server records video files as "largestripe" and audio files as "smallstripe," based on the file extension (.dv, .aif, .601, etc.) assigned internally by the Spectrum video server's recording software. Please note:

- Nostripe files are files that are stored compactly on disk, but are not intended to contain real time media. The File System cannot retrieve these files quickly enough for real time playback purposes. On the Harmonic system, most .mov files and any other files that do not contain any actual media fall into this category.
- Smallstripe files are those that contain media of relatively low bit rates, for real-time playout. They use a larger block size on disk and consume a medium amount of Spectrum video server resources. On the Harmonic system, .aiff and .wav audio files fall into this “smallstripe” category.
- Largestripe files are those that contain high bit rate real-time media. They use the largest block size on disk and consume a large amount of Spectrum video server resources. On the Harmonic system, all video files (including .dv, .601, .mpg, etc.) fall into this “largestripe” category.

All of these striping schemes are applied automatically when files are recorded by the Spectrum video server through MediaPorts. When files are recorded using Ethernet, however, these rules do not automatically apply. Instead, rules specified in a special file called "filetypes.conf" are used. This file is setup by default to handle files saved by Apple® Final Cut Pro®, and to handle standard Harmonic media file types. To add new rules for file type handling as required, the user may edit the filetypes.conf file.

NOTE: Remember that a MediaDirector 2100 has a single host and MediaDirectors 2101, 2102, and 2102B have multiple hosts. Each host in turn has its own filetypes.conf file.

CAUTION: Only qualified support personnel should change the Spectrum video server striping method.

Related information

Editing the filetypes.conf file

About file handling for Final Cut Pro

Files recorded by Apple Final Cut Pro (FCP) do not follow Harmonic's file naming schemes, so the server has to be given special rules in order to write FCP's output such that edited clips will play out correctly using Spectrum I/O modules.

These special rules are required because most FCP files often contain real-time media. Harmonic ships Spectrum video servers pre-configured with the following rules (pertaining to FCP):

- Anything saved in or below an "FCP" directory and ending with ".mov" will be recorded as largestripe. Harmonic recommends that the FCP user create an "FCP" directory on the Spectrum video server under the appropriate host. Use this directory to store FCP's files.
- Anything recorded in or below the "Render Files" or "Capture Scratch" directories will be largestripe. These directories are automatically created by FCP (on the Spectrum video server).
- Anything recorded in or below the "Audio Render Files" or "Audio Capture Scratch" directories will be smallstripe. These directories are also automatically created by FCP (on the Spectrum video server).

These rules should suffice for most FCP users as long as all Final Cut Pro movies are exported to the "FCP" directory on the Spectrum File System with the ".mov" extension. For the files to be playable by the Spectrum video server, they must end with ".mov" in order to appear as Harmonic clips.

About changing the Ethernet file striping behavior

The filetypes.conf file can be edited to change the striping behavior.

The file is plain text and contains rules using "regular expressions" compliant with POSIX 1003.2 (aka Unix egrep, etc.) except that the expressions are case-insensitive.

Note the following usage in POSIX expressions:

- (#) Lines beginning with a pound sign are comments and will not be processed.
- (.) matches any single character.
- (*) Indicates that the preceding item will be matched zero or more times.
- (+) Indicates that the preceding item will be matched one or more times.
- (.*) Acts as a wildcard. It matches all characters.
- ($) Means match the string at the end of the line. For example, "mov$" matches strings that end with ".mov".
- Regarding ([ ]) square brackets:
  - A pair of square brackets matches a selection of characters specified within the square brackets. For example, [Hh]ello matches lines containing "Hello" and "hello". And [.] matches a line containing a dot.
  - The square brackets can be used to search for non-matches. This is done by putting a carat (^) as the first character inside the square brackets. So, if the list within the([ ]) begins with a carat (^), it matches any single character not from the list. For example, clip [^123456789]+ matches clipA, clipQ, and clipz, but not clip0, clip5, and clip8.

- (|) A vertical line is used to separate alternatives. For example, dv|dif|m2v matches "dv", or "dif", or "m2v".
- A pair of parentheses ( ) or round brackets is required to enclose sub expressions. For example, dv|dif|m2v must be enclosed within a pair of parenthesis in order to be a valid sub expression as in (dv|dif| m2v)

Make changes as desired using standard editing procedures. When changes are completed, click on Save File to preserve your edits or Cancel to abort changes.

CAUTION: If these instructions are beyond your capabilities, do not attempt to edit the filetypes.conf file. Only qualified support personnel should change the Spectrum video server striping method.

The default rules assume that you will create a directory named FCP on the Spectrum File System and use that directory for all FCP output. Other directory names can be used for FCP output, but the filetypes.conf must be edited accordingly. For example, if FCP movies will be exported directly to the default clip.dir directory for use by automation applications, you will want to add the following rule into the filetypes.conf files:

```
large       /clip[.]dir/.*[.]mov$
```

This is performed so that all .mov files written using Ethernet into the clip.dir directory will be recorded as largestripe. You would put this new rule just before or after the line:

```
large       /FCP/.*[.]mov$
```

or, you would replace this old rule with the new one if you do not want to use an “FCP” directory at all.

Note that Final Cut Pro will create some or all of the following subdirectories in any directory that it is told to use for a “scratch disk”:

- Audio Render Files
- Capture Scratch
- Render Files
- Audio Capture Scratch

The default rules account for these subdirectories automatically. All you have to change (if you want to change anything) is the directory or directories within which Harmonic will enforce the “record .mov as largestripe” rule.

NOTE: The rules in filetypes.conf only apply to files written by external applications like Final Cut Pro. Files recorded using MediaPorts are always written with the correct striping regardless of the rules in the file, so you will not “break” the server’s basic operations by changing the file.

Refer to “Mapping Suffixes for File Types” for information regarding alternate file suffixes for the same file type.

Related information

Mapping suffixes for file types

Mapping suffixes for file types

You can use the “filetypes.conf” file to map one file suffix to another.

Some third party applications recognize different file suffixes for the same file type. For example, one application may recognize .dif as a valid suffix for the DV file format and not .dv. To ensure compatibility, add an expression to the “filetypes.conf” file to map one file suffix to another.

1. From the Edit “filetypes.conf” page, in the scrolling text box, enter the following expression: “media_map suffix1 suffix2” (Where suffix1 stands for the suffix you want to replace and suffix2 is the replacement.)

   The following table lists the suffixes which can be substituted for each supported file type with multiple suffix options.

   Table 2-4: Mapping suffixes for file types

File type	Recognized suffixes
DV	.dv
	.dif
AIFF	.aiff
	.aifc
	.aif
WAVE	.wav
	.wave
MPEG-2	.m2v
	.mpg

2. Click **Save File** to preserve your edits or **Cancel** to abort changes.

   All new recordings now generate a file with the new suffix (suffix2) as specified above.

About file sharing cautions and limitations

Note some important file sharing cautions and limitations.

- 255 characters is the maximum length for file names (for files created through the SMB interface). The maximum length for path names (as supported by the Spectrum video server) including the file name and all directories is 4095 characters. However, Windows clients generally do not allow path lengths greater than 255 characters.
- File creation and modification times for files and directories are maintained, but not always exactly in the same way as Windows servers. That is, if you copy a file from a client to the Spectrum video server, the modification time is reset to the time that the file copy was completed (instead of the modification time on the original file).
- Access time information is not supported.
- Per-file and per-directory permissions are not supported in the Spectrum video server release. The SMB File Server allows complete access to all users. Please ignore information or controls in the "Security" tabs of all “Properties” dialogs.

- All locking operations are allowed without checking for the existence of multiple users. This improves performance, but means that applications that depend on file locking for coordination should not be used.
- The Spectrum video server cannot be used as a Network Print Server, LDAP server, Master Browser (Local or Domain) or WINS server.

About source code availability

Source code for the Harmonic CIFS Server or Harmonic AFP Server is available on different web sites.

The Harmonic CIFS Server is based on Samba, which is open source software with a GNU General Public License. Per the terms of this license Harmonic provides the Samba source code, including Harmonic modifications that make it work with the Harmonic Server System. Please contact Harmonic for details regarding the Samba source code, or visit the Samba web site at *http://www.samba.org*.

The Harmonic AFP Server is based on Netatalk which is open source software with a GNU General Public License. Per the terms of this license Harmonic provides the Netatalk source code, including Harmonic modifications that make it work with the Harmonic Server System. Please contact Harmonic for details regarding the Netatalk source code, or visit the Netatalk web site at *http://netatalk.sourceforge.net*.

About naming files and system elements

Fine important notes about the naming of files, devices, hosts, Players, RAID sets, and File Systems on a Harmonic network.

Table 2-5: File naming conventions and elements

Element	Notes
Filename Clip Name	Naming conventions follow Windows32™ rules. In general, names can be quite long. Standard alphanumeric characters are allowed: a-z, A-Z, 0-9. Most characters, including spaces, are valid except: / \ : * ? < > | and the double quote character (“).
Device Name Host Name	Maximum name length is *fifteen* characters. Standard alphanumeric characters are allowed: a-z, A-Z, 0-9 also _ (underscore) and -(dash). 9 special characters are allowed for Device or Host names: ! ^ ( ) { } - _ ~ No spaces are allowed.

Element	Notes
Player Name	Maximum name length is *thirty* characters. Player names must be unique across all systems managed by a given instance of the SystemManager. Standard alphanumeric characters are allowed: a-z, A-Z, 0-9 also _ (underscore) and -(dash). 9 special characters are allowed for Player Names: ! ^ ( ) { } - _ ~ No spaces are allowed.
RAID Set Name	Maximum name length is *thirty* characters. Standard alphanumeric characters are allowed: a-z, A-Z, 0-9 also _ (underscore) and -(dash). 9 special characters are allowed for RAID Set Names: ! ^ ( ) { } - _ ~ No spaces are allowed.
File System Name	Maximum name length is *eight* characters. Standard alphanumerics are allowed: a-z, A-Z, 0-9 also _ (underscore) and -(dash). 9 special characters are allowed: ! ^ ( ) { } - _~ No spaces are allowed.

Keep in mind the following additional points:

- For a Harmonic system with an Omnibus automation system, clip names are usually generated on the Omnibus side. To create clips for use on an Omnibus system, follow these guidelines:
  - Avoid creating long Harmonic clip names that only differ in the last few characters as long Harmonic clip names are truncated to 25 characters when Omnibus clip names are generated.
  - Avoid creating clip names that differ only in uppercase/lowercase iteration. Omnibus preserves the case of clip names but internally uses case insensitive searching.
- When using AFP, the maximum file name length should be 26 characters.
- Clips with file names longer than 26 characters cannot be imported into Final Cut Pro There is a known incompatibility issue with long file names between Final Cut Pro and OSX.

Editing the filetypes.conf file

The Edit “filetypes.conf” File page allows qualified users to modify the “filetypes.conf” file for the associated Spectrum video server host. This file specifies the rules by which striping schemes are applied to all media files recorded over Ethernet.

Harmonic uses three different file striping schemes for performance reasons: Nostripe, Smallstripe and Largestripe.

For applications that recognize different file suffixes for the same file type, you can edit “filetypes.conf” so that one file suffix is mapped to another. Refer to “Mapping Suffixes for File Types” for more information.

The filetypes.conf file can be edited with a simple text editor or from the SystemManager application.

1. Start the SystemManager application.
2. Click the **Configuration** tab to display the **Configuration** page.
3. In the **System** diagram, click a Spectrum video server host icon to display the **Physical Configuration** page.
4. Click the Spectrum video server’s picture to display the Properties page.
5. Click on the **Edit “filetypes.conf”** button that appears below each host’s **Unique Properties**. This takes you to the **Edit “filetypes.conf”** page as shown.

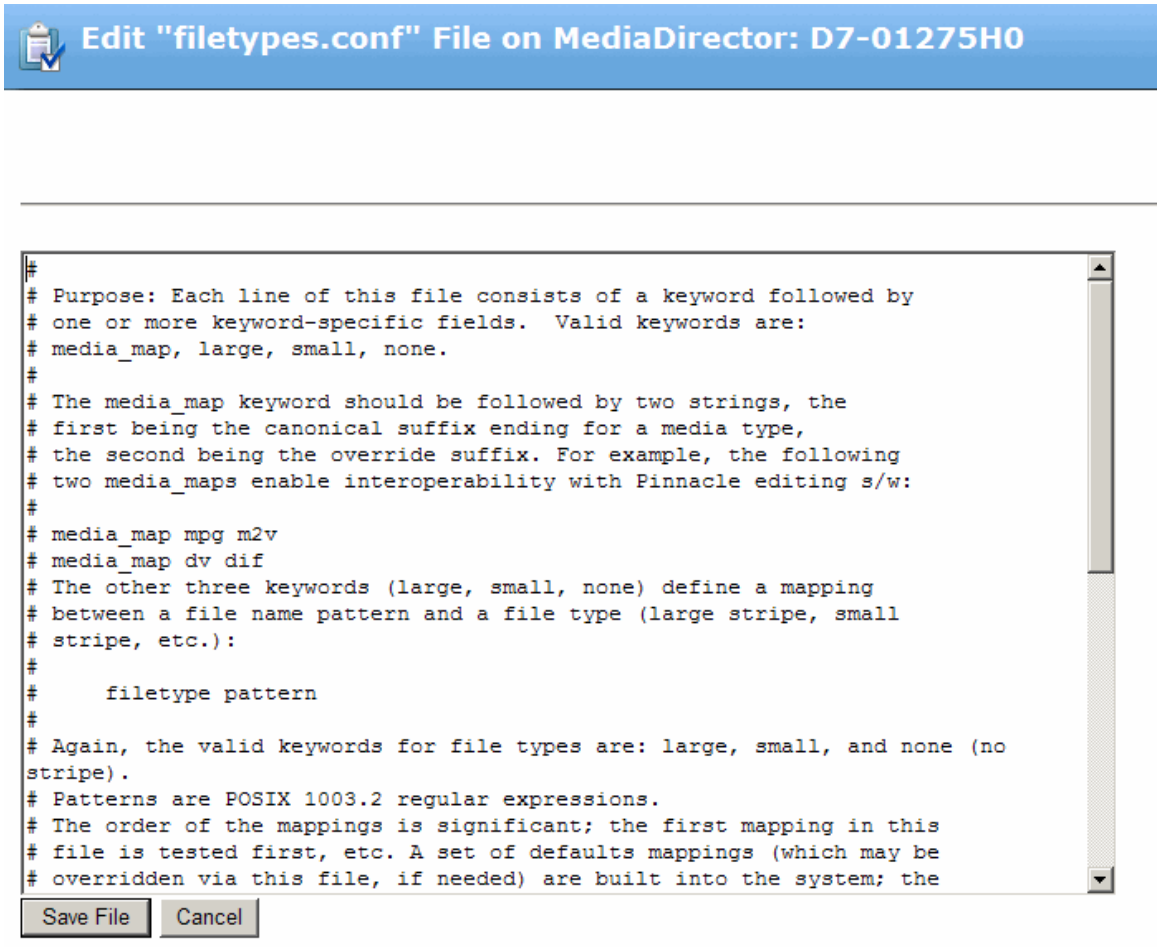


Figure 2-18: Editing the Filetypes.conf File

6. Edit the file following the rules and recommendations from Harmonic.

Related information

About changing the Ethernet file striping behavior
Mapping suffixes for file types

Configuring the stripe size for WebM files

If you have updated your Spectrum system from a pre-8.4 version to 8.4 or later, make sure to configure the stripe size for WebM files in the `filetypes.conf` file before loading WebM files on your Spectrum server.

IMPORTANT: WebM files must be configured for Large Stripe. Failure to configure the stripe size will result in very slow load times.

1. From SystemManager, navigate to the **Properties** page for your video server.
   a. From the **Configuration** tab, click the icon for your video server.
   b. From the **Physical Configuration** page, click the video server icon or name to open the **Spectrum Server Properties** page.
2. In the **Change Settings** field, click **Edit filetypes.conf** to open the **Edit "filetypes.conf"** page.
3. From the **Edit "filetypes.conf"** page, scroll down and locate the following line.

```
#large [.](dv|mpg|mpeg|m2v|601|avi|hdcam|dif|gxf|lxf|mxf|dnxhd|avc|mp4|flv|zip|
ts|mts|prores|largestripe)$
```

4. Add "webm" as follows.

```
#large [.](dv|mpg|mpeg|m2v|601|avi|hdcam|dif|gxf|lxf|mxf|dnxhd|avc|mp4|flv|zip|
webm|ts|mts|prores|largestripe)$
```

5. Click **Save File** for the changes to take effect.

Chapter 3

Spectrum file system configurations

Find the configuration instructions for Spectrum file systems.

IMPORTANT: The procedures outlined for file system configurations are written for qualified technical personnel, skilled at advanced networking procedures. If you have any questions, please consult with your facility's Information Service staff or contact Technical Support.

- *About file system configurations for Spectrum video servers*
- *Building a file system for a single MediaDirector 2252B, 2251B, 2252, or 2251*
- *Building an EFS system for multiple MediaDirector 2252B, 2251B, 2252, or 2251 units*
- *Verifying Spectrum video servers in an EFS have common views of storage*
- *About disk subsystem performance factors*
- *Creating a RAID set*
- *Deleting a RAID set*
- *Adding drives to a RAID set*
- *Removing drives from a RAID set*
- *Creating a file system*
- *Initializing a file system*
- *Deleting a file system*
- *Renaming a file system*
- *Extending a file system*
- *Adding a RAID set to a file system*
- *Removing a RAID set from a file system*
- *Changing a file system wink state*
- *Viewing a file system Unicode status*
- *Modifying the RAID set channel*
- *About making or clearing a hot spare*
- *Changing RAID set wink state*
- *Creating file systems with One-Click functions*

About file system configurations for Spectrum video servers

Spectrum video servers provide different file system configurations depending on the model of video server.

About file system configurations for MediaDirector 2252B, 2251B, 2252, and 2251

The MediaDirectors 2252B, 2251B, 2252, and 2251 connect to the MediaStore 5000 series to provide a number of file system configurations based on different drive sizes.

The following tables describe the different file system configurations.

Table 3-1: File system configurations with MSS-5000 series a

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
16	2 x (6+2)	300 GB	3.49 TB
24	3 x (6+2)	300 GB	5.23 TB

Table 3-2: File system configurations with MSS-5000 series b

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
16	2 x (6+2)	600 GB	6.98 TB
24	3 x (6+2)	600 GB	10.46 TB

Table 3-3: File system configurations with MSS-5000 series c

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
16	2 x (6+2)	900 GB	10.47 TB
24	3 x (6+2)	900 GB	15.71 TB

Table 3-4: File system configurations with MSS-5000 series d

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
16	2 x (6+2)	1.2 TB	13.97 TB
24	3 x (6+2)	1.2 TB	20.95 TB

About file system configurations for MediaDirector 2252B and 2251B, and MediaStore 5100

The MediaDirectors 2252B and 2251B connect to the MediaStore 5100 series to provide a number of file system configurations based on different drive sizes.

The following tables describe the different file system configurations.

Table 3-5: File system configurations with the MediaStore 5100 series

Drives	RAID set	Capacity per Drive	Raw Storage Capacity
24	3 (6+2)	300 GB	5.23 TB
24	3 (6+2)	600 GB	10.46 TB
24	3 (6+2)	1.2 TB	20.95 TB

About the file system configuration for MediaCenter

Find available file system configurations for the MediaCenter 2200B and 2200/2200A.

Table 3-6: MediaCenter 2200B File System Configuration

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
12 SAS	2 x (4+2)	6 TB	48 TB
12 SAS	2 x (4+2)	4 TB	32 TB
12 SAS	2 x (4+2)	2 TB	16 TB

Table 3-7: MediaCenter 2200 and 2200A File System Configuration

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
12 SAS	2 x (4+2)	4 TB	32 TB
12 SATA	2 x (4+2)	2 TB	16 TB
12 SSD	2 x (5+1)	480 GB	4.8 TB
6 SSD	1 x (5+1)	480 GB	2.4 TB

Use the “One-Click” functions to create the file system and RAID set, and initialize the file system.

Related information

Creating file systems with One-Click functions

About the file system configuration for MediaCenter 2200B with MediaStore 7200

The available file system configurations for the MediaCenter 2200B with a MediaStore 7200are described here.

Table 3-8: MediaCenter 2200B (12 drives) with the MediaStore 7224 (24 drives)

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
36	6 x (4+2)	6 TB	144 TB
36	6 x (4+2)	4 TB	96 TB
36	6 x (4+2)	2 TB	48 TB

Table 3-9: MediaCenter 2200B (12 drives) with the MediaStore 7212 (12 drives)

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
24	4 x (4+2)	6 TB	96 TB
24	4 x (4+2)	4 TB	64 TB
24	4 x (4+2)	2 TB	24 TB

About the file system configuration for MediaDeck 7000

Find the file system configuration for a single Spectrum MediaDeck 7000.

Table 3-10: MediaDeck 7000 File System Configuration

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
4 SATA	3+1	4 TB	12 TB
4 SATA	3+1	2 TB	6 TB
4 SSD	3+1	480 GB	1.406 TB (1440 GB)

Use the “One-Click” functions to create the file system and RAID set, and initialize the file system.

Related information

Creating file systems with One-Click functions

About the file system configuration for Spectrum X

Find the file system configuration for a single Spectrum X in internal storage mode.

Table 3-11: Spectrum X File System Configuration

# Drives	RAID Set	Capacity per Drive	Raw Storage Capacity
4 SAS	3+1	6 TB	18 TB
4 SAS	3+1	4 TB	12 TB
4 SAS	3+1	2 GB	6 TB

Use the “One-Click” functions to create the file system and RAID set, and initialize the file system.

Related information

Creating file systems with One-Click functions

Building a file system for a single MediaDirector 2252B, 2251B, 2252, or 2251

Build a File System for a single MediaDirector, using a MediaDirector 2252B, 2251B, 2252, or 2251.

A variety of system configurations are supported; please consult with your Harmonic representative for assistance in designing your particular system.

1. Ensure that your serial attached SCSI (SAS) connections are properly connected. Connect up to four MediaStore 5000 or 5100 per MediaDirector 2252B, 2251B, 2252, or 2251. Refer to the *Spectrum System Installation Guide* for detailed connection instructions.
2. Ensure that the MediaStore’s configuration is correct.
3. Harmonic recommends that you set the Unit ID number on each MediaStore with a unique number, starting with 1. For instructions on setting Unit ID number, refer to “Setting the Unit ID Number” in the *Spectrum System Installation Guide* .
4. Check the MediaStore’s drive status on the **Disk Utilities** page:
   a. Click the **Configuration** tab to display the Configuration page.
   b. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available MediaDirectors will be shown.
   c. Click the icon for the MediaDirector that you want to check. Its **Disk Utilities** page appears. Verify that the correct number of drives appears, and that each drive’s status is "alive.";
   d. Click each drive’s **Disk** icon, and on the **Drive Properties** page, verify the disk size (in GB) is as expected.
   e. All drives are shipped already formatted from the Harmonic factory. If a drive is not “alive” or if an incorrect capacity (in GB) or block size appears, contact Harmonic technical support. Before continuing with the next step, all drives should be alive, formatted and not part of a RAID set.
5. Use the “One-Click” functions to create and initialize the File System.

   At this point, the File System is ready for use.

IMPORTANT: This system can expand to EFS (Extended File Sharing) with two MediaDirectors. If you wish to use two MediaDirectors, you should start with 24 drives in the first MediaStore.

Related information

About file system configurations for MediaDirector 2252B, 2251B, 2252, and 2251

Creating file systems with One-Click functions

Building an EFS system for multiple MediaDirector 2252B, 2251B, 2252, or 2251 units

Build an EFS shared across multiple MediaDirectors, using the MediaDirector 2252B, 2251B, 2252, or 2251 units.

A number of system configurations are supported; please consult with your Harmonic representative for assistance in designing your particular system.

Note the following important points:

- The EFS (Extended File Sharing) feature requires the Extended File Sharing License. Contact your Harmonic representative for more information.
- For each system, the attached MediaStores must all use the same capacity drives. However, you may connect MediaStores which have different numbers of RAID sets (for example, one with a 2 x (6+2) configuration and one with a 3 x (6+2) configuration).
- You may only connect a MediaDirector 2252 to another MediaDirector 2252 in an EFS. Likewise, you may only connect a MediaDirector 2251 to another MediaDirector 2251.

IMPORTANT: Changing from a single Spectrum System to a multiple Spectrum Systems requires shutting down the single system, re-wiring the system to accommodate the new MediaDirectors, and then starting the File System on each new MediaDirector. Files that already resided on the single system are protected. Contact Harmonic technical support for additional assistance.

1. Ensure that your serial attached SCSI (SAS) connections are properly connected. Connect up to 4 MediaStore 5000/5100 series. Refer to "Connecting MediaDirectors and MediaStores Using SAS" in the *Spectrum System Installation Guide*.
2. Ensure that the MediaDirector EFS Ethernet connections are properly connected. Refer to "Connecting Two MediaDirectors in an EFS Configuration" or "Connecting Two MediaDirectors in an EFS Configuration" in the *Spectrum System Installation Guide*.
3. Harmonic recommends that you set the Unit ID number on each MediaStore in your system with a unique number, starting with 1. For instructions on setting Unit ID number, refer to "Setting the Unit ID Number" in the *Spectrum System Installation Guide* .
4. Ensure that all MediaDirectors are running the same version of firmware before creating the EFS system.

   Refer to "Upgrading MediaDirector Firmware" in the *Spectrum System Installation Guide* for details.
5. Create a File System on MediaDirector 1 according to the steps in the “Creating a File System” procedure. At the conclusion of the process, your **Disk Utilities** page will only show one MediaDirector and one File System.

6. Once the File System is working on MediaDirector 1, start the File System on MediaDirector 2. Note that this step is only required the *first time* an EFS system is brought up. On subsequent start-ups, the File System starts automatically.
7. For MediaDirector 2, go to the **Disk Utilities** page and verify it has the same File System and RAID sets as displayed for the MediaDirector 1.

   At this point, the File System will be running on both MediaDirectors. If you are adding a third or fourth MediaDirector, repeat steps 6 and 7 for the third MediaDirector, and then for the fourth.

Related information

About file system configurations for MediaDirector 2252B, 2251B, 2252, and 2251
Creating a file system
Starting the file system

Verifying Spectrum video servers in an EFS have common views of storage

Prior to taking any action on a disk drive, RAID set, File System, or MediaStore it is important to verify that all Spectrum video server in an Extended File System (EFS) have a common view of disks, RAID sets and MediaStores.

IMPORTANT: Under certain error conditions, taking action without this check may result in an aborted or damaged File System.

1. Open a SystemManager application page for each Spectrum video server in the EFS.
2. Navigate to the **Disk Utilities** page for the each Spectrum video server.
3. Compare the data on the **Disk Utilities** pages.
   - If the system is not in a transient state, the view from all Spectrum video server should be identical with respect to all elements on the page. If they are, further actions or operations may proceed.
   - If the view between Spectrum video servers is not consistent, and circumstances allow a reboot of all Spectrum video servers, do this and go to step 1. If not, or if this reboot is performed but an inconsistent state persists, call Harmonic technical support.

About disk subsystem performance factors

If you are creating a file system manually, note some important points about disk subsystem performance.

If you are using the **One-Click File System** function, the system will automatically make decisions (as described below) for you.

When configuring disk storage for a MediaDirector or multiple MediaDirectors, the number of virtual RAID channels is paramount in determining the potential bandwidth of the disk subsystem:

The impact of adding virtual RAID channels is not obvious because their function may not be clear. When recording, data can be written in parallel to RAID sets that have different virtual channel settings, but data cannot be written to RAID sets that have the same virtual channel settings. In addition, the record process determines the limits of the playback process.

The net effect is that with more virtual channel settings, more disks can be driven to read and write data simultaneously, thereby improving the disk subsystem's potential bandwidth.

Suppose a system has two RAID sets. If both RAID sets are assigned to virtual channel A, data will be recorded to the first RAID set until it is full, and then to the second RAID set. On the other hand, if one RAID set is assigned to channel A and one to channel B, then "writes" are alternated between the two RAID sets as data is recorded, filling both more or less equally throughout the recording process. Since the disks in both RAID sets are active at any one time, this approach has significantly more potential disk bandwidth than the first approach.

Given the discussion above, is there any good reason not to maximize the number of virtual channels used in any configuration. Unfortunately, the answer is yes. When expanding storage, the minimum RAID set increment is the number of virtual channels in the system. Thus, if a system is configured with four RAID virtual channels, expanding storage must be accomplished in increments of four RAID sets. There is, therefore, good reason to keep the total number of virtual RAID channels to the minimum necessary to meet your performance needs.

Related information

Modifying the RAID set channel

Creating a RAID set

You can manually create a RAID set.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature.

Use this procedure to create an empty RAID set, to which drives can then be attached. A RAID set can contain from four (minimum) to nine (maximum) drives.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers appears.
3. Click the icon for the Spectrum server on which you want to create a RAID set. Its **Disk Utilities** page appears.
4. Click **Create RAID Set** to access the **Create RAID Set** page.
5. Type name of the RAID set in the **Name** field, and select a type:
   - Select **Un-protected** to create a RAID set with no parity drive.
   - Select **Protected** to create a RAID set with a parity drive that stores redundancy information. This is the default selection.
6. Click **Create RAID** to return to the **Disk Utilities** page. The new RAID set appears without any drives attached.

Deleting a RAID set

You can manually delete a RAID set.

NOTE: This procedure is automatically performed as part of the “One-Click” File System feature.

Use this procedure to delete a RAID set, typically, when the wrong drives have been attached. This procedure is preferable to *removing* drives from a RAID set.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which you want to delete a RAID set. Its **Disk Utilities** page appears.
4. Verify that the RAID set is not attached to a File System. If it is, remove the RAID set from the File System.

   When the RAID set is not attached to a File System, the **Delete** button appears next to the **RAID Set** icon.
5. Click the **Delete** button to delete the RAID set. In the **Confirmation** dialog, click **OK**. The RAID set disappears from the **Disk Utilities** page. As required, create a new RAID set.

Related information

Removing a RAID set from a file system
Creating a RAID set
Creating file systems with One-Click functions

Adding drives to a RAID set

You can manually add drives to a RAID set.

NOTE: This procedure is automatically performed as part of the “One-Click” File System feature.

CAUTION: Proceed with caution through this procedure as it is possible to add drives to a RAID set from a different MediaStore than the one intended.

Use this procedure to add drives to a RAID set. A RAID set can contain from four (minimum) to nine (maximum) drives.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which the new RAID set resides — the one for which you want to add drives. The **Disk Utilities** page appears.
4. Click the **RAID Set** icon to display the **RAID Set Utilities** page.

5. Scroll to the bottom of the page and click the **Add/Remove Drives** button to access the **Add/Remove Drives** page. The **Add/Remove Drives** page lists the status of the RAID set, and lists all available drives and hot spares connected to your Spectrum server.
6. In the **Available Drives** section, make a note of the drive slot numbers and MediaStore names. Note the **Check Box** adjacent to all available drives.
7. Check the drives that you wish to attach to the RAID set. Continue until all desired drives are checked, and then click the **Add Selected Drives** button. The selected drives are now removed from the **Available Drives** section and added to the **Current Drives** section.

   NOTE: Keep in mind that when adding a drive to an existing RAID set, the drive with the smallest capacity in the RAID set dictates the capacity of the other drives within that RAID set.

   If a Hot Spare is to be assigned to this RAID set, that step may be done now.
8. The RAID set's Virtual Channel may also be changed at this time.
9. Click **Done** to return to the **RAID Set Utilities** page. The drives that you selected will now be listed in the drive list.
10. If desired, verify that the correct drives have been assigned to the RAID set by clicking **Wink On**. Clicking **Wink Off** may then disable the wink function.
11. Click **Done** to return to the **Disk Utilities** page.

Related information

About making or clearing a hot spare
Modifying the RAID set channel
Creating file systems with One-Click functions

Removing drives from a RAID set

You can manually remove drives from a RAID set.

This procedure is used to remove drives from a RAID set. However, when you perform the procedure, a "hole" is left in the RAID set that cannot be filled. If you have added the wrong drives to a RAID set, it is recommended that you delete the RAID set and start again.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature.

CAUTION: Removing a disk drive from a running MediaStore may generate fibre channel noise which will disrupt playback or recording of video for a few moments. In order to avoid disruption, disk drives should be bypassed before removing them from the MediaStore. Once a disk drive has been bypassed, it cannot be used again. Only bypassed disks that have failed can be returned to Harmonic.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which the RAID set resides — the one from which you want to remove drives. The **Disk Utilities** page appears.

NOTE: In an EFS environment, you must remove the “dead” drive from each of the MediaDirectors in the system.

4. Click the **RAID Set** icon to display the **RAID Set Utilities** page.
5. Scroll to the bottom of the page and click the **Add/Remove Drives** button to access the **Add/Remove Drives** page. The **Add/Remove Drives** page lists the status of the RAID set, and lists all available drives and hot spares connected to your Spectrum server.
6. Click the **Remove** button adjacent to the drive that you wish to remove from the RAID set. Continue until all desired drives are removed from the RAID set. Once removed, the drive jumps down to the **Available Drives** section.
7. When all desired drives are removed, click **Done** to return to the **RAID Set Utilities** page. In the table, the labels **Unknown** and **Removed** will appear for each removed drive.
8. Click **Done** to return to the **Disk Utilities** page.

Creating a file system

You can manually create a file system.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature. Refer to for more information.

Use this procedure to create an empty File System to which RAID sets can be attached. The procedure is performed when you are installing a new Spectrum System.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which you want to create a new File System. The **Disk Utilities** page appears.
4. Click the **Create File System** button to display the **Create File System** page.
5. Enter a name for the new File System, with a maximum of eight characters. Refer to "About Naming Files and System Elements" for proper naming conventions.
6. Click **Create File System**.

   The system automatically returns to the **Disk Utilities** page. Verify that a new folder appears with name of the new File System adjacent to it.

Related information

Creating file systems with One-Click functions
About naming files and system elements

Initializing a file system

You can manually initialize a file system.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature for MediaDirectors.

This procedure initializes and starts an existing File System. Use this procedure to complete the creation phase of the File System. Perform this procedure the very first time that you want to use the File System. After the first time, use the **Start FS** procedure to start the File System; do not initialize the File System again.

IMPORTANT: All content on all RAID sets that are attached to the File System will be erased.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers appears.
3. Click the icon for the Spectrum servers on which you want to initialize a File System. The **Disk Utilities** page appears.
4. Verify that the File System has been created, and that at least one RAID set is attached to it.
5. Click the **File System Hyperlink** to display the **File System Utilities** page.
6. Reboot the system.
7. At the bottom of the page, click the **Initialize FS** button to display the **Initialize File System** page. This button only appears when the File System is stopped.
8. Select the desired File System options: **NVRAM Journaling, Read-only**, **Use Previous Start**, and **Save Options**.

   NOTE: In most cases, you should not need to change the options away from the default selections.
9. Click **Initialize** to accept the selected options and initialize (and start) the File System. The system automatically returns to the **File System Utilities** page.
10. Verify that the File System's status has changed to **Started**.
11. Click **Done** to return to the **Disk Utilities** page.

    NOTE: If the File System does not start automatically, attempt to start the File System manually using the SystemManager. The File System must be started manually when a new Spectrum server is connected to a preexisting File System.

Related information

Creating file systems with One-Click functions
Starting the file system

Deleting a file system

You can manually delete a file system.

NOTE: This procedure is automatically performed as part of the “One-Click” File System feature.

Use this procedure to delete a File System, for example, when it is no longer needed or when a File System has been created accidentally.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which you want to delete an existing File System. The **Disk Utilities** page appears.
4. Verify that there are no RAID sets attached to the File System. If there are, follow the procedures for removing a RAID set from a File System.
5. With all RAID sets removed, click the **Delete** button adjacent to the **File System** hyperlink. When the confirmation dialog appears, click **OK** to accept.
6. Verify that the File System is no longer present on the **Disk Utilities** page.

   NOTE: If a file system belonging to a Spectrum system is deleted and then recreated with a new name, both versions of the file system will appear as available in Windows* Explorer. To resolve this issue, restart the MediaDirector after deleting the file system.

Related information

Creating file systems with One-Click functions

Removing a RAID set from a file system

Renaming a file system

Rename a file system if needed.

1. Stop the File System.

   NOTE: In an Extended File System configuration, this must be done on each MediaDirector.
2. Click the **Change File System Name** button on the **File System Utilities** page.
3. Enter the new File System name.
4. Click the **Change** button.
5. Reboot all Spectrum servers connected to the File System.
6. Verify that the File System restarts on each Spectrum video server.

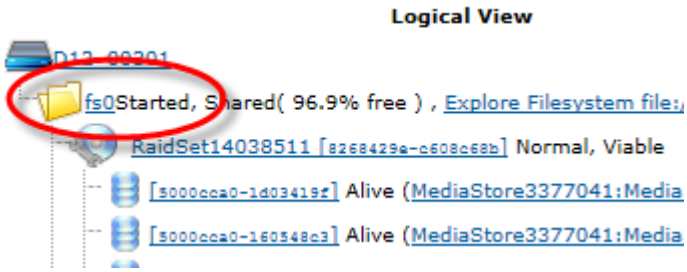
   The new File System name should be reflected in the **Disk Utilities** page on the SystemManager, and under IP connection under CIFS.

Extending a file system

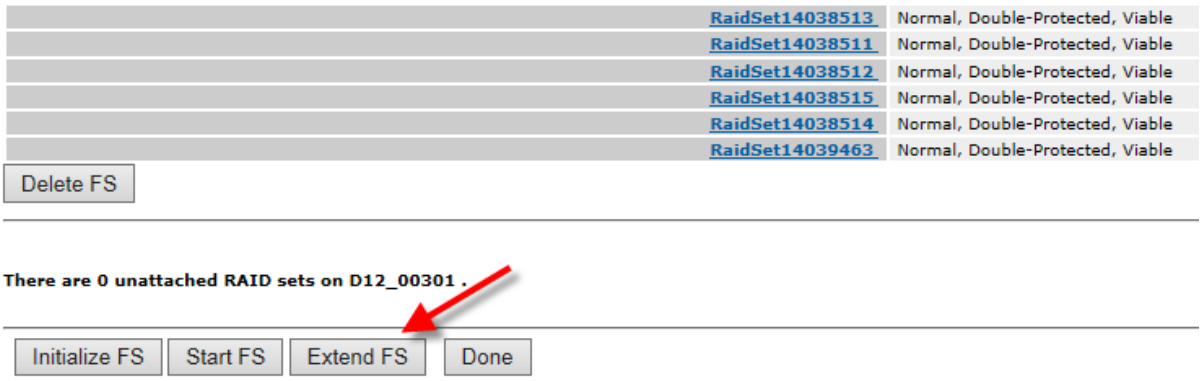
Use the extend file system operation when you are expanding a file system to include new RAID sets (for example, when adding a new storage enclosure to your Spectrum system).

This operation is supported on a MediaCenter 2200B, and a MediaDirector 2252B, 2252B-DS, 2251B, 2252, or 2251.

1. Make sure any new storage enclosure is attached according to the instructions in the *Spectrum System Installation Guide*. The enclosure must have a complete set of drives. Otherwise, the extend file system operation will not work.
2. Make sure there are no compromised RAID sets in your system. Otherwise, the extend file system operation will not work.
   a. From the **Configuration** tab, click the **Disk Utilities** icon to view the **Disk Utilities** page for your entire system.
   b. Verify that your Spectrum video server shows "RAIDs: Normal."
3. Stop the file system. Navigate to the **File System Utilities** page for your video server and stop the file system as follows.
   a. From the **Spectrum Disk Utilities** page, click the icon for your Spectrum video server to open the **Disk Utilities** page for that server.
   b. From the **Disk Utilities** page, click the file system hyperlink, as shown in the following figure, to display the **Filesystem Utilities** page.



   c. From **Filesystem Utilities**, click the **Stop FS** button at the bottom of the page.
4. Verify that the file system status changes to stopped, and that the **Extend FS** button is available, and then click **Extend FS**.



At this point, Spectrum creates new RAID sets and adds them to the file system. Depending on the size of your Spectrum system, it may take several minutes for the operation to complete and for SystemManager to display the new RAID sets in your file system.

5. Click **Done** to return to the **Disk Utilities** page for your server.
6. From the **Disk Utilities** page, do the following:
   - In the **Physical View** column, verify that the new drives are part of a RAID set.
   - In the **Logical View** column, verify that the new RAID sets are part of the file system.

Adding a RAID set to a file system

You can manually add a RAID set to a file system.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature.

Use this procedure to attach a RAID set to a File System. Perform the procedure when you are creating a new File System, or when you are adding new storage to an existing File System.

The RAID set that is to be added must have the correct number of disk drives, typically either 5 or 8. Verify this fact on the **RAID Set Utilities** page before proceeding.

IMPORTANT: Before attaching new RAID Sets to a preexisting File System, make sure the File System has been stopped on all MediaDirectors. Failure to do this could cause the other MediaDirectors sharing the File System to automatically stop the File System.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which you want to add a RAID set to an existing File System. The **Disk Utilities** page appears.
4. Click on the **File System** hyperlink to display the **File System Utilities** page.
5. The RAID set that you want to attach will be listed in the **Unattached** section. Click the **Add** button adjacent to the RAID set. This action causes the RAID set to move up into the list of attached RAID sets.
6. Click **Done** to return to the **Disk Utilities** page.

Removing a RAID set from a file system

You can manually remove a RAID set from a file system.

NOTE: This procedure is automatically performed as part of the "One-Click" File System feature.

Use this procedure to remove a RAID set from a File System for purposes of deleting the RAID set or the File System itself. This procedure is required if you have made a mistake with the RAID set, or you are reconfiguring the disk drives.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the Spectrum server on which you want to remove a RAID set from a File System. The **Disk Utilities** page appears.
4. Click the **File System** icon that contains the target RAID set, to display the **File System Utilities** page.
5. Ensure that the File System is stopped. If it is not, click **Stop FS**. When the confirmation dialog appears, click **OK** to accept. A **Detach** button appears if the File System is stopped.
6. Click **Detach**. When the confirmation dialog appears, click **OK** to accept. The File System now displays a "**Removed**" message in the previous RAID set's location.
7. Click **Done** to return to the **Disk Utilities** page.

Related information

Creating file systems with One-Click functions

Changing a file system wink state

You can change the wink state of a file system at any time.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to wink the File System. The **Disk Utilities** page appears.
4. Click the **File System** hyperlink to display the **File System Utilities** page.
5. Check the **File System Drives Wink State** line.
6. Change the File System's wink state as desired:
   - If currently On, click Wink Off to stop winking all drives in the File System.
   - If currently Off, click Wink On to start winking all drives in the File System.

   NOTE: Winking drives utilizes a small amount of Fibre Channel bandwidth. For optimum system operation, do not leave drives in the wink state when unnecessary.

Viewing a file system Unicode status

You can view a File System's Unicode status by determining whether a file necessary for Unicode conversions is loaded on a File System.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.

3. Click the icon for the Spectrum video server on which you want to check the File System. The **Disk Utilities** page appears.
4. Click the **File System** hyperlink to display the **File System Utilities** page.
5. Check the **Character Set DB Loaded** line:
   - If the status is Yes, the file needed for Unicode conversion is available to the File System.
   - If the status is No, the file needed for Unicode is missing and no conversion can take place.
6. Click **Done** to return to the **Disk Utilities** page.

Modifying the RAID set channel

You can manually modify the RAID set channel.

NOTE: This procedure is automatically performed as part of the “One-Click” File System feature.

Use this procedure to change the RAID set’s virtual channel assignment, in order to optimize the system’s bandwidth. Use this procedure in systems with more than one Fibre Channel loop.

IMPORTANT: File System is next started or initialized. Changing the channel on a RAID set that already has media recorded onto it may cause the media to become inaccessible. Harmonic recommends that you initialize the File System (hence erasing all media) after changing any RAID set’s channel.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum servers will be shown.
3. Click the icon for the MediaDirector on which you want to modify the RAID set channel. The **Disk Utilities** page appears.
4. Click a **RAID Set** hyperlink to display the **RAID Set Utilities** page.
5. Scroll to the bottom and click **Set Channel** to display the **Modify Channel** page.
6. Select the desired virtual channel by clicking one of the **Channel Selection Buttons**, **A** through **H**. This action selects the channel and automatically returns to the **RAID Set Utilities** page.
7. At the top of the **RAID Set Utilities** page, verify that the **Channel** field displays the selected virtual channel.
8. Click **Done** to return to the **Disk Utilities** page.

Related information

About disk subsystem performance factors

Creating file systems with One-Click functions

About making or clearing a hot spare

Harmonic recommends that you always have at least one hot spare available for each RAID set.

If a drive failure occurs and a hot spare is available, the system will automatically use the hot spare to rebuild a protected RAID set with no interruption to video playback.

A system can have multiple hot spares. There are two types of hot spares.

- A "**Global**" hot spare is a drive used by the Spectrum server to fulfill hot spare requirements for any RAID set in the MediaStore in which the hot spare resides. A "**Global**" hot spare does *not* fulfill hot spare requirements in different enclosures.
- A "**Local**" hot spare is a drive associated with a particular RAID set. The Spectrum server uses this drive only to fulfill hot spare requirements for that particular RAID set. .

NOTE: If you enable **Monitor Hotspares** (from the **Options** page on the **Home** tab), the SystemManager will raise an alarm and send a notification by e-mail or trap, depending on the configuration, when a RAID set is no longer protected with an available hot spare.

You can clear a **Hot Spare** if you accidentally create one or you want to use the selected drive as a normal part of a RAID set.

Related information

Making a global hot spare drive

Clearing a global hot spare drive

Making a global hot spare drive

You can make a global hot spare for your Spectrum system.

Before you begin

Ensure that you have purchased the **Hot Spare Option**. Contact your Harmonic representative for details.

1. Insert the hot spare drive into the MediaStore, into any open slot. There is no limit on the number of hot spares that can be created, however, you should not need more than one hot spare per RAID set.

   NOTE: Not all MediaStore versions can support a hot spare. Check with Harmonic technical support for details.

2. Verify the hot spare drive's condition. On the **Disk Utilities** page, the drive should appear as "**Alive**" and "**Unraided**." If the drive does not appear this way, contact Harmonic technical support.
3. Verify the drive's firmware. If the firmware revision level does not match the other drives, upgrade the drive's firmware.

   Refer to **Upgrading Disk Drive Firmware** in the *Spectrum System Getting Started Guide*. You can use this procedure to both check the firmware revision level and perform the upgrade if required.

4. Once the drive's firmware matches the other drives, on the **Disk Utilities** page, click the **Disk Drive** icon to display the **Drive Properties** page (for the selected drive).

5. At the bottom of the **Drive Properties** page, click **Make Hot Spare**. The button's label changes to **Clear Hot Spare**, the drive's status changes immediately to "**Alive, Hot Spare**," and the drive is ready for use as a global hot spare.

Making a local hot spare drive

You can make a local hot spare for your Spectrum system.

Before you begin

NOTE: This procedure is used when creating a File System manually. Note that the procedure is automatically performed as part of the "One-Click" File System feature.

Ensure that you have purchased the **Hot Spare Option**. Contact your Harmonic representative for details.

1. Insert the hot spare drive into the MediaStore, into any open slot. There is no limit on the number of hot spares that can be created, however, you should not need more than one hot spare per RAID set.

   NOTE: Not all MediaStore versions can support a hot spare. Check with Harmonic technical support for details.

2. Verify the hot spare drive's condition. On the **Disk Utilities** page, the drive should appear as "**Alive**" and "**Unraided**." If the drive does not appear this way, contact Harmonic technical support.
3. Verify the drive's firmware. If the firmware revision level does not match the other drives, upgrade the drive's firmware.

   Refer to **Upgrading Disk Drive Firmware** in the *Spectrum System Getting Started Guide*. You can use this procedure to both check the firmware revision level and perform the upgrade if required.

4. Once the drive's firmware matches the other drives, on the **Disk Utilities** page, click the **RAID Set** icon to display the **RAID Utilities** page.
5. At the bottom of the **RAID Utilities** page, click **Add/Remove Drives** to display the **Add/Remove Drives** page.
6. Scroll down to the "**Available Drives**" section, where each drive will have an adjacent **Hot Spare** button.
7. Locate the drive that you just inserted, and click its **Hot Spare** button. The drive will be removed from the "**Available Drives**" section and will appear in the "**Hot Spares**" section.
8. Click **Done** to complete the procedure and return to the **RAID Utilities** page.

Clearing a global hot spare drive

You can clear a global **Hot Spare**, for example, if you accidentally created a Hot Spare or if you wanted to use the selected drive as a normal part of a RAID set.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page.
3. Click the icon for the MediaDirector on which you want to clear a hot spare. The MediaDirector's **Disk Utilities** page appears.

4. In the drive list, locate the desired Hot Spare and click its **Disk Drive** icon to display the **Drive Properties** page (for the selected drive).
5. At the bottom of the **Drive Properties** page, click **Clear Hot Spare**. The button's label changes to **Make Hot Spare**, the drive's status changes immediately to "**Alive**," and the drive is ready for use as normal drive.

Clearing a local hot spare drive

You can clear a local **Hot Spare**, for example, if you accidentally created a Hot Spare or if you wanted to use the selected drive as a normal part of a RAID set.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page.
3. Click the icon for the MediaDirector on which you want to clear a hot spare. The **MediaDirector's Disk Utilities** page appears.
4. Click the **RAID Set** icon to display the **RAID Utilities** page.
5. At the bottom of the **RAID Utilities** page, click **Add/Remove Drives** to display the **Add/Remove Drives** page.
6. Scroll down to the "**Hot Spares**" section. Click the **Remove** button adjacent to the hot spare that you wish to clear. The drive is removed from the "**Hot Spares**" section and appears in the "**Available Drives**" section.
7. Click **Done** to complete the procedure and return to the **RAID Utilities** page.

Changing RAID set wink state

You can change the wink state of a RAID set at any time.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page.
3. Click the icon for the Spectrum video server on which you want to wink a RAID set. The **Disk Utilities** page appears.
4. Click the **RAID Set** icon (or the **RAID Set Hyperlink**) to display the **RAID Set Utilities** page.
5. Check the **RAID Set Drives Wink State** line.
6. Change the RAID set's wink state as desired:
   - If currently On, click **Wink Off** to stop winking the drives in the RAID set.
   - If currently Off, click **Wink On** to start winking the drives in the RAID set.

Creating file systems with One-Click functions

Use the One-Click functions to automatically create file systems on Spectrum video servers.

About One-Click functions

One-Click Functions allow you to quickly and automatically create File Systems on Spectrum video servers that match one of the valid configurations described in "Spectrum File System Configuration."

File Systems for configurations not described in these topics may need to be created manually.

Using a "**One-Click Function**" saves you from having to perform the following individual tasks in sequence:

- Create a RAID set.
- Add disk drives to the RAID set.
- Create a File System.
- Add the RAID Set to the File System.

Related information

Spectrum file system configurations

Viewing One-Click functions

View the possible One-Click Functions for a Spectrum video server.

1. From the **Disk Utilities** page, click a Spectrum video server.
2. Click the **One-Click Functions** button to display the **One-Click Functions** page.

   A sample **One-Click Functions** page is illustrated in the following figure. .

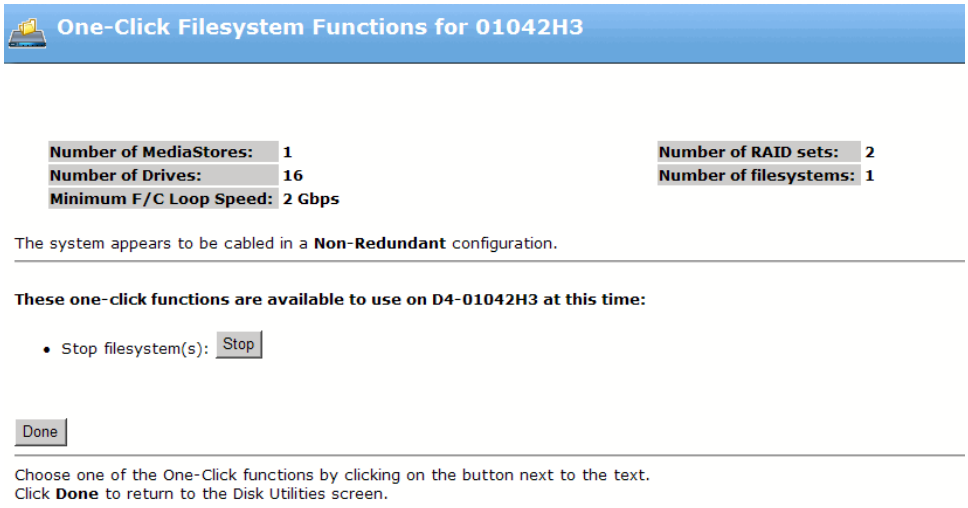


Figure 3-1: One-Click Functions

SystemManager will display one or more one-click buttons that apply to your Spectrum video server.

One-Click functions page options

The **One-Click Functions** page is divided into sections.

- RAID sets and File Systems that the Manager application discovers. The discovery process also indicates the Minimum F/C Loop Speed: **Unknown**, **1 Gbps**, or **2 Gbps**, and the wiring configuration: **Non-redundant**, **Redundant** or **Invalid**.
- In the middle “Warning” section (if it appears), one or more messages will be shown if the system (as discovered by the Manager application) does not match a valid wiring configuration. If the “Warning” section does not appear, the system is valid and you may create a File System using “One-Click” functions.
- In the lower “One-Click Functions” section, the array of buttons *changes* depending on whether or not a File System exists.

Following are descriptions of buttons in the **One-Click Functions** section. Remember that only selected buttons appear, depending upon the File System state.

Start

When the Start button appears, it indicates that the File System has already been created, and it is stopped. Click Start to start the File System on the selected Spectrum video server, including as many RAID sets as defined. The button disappears once the File System starts.

Stop

When the Stop button appears, it indicates that a File System is running. Click **Stop** to stop all File Systems that are currently running. The button disappears when the File System has stopped.

Delete

When the Delete button appears, it indicates that a File System has already been created, and it is stopped. Click to delete all File Systems and RAID sets on the selected Spectrum video server. A "Warning" dialog appears once clicked. After confirmation, the Delete button disappears and the Create button appears.

Create

When the Create button appears, it indicates that there is no File System and RAID set. Click to create a File System and RAID set using all the drives discovered in all MediaStores attached to the selected Spectrum video server or located on the Spectrum video server itself.

For Spectrum video servers: two mutually exclusive radio buttons accompany the Create button, allowing you to choose the type of RAID set desired:

- **6+1+1**. Selects a RAID set with 6 data drives, 1 parity drive and 1 hot spare. This is the default selection. For example:
  - If the system sees 8 drives, a 6+1+1 RAID set is created.
  - If the system sees 16 drives, two 6+1+1 RAID sets are created.
- **7+1**. Selects a RAID set with 7 data drives and 1 parity drive. For example:
  - If the system sees 8 drives, a 7+1 RAID set is created.
  - If the system sees 16 drives, two 7+1 RAID sets are created.

  Note the following important points:
  - There are no explicit hot spares created with the **7+1**selection, but hot spares can be added manually using the **Disk Utilities** page.
  - A minimum of 8 drives is required to perform a “One-Click” function.
  - If you have 9 drives in the MediaStore chassis and you pick **7+1**, the ninth drive becomes a hot spare automatically.

    - **Done**. Click to return to the **Disk Utilities** page.
- For the Spectrum X and MediaDeck 7000, the **3+1** button allows you to create a file system with a 3+1 RAID set.

Related information

About making or clearing a hot spare

Creating and starting a file system

Use the one-click function to automatically create and initialize File Systems on a new Spectrum system.

Before you begin

There should be no RAID sets or File Systems present on your system. To remove RAID sets or File System, refer to “Deleting all File Systems” for details.

1. On the **Disk Utilities** page, click the **One-Click Functions** button to display the **One-Click Functions** page.
2. Choose your desired RAID set configuration. Click the **6+1+1**, **7+1**, or **3+1** radio button.
3. Enter the new File System’s name in the **New File System Name** field. See “About Naming Files and System Elements” for proper naming conventions.
4. Click **Create**. This action creates and starts the File System with the selected RAID set configuration.
5. Click **Done** to complete the procedure and return to the **Disk Utilities** page.

NOTE: If the MediaDirector's SMB interface displays an outdated view after creating, renaming, or deleting a file system, reboot all MediaDirectors to update the view.

Related information

Deleting all file systems

About naming files and system elements

Stopping all file systems

From the **One-Click Functions** page, you can stop all File Systems on the MediaDirector, in preparation for system configuration changes or to transport the system.

1. On the **Disk Utilities** page, click the **One-Click Functions** button to display the **One-Click Functions** page.
2. Click the **Stop** button. This action displays a warning dialog box.
3. In the dialog, click **OK** to continue. All File Systems on the MediaDirector are now stopped.
4. Click **Done** to complete the procedure. You may now restart the File Systems or delete them.

Starting all file systems

From the **One-Click Functions** page, you can start all file systems.

1. On the **Disk Utilities** page, click the **One-Click Functions** button to display the **One-Click Functions** page.

2. Click the **Start** button, then click **Done** to complete the procedure.

Deleting all file systems

From the **One-Click Functions** page, you can delete all Spectrum video server File Systems, in preparation for creating a new File System.

1. On the **Disk Utilities** page, click the **One-Click Functions** button to display the **One-Click Functions** page.
2. Ensure that all File Systems are stopped. This is indicated by the presence of the **Delete** and **Start** buttons.
3. Click the **Delete** button. This action displays a warning dialog box.
4. Click **OK** to continue, then click **Done** to complete the procedure.

Chapter 4

Spectrum storage and file system maintenance

Find details on File System maintenance utilities.

- *Changing the MediaStore name*
- *Winking all drives on a MediaStore*
- *Winking one drive on a MediaStore*
- *About proactive drive removal*
- *Assigning a virtual channel to a RAID set*
- *Navigating the Disk Utilities*
- *Upgrading drive firmware*
- *Failing a drive*
- *Unfailing a drive*
- *Replacing a failed drive*
- *Renaming a RAID set*
- *Stopping a RAID set rebuild in progress*
- *Restarting a RAID set rebuild*
- *Starting the file system*
- *Stopping the file system*

Changing the MediaStore name

Renaming may help you more easily locate MediaStores and storage enclosures throughout the SystemManager application.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. If there is more than one MediaDirector in your system, make a note of the MediaDirector to which the specific MediaStore is attached. Next, click a single or dual host **MediaDirector** icon to display the **MediaDirector Physical Configuration** page for the selected MediaDirector.
3. For the specific MediaStore that you want to change, click that MediaStore's picture (there may be more than one) to display the **Storage Properties** page.
4. Click **Change Name** to display the **Change MediaStore Name** page.
5. Type the new name in the text box. Refer to “About Naming Files and System Elements” for naming conventions.
6. Click **Save** to return to the **Storage Properties** page.

Related information

About naming files and system elements

Winking all drives on a MediaStore

You can wink all drives on a selected MediaStore.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. If there is more than one MediaDirector in your system, make a note of the MediaDirector to which the specific MediaStore is attached. Next, click a single or dual host **MediaDirector** icon to display the **MediaDirector Physical Configuration** page for the selected MediaDirector.
3. For the specific MediaStore that you want to change, click that MediaStore's picture (there may be more than one) to display the **Storage Properties** page.
4. At the top of the page, check the **Wink state for all MediaStore drives** line.
5. Change the MediaStore's wink state (for all drives) as desired:
   - If currently On, click **Wink Off** to stop winking all drives on the MediaStore.
   - If currently Off, click **Wink On** to start winking all drives on the MediaStore.

Winking one drive on a MediaStore

You can wink a single drive on a selected MediaStore.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. If there is more than one MediaDirector in your system, make a note of the MediaDirector to which the specific MediaStore is attached. Next, click a single or dual host **MediaDirector** icon to display the **MediaDirector Physical Configuration** page for the selected MediaDirector.
3. For the specific MediaStore whose drives you want to change, click that MediaStore's picture (there may be more than one) to display the **Storage Properties** page.
4. Scroll down to the "**Status**" section and click the **Serial Number Hyperlink** or the **Disk Drive** icon for the drive that you want to wink. The **Drive Properties** page appears.
5. Check the **Individual Drive Wink State** line.
6. Change the drive's wink state as desired:
   - If currently On, click **Wink Off** to stop winking the individual drive.
   - If currently Off, click **Wink On** to start winking the individual drive.

   NOTE: Drives that are winked will only wink for 30 seconds.

About proactive drive removal

In Spectrum systems, drives which report SMART warnings, hardware errors, and some persistent login failures are removed from the RAID set.

Note that the following conditions must exist:

- The RAID set has a hot spare
- No other drives in the RAID set have bad blocks.
- The RAID set is not already compromised or in the process of rebuilding.

For additional information, see “Overview of proactive drive alarming and removal” in the *Spectrum System Installation Guide*.

Assigning a virtual channel to a RAID set

On the **Modify Channel** page you can select a virtual channel to use on a specific RAID set.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available MediaDirectors will be shown.
3. Click the icon for the MediaDirector on which you want to “unfail” a drive. The **Drive Utilities** page appears.
4. Click the **RAID set** link to display the **RAID Utilities** page.
5. *With the File System stopped*, click the **Set Channel** button at the bottom of the page to display the **Modify Channel for RAID** page as shown in the following figure.

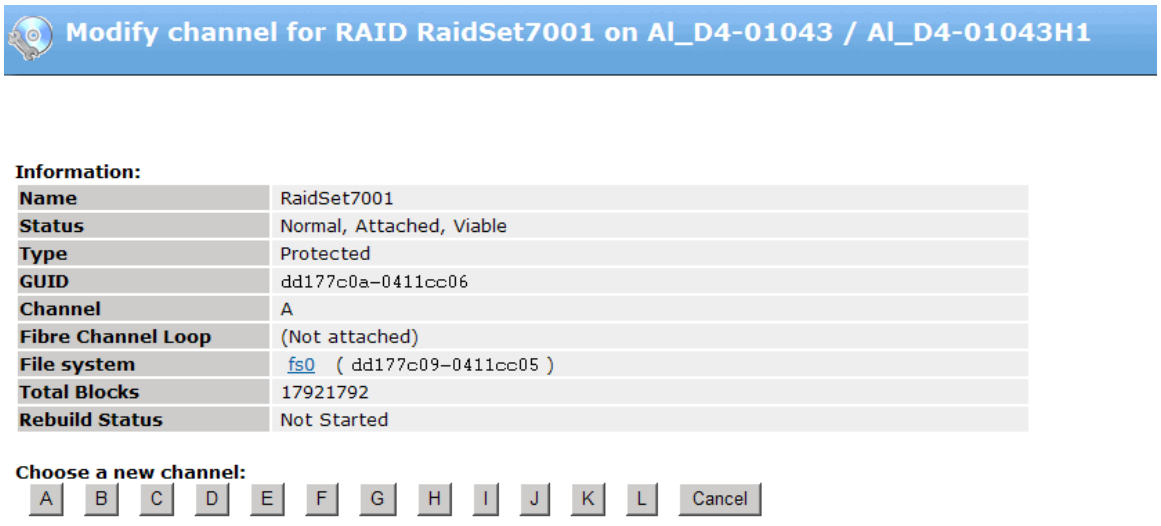


Figure 4-1: Modify channel for RAID

6. Under **Choose a new channel**, click a letter to assign a virtual channel to a physical RAID set loop, thereby optimizing bandwidth with regard to the new RAID set in the File System. When a new RAID set is added to a MediaStore, and a new Fibre Channel loop is also connected, the RAID set must

be assigned a different virtual channel than the original (or existing) RAID sets in order to increase bandwidth along with the increased storage capacity.

Creating a file system

Navigating the Disk Utilities

Open the **Disk Utilities** page (and all associated linked pages) for a particular Spectrum video server to view disk information.

1. Click the **Configuration** tab.
2. Click the **Disk Utilities** icon in the left-hand column to display the System **Disk Utilities** page. This page provides a list of all Spectrum video servers attached to the SystemManager.
3. Click a Spectrum video server icon to show the **Disk Utilities** page for that Spectrum video server alone. Note that this page applies to all hosts on a server, because disks are shared between hosts.

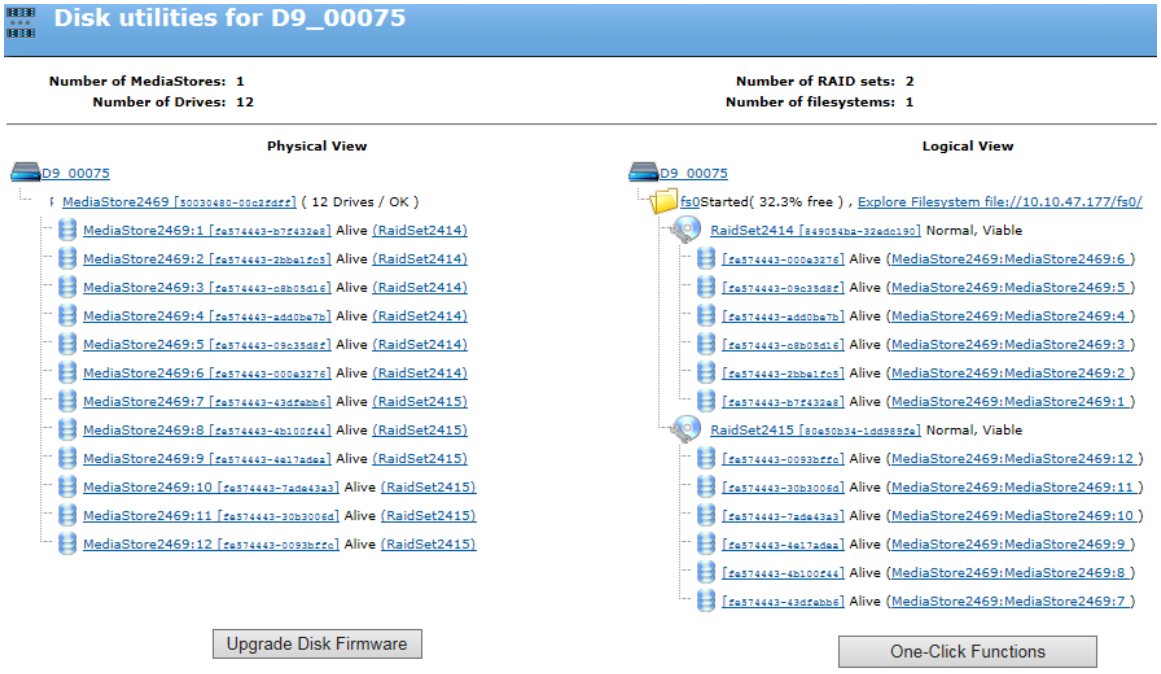


Figure 4-2: Disk utilities

Upgrading drive firmware

Refer to “Upgrading disk drive firmware” in the *Spectrum System Installation Guide* for firmware upgrade instructions.

Failing a drive

Use this procedure to remove a drive from a RAID set, when the drive is experiencing a loss of data.

This step is performed as a prerequisite to removing the drive from the chassis and then replacing it with a new drive, at which time the RAID set “rebuild” occurs automatically (provided that the new drive is formatted).

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to fail a drive. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the **Disk Drive** icon (or the **Disk Drive** hyperlink) to display the **Drive Properties** page (for the selected drive).
5. At the bottom of the page, click **Fail Drive**.
6. When the confirmation dialog appears, click **OK** to accept.

   The drive status now appears as “**Dead**” on the **Disk Utilities** page. Continue the procedure by replacing the drive.

   Refer to the *Spectrum System Component Replacement Guide* for instructions.

Unfailing a drive

Use the “unfail” procedure if you accidentally fail the wrong drive.

The procedure “might” work to restore the drive to service. Perform this process only on drives that have been manually failed. Drives that have been declared “**Dead**” by the Spectrum video server, however, cannot be un-failed.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to “unfail” a drive. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the **Disk Drive** icon (or the **Disk Drive** Hyperlink) to display the **Drive Properties** page (for the selected drive).
5. At the bottom of the page, click **Unfail Drive**.

   On the **Disk Utilities** page, the drive’s status should now appear as “**Alive**.” If it does not (if the status remains “**Dead**”), contact Harmonic technical support or replace the failed drive. Refer to the Spectrum component replacement guide for your device for instructions.

Replacing a failed drive

In the event of a disk drive failure, replacement disk drives are available from Harmonic.

Before you attempt to remove a failed drive, refer to the Spectrum component replacement guide for your device and follow the drive replacement instructions.

Renaming a RAID set

Use this feature to rename a RAID set.

This process makes it easier to identify a selected RAID set, especially in Harmonic systems that use multiple MediaStores or multiple loops.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to rename a RAID set. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the **RAID Set** icon (or the **RAID Set Hyperlink**) to display the **RAID Set Utilities** page.
5. At the top of the page, click **Change** to display the **Change RAID Set Name** page.
6. Enter the new RAID set name and click **Update**. The system returns to the **RAID Set Utilities** page.
7. Click **Done** to return to the **Disk Utilities** page, where the new RAID set name appears.

Stopping a RAID set rebuild in progress

Use this procedure to stop a RAID set “rebuild” in progress.

Note that when the rebuild stops, the RAID set is left in a compromised state. In this state, the RAID set can still be used, but there is no protection. If another drive is lost, your content will also be lost.

The rebuild might be manually stopped, for example, if you noted that the rebuild was occurring to the wrong Hot Spare. More likely, you might stop the rebuild if it was taking away bandwidth from an important on-air operation. Once stopped, the rebuild can be started again successfully.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to stop the rebuild. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the **RAID Set** icon (or the **RAID Set Hyperlink**) for the RAID set that is currently rebuilding. The **RAID Set Utilities** page will be displayed.
5. Scroll to the bottom of the page and click **Abort Rebuild**.

6. Verify that the Rebuild status field reads “**Aborted**.” Note that the button’s name changes to **Start Rebuild**.

   The rebuild has now been stopped, but it can be started again successfully.

   Restarting a RAID set rebuild

Restarting a RAID set rebuild

Normally, the rebuilding of a RAID set occurs automatically when a drive fails and a Hot Spare is available. The rebuild can also occur when a failed drive is replaced.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to restart the RAID set “rebuild” process. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the **RAID Set** icon (or the **RAID Set Hyperlink**) for the RAID set that has stopped rebuilding. The **RAID Set Utilities** page will be displayed.
5. Scroll to the bottom and click **Start Rebuild**. The status field changes to “**Rebuilding**.”
6. Click Done to return to the **Disk Utilities** page.

Starting the file system

Use this procedure to start an existing File System that has been previously initialized.

NOTE: This procedure is used when starting a File System manually. Note that this procedure is automatically performed as part of the “One-Click” File System feature.

The procedure is typically used after performing maintenance on the File System, or when starting a File System in a multi-MediaDirector configuration. To start (and initialize) a File System for the *first time*, immediately after the File System has been created, use the File System initialization procedure. .

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for the Spectrum video server on which you want to start a File System. The **Disk Utilities** page appears.
4. Under the Logical View, click the File System hyperlink (see the following figure) to display the **File System Utilities** page.

Figure 4-3: File System hyperlink

5. At the bottom of the **File System Utilities** page, click the **Start FS** button to display the **Start File System** page. This button only appears when the File System is stopped.

   CAUTION: Do not click “Initialize FS.” This will wipe out the entire file system.

6. Select the desired File System options: **NVRAM Journaling, Read-only, Use Previous Start**, and **Save Options**.

   NOTE: In most cases, you should not need to change the options from the default selections.

7. Click **Start** to accept the selected options and start the File System. The system automatically returns to the **File System Utilities** page.
8. Verify that the File System’s status has changed to **Started**.
9. Click **Done** to return to the **Disk Utilities** page.

Related information

Initializing a file system

Stopping the file system

This procedure stops the File System on the selected Spectrum video server.

Follow this procedure before powering down the Spectrum video server. If this procedure is not performed, a small amount of disk space will be lost each time the Spectrum video server is powered down improperly. You may also use this procedure when you want to perform maintenance on the File System, for example, to delete it or to remove a RAID set.

NOTE: This procedure is used when stopping a File System manually. Note that the procedure is automatically performed as part of the "One-Click" File System feature.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers will be shown.
3. Click the icon for your Spectrum video server. The **Disk Utilities** page for that Spectrum video server appears.
4. Click the file system hyperlink, as shown in the following figure, to display the **Filesystem Utilities** page.

Figure 4-4: File System hyperlink

5. At the bottom of the **Filesystem Utilities** page, click the **Stop FS** button. This button only appears when the file system is started.
6. Click the **Disk Utilities** icon in the left-hand column and verify that the file system status for the Spectrum video server is **Stopped**.

   The Spectrum video server can now be powered down.

Chapter 5

Spectrum I/O module configuration

Find configuration and operation instructions for Spectrum I/O modules including MediaPorts, ChannelPorts, and the Spectrum X.

- *About Spectrum X configurations*
- *Viewing a Spectrum X in shared storage mode*
- *Changing the channel mode*
- *About Simulcast mode*
- *Enabling OP-47 subtitle conversion*
- *Configuring OP-47 subtitle conversion for the MediaPort 5000 series*
- *Overview of configuring GPIO triggers*
- *Changing the I/O module name*
- *Changing the I/O module description*
- *Changing the I/O module wink state*
- *Rebooting the I/O module*
- *Upgrading I/O module firmware*
- *About software licensing for Spectrum X*
- *Upgrading the MediaPort or ChannelPort license*
- *Overview of configuring a MediaPort channel for Playlist Control*
- *Spectrum X and ChannelPort system configuration overview*
- *Determining the Spectrum X and ChannelPort port number*
- *About recording embedded and non-embedded audio*

About Spectrum X configurations

The Spectrum X can operate in either *internal storage* mode or *shared storage* mode.

In internal storage mode, the Spectrum X provides four hot-swappable drives and up to 12 TB of usable storage. In shared storage mode, the Spectrum X can be connected to a MediaDirector 2252B or 2251B or a MediaCenter 2200B.

In the System Diagram view, Spectrum X in internal storage mode appears as a typical Spectrum video server. In the following diagram, D13_0009 is a Spectrum X in internal storage mode. Each MIP-91x1 is an installed SD I/O card.

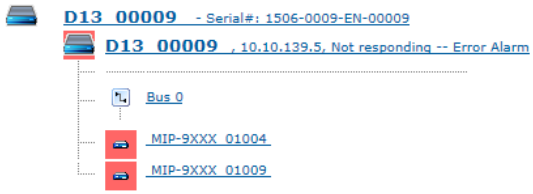


Figure 5-1: System diagram: internal storage mode

In Internal storage mode the Spectrum X is configured like other Spectrum video servers.

In the System Diagram view, Spectrum X in shared storage mode appears as a MediaPort attached to a Spectrum video server. In the following diagram, D12_00308 is a MediaDirector and D13_00017 is an attached Spectrum X in shared storage mode. Each MIP-91x1 shown in the diagram is an installed SDI I/O card.

Figure 5-2: System diagram: shared storage mode

Viewing a Spectrum X in shared storage mode

View the details of a Spectrum X in shared storage mode.

1. Click the **Configuration** tab to display the **Spectrum- System Diagram** page.
2. Click the icon or text for your Spectrum X to open the **Physical Chassis Properties** page, as shown in the following diagram.

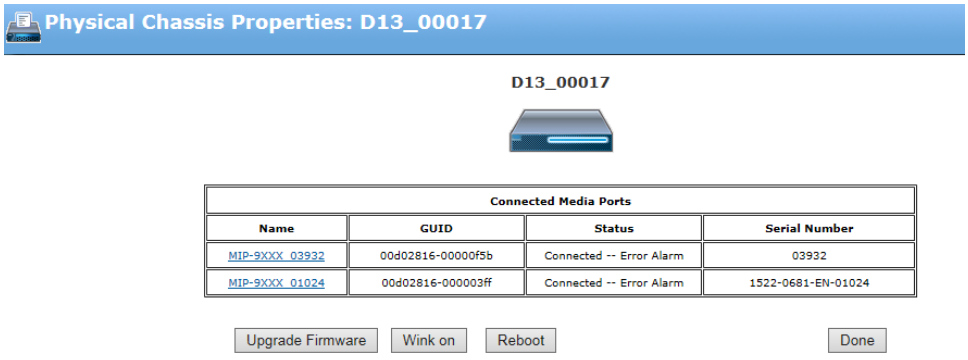


Figure 5-3: Spectrum X Physical Chassis Properties

In the **Connected MediaPorts** section, you can view details of the installed SDI I/O cards. For each SDI I/O card, you can click the link to view its respective properties pages.

The following buttons are available:

Upgrade Firmware	Click to upgrade the Spectrum X firmware. For details, see "Upgrading Spectrum video server firmware" in the *Spectrum System Installation Guide*.
Wink on/off	Click to change the wink state of the Spectrum video server's light bar.
Reboot	Click to reboot the Spectrum video server.
Done	Click to return to the system diagram.
	In the **Environment** section, you can view environmental statistics for the Spectrum X.

Related information

Spectrum server: Environment

Viewing I/O module properties

Viewing a Spectrum X in internal storage mode

View the details of a Spectrum X in internal storage mode.

1. Click the **Configuration** tab to display the **Spectrum- System Diagram** page.
2. Click the icon or text for your Spectrum X to open the **Physical Configuration** page.
3. Click the Spectrum X icon or name to display its **Properties** page.

Related information

Viewing Spectrum video server properties

Changing the channel mode

For a Spectrum X or ChannelPort I/O module, to take advantage of an Enhanced Channel or UHD license, you must first change the channel configuration or "mode" for your I/O module.

If you have a purchased a license for Enhanced Channel or one for UHD, **Channel Configuration** options will be available on the **I/O Module Properties** page.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Under **General Information**, in the **Channel Configuration** field, select the check box for the channel configuration or "mode" you want to apply.
3. Read the confirmation message that appears. Note any channel or player settings that you may want to record if you are restarting your system. Click **OK**.

   NOTE: Enabling or disabling the **Ultra** channel configuration requires a restart of the Spectrum X. Due to the system changes, the restart may take up to 15 minutes. In addition, changing the channel configuration may require that you change EAS, Mixer Transitions, and other graphics settings for the channel.

NOTE: Enabling or disabling the **Enhanced** channel configuration requires a restart of the I/O module. Once the I/O module has restarted, some options on the **Channel Properties** page, including Mixer Transitions and the Master Control Switcher Configuration options, will change.

4. If necessary, restart the I/O module by clicking **Reboot**.

Related information

Spectrum I/O channel configuration
I/O configurations

About Enhanced Channel mode

Enhanced Channel is a licensed option for Spectrum X and ChannelPort that combines resources from both channels of an I/O module into a single channel with additional capabilities.

These include:

- External key/fill support (available when inputs are not in use for live video). The input format must match the video format of the primary output and must be referenced aligned.
- Two live SDI inputs (available when SDI inputs are not being used for external key/fill). Each live SDI input must match the video format of the Primary SDI output and must be reference-aligned.
- Two DVE engines on a single channel.
- Two clip players for a single channel.

These additional features allow you to:

- Mix video from any combination of two clip players or two live SDI input sources.
- Use two DVE engines on a single channel, allowing squeeze-backs between player/SDI input combinations.
- Use an external device to generate key/fill graphics, and overlay that onto the output video of the Spectrum I/O module along with graphics generated by the Spectrum I/O module.

Note that when the I/O module is in Enhanced Channel mode, the functionality of some connectors will change based on your I/O or Connector Configuration selection when configuring the channel properties.

About UHD Channel mode

With Spectrum 8.3 and later, Spectrum X supports UHD playout and record. For information on the codecs and the wrappers that can be used with UHD, see the *Harmonic Spectrum Media and Wrapper Formats* document.

Note that both SDI cards on the Spectrum X are used to play one channel of UHD.

UHD playout includes the following:

- Agile timeline file playback: Spectrum supports a mixed timeline, which can include UHD, HD, and 3G HD video formats.
- Simulcast out: UHD down-convert with Independent Branding, Clean, or Mirrored for secondary output.
- Dual live inputs with auto up-convert: Unlike the standard or enhanced channel modes, with UHD channel, you can have two Spectrum X inputs with different video formats, and Spectrum will automatically up-convert to play out UHD.
- Support for branding with multiple layers, animation, DVE, and dynamic data.

- Support for Polaris Play: Playlist Control automation.

In order to configure a UHD player, the Channel Configuration or "mode" for the I/O module must be set to "Ultra."

NOTE: Changing the Spectrum X channel configuration requires a restart. Due to the system changes, the restart may take up to 15 minutes. In addition, changing the channel configuration may require that you reset EAS and graphics configurations for the channel.

Once UHD is enabled on the Spectrum X, you can configure a compatible player for UHD. See related information.

Related information

Creating an AVC I-frame only UHD player

About Simulcast mode

The MediaPort 7000 series is able to play out in simulcast mode, which means it can up-convert and down-convert any mix of SD and HD material to play out simultaneous SD and HD content on a single channel.

In simulcast mode, SD video is up-converted to HD SDI video and HD SDI video is down-converted to SD video.

The MediaPort 7000 series operates in both simulcast mode and non-simulcast mode.

NOTE: When operating in on a In simulcast mode, the number of playout channels on a MediaPort 7000 is reduced from four to two.

In non-simulcast mode, the MediaPort up-converts or down-converts but does not play out simultaneous SD and HD content on a single channel.

Enabling OP-47 subtitle conversion

Up converting or down converting subtitles or teletext that use the OP-47 standard is a MediaPort-wide setting, which affects all players attached to that MediaPort.

Note the following points regarding subtitle conversion:

- The subtitle conversion setting only applies to players with the PAL type of frame rate (for example, 25 Hz or 50 Hz).
- Because the subtitle conversion setting is MediaPort-wide, once it is configured, it will affect all active players attached to that MediaPort.

- To enable OP-47 subtitle conversion, from the **I/O Module Properties** page, in the **OP-47 subtitle to/ from SD** drop-down menu, select **Enable**.

  If you select **Disable**, Spectrum will not convert OP-47 packets regardless of how your player is configured.

Related information

Configuring subtitle insertion

Configuring OP-47 subtitle conversion for the MediaPort 5000 series

Up converting or down converting subtitles or teletext that use the OP-47 standard is a MediaPort-wide setting, which affects all players attached to that MediaPort.

Note the following points regarding subtitle conversion:

- Of the MediaPort 5000 series, subtitle conversion is only available on the MediaPort 5400 and 5500, which are licensed for up or down conversion.
- The subtitle conversion setting only applies to players with the PAL type of frame rate (for example, 25 Hz or 50 Hz). However, it does apply to all video formats.
- Because the subtitle conversion setting is MediaPort-wide, once it is configured, it will affect all active players attached to that MediaPort.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the MediaPort that you want to configure. Its **Properties** page appears.
3. In the **OP-47 subtitle to/from SD** drop down menu, select from the following:
   - **Default**. If selected, Spectrum will up convert the SD version of the subtitles. Any OP-47 packets in HD clips are down-converted to SD on the lines specified in the packets.

     NOTE: If using the MediaPort/MediaDeck Module 5500 series, and your video source is IMX, the subtitles or teletext must be present on VBI line 21 in order for the conversion to work. If **Default** is selected, the **Always output OP47 Packets** check box appears and is unchecked by default. Note the following:

     - If **Always output OP-47 Packets** is left unchecked, Spectrum will only output OP-47 packets on fields where subtitles are present in the SD clip.
     - If **Always output OP-47 Packets** is checked, Spectrum will output OP-47 packets regardless of whether subtitles are present in the SD clip. If there are no SD subtitles, Spectrum will output empty OP-47 packets.
   - **Disable**. If selected, Spectrum will not convert OP-47 packets.
   - **SD Subtitle line**. If selected, you will be able to select from a drop-down menu which VBI line (from 7-23) Spectrum will use to convert OP-47 packets.

     NOTE: If using the MediaPort/MediaDeck Module 5500 series MediaPort or MediaDeck Module, and your video source is IMX, the subtitles or teletext must be present on VBI line 21 in order for the conversion to work. If **SD Subtitle line** is selected, the **Always output OP-47 Packets** check box appears and is unchecked by default. Note the following:

     - If **Always output OP-47 Packets** is left unchecked, Spectrum will only output OP-47 packets on fields where subtitles are present in the SD clip.
     - If **Always output OP-47 Packets** is checked, Spectrum will output OP-47 packets regardless of whether subtitles are present in the SD clip. If there are no SD subtitles, Spectrum will output empty OP-47 packets.

   Once the MediaPort has been configured and you have attached a player with a PAL type of frame rate (25 or 50 Hz), the player properties page will display a field indicating that subtitle conversion is configured, and showing which VBI line has been selected. See the following figure.

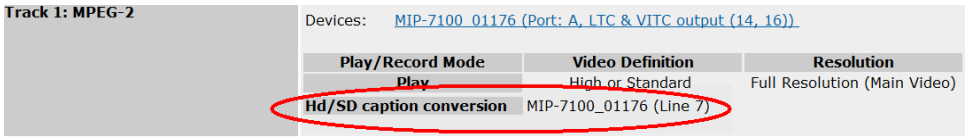


Figure 5-4: Configuring subtitle conversion—Player Properties page

Overview of configuring GPIO triggers

Spectrum I/O modules provide a GPIO connector, which allows you to use an external device to control players, graphics, or an EAS.

In order to use GPIO to control players, first follow the procedure to create GPIO triggers, and then do one of the following:

- Map GPIO triggers to player functionality. Configure the GPIO settings for the attached players from their respective Player Properties pages.
- Map GPIO triggers to defined events or an EAS. Configure the GPIO settings on the **Channel Properties** page for your Spectrum X or ChannelPort.
- Map GPIO triggers to Playlist operations using Polaris Play: Playlist Control. Configure the Channel Control settings on the Playout Channel properties page.

Related information

Configuring GPIO settings for players
Spectrum I/O channel configuration
Configuring a playout channel

Creating GPIO triggers

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the I/O module that you want to configure. Its **Properties** page appears.
3. Click the **Edit GPIO Configuration** check box to enable the **GPIO Configuration** section.

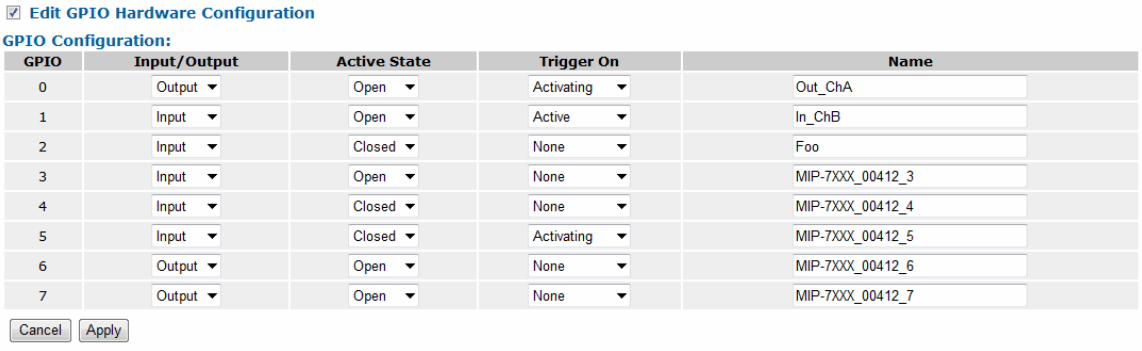


Figure 5-5: Configuring GPIO from the Properties page

4. In the **GPIO Configuration** section, the **GPIO** column indicates which GPI lines are configurable. For a description of where these pins are physically located on the connector, refer to the Quick Reference Guide for your I/O module. Identify which GPI line you wish to configure.

5. In the **Input/Output** column, select **Input** or **Output** depending on how the GPI line will be used. If
   - **Input**: If selected, a signal from the control device will generate the trigger.
   - **Output**: If selected, the player activity configured on the **Change GPI Player Configuration** page for the attached player will drive the signal.
6. In the **Active State** column, select Open or Closed to associate GPI line behavior with the active signal state. For outputs, this controls an internal switch to ground. For inputs, this senses the state of an external switch to ground.
   - Open: Active signal state = open switch
   - Closed: Active signal state = closed switch
7. In the **Trigger On** column select one of the following:
   - **None**: If selected, incoming signal changes do not affect the trigger. If you are configuring the GPI line for **Output**, select this option.
   - **Activating**: If selected, when the signal transitions to an active state, it generates the trigger. Select this state or **Deactivating** if you have configured the GPI line for Input and are configuring the trigger to perform one of the following: “Play Pause/Continue,” “Record Start/Stop,” or “Play Take Next.”
   - **Deactivating**: If selected, when the signal transitions to an inactive state, it generates the trigger. Select this state or **Activating** if you have configured the GPI line for Input and are configuring the trigger to perform one of the following: “Play Pause/Continue,” “Record Start/Stop,” or “Play Take Next.”
   - **Active**: If selected, the trigger is generated and remains valid while the signal is in the active state. Select this option if you have configured the GPI line for Input and are configuring the trigger to perform a “Crash Record.” Otherwise, the crash record will not work properly.
8. In the **Name** column, a default GPIO trigger name is provided. If you wish to change this name, type a new GPIO trigger name in the field.

   IMPORTANT: GPIO trigger names are global across a Spectrum video server. Therefore, Harmonic highly recommends that you use unique names for all triggers on all I/O modules connected to a single video server.
9. Repeat steps four through nine for any additional GPI lines you wish to add.
10. Click **Apply** to save your changes.
11. To configure GPIO triggers for player control, you must configure the GPIO settings for the attached players from their respective Player Properties pages.

Related information

Configuring GPIO settings for players

Changing the I/O module name

Renaming may help you locate I/O modules throughout the SystemManager application.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the I/O module that you want to rename. Its **Properties** page appears.
3. Click **Change Name** to display the **Change I/O module name** page.

4. Type the new name in the text box. Refer to “About Naming Files and System Elements” for proper naming conventions.
5. Click **Save** to return to the **I/O Module Properties** page.

   The new name now appears in the **System** diagram, in various page titles and in other I/O module-related fields throughout the application.

Related information

About naming files and system elements

Changing the I/O module description

The I/O module description is useful in clarifying a particular I/O module’s role in your Spectrum System.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the I/O module whose description you want to change. Its **Properties** page appears.
3. Click **Change Desc** to display the **Change I/O Module Description** page.
4. Type the new description in the text box.
5. Click **Save** to save the description and return to the **Properties** page. The new description appears in the **I/O Module Description** field.

Changing the I/O module wink state

Change the wink state for the light bar associated with the I/O module.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the I/O module whose wink state you want to change. Its **Properties** page appears.
3. Scroll to the bottom of the page, and check the **Wink State** line.
4. Change the I/O module’s wink state, as desired:
   - If currently On, click **Wink Off** to stop winking the I/O module’s blue light bar.
   - If currently Off, click **Wink On** to start winking the I/O module’s blue light bar.

Rebooting the I/O module

Located on the **Properties** page, the reboot function is a *local* function that is not associated with the firmware upgrade process. Reboot the I/O module when it is experiencing problems, or if you do not want to reboot the I/O module immediately after a firmware upgrade.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the icon for the I/O module that you want to reboot. Its **Properties** page appears.
3. Scroll to the bottom of the page and click **Reboot**.

4. When the **Confirmation** dialog appears, click **OK**. The I/O module's status changes to "**Rebooting**," then "Not Connected," then "**Configuring**," and finally to "**Connected**." The complete process takes approximately two minutes.

   You can also reboot one or more I/O modules on the **Upgrade Firmware** page. Refer to "Upgrading Spectrum Firmware" in the *Spectrum System Installation Guide*.

Upgrading I/O module firmware

Refer to "Upgrading Spectrum Firmware" in the *Spectrum System Installation Guide* for firmware upgrade instructions.

About software licensing for Spectrum X

In Spectrum 8.0 and later, software licenses are installed only on the Spectrum video servers.

This means if you are operating Spectrum X in internal storage configuration, the licenses are installed directly on the Spectrum X. However, if you are operating it in a shared storage configuration, licenses are not installed on the Spectrum X. If your system includes MediaPort or ChannelPort s, licenses will continue to be installed directly on those devices.

Upgrading the MediaPort or ChannelPort license

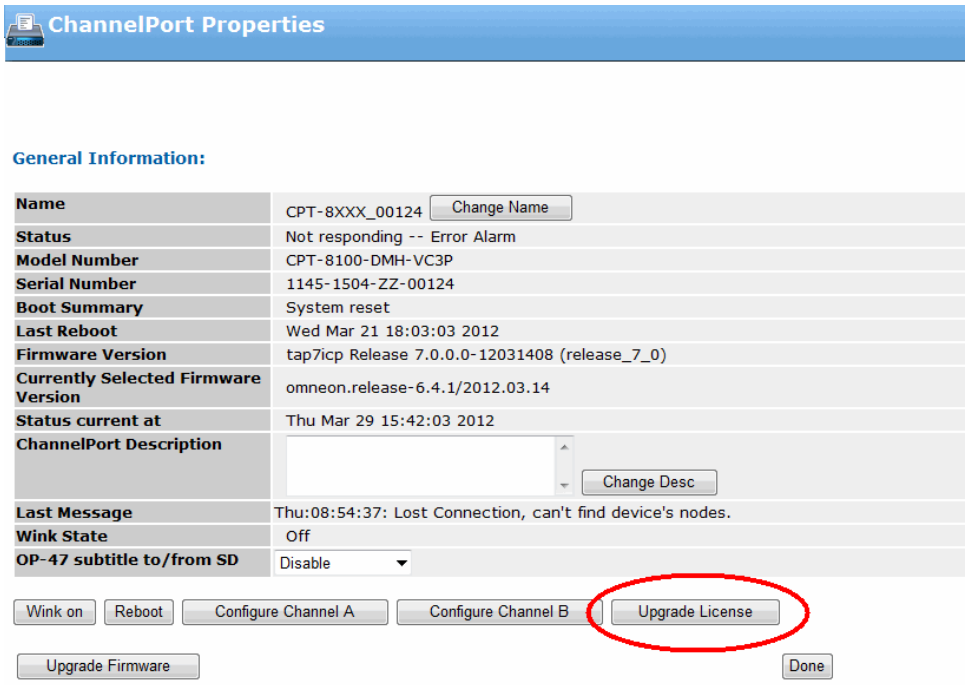
Upgrade the license for your MediaPort or ChannelPort.

Every Spectrum MediaPort or ChannelPort includes a license file. For some, upgrading the license file also changes the model number and enables additional features and functionality. Note that the three letter-identifier changes (for example, 7100-DVS may be upgraded to 7100-DVH). If you have purchased a new license file from Harmonic, you may upgrade your license using SystemManager.

1. Locate the license file provided to you by Harmonic. Note that the file name will have the MediaPort or ChannelPort serial number embedded in it. For example, the license file name for a MediaPort with serial number D25 could be t4_520x_D25.hex.
2. Copy the license file to the SystemManager hard drive under **<install drive>:\Licenses**.

   NOTE: The drive letter for <install drive> depends on which drive was selected when installing SystemManager.

3. From the **Configuration** tab in SystemManager, navigate to the **Properties** page for the MediaPort or ChannelPort that you wish to upgrade. Once the new license file is found, an **Upgrade License** button will appear, as shown in the following image.



4. Click **Upgrade License**.
5. Reboot the MediaPort or ChannelPort.

NOTE: After restarting, either the three-letter identifier at the end of the model number will change or new identifiers will appear in the Additional Features field. For example, a CPT-8100-DMH may be upgraded to CPT-8100-DMH-VC3P.

Overview of configuring a MediaPort channel for Playlist Control

Review the configuration overview before configuring a MediaPort channel for Playlist Control.

1. In SystemManager, create the player you wish to use for Playlist Control and configure it to use “Harmonic Playout” for Control.
2. In SystemManager, attach the player to the MediaPort and then activate it.
3. In SystemManager, enable the Traffic and Billing service for the corresponding video server.
4. In SystemManager, configure the Playout Channel for the corresponding video server for Playlist Control by selecting “Playout” for the Channel Type on the Playout Channel Properties page. Configure other Playout Channel settings as needed.
5. If you are using the Media Fetch service, enable Media Fetch on the Playout Channel Properties page and then configure the Media Fetch settings.
6. Refer to the *Polaris Play: Playlist User Guide* for information about creating and monitoring playlists with Polaris Play: Scheduler and Polaris Play: Playlist.

Related information

Creating a player

Attaching devices and setting conversion options

Changing the player state
Enabling and configuring global Traffic and Billing Settings
Configuring a playout channel
Media Fetch configuration overview

Spectrum X and ChannelPort system configuration overview

If you are using the branding and graphics features of the Spectrum X or the ChannelPort, configure your system in the order provided.

1. **System**: If you wish to enable Enhanced Channel mode on your Spectrum X or ChannelPort, do so before configuring your channels. Otherwise, it will operate in Standard Channel mode. See the *SystemManager User Guide* for instructions.
2. **Channel**: Configure the basic parameters for your Spectrum X or ChannelPort channel, including master control switcher settings, audio profiles, independent branding, or serial port settings required for automation. See the instructions for configuring Spectrum I/O channels in the *SystemManager User Guide* for details.
3. **Player**: See the *SystemManager User Guide* for instructions on configuring a player. Note that if you wish to use Playlist Control for player control, configure your player to use “Harmonic Playout” for control.
4. **Graphics**: Make sure your graphic templates follow Harmonic guidelines so they can be played on the Spectrum X or the ChannelPort. Configure the FXTool if you plan to use it. See the *Spectrum Template User Guide* for more information.

   NOTE: The transfer and the loading of graphics to a Spectrum X or a ChannelPort is tied to the low-priority bandwidth settings for Samba and AFP. Changing the bandwidth settings can affect the graphics.
5. **Playlist Control**: Configure any Polaris Play: Playlist Control features and tools that you wish to use. For help with configuring the Playout Channel, Traffic and Billing, or Polaris Play: Media Fetch, see the playout channel configuration instructions in the *SystemManager User Guide*. For information on creating and monitoring playlists with Polaris Play: Scheduler and Polaris Play: Playlist Control, see the *Polaris Play: Playlist User Guide*. For information on configuring PreviewTool, refer to the *Spectrum Tools User Guide*.
6. **GPIO**: If using GPIO, configure the Spectrum X or the ChannelPort GPIO triggers and then map them to channel events or Playout Channel events. See the instructions on configuring GPIO triggers for the Spectrum X or the ChannelPort in the *SystemManager User Guide*.
7. **EAS**: If using an EAS, make sure the Spectrum X or ChannelPort is connected to the EAS as described in the installation instructions, and then configure the EAS settings. See the instructions on configuring a Spectrum X or a ChannelPort channel in the *SystemManager User Guide* for EAS setting details.

Related information

Changing the channel mode
Spectrum I/O channel configuration
Player configuration
Playout channel configuration

Overview of configuring GPIO triggers

Determining the Spectrum X and ChannelPort port number

If you are using a Spectrum X or a ChannelPort to preview graphics with FXTool or using it with an automation system, you will need to identify the port number for theSpectrum X or a ChannelPort channel you wish to use.

Note that FXTool and most automation systems use different protocols—FXTool uses “Network Automation” and most automation systems use “Serial Automation.” Automation that uses Oxtel over Ethernet is considered "Network Automation."

When a ChannelPort module is installed in a MediaDeck 7000, the module on the left (when facing the rear panel) is com0, and the module on the right is com1. In a Spectrum X, the left-hand SDI I/O card is com0 and the right-hand SDI I/O card is com1. If only one SDI I/O card is installed, that card is always com 0.

For a Spectrum X in shared storage mode, navigate to the Properties page for your video server in SystemManager, and then scroll down to the Private Ethernet Interfaces section to view the “com” label for the associated Ethernet port.

Each Spectrum X SDI I/O card and each ChannelPort module supports two channels (A and B). Once you know the module or SDI I/O card and channel you will be using for FXTool or automation, you may use the following table to identify the correct port number to use.

Table 5-1: Port numbers

Spectrum X or ChannelPort Module IP	Spectrum X or ChannelPort channel	Port number for network automation (FXTool)	Port number for serial automation
com 0	A	9100	9000
com 0	B	9101	9001
com 1	A	9102	9002
com 1	B	9103	9003
com 2	A	9104	9104
com 2	B	9105	9105
com 3	A	9106	9106
com 3	B	9107	9107
com 4	A	9108	9108
com 4	B	9109	9109
com 5	A	9110	9110
com 5	B	9111	9111
com 6	A	9112	9112
com 6	B	9113	9113

Spectrum X or ChannelPort Module IP	Spectrum X or ChannelPort channel	Port number for network automation (FXTool)	Port number for serial automation
com 7	A	9114	9114
com 7	B	9115	9115
com 8	A	9116	9116
com 8	B	9117	9117
com 9	A	9118	9118
com 9	B	9119	9119
com 10	A	9120	9120
com 10	B	9121	9121
com 11	A	9122	9122
com 11	B	9123	9123
com 12	A	9124	9124
com 12	B	9125	9125
com 13	A	9126	9126
com 13	B	9127	9127
com 14	A	9128	9128
com 14	B	9129	9129
com 15	A	9130	9130
com 15	B	9131	9131

About recording embedded and non-embedded audio

SDI embedded audio functions (per SMPTE 272M) on Spectrum I/O modules eliminate the need for external embedders and de-embedders.

NOTE: Audio is interleaved in a DV frame when recording in SD and not when recording in HD.

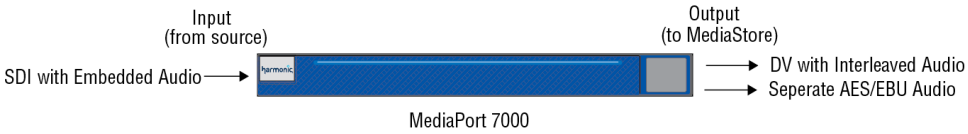
MediaPorts and Spectrum X can play back embedded audio in SDI format. By default, embedded audio is turned on for all AES outputs. Full system audio storage options are available as follows.

TIP: In the following discussions and diagrams, DV refers to DV (25 Mbps), DVCPRO (25 Mbps), DVCPRO 50, or DVCPRO HD formats.

Example: Recording SDI with embedded audio as DV with separate AES/EBU audio

In the following figure, SDI with embedded audio is the MediaPort's input. DV with both interleaved audio and separate AES/EBU audio is recorded. Two files are recorded on the MediaStore:**.dv** and **.aiff**.

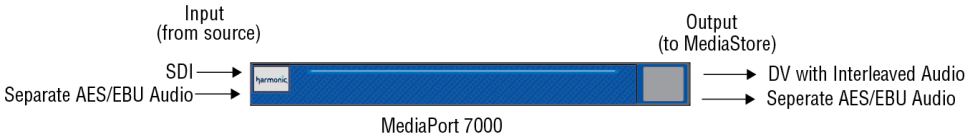
To accomplish this, create a Player with one DV track and one AES/EBU track on the **Edit Player** page. To use SDI with embedded audio on the input stream, select **Embedded** or **Limited Embedded** on the **Attach Devices** page.



Example: Recording SDI with separate AES/EBU Audio as DV with separate AES/EBU audio

In the following figure, both SDI and separate AES/EBU audio are the MediaPort's inputs. DV with both interleaved audio and separate AES/EBU audio is recorded. Two files are recorded on the MediaStore: .**dv** and .**aiff**.

To accomplish this, create a Player with one DV track and one AES/EBU 8 Channel track on the **Edit Player** page. To use separate audio on the input, select **Non Embedded** on the **Attach Devices** page.



Chapter 6

Spectrum I/O channel configuration

Find configuration instructions for configuring a channel for a Spectrum X SDI I/O card or ChannelPort module in a Spectrum system.

- *Configuring a Spectrum X or ChannelPort channel*
- *Renaming the graphics directory folder*
- *Enabling and configuring Independent Branding*
- *Configuring audio profiles*
- *Configuring audio watermarking*
- *Configuring Dolby® E encode*

Configuring a Spectrum X or ChannelPort channel

Configure a Spectrum X or ChannelPort channel.

IMPORTANT: In order to apply any channel changes to an active player, you must first deactivate and then re-activate the player.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the link or icon for your Spectrum X or ChannelPort to open its Properties page.
3. Click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
4. Configure the settings in each section in order.
5. Click **Apply** to apply the channel settings.

   To revert to default settings, click **Cancel**.

Related information

Master Control Switcher Configuration
Effect Configuration
Event Configuration
EAS Configuration

Master Control Switcher Configuration

In the Master Control Switcher Configuration section, you can configure settings for secondary video and audio, audio profiles, and depending on your Spectrum X or ChannelPort model and its I/O configuration.

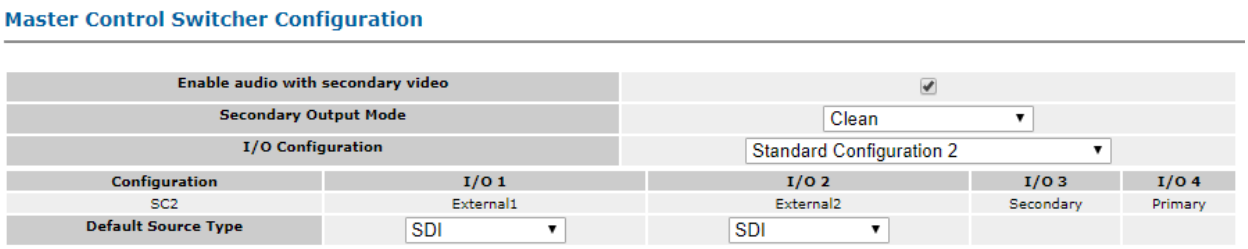


Figure 6-1: Master Control Switcher Configuration

General **Master Control Switcher Configuration** options include the following:

Enable audio with secondary video

When selected, any audio present in a loaded template (such as a .flv or .mp4 file) will be mixed in with the output audio.

NOTE: Harmonic recommends that you only enable this setting if you explicitly intend to play audio with your secondary event video.

Secondary Output Mode

This option determines how the secondary output on your Spectrum X or ChannelPort will behave. Select from the following modes:

- **Clean**: If selected, the secondary output will play out clean without branding or any other modifications.
- **Independent Branding**: If selected, the secondary output will play out independent branding graphics as configured in the Effects section.
- **Mirror**: If selected, the secondary output will mirror the primary output.

I/O Configuration

Select the desired configuration for the I/O module connectors.

IMPORTANT:

For Spectrum X or ChannelPort in Standard or Enhanced Channel mode, when playing live output, the format of the External Input must match the video format of the Primary Output and must be referenced aligned.

For Spectrum X in UHD mode, the format of the External Inputs do not need to match the Primary Output format. However, the External SDI input must be referenced aligned.

For details on configuring **SMPTE 2022-6** settings, see "Configuring 2022-6 settings for a Spectrum X channel"

For details on configuring **Audio Processing Settings**, see "Configuring audio watermarking" or "Configuring Dolby® E encode.

Related information

Creating a player
Configuring 2022-6 settings for a Spectrum X channel

Configuring audio watermarking
Configuring Dolby® E encode

I/O configurations

Find the configurations for Spectrum I/O connectors.

NOTE: In the following tables, "Clean Primary/Secondary" refers to video output with no graphics or overlays.

Table 6-1: Standard Channel configuration 1 (SC1)

Connector	Description	Connector	Description
I/O 1	Ext In 1 (Channel A)	I/O 5	Ext In 1 (Channel B)
I/O 2	Out, Primary (Channel A)	I/O 6	Out, Primary (Channel B)
I/O 3	Out, Secondary (Channel A)	I/O 7	Out, Secondary (Channel B)
I/O 4	Out, Primary (Channel A)	I/O 8	Out, Primary (Channel B)

Table 6-2: Standard Channel configuration 2 (SC2)

Connector	Description	Connector	Channel B
I/O 1	Ext In 1 (Channel A)	I/O 5	Ext In 1 (Channel B)
I/O 2	Ext In 2 (Channel A)	I/O 6	Ext In 2 (Channel B)
I/O 3	Out, Secondary (Channel A)	I/O 7	Out, Secondary (Channel B)
I/O 4	Out, Primary (Channel A)	I/O 8	Out, Primary (Channel B)

Table 6-3: Enhanced Channel configuration 1 (EC1)

Connector	Description	Connector	Description
I/O 1	Ext In 1/Key 1	I/O 5	Ext In 4/Key 2
I/O 2	Ext In 2/Fill 1	I/O 6	Ext In 5/Fill 2
I/O 3	Out, Secondary	I/O 7	Ext In 6
I/O 4	Out, Primary	I/O 8	Out, Clean Primary

Table 6-4: Enhanced Channel configuration 2 (EC2)

Connector	Description	Connector	Description
I/O 1	Ext In 1/Key 1	I/O 5	Ext In 4/Key 2
I/O 2	Ext In 2/Fill 1	I/O 6	Ext In 5/Fill 2
I/O 3	Out, Secondary	I/O 7	Out, Clean Secondary
I/O 4	Out, Primary	I/O 8	Out, Clean Primary

Table 6-5: Enhanced Channel configuration 3 (EC3)

Connector	Description	Connector	Description
I/O 1	Ext In 1/Key 1	I/O 5	Ext In 4/Key 2
I/O 2	Ext In 2/Fill 1	I/O 6	Ext In 5/Fill 2
I/O 3	Ext In 3	I/O 7	Ext In 6
I/O 4	Out, Primary	I/O 8	Out, Secondary

UHD configuration

NOTE: In UHD mode, both SDI cards on the Spectrum X are used for one channel of UHD. SDI card 1 refers to the card on the left-hand side when facing the rear panel. SDI card 2 refers to the card on the right-hand side when facing the rear panel.

Table 6-6: UHD configuration (UC1)

Connector, SDI card 1	Description	Connector, SDI card 2	Description
I/O 1	External input 1	I/O 1	External input 2
I/O 2	External input 1	I/O 2	External input 2
I/O 3	Out, Primary	I/O 3	Out, Secondary
I/O 4	Out, Primary	I/O 4	Out, Secondary
I/O 5	External input 1	I/O 5	External input 2
I/O 6	External input 1	I/O 6	External input 2
I/O 7	Out, Primary	I/O 7	Out, Secondary
I/O 8	Out, Primary	I/O 8	Out, Secondary

Monitor Out

The Monitor Out feature allows you to display active player and mixer information for your channel superimposed over your primary output while playing a clean output to air over the secondary output.

Monitor Out information can include details such as mixer state, player state, clip name (for loaded and cued clips), time until next clip, player name, looping state, transport status (PLAY, REW, FF, PAUS, IDLE), and timecode.

The Monitor Out information displayed over your primary output is configured in your Monitor Out graphics template. Before configuring SystemManager or , first create your own custom Monitor Out template and save it to your graphics directory (/fs0/gfx.dir). To create and configure your template, see “Creating a Monitor Out Template” in the *Spectrum Template User Guide* .

Once your Monitor Out template is saved to the graphics directory, make sure that the **Secondary Output Mode** for your channel is set to **Clean**. This way, the secondary output will display a clean output that can be played to air.

Enable	Click to enable Monitor Out.
Monitor Template	Enter the name of the graphics template to be used for Monitor Out.
Layer	Select a graphics layer between 1 and 8.

Audio Profile Group

The options in this section allow you to apply an Audio Profile Group to this channel. Once you have applied an Audio Profile Group, you can map the channel sources to individual Audio Profiles using the menus in the Audio Profile Mapping section.

Show Audio Configuration	Click to open any Audio Profile Group that is applied to this channel. If no group is applied, a default Audio Profile Group will appear.
Change Audio Profile Group	Click to open the **Select Audio Profile Group** menu. From this drop-down menu, select an Audio Profile Group that you wish to apply to this channel. **IMPORTANT:** If you modify an Audio Profile Group after it has been applied to a channel, you must re-apply that group for the changes to take effect.
View All Audio Profile Groups	Click to open the Audio Profile Group page for the attached video server.

Audio Profile Mapping

Use this section to map Spectrum X or ChannelPort channel sources to audio profiles from the selected Audio Profile Group.

For each source, you may select an Audio Profile from the drop-down menu. If the default 0 is selected, no profile will be applied.

IMPORTANT: When mapping audio profiles, be aware that Spectrum supports a total of four Dolby® E decodes per ChannelPort or Spectrum X. Applying more than four decodes to your channel sources will result in all Dolby E decodes failing.

Graphics and MCS

For Spectrum X, if you have purchased licenses for four or eight graphics layers, MCS, DVE, or SMPTE 2022-6, you can enable or disable those features.

IMPORTANT: If you apply licensed feature changes to a channel (including graphics layer count, MCS, DVE, or SMPTE 2022-6) with an active player attached to it, and the active player is also connected to tools such as FXTool, PreviewTool, Playlist, or Scheduler, those tools will not reflect the new channel state until the player is deactivated and then activated again. For details on changing the player state, see “Changing the player state.”

Graphics Layer Count	Select the number of graphics layers that will be available for this channel.
Enable MCS	Select to enable master control switching for this channel.
Enable DVE	Select to enable branding with DVE for this channel.
Enable SMPTE 2022-6	Select to enable 2022-6 for this channel.

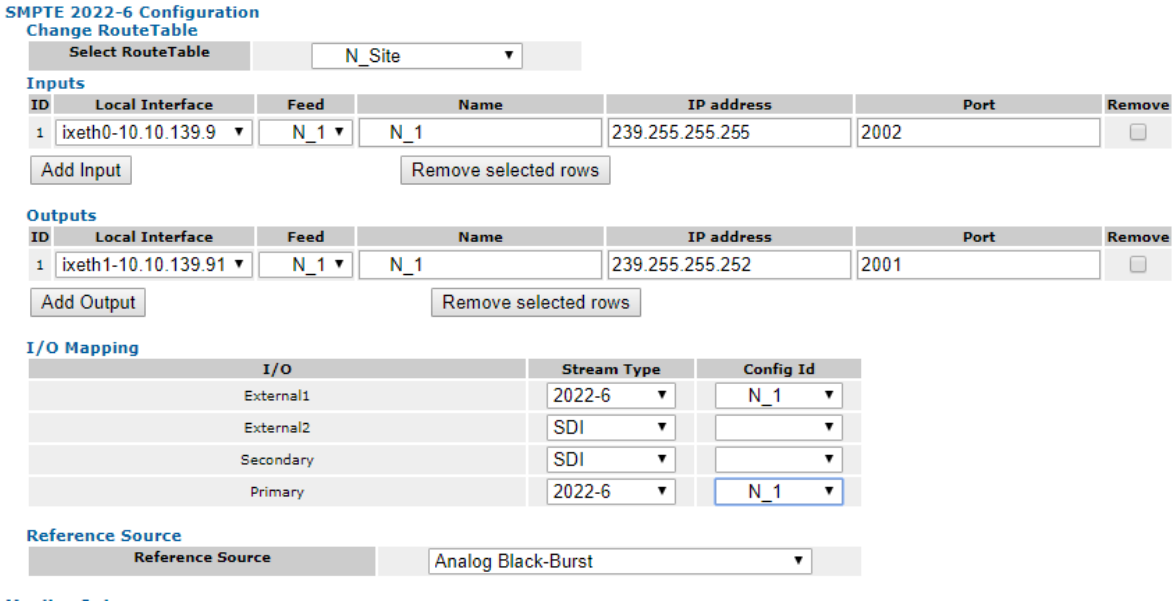
Related information

Changing the player state

Configuring 2022-6 settings for a Spectrum X channel

Configure 2022-6 inputs and outputs and map them to your Spectrum X channel I/O.

1. Navigate to the I/O Module Properties page for your Spectrum X by clicking its link or icon in the System Diagram, and then click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
2. Under **Master Control Switcher Configuration** > **Default Source Type**, for the I/O to be used with 2022-6 click the drop-down menu, and select **SMPTE 2022-6**.
3. In the **SMPTE 2022-6 Configuration** section, configure the following settings.



a. For **Change RouteTable**:

Select RouteTable	If you have configured a RouteTable for your 2022-6 network, select it from the drop-down menu.

b. For **Inputs** and **Outputs**, click **Add Input/Output**, and configure as follows:

NOTE: Changing Input and Output settings from this page does not change the RouteTable settings.

Local Interface	Select the 10 Gb Ethernet interface to be used. If no 10 Gb NICs are configured, the drop-down menu will be empty.
Feed	Select a feed from the drop-down menu. Note that the remaining fields will be populated with the settings specified in the RouteTable entry for that feed.

Name	Enter a name for the Input/Output.
IP address	If using a different address than the one specified in the RouteTable, enter the multicast address to be used for the 2022-6 Input/Output.
Port	If using a different port than the one specified in the RouteTable, enter the port to be used for the 2022-6 Input/Output.

c. For **I/O Mapping**, map the channel I/O to 2022-6 streams as needed.

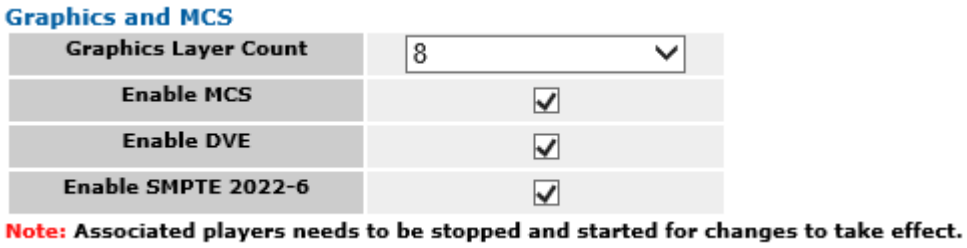
IMPORTANT: Mapping an I/O to a 2022-6 stream and applying the configuration automatically starts the stream. Mapping the I/O back to SDI stops the stream.

Stream Type	Select the **SDI** or the **2022-6** stream.
Config ID	Select the name of the 2022-6 feed.

d. For **Reference Source**, select from the following.

- **Analog Black-Burst**: The default selection.
- **PTP-AutoSelect**: Available when PTP is enabled. When selected, Spectrum automatically selects a NIC for PTP reference. In the event one NIC fails, Spectrum switches to the second NIC.
- **PTP-Eth0, PTP-Eth1**: Available when PTP is enabled. Spectrum will use the PTP reference from the selected NIC.

4. In the **Graphics and MCS** section, select **Enable SMPTE 2022-6** to enable the standard for the channel.



5. Click **Apply** to save the settings and start any 2022-6 mapped streams.

Effect Configuration

If you are using an automation system that connects to the Spectrum X or ChannelPort via serial port, configure the settings in the **Effect Configuration** section.

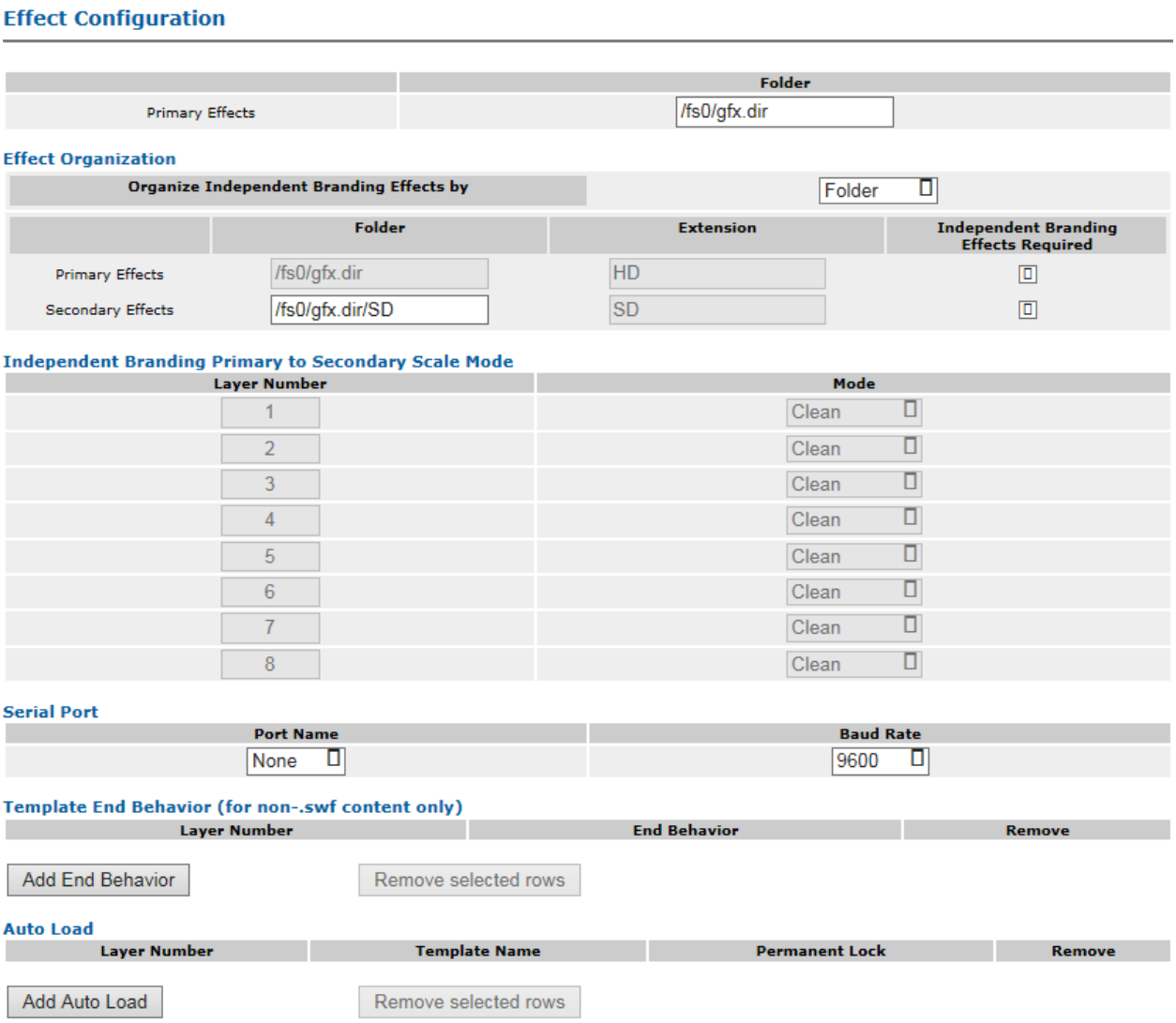


Figure 6-2: Effect Configuration

Primary Effects: Folder — This field shows the location of the graphics directory on your video server file system. If you have named the graphics directory on your video server file system something other than /fs0/gfx.dir, you must enter the new name in the Primary Effects Folder field.

Effect Organization

The options in this section will only be activated if you have selected **Secondary Output Mode Independent Branding** in the Master Control Switcher Configuration section of the page.

Organize Independent Branding Effects by	Select **Folder** or **Extension** to determine how Spectrum will look for graphics on the video server file system.
Primary Effects: Folder	This field shows the location of the graphics directory on your video server file system. To modify, edit the Primary Effect field shown above.
Primary Effects: Extension	This field is used to configure graphics for Independent Branding by **Extension**. If you have selected “Organize Independent Branding Effects by Extension” and have named your SD and HD graphics with separate extensions, make sure to enter the name of your HD extensions in the **Extension** column for Primary Effects.
Primary Effects: Independent Branding Effects Required	Select if primary/HD graphics are required. **NOTE:** When the check box is checked, a graphic must be present in the folder in order to be loaded.
Secondary Effects: Folder	This field is used to configure graphics for Independent Branding by **Folder**. If you have selected “Organize Independent Branding Effects by Folder” and have created a sub-folder for your SD graphics, make sure to enter the name of the SD sub-folder in the **Folder** column for Secondary Effects.
Secondary Effects: Extension	This field is used to configure graphics for Independent Branding by **Extension**. If you have selected “Organize Independent Branding Effects by Extension” and have named your SD and HD graphics with separate extensions, make sure to enter the name of your SD extensions in the **Extension** column for Secondary Effects.
Secondary Effects: Independent Branding Effects Required	Select if secondary/SD graphics are required. **NOTE:** When the check box is checked, a graphic must be present in the folder in order to be loaded.

Related information

Configuring Independent Branding

Independent Branding Primary to Secondary Scale Mode

The Independent Branding Primary to Secondary Scale feature allows you to down-scale HD graphics for use on the Independent Branding SD secondary output. This allows you to make HD graphics available for use on SD-branded channels.

To use the scale mode feature, make sure that the “Independent Branding Effects Required” checkbox is *de-selected* for Secondary Effects.

Layer Number	Indicates the graphic layer number.
Mode	Select one of the following scaling options: • **Clean** Specifies that the HD template will not be displayed on the secondary output.

- **None** Specifies that no down scaling will occur. When selected, all HD graphics *except* External Key/Fill (.ekf) content will be placed in the upper-left hand corner of the screen without any down-scaling. External Key/Fill content will not be displayed on the secondary output.
- **Anamorphic** Specifies that frames will be scaled down horizontally and vertically to fit a SD 4:3 aspect ratio.
- **Crop** Specifies that frames are scaled horizontally to a 14:9 aspect ratio and centered in the active area.
- **Full** Specifies that frames are scaled vertically to fill the SD active height and then centered in the active area.
- **Letter** Specifies that frames are scaled horizontally to fill the SD active width and then centered in the active area.

NOTE: Down-scaling only occurs if the secondary SD output is configured for 4x3 in the player properties. If the secondary output is configured for 16x9, the output will look the same.

Related information

Configuring Independent Branding

Serial Port

In the **Serial Port** section configure the following serial port settings.

Port Name	From the drop-down menu, select the Serial Port that you are using to connect to an automation system. For GPIO/RS-422 connector signal assignments on a ChannelPort, refer to the *Spectrum ChannelPort Module Quick Reference Guide*. For signal assignments on the DSUB 60 connector on a Spectrum X, see “High Density DSUB 60 Connector Pinout” in the *Spectrum System Installation Guide* for version 8.0 or later.
Baud Rate	From the drop-down menu, select the required Baud Rate for your automation system. Refer to the documentation for your automation system for details.

Template End Behavior

In the **Template End Behavior (for non-.swf content)** section, you can configure the “end behavior” for non-.swf content that you load onto Spectrum X or ChannelPort layers, which is the behavior when the graphic reaches the last frame.

This section applies only to non-.swf content that you can play on the Spectrum X or ChannelPort, including the following file types:

- .flv (Flash Video)
- .mp4 (MPEG-4)
- .png (Portable Network Graphic)
- .jpg (Joint Photographic Experts Group)
- .tga (Targa Graphic)
- .gif (Graphical Interchange Format)
- .bmp (Bitmap Image)
- .tif (Tagged Image File)

NOTE: PEG file compression and planar formats within .tif files are not supported by Spectrum X or ChannelPort.

For instructions on configuring Flash Videos and MPEG-4 files to be played on a Spectrum X or ChannelPort, refer to “Creating Flash Videos and MPEG-4 Files” in the *Spectrum Template User Guide* .

NOTE: When you load a graphic onto the Spectrum X or ChannelPort, it is positioned on a layer above the main video source. Layer 1 is the bottom-most layer, while layer 8 is the top-most layer.

Layer Number	Select a layer between 1 and 8.
End Behavior	This setting describes what happens when the graphic on the selected reaches its last frame, and the graphic is still playing. For each layer, select from the following list of behaviors: • **Still**: The last frame of the graphic on this layer will be still. • **Loop**: The graphic on this layer will loop continuously. • **Disappear**: The graphic on this layer will disappear. If a still image (for example, .jpg or .gif file) is loaded on the layer and Disappear is selected as the End Behavior, the image will appear for one frame and then disappear.
Remove	Click to select the layer you wish to remove.
Add End Behavior	(button) Click to add an effect layer. You may add up to 8 layers.
Remove selected rows	(button) Click to remove any rows selected in the Remove column.

Graphics Anchor

For Spectrum X in UHD mode, use the graphics anchor setting to anchor your graphic templates to one of nine pre-defined anchor points on the video output.

Note that you can specify one anchor point per graphic layer.

NOTE: You can also define anchor points directly in the graphic template. Note that any anchor settings defined in the template will override the Graphics Anchor setting in SystemManager. For details, see the *Spectrum Template User Guide* for information about applying an anchor override widget.

Click **Add Anchor** to add a graphics anchor. You can add up to eight anchors, one for each layer.

Layer number	Select a layer between 1 and 8. When you load a graphic onto the Spectrum X or ChannelPort, it is positioned on a layer above the main video source. Layer 1 is the bottom layer, while layer 8 is the top layer.
Anchor	Select a pre-defined anchor point from the drop-down menu.
Remove selected rows	(button) Click to remove any rows selected in the Remove column.

About template anchor points

Anchor points enable you to create templates that are smaller than the raster size. This can improve performance by reducing the number of transparent pixels that must be rendered.

Anchor points can be used across all supported raster sizes, but are particularly important in UHD workflows. You can configure anchor points per graphic layer in SystemManager or Spectrum Management. When authoring templates in Flash Professional, you can apply a Harmonic Anchor Override widget, which overrides the pre-configured layer anchor point.

In the following image, the anchor points are represented by the red squares. The blue squares are an example of how a small template will be placed when loaded on a layer with the corresponding anchor point.

NOTE: If a small template is loaded onto a graphic layer and no anchor point is configured, the template is positioned in the upper left corner by default.

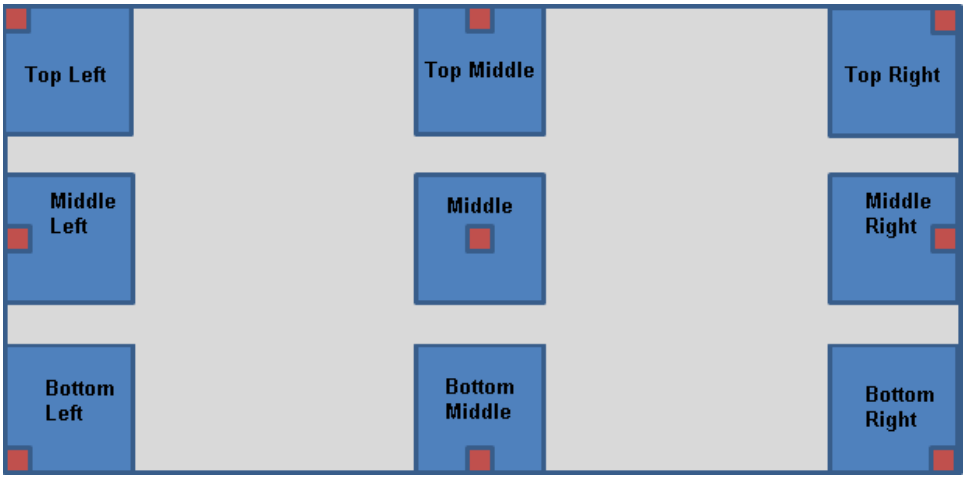


Figure 6-3: Anchor points

Auto Load

The Auto Load feature allows you to select a graphic template that you wish to be automatically loaded to the Spectrum X or ChannelPort channel.

You can also lock the layer so that the graphic cannot be overridden except by clearing the "Lock" setting in SystemManager.

Click **Add Auto Load** to configure Auto Load.

Layer Number	Select a layer between 1 and 8.
Template Name	Enter the name of the graphics template to be used for Auto Load.
Permanent Lock	Select to lock this graphics layer. When selected, this graphics layer cannot be overridden except by clearing this setting.
Remove	Click to select the layer you wish to remove.
Add Auto Load	(button) Click to add an Auto Load layer. You may add up to 8 layers.
Remove selected rows	(button) Click to remove any rows selected in the Remove column.

Event Configuration

In the **Event Configuration** section, you can configure GPIO events that correspond to graphics templates to be played out on the Spectrum X or ChannelPort.

For each event, you can select the graphics layer that it appears over the video output and set the fade duration.

When you load a graphic template or .swf file onto the Spectrum X or ChannelPort, it is positioned on a layer above the main video source. Layer 1 is the bottom-most layer, while layer 8 is the top-most layer.

You can also configure events that correspond to Trouble Slate, Mixer Transitions, and ARC control.

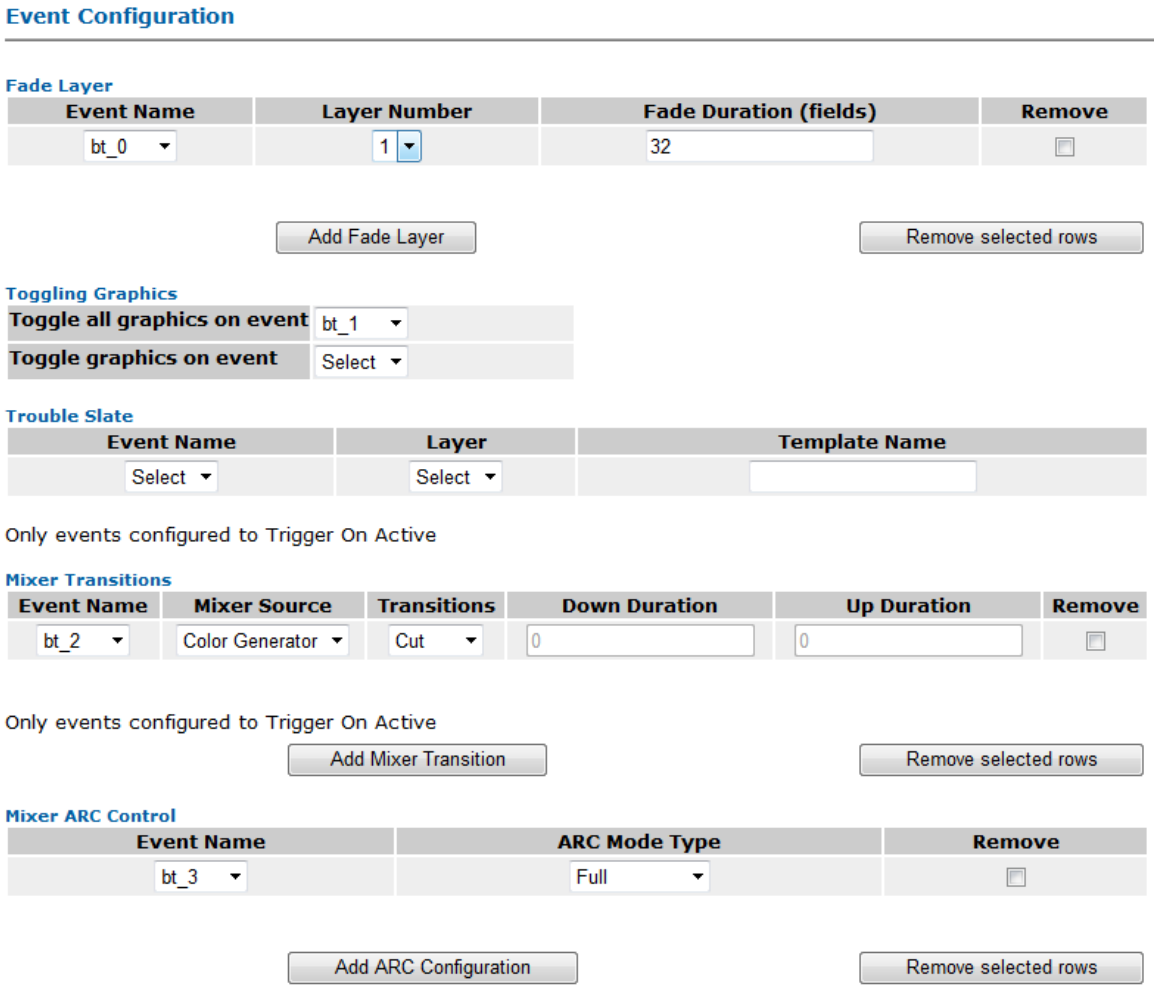


Figure 6-4: Event configuration

Related information

Overview of configuring GPIO triggers

Fade Layer

In the **Fade Layer** section, configure fade layer events.

Event Name	From the drop-down menu, select the GPIO trigger to be used for this event.
Layer Number	From the drop-down menu, select the layer associated with this event (between 1-8).
Fade Duration (fields)	Enter the fade duration (in fields) to be applied to this event.
Remove	Click to select an event that you wish to remove.
Add Fade Layer	Click to add a new event. Note that you must configure the layer settings before clicking **Apply** or an error message will appear.
Remove selected rows	Click to remove a selected event.

Toggle Graphics

GPIO triggers can be used to toggle graphics on or off.

Toggle all graphics on event	From the drop-down menu, select a GPIO trigger, which will be used to toggle all graphics on or off.
Toggle graphics on event	If you have configured an Auto Load graphic, use this setting to toggle all graphics *except* the Auto Load graphic. From the drop-down menu, select a GPIO trigger, which will be used to toggle graphics on or off

Trouble Slate

You can use the Trouble slate feature to configure an event that will mute audio and video and load a specified graphic template when directed by an operator.

The Trouble Slate feature may be used if there is a video failure and the channel goes to black.

To configure this feature, you must have the GPIO trigger configured to Trigger On = Active.

Event Name	From the drop-down menu, select the GPIO trigger to be used for this event.
Layer	From the drop-down menu, select the layer associated with this event (between 1-8). Harmonic recommends choosing a layer not used for any other purpose in the overall branding look.
Template Name	Enter the name of the graphics template to be used for Trouble Slate. Note that the name must not include the path. Spectrum assumes the template exists in the graphics directory.

Mixer Transitions

The Mixer Transitions feature allows you to configure a GPIO trigger to transition the mixer to a specified mixer input when the trigger is asserted.

When de-asserted, the mixer will return to its previous input. The Mixer Source options in this section vary depending on the model of Spectrum X or ChannelPort and whether it is in Enhanced Channel mode or Standard Channel mode.

Event Name From the drop-down menu, select the GPIO trigger to be used for this event.

Mixer Source From the drop-down menu, select the mixer source to be used for the transition. The available sources will vary according to Spectrum X or ChannelPort model and mode. See the following table for a list of available sources.

Model	Standard Channel Mode	Enhanced Channel Mode
Spectrum X or ChannelPort 8200	Available mixer sources: • Player • External In 1 • External In 2 • Color Generator	Available mixer sources (may vary according to BNC configuration): • Player A • Player B • External In 1 • External In 2 • External In 3 • External In 4 • External In 5 • External In 6 • Color Generator
ChannelPort 8100	Available mixer sources: • Player • External In • Color Generator	Available mixer sources: • Player A • Player B • External In 1 • External In 2 • Color Generator

Transitions Select from the following transition options:

- **Cut**: If selected, the GPIO event causes the mixer to transition from the current source to the selected mixer source immediately without any fade.
- **VFade**: If selected, the GPIO event causes the mixer to fade down the current source by the number of frames specified in the Down Duration field, and then fade up the selected mixer source by the number of frames specified in the Up Duration field.
- **XFade**: If selected, the GPIO event causes the mixer to fade down the current source by the number of frames specified in the Down Duration field while simultaneously fading up the selected mixer source by the number of frames specified in the Up Duration field.

Down Duration Enter the number of fields/frames to be used for the fade down during the transition.

Up Duration Enter the number of fields/frames to be used for the fade up during the transition.

Remove Click to select a transition that you wish to remove.

Add Mixer Transition	(button) Click to add a mixer transition.
Remove selected rows	(button) Click to remove any rows selected in the Remove column.

Related information

Changing the channel mode

Mixer ARC Control

The Mixer ARC Control feature allows you to configure an event to temporarily change the channel aspect ratio.

Once the GIPO event is asserted, the aspect ratio change lasts the duration of the current clip, and then, at the next primary transition in the schedule, the previous aspect ratio resumes. The event automatically toggles to the “off” state at that transition point.

Event Name	From the drop-down menu, select the GPIO trigger to be used for this event.
ARC Mode Type	From the drop-down menu, select the desired aspect ratio to be used for ARC control. Note that the “default” selection applies whatever aspect ratio was present on the channel before the latest ARC Control event. **NOTE:** Once the GPIO event for Mixer ARC Control is asserted, there will be a slight delay before the ARC change takes effect.
Remove	Click to select an event that you wish to remove.
Add ARC Configuration	(button) Click to add an ARC Configuration.
Remove selected rows	(button) Click to remove any rows selected in the Remove column.

EAS Configuration

If you have purchased a license for EAS support for your Spectrum X or ChannelPort, the EAS Configuration section will be enabled.

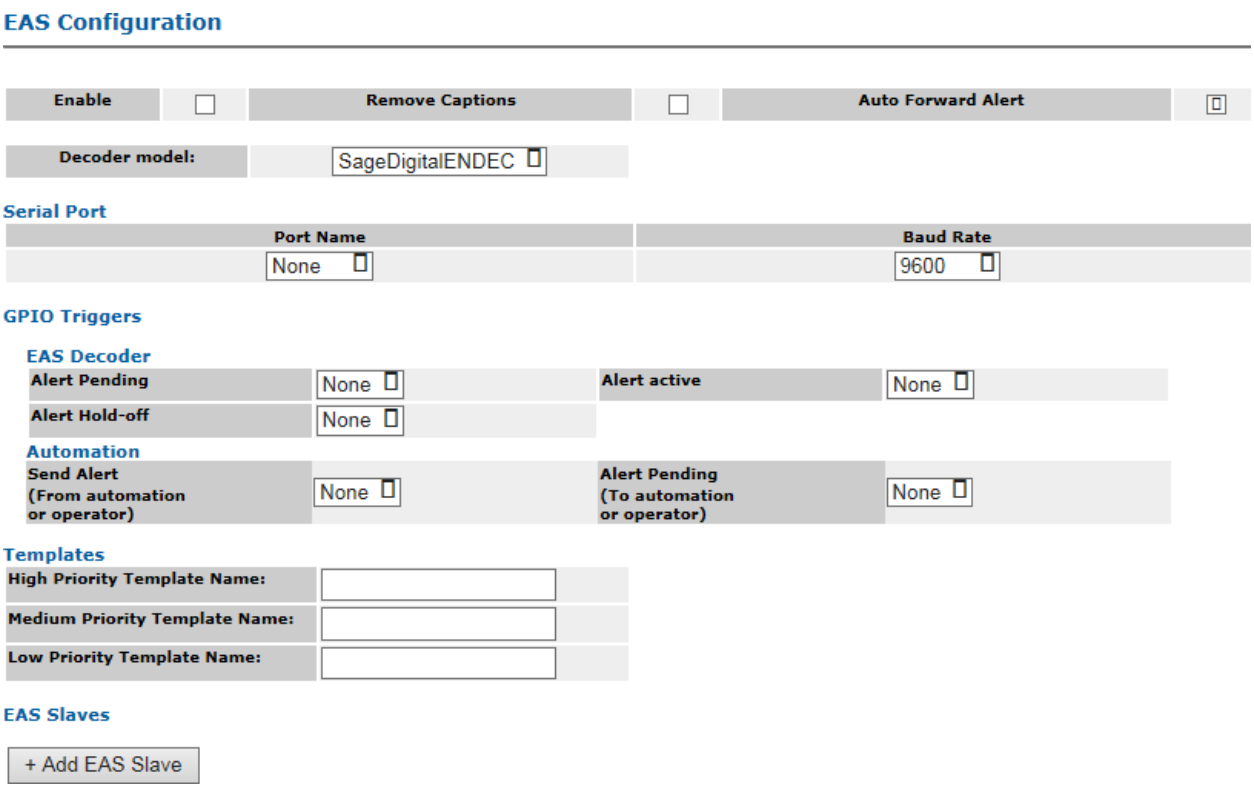


Figure 6-5: Channel Properties—EAS Configuration

General Properties

Find settings to enable EAS support and configure general properties.

Enable	Click to enable EAS support.
Remove Captions	If selected, closed captions will be turned off.
Auto Forward Alert	Click if you wish to automatically forward alerts once they are available. Note that this setting overrides the “Send Alert” input from automation.
Decoder model	Select the decoder from the drop-down menu. At this time, the Spectrum X and ChannelPort support the Sage* Digital ENDEC, TFT* EAS 911T, and the Monroe DASDEC, which can be set to emulate a Sage Digital ENDEC or TFT EAS 911T.

Serial port

In the **Serial Port** section, configure settings for your serial connection.

Port Name	From the drop-down menu, select the Serial Port that you are using to connect to the EAS or select none. The connection instructions described in the *Spectrum System Installation Guide* indicate Serial 0. For GPIO/RS-422

	connector signal assignments on the ChannelPort, and for signal assignments for the DSUB 60 connector on the Spectrum X, refer to the respective hardware reference sections in the *Spectrum System Installation Guide*.
Baud Rate	From the drop-down menu, select the required Baud Rate for your EAS system. Refer to the documentation for your EAS decoder for details.

GPIO Triggers

In the **GPIO Triggers** section, configure the GPIO triggers you wish to use for the EAS decoder and automation.

EAS Decoder	• **Alert Pending**: (for Sage only) From the drop-down menu, select a trigger. This signal indicates to the Spectrum X or ChannelPort that an alert has been received by the EAS system. • **Alert Hold-off**: (for Sage only) From the drop-down menu, select a trigger. This signal prevents an alert from being sent automatically. • **Alert active**: From the drop-down menu, select a trigger. This signal indicates that the EAS is playing an alert on air.
Automation	• **Alert Pending**: (To automation or operator) From the drop-down menu, select a trigger. This signal indicates an alert is available to be sent to automation. • **Send Alert**: (From automation or operator) From the drop-down menu, select a trigger. This signal indicates that an alert can go to air.

Templates

The **Template** fields specify the graphic templates to use for EAS alerts.

High Priority Template Name	Enter the name of the graphics template to use for high priority alerts. The file extension is not required.
Medium Priority Template Name	Enter the name of the graphics template to use for medium priority alerts. The file extension is not required.
Low Priority Template Name	Enter the name of the graphics template to use for low priority alerts. The file extension is not required.

EAS slaves

You can click **Add EAS Slaves** to add and configure separate channels you want controlled by the same EAS system.

By adding EAS slaves, you can have multiple Spectrum X or ChannelPort channels controlled by the same EAS system. To connect the Spectrum Xs or the ChannelPorts, they must be connected to the same Spectrum video server.

For instructions on connecting multiple ChannelPort channels to the same EAS system, see the *Spectrum System Installation Guide*.

ChannelPort Name	Select the Spectrum X SDI I/O card or ChannelPort module you want controlled by the EAS.
Channel	Select the channel to use.
High Priority Template Name	Enter the name of the graphics template to use for high priority alerts. The file extension is not required.
Medium Priority Template Name	Enter the name of the graphics template to be use for medium priority alerts. The file extension is not required.
Low Priority Template Name	Enter the name of the graphics template to be use for low priority alerts. The file extension is not required.

Renaming the graphics directory folder

If you wish to name the graphics directory something other than /fs0/gfx.dir, you must modify the properties page for each Spectrum X or ChannelPort channel to direct it to the new location for your graphic templates.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the link or icon for your Spectrum X SDI card or ChannelPort to open its **Properties** page.
3. Click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
4. In the **Effect Configuration** area, in the **Primary Effects: Folder** field, type the new name of the graphics directory.
5. Click **Apply**, and then click **Done**.
6. Repeat steps 3 through 5 for the remaining channel.

Enabling and configuring Independent Branding

Independent Branding is a licensed feature for Spectrum X and ChannelPort, which allows you to brand a channel's Primary and Secondary outputs independently.

Unlike the ChannelPort, Spectrum X can play HD content from both the primary and secondary outputs. As a result, different configurations are supported on the Spectrum X and ChannelPort.

Spectrum X supports the following configurations:

- Primary (HD) and Secondary (SD)
- Primary (HD) and Secondary (HD)
- Primary (SD) and Secondary (SD)

ChannelPort supports the following configuration: Primary (HD) and Secondary (SD)

Independent Branding can be used in Standard Channel or Enhanced Channel mode and supports all graphic template types, including DVEs. This feature requires that you create separate version of a template, and that you organize the two versions either in separate folders (for example, /SD and /HD, or /HD1 and /HD2) within the graphics directory, or with different file extensions (for example, "SD" and "HD", or "HD1" and "HD2"). Follow the instructions in this section to enable Independent Branding, organize

your templates, and configure how the primary and secondary versions of your graphic templates will be loaded. For instructions on creating graphic templates, refer to the *Spectrum X and ChannelPort Template Authoring Guide*.

Enabling Independent Branding

Enable Independent Branding.

1. Navigate to the Channel properties page for your Spectrum X or ChannelPort.
   a. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
   b. Click any Spectrum X or ChannelPort (name or icon) to open its **Properties** page.
   c. Click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
2. In the **Master Control Switcher Configuration** section, from the **Secondary Output Mode** drop-down menu, select **Independent Branding**.
3. Click **Apply**.

Configuring Independent Branding

You can configure Independent Branding to use one of two methods for naming assets: by folder or by extension.

Before you begin

Since it is not possible to notify a device (such as an automation system) controlling a Spectrum X or ChannelPort that Independent Branding is enabled, both versions of your templates must be saved to the graphics directory (gfx.dir by default) on your video server and must follow one of two specific naming conventions. The naming convention you choose depends on the settings you configure in SystemManager.

Organizing Independent Branding effects by folder

Organizing Independent Branding effects by extension

Organizing Independent Branding effects using folders

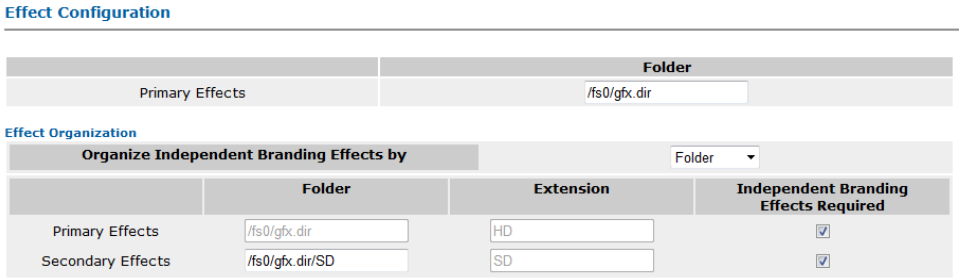
If you are organizing your Independent Branding Effects using folders, your templates must be organized so the primary and the secondary versions of the templates are named identically, but located in separate folders on your video server.

1. Create a separate folder in the /fs0/gfx.dir graphics directory for secondary templates.
2. Name the primary and the secondary versions of your templates identically
3. Save the primary versions of your templates (in this case, HD) to /fs0/gfx.dir on your video server, and the secondary versions (in this case, SD) to the sub-folder in /fs0/gfx.dir. See the following example:

```
/fs0/gfx.dir/
                a.swf
/fs0/gfx.dir/SD/
                  a.swf
```

4. From the Channel Properties page in the SystemManager, scroll to the **Effect Configuration** section. Select **Folder** from the **Organize Independent Branding Effects by** drop-down menu.

5. In the **Independent Branding Effects Required** column, select the check boxes for **Primary Effects** and the **Secondary Effects** to require that templates load on the primary or the secondary channels. The template must be present in the associated folder to load.



6. In the **Folder** column, you may modify the name of the graphics folders for the Primary and Secondary Effects on your video server depending on how you have organized your templates, or you keep the default settings.

Result:

The following shows a typical directory structure organized by folder:

```
/fs0/gfx.dir/
              a.swf
              b.swf
/fs0/gfx.dir/SD/
                 a.swf
                 c.swf
```

The following table shows how the Independent Branding check boxes in SystemManager affect the visibility and the functionality of the templates shown in the directory above.

Table 6-7: Example of Independent Branding effects organized by folder

Primary Effects Required	Secondary Effects Required	Files Visible to Automation	Loads on Primary graphic channel	Loads on Secondary graphic channel
checked	checked	a.swf	/fs0/gfx.dir/**a.swf**	fs0/gfx.dir/SD/**a.swf**
checked	unchecked	a.swf b.swf	• /fs0/gfx.dir/**a.swf** • /fs0/gfx.dir/**b.swf**	/fs0/gfx.dir/SD/**a.swf**
unchecked	checked	a.swf c.swf	/fs0/gfx.dir/**a.swf**	• /fs0/gfx.dir/SD/**a.swf** • /fs0/gfx.dir/SD/**c.swf**
unchecked	unchecked	a.swf b.swf c.swf	• /fs0/gfx.dir/**a.swf** • /fs0/gfx.dir/**b.swf**	• /fs0/gfx.dir/SD/**a.swf** • /fs0/gfx.dir/SD/**c.swf**

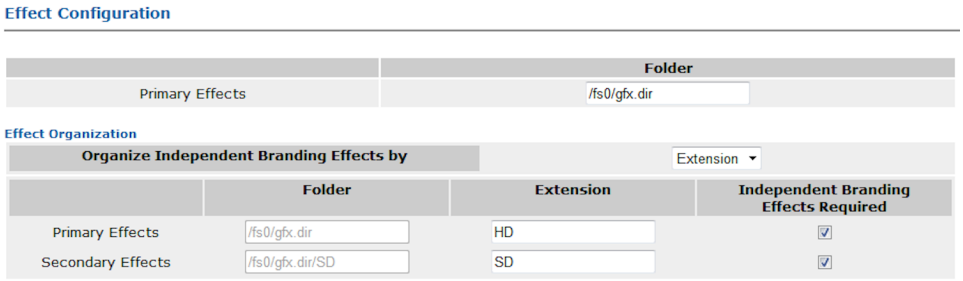
Organizing Independent Branding effects by extension

If you are organizing Independent Branding effects by **Extension**, your primary and secondary templates must be located in the same folder but contain a base-name extension to identify them as primary and secondary templates (for example, either "HD" and "SD," or "HD1" and "HD2").

1. Name the primary and the secondary versions of your templates with separate base-name extensions respectively. You will need to specify these extensions in SystemManager.
2. Save both versions of your templates to the /fs0/gfx.dir directory on your video server. See the following example:

```
/fs0/gfx.dir/aHD.swf
             aSD.swf
             bHD.swf
             cSD.swf
```

3. From the Channel Properties page in SystemManager, scroll to the **Effect Configuration** section, and then, from the **Organize Independent Branding Effects by** drop-down menu, select **Extension**.
4. In the **Independent Branding Effects Required** column, select the check boxes for **Primary Effects** and the **Secondary Effects** to require that templates load on the primary or the secondary channels. The template must be present in the associated folder to load.



5. In the **Extension** column, you may modify the extensions of your Primary and Secondary Effects depending on how you have named your templates, or leave the default settings.

Result:

The following shows a typical directory structure organized by extension:

```
/fs0/gfx.dir/aHD.swf
             aSD.swf
             bHD.swf
             cSD.swf
```

The following table shows how the Independent Branding check boxes in SystemManager affect the visibility and functionality of the templates shown in the directory above.

Table 6-8: Example of Independent Branding effects organized by extension

Primary Effects Required	Secondary Effects Required	Files Visible to Automation*	Loads on Primary graphic channel	Loads on Secondary graphic channel
checked	checked	a.swf	/fs0/gfx.dir/**aHD.swf**	/fs0/gfx.dir/**aSD.swf**
checked	unchecked	a.swf b.swf	• /fs0/gfx.dir/**aHD.swf** • /fs0/gfx.dir/**bHD.swf**	/fs0/gfx.dir/**aSD.swf**
unchecked	checked	a.swf c.swf	/fs0/gfx.dir/**aHD.swf**	• /fs0/gfx.dir/**aSD.swf** • /fs0/gfx.dir/**cSD.swf**
unchecked	unchecked	a.swf b.swf c.swf	• /fs0/gfx.dir/**aHD.swf** • /fs0/gfx.dir/**bHD.swf**	• /fs0/gfx.dir/**aSD.swf** • /fs0/gfx.dir/**cSD.swf**

*When automation queries for available files, the extension (SD or HD, for example) will not be present in the file name.

Configuring audio profiles

With the audio profile feature, you can create profiles, which contain down-mix and voice-over parameters for audio on the primary and the secondary outputs of a Spectrum X or ChannelPort.

1. Follow the instructions in "Creating an Audio Profile Group" to create one or more audio profile groups and save them to the video server.
2. Follow the instructions in "Mapping audio profiles to a channel" to select an audio profile group for the Spectrum X or ChannelPort channel, and then map audio profiles from that group to channel sources.

About audio profiles and audio profile groups

Find details on the contents and functionality of an audio profile.

An audio profile may contain down-mix and voice-over parameters for audio on the primary and the secondary outputs of an I/O module.

Once you have created a group of profiles you can map the profiles to your Spectrum I/O module channel sources, such as a player, graphic, or external input. Once a channel source is mapped to an audio profile group, the channel will continue to use those audio profiles by default.

You may configure up to eight profiles in an audio profile group. You may have as many groups as you wish on a Spectrum video server, and may import or export audio profile groups to and from video servers. However, a Spectrum I/O module channel may only map to the profiles from one audio profile group.

An audio profile may contain:

- Specifications for how to down-mix PCM audio from 5.1 surround to stereo or mono, from 7.1 surround to stereo or mono, or from stereo to mono. Note that the LFE input is dropped when down-mixing.
- Spectrum provides a licensed option for decoding and down-mixing Dolby® E audio. Down-mix options include 5.1 surround to stereo or mono, 7.1 surround to stereo or mono, and stereo to mono.
- Mute tracks.
- Duplicate tracks.
- Ability to “shuffle” the audio by placing a given track (from the original source or the result of a down-mix) where specified.
- Voice over and duck settings, which are only used for voice-over operations.

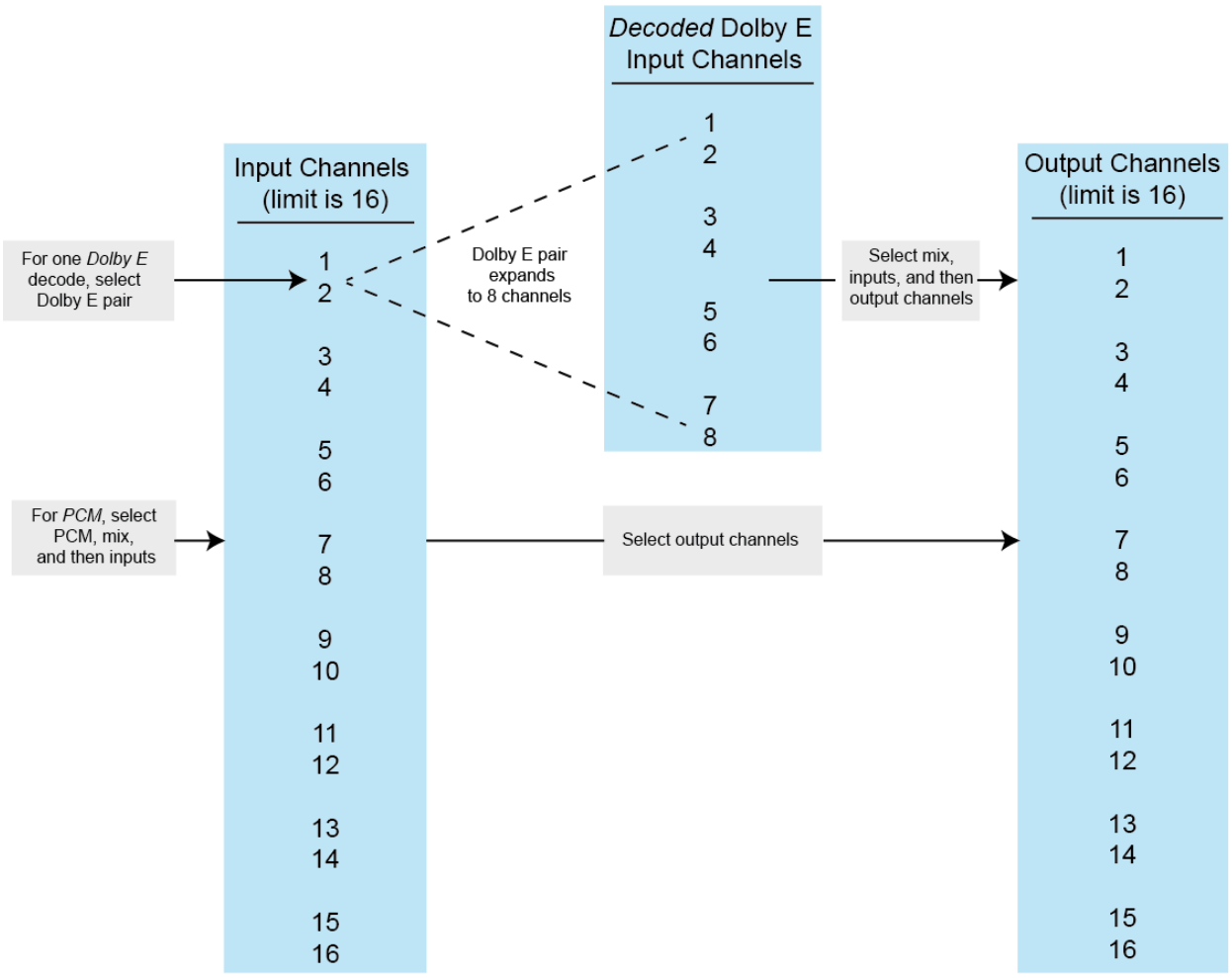
For primary events, such as clips, you can control audio profiles via the Player API or an automation system. If using VDCP automation, you must create a secondary event for audio profile selection so that an Oxtel command can be used to set the profile.

About Dolby® E decode support

The Dolby E decode license option allows you to do four decodes of Dolby E on one Spectrum X SDI I/O card.

To decode Dolby E, create an audio profile group, and then select a Dolby E source pair from the **Source Type** menu in the **Edit Mix** dialog box.

When configuring a profile, note that you start with a maximum of 16 input channels, which you may assign to a maximum 16 output channels. However, when you select a Dolby E source pair from the Source Type menu, note that the Dolby E pair expands into 8 channels, which you may assign to your output channels, as shown in the following figure.



The limit of four decodes means that only four unique Dolby E stereo pairs can be decoded by a Spectrum X SDI I/O card at one time. For example, the following set of mixes within a profile would be valid because it includes only three unique Dolby E pairs:

Valid profile:

- Type: Dolby E 1&2, Mix: 5.1:2
- Type: Dolby E 1&2, Mix: 5.1:1
- Type: Dolby E 3&4, Mix: 5.1:2
- Type: Dolby E 3&4, Mix: 5.1:1
- Type: Dolby E 5&6, Mix: 5.1:2
- Type: Dolby E 5&6, Mix: 5.1:1

If you attempted to add two more Dolby E pairs to this profile, Spectrum would prevent it and indicate that you are exceeding the limit.

Make sure to consider the limit when mapping the profiles to your Spectrum X sources. For example, if you have these profiles:

- **Profile 1**: Type: Dolby E 1&2, Mix: 5.1:2
- **Profile 2**: Type: Dolby E 1&2, Mix: 5.1:2; Type: Dolby E 3&4, Mix: 5.1:2

Then the following mapping would be valid because it maps one Dolby E stereo pair to four different channel sources, resulting in four decodes.

Valid mapping:

- **Player A**: profile 1
- **Player B**: profile 1
- **External In 1**: profile 1
- **External In 2**: profile 1

But the following mapping would be invalid because the extra Dolby E stereo pair in profile 2 mapped to Player A would result in five decodes.

Invalid mapping:

- **Player A**: profile 2
- **Player B**: profile 1
- **External In 1**: profile 1
- **External In 2**: profile 1

IMPORTANT: Spectrum does not provide a warning if you exceed the four decode limit when mapping profiles to your channel sources. If you attempt to apply more than four Dolby E decodes to a Spectrum X, all the decodes will fail.

In addition, note the following:

- When creating the audio profile, if you wish to pass-through Dolby E without decoding, from the **Type** menu, select **PCM**.
- When mapping an audio profile to your channel sources, note that Spectrum supports Dolby E decode on the **Player**, **Live**, and **External In** sources, but not the **Graphics** source.

  IMPORTANT: When mapping an audio profile to a player, if your audio profile includes Dolby E decode and down-mixes or shuffles audio to the upper 9-16 channels, make sure your player is configured for 16 channels of audio.

Creating an audio profile group

Once you have created a group of profiles, you can map the profiles to your Spectrum X or ChannelPort channel sources, such as a player, a graphic, or an external input.

1. From the **System Diagram**, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
2. Click the picture of the Spectrum video server to display the **Properties** page.
3. In the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Audio Profiles**. The Audio Profile Groups page for your Spectrum video server appears
4. Click **Create New Group** to open the **Configure Audio Down Mix** page.
5. In the **Audio Profile Group Name** field, type the name of the group.
6. If you wish to apply the same voice-over and audio down mix setting to both SDI 0 and SDI 1 for all the audio profiles in this group, select the **Mirror SDI 0 to SDI 1** check box. If you wish to apply different audio settings to SDI 0 and SDI 1, leave this option unselected.
7. Under Profile 1, configure as follows:

- **Voice Over Level (dB)**: Type a value, from -100 to 0 (from silence to full volume) to indicate the level of voice-over for this audio input. For information on how Spectrum processes audio voice-overs, see "About Audio Processing of Voice-overs."
- **Duck Level (dB)**: Type a value from -100 to 0 (from silence to full volume) to indicate the duck level for this audio input.
- **Add Mix**: Click to open the **Edit Mix** dialog box and then configure the following
  - **Type**: Select from the following:
    - **PCM**: Use for PCM or to pass-through Dolby E without decoding.
    - **Dolby® 1&2**: (available with Dolby E decode license only) indicates the Dolby E source pair.
    - **Dolby® 3&4**
    - **Dolby® 5&6**
    - **Dolby® 7&8**
    - **Dolby® 9&10**
    - **Dolby® 11&12**
    - **Dolby® 13&14**
    - **Dolby® 15&16**

    NOTE: When you select a Dolby E source pair, the Dolby E source is decoded into 8 input channels. When configuring a mix, you must indicate how the decoded input channels of your source are associated with inputs of the Mix option you select. See "About Dolby E Decode Support" for more information.
  - **Mix** : Select from the following:
    - **5.1:2**: down-mixes from 5:1 surround sound to stereo.
    - **5.1:1**: down-mixes from 5:1 surround sound to mono.
    - **2:1**: down mixes from stereo to mono.
    - **1:1**: mixes mono to mono, and can be used to shuffle one channel for another.
    - **Mute**: mutes the audio channel.
    - **7.1:2**: down-mixes from 7.1 surround sound to stereo.
    - **7.1:1**: down-mixes from 7.1 surround sound to mono.
    - **6:6**: (for Dolby E only) use to shuffle the six 5.1 decoded input channels to six output channels.
    - **8:8**: (for Dolby E only) use to shuffle the eight 7.1 decoded input channels to eight output channels.
  - **In**: Select the input audio channels. For 7.1, note: S.L. = surround left; S.R. = surround right; L.R. = left rear; R.R. = right rear.

    NOTE: For 5.1 and 7.1 down-mixes, the LFE input is dropped.
  - **Out**: Select the output audio channels.
  - Click **OK** to save the mix.
- **Copy Previous Mix icon** (plus sign button): Click to add another mix, which is identical to the previous one.
- **Delete icon** (button): Click to delete the selected mix.

8. Configure additional profiles as desired.
9. Click **Save Group** to save this audio profile group.

Examples of audio profiles

Find examples of different audio profiles and descriptions of their possible uses.

Examples of audio profiles for use with voice overs

For help with configuring your own profiles, review the examples of audio profiles, which can be used with voice overs.

The following tables show three different profiles, which can be used with secondary graphic events. In this Audio Profile Group, **Mirror SDI 0 to SDI 1** is selected so that both SDI outputs share the same configuration for each profile. For all the profiles in this group, only the Voice Over and Duck levels are configured.

Profile 1 shows a case in which a graphic template, which includes a jingle, will be added over the top of the main video. In this case, the audio for the main video and the audio for the jingle remain at the same level without any Voice Over or Duck so both values are set to 0.

Table 6-9: Profile 1

Mix modes SDI 0	
Voice Over Level (db): 0	Duck Level (dB): 0

Profile 2 shows a case in which a promo for a new show will be added over the audio for the main video. In this case, the audio for the main video is suppressed completely while the promo becomes fully audible, so the Duck level is set to -100.

Table 6-10: Profile 2

Mix modes SDI 0	
Voice Over Level (db): 0	Duck Level (dB): -100

Profile 3 shows a case where a DVE for breaking news is added over the top of the main video. In this case, the audio for the main video is only suppressed a little while the breaking news segment becomes audible, so the Duck level is set to -3.

Table 6-11: Profile 3

Mix modes SDI 0	
Voice Over Level (db): 0	Duck Level (dB): -3

Examples of audio profiles for use with multiple languages

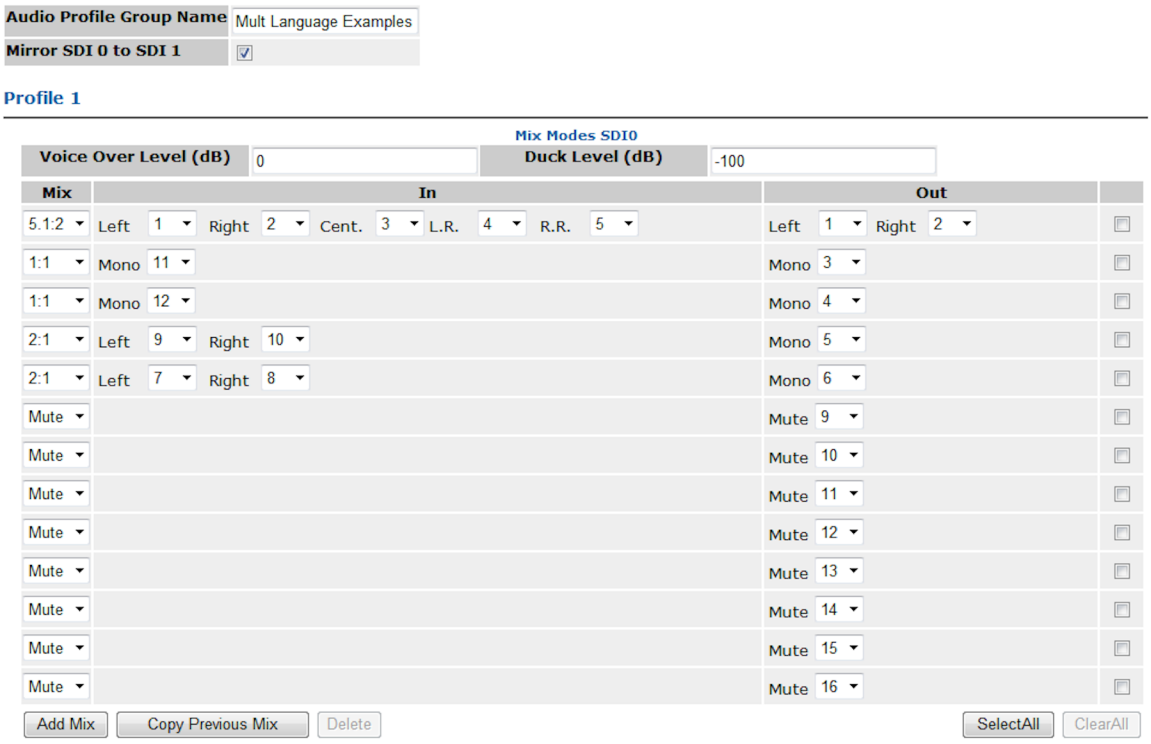
For help with configuring your own profiles, review the examples of audio profiles, which can be used with multiple language tracks.

The following two audio profile examples illustrate cases in which certain audio channels are dedicated for use with certain languages. In both examples, the Mirror SDI 0 and SDI 1 option is selected.

In the **Profile 1** table below, the “Channel Inputs” columns describe which audio input channels are used for which languages. The “Profile 1 Channel Output” columns describe how the inputs are down-mixed to the output channels, as shown in the accompanying figure. Note that by not specifying channels 7 and 8 in the output, those inputs will be passed through as is.

Channel Inputs		Profile 1 Channel Outputs	
1 Left	English	1 Left	5:1:2 down-mix to English
2 Right		2 Right	
3 Center		3 Mono	1:1 shuffle to German
4 Left Rear		4 Mono	1:1 shuffle to Italian
5 Right Rear		5 Mono	2:1 shuffle to French
6 LFE		6 Mono	2:1 shuffle to Spanish
7 Left	Spanish	7 Left	1:1 to Spanish. Note: By not specifying 7 and 8 in the Out column, they are passed through as is.
8 Right		8 Right	
9 Left	French	9-16	0:1 Mute
10 Right			
11 Mono	German		
12 Mono	Italian		

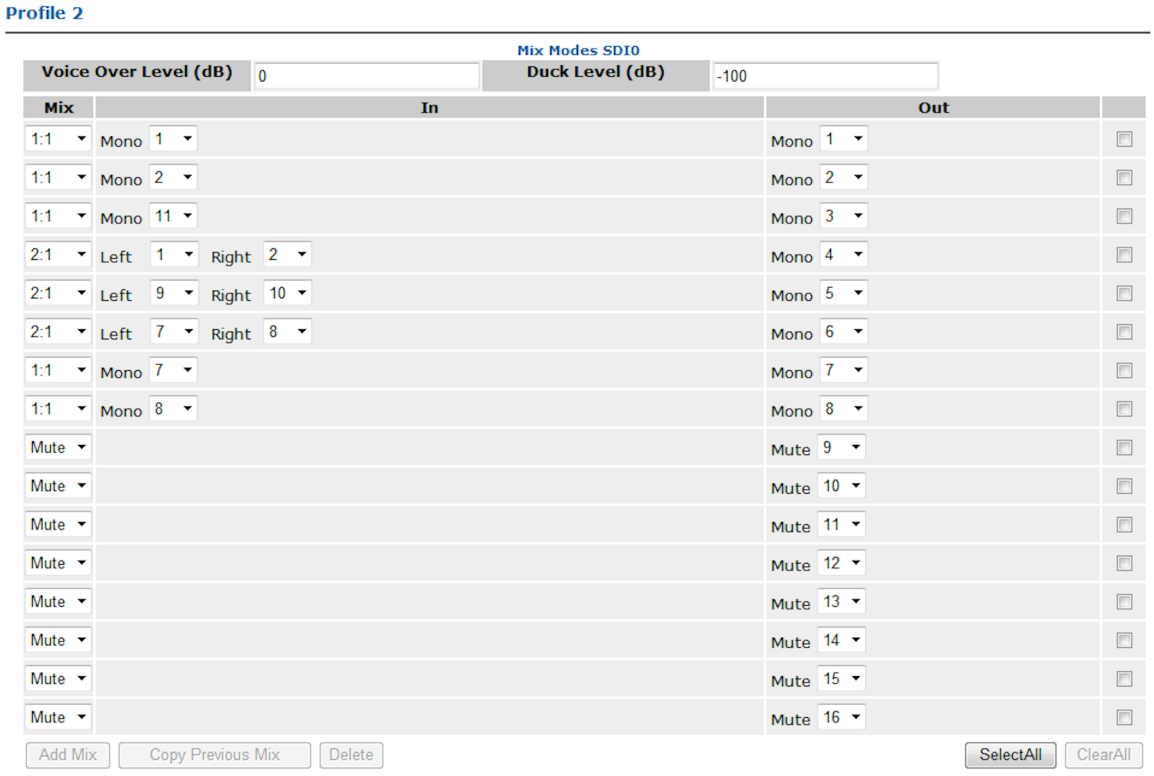
The following figure shows how the down-mix described in the **Profile 1** table is configured.



In the **Profile 2** table below, the “Channel Inputs” columns are identical to those Profile 1 table but the “Profile 2 Channel Output” columns show different outputs. For example, the output for channels 7 and 8 are specified.

Channel Inputs		**Profile 2 Channel Outputs**	
1 Left	English	1 Left	1:1 to English
2 Right		2 Right	
3 Center		3 Mono	1:1 shuffle to German
4 Left Rear		4 Mono	1:1 shuffle to English
5 Right Rear		5 Mono	2:1 down mix to French
6 LFE		6 Mono	2:1 down mix to Spanish
7 Left	Spanish	7 Left	1:1 to Spanish
8 Right		8 Right	
9 Left	French	9-16	0:1 Mute
10 Right			
11 Mono	German		
12 Mono	Italian		

The following figure shows how the down-mix described in the **Profile 2** table is configured.



Examples of audio profiles using Dolby® E decode

For help with configuring your own profiles, review the examples of audio profiles using Dolby E decode.

Profile 1, shown in the following figure, shows a case where a movie track in Dolby E is decoded from channels 1 and 2, and then down-mixed from 7.1 surround sound to stereo.

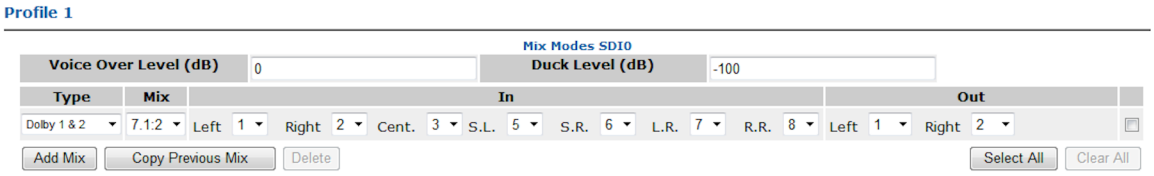


Figure 6-6: Profile 1

Profile 2, shown in the following two tables, shows a case where the Dolby E source on channels 1 and 2 contains a movie track in 5.1 surround and a separate language (Spanish) in a stereo pair (this is 5.1+2 configuration). In addition, on channels 7 and 8, there is a stereo pair of PCM audio containing a third language (French). This profile decodes and down-mixes the movie track from 5.1 to stereo, mutes the Spanish, and shuffles in the French.

In the following tables, the “Decoded Dolby E Channel 1 & 2 Inputs” column describes the decoded Dolby E source. The “PCM Channel Inputs” column describes the PCM channel Inputs. And the “Channel Output” columns describe how the inputs are mixed to the output channels as shown in the figure that follows.

Decoded Dolby E 1&2 channel inputs		Channel outputs	
1 Left	Movie track	1 Left	5.1:2 down mix
2 Right			
3 Center			
4 LFE		2 Right	
5 Surround Left			
6 Surround Right			
7 Left	Spanish	Not mapped to output	
8 Right			

PCM inputs		Channel outputs	
7 Left	French	3 Left	1:1 to French
8 Right		4 Right	
		7 Left	0:1 Mute
		8 Right	

In the following figure, the LFE input is not shown in the "In" column, indicating it is dropped.

Profile 3, shown in the following two tables, includes the same source described in Profile 2. Like Profile 2, this profile decodes and down-mixes the movie track from 5.1 to stereo. However, in this profile, the stereo pair of PCM audio containing French on channels 7 and 8 is dropped, and the Spanish (decoded from the Dolby E source on channels 1 and 2) is shuffled to different output channels.

Decoded Dolby E 1&2 channel inputs		Channel outputs	
1 Left	Movie track	1 Left	5.1:2 down mix
2 Right			
3 Center			
4 LFE		2 Right	
5 Surround Left			
6 Surround Right			
7 Left	Spanish	15 Left	1:1 to Spanish
8 Right		16 Right	1:1 to Spanish

PCM inputs		Channel outputs
7 Left	French	Not mapped to output
8 Right		

The following figure shows how the Profile 3 down-mix is configured.

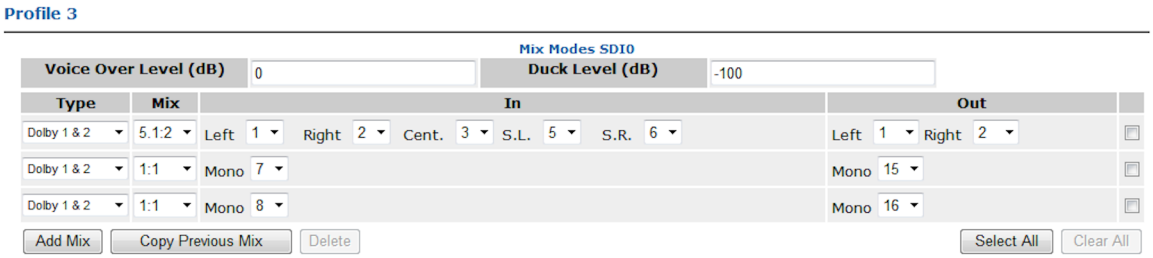


Figure 6-7: Profile 3

Mapping audio profiles to a channel

After you have created an Audio Profile Group, you can map the profiles from that group to your Spectrum X or ChannelPort channel sources. Once mapped, the channel will continue to use those audio profiles by default.

IMPORTANT: If you modify an Audio Profile Group after it has been applied to a Spectrum X or ChannelPort channel, you must re-apply that group for the changes to take effect.

1. Navigate to the **Properties** page for the channel you wish to map.
   a. Click the **Configuration** tab to display the **Configuration** page and System Diagram.
   b. Click the Spectrum X or ChannelPort name or icon to open its Properties page.
2. Click the **Configure Channel A** or **Configure Channel B**button to open the properties page for that channel.
3. Under **Audio Profile Group**, click **Change Audio Profile Group** to open the Select Group menu.
4. From the **Select Group** menu, select the Audio Profile Group you wish to apply to this channel.
5. Under **Audio Profile Mapping**, for each source, use the drop-down menu to select the Audio Profile you wish to apply to that source. If the default 0 is selected, no profile will be applied.
6. Click **Apply** to save your changes.

NOTE: When mapping an audio profile to your channel sources, note that Spectrum supports Dolby E decode on the **Player**, **Live**, and **External In** sources, but not the **Graphics** source.

IMPORTANT: Spectrum does not provide a warning if you exceed the four decode limit when mapping profiles to your channel sources. If you attempt to apply more than four Dolby E decodes to a Spectrum X or ChannelPort, all the decodes will fail.

Importing an audio profile group

You can import an audio profile group to your video server.

1. Navigate to the Audio Profile Groups page.
   1. From the System Diagram, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
   2. Click the picture of the Spectrum video server to display the **Properties** page.

3. From the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Audio Profiles**.

2. In the **Import Group** field, click Browse to open an Explorer window.
3. Browse to the .XML file that contains the Audio Profile Group. This file will have the same name as the group.
4. Click **Import Group** to import the file.

Exporting an audio profile group

You can export an audio profile group for use on a different video server.

1. Navigate to the Audio Profile Groups page.
    1. From the System Diagram, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
    2. Click the picture of the Spectrum video server to display the **Properties** page.
    3. From the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Audio Profiles**.
2. In the **Select** column, select the check box for the Audio Profile Group you wish to export, and then click **Export Group**.
3. The browser allows you to open or save the .XML file that contains the audio profile. Choose **Save as** to open an Explorer window, and then navigate to the desired directory and save the file.

Deleting an audio profile group

You can delete an audio profile group at any time.

1. Navigate to the **Audio Profile Groups** page.
    a. From the System Diagram, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
    b. Click the picture of the Spectrum video server to display the **Properties** page.
    c. From the **Host Properties** section of the page, in the **Change Settings** field, click **Configure Audio Profiles**.
2. In the **Select** column, select the check box for the Audio Profile Group you wish to export, and then click **Delete Group**.

About audio processing of voice-overs

Spectrum processes audio voice-overs in a particular order, which is static. This order is important to note when configuring audio profiles and planning for voice-overs using secondary events like Digital Video Effects (DVEs), graphics, or an EAS.

Spectrum processes audio for DVE0 first, DVE1 second, graphics third, and AES input (used for an EAS) fourth. When configuring voice-overs, this means, for example, that the audio layer for a graphic will always be above the audio layer for a DVE, as shown in the following figure.

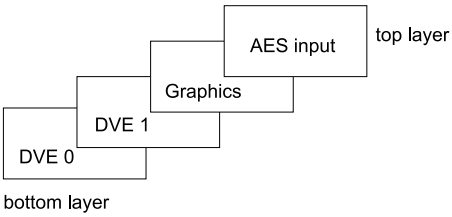


Figure 6-8: Voice-over processing order

Configuring audio watermarking

With Spectrum 8.3 or later, you can add audio watermarks to a Spectrum X channel during playout.

Note the following points about Spectrum support for audio watermarking.

- Spectrum uses Kantar® Media Watermarking to add audio watermarks to PCM audio channels.
- Audio watermarking is supported with Spectrum X in either shared storage mode or internal storage mode.
- Spectrum supports a total of 32 watermarked audio channels per Spectrum X.
- Audio watermarking is only supported for 25Hz/50Hz (PAL) frame rates.
- If you have configured audio profiles for your Spectrum X channel, note that Spectrum applies audio watermarking to the audio channels after any changes specified in the audio profiles.
- Once you have configured audio watermarking for a Spectrum X channel, the associated player must be de-activated and then activated again for the changes to take effect.

Installing license files for audio watermarking

In order to add audio watermarks with Kantar® Media Watermarking, you must have both the Harmonic license for audio watermarking, "WM-KANTAR-CH," and also the required license and audience files from Kantar installed on your Spectrum video server.

You can verify that the Harmonic license is installed by viewing the **Licensed Features** page in SystemManager. See "Viewing licensed features for a Spectrum video server."

Before you begin

Make sure you can access the Kantar Watermarking Support portal here: *http://www.kantarmedia.com/watermarkinghelpdesk*.

If you do not already have an account, follow the steps online to create one. You will need to work with Kantar to receive the necessary license files for Kantar Media Watermarking.

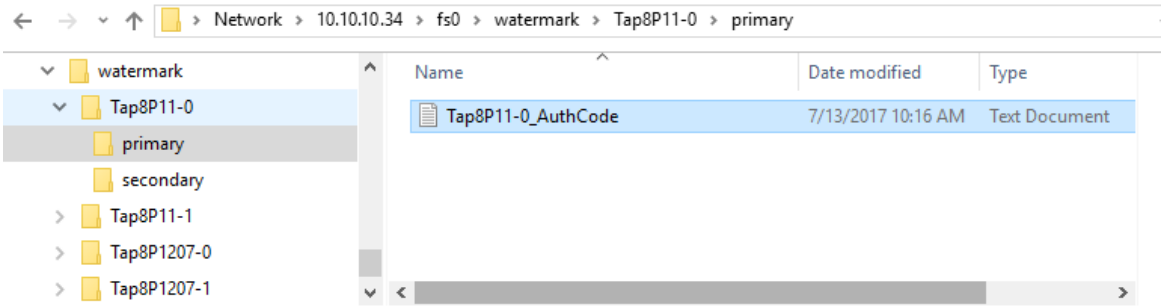
Review the following steps to acquire the license and audience files from Kantar and apply them.

1. Locate the "AuthCode" text file for each Spectrum X that will use audio watermarking.
    - For a Spectrum X in *internal storage mode*:
    a. Using Windows Explorer, access the fs0/watermark directory on your Spectrum X file system.

TIP: If using SystemManager, from the **Disk Utilities** page in SystemManager, you can click the "Explore Filesystem" link to open the file system for your video server.

When prompted, enter the user name and password for your video server file system. The root directory of the video server file system will appear in a new Explorer window.

b. The watermark directory contains sub-folders for each I/O module, channel, and primary or secondary output. In the following image, for "Tap8P11-0," the name of the I/O module is "11," and "-0" indicates channel A. "Tap811-1" is the directory for channel B of the same I/O module. The "primary" and "secondary" sub-folders correspond to the primary and secondary outputs for each channel.



Select the "AuthCode" text file from any primary or secondary sub-folder in the watermark directory for this Spectrum X, and copy it to your client system.

◦ For a Spectrum X in *shared storage mode*:

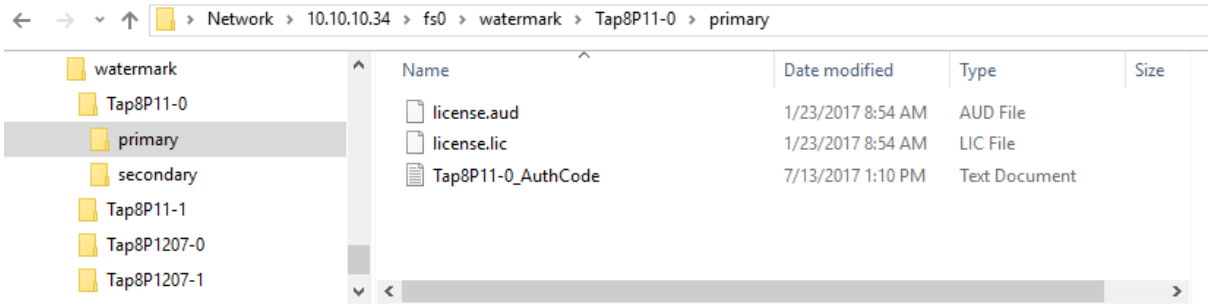
a. Using Windows Explorer, access the fs0/watermark directory on your Spectrum video server file system.

b. You will need one "AuthCode" text file for each Spectrum X connected to your Spectrum video server regardless of how many I/O modules are installed in each Spectrum X chassis. In other words, one "AuthCode" file per Spectrum X chassis.
For example, in the previous image, Tap8P11 and Tap8P1207 could be I/O modules installed in two separate Spectrum X devices. In that case, you would need two "AuthCode" text files—one from a Tap8P11-0 or Tap8P11-1 primary/secondary sub-folder, and one from a Tap8P1207-0 or Tap8P1207-1 primary/secondary sub-folder.

If Tap8P11 and Tap8P1207 are I/O modules installed in the same Spectrum X chassis, then you would only need one "AuthCode" text file, which can be copied from a primary or secondary sub-folder within either the Tap8P11 or Tap8P1207 folder.

For any Spectrum X connected to your Spectrum video server, select the "AuthCode" text file and copy it to your client system.

2. Provide your Kantar representative the "AuthCode" text file for each Spectrum X that will use audio watermarking, and request a corresponding Kantar license file and audience file. From Kantar, you will need to receive:
   - A Kantar license file (named license.lic), which is unique to your Spectrum X chassis (regardless of whether it is being used in internal storage mode or shared storage mode).
   - One or more audience files (all named license.aud) which are unique to your Spectrum X chassis (regardless of whether it is in internal storage mode or shared storage mode). Each audience file contains a list of audience names that you can select from when configuring watermark settings for a Spectrum X channel.
3. Copy and paste the Kantar license file and audience files to your watermark directory as follows.



   a. Paste the license.lic file into all primary or secondary sub-folders for a Spectrum X chassis.
   b. Paste an audience file into the primary or secondary sub-folder that applies to the output you want to use with that audience file.

      NOTE: It is possible to have multiple audience files on the same Spectrum X, each file containing a different list of audience names. This allows you to select different audience names for different Spectrum X channels and outputs. However, *all* audience files must be named license.aud. If using multiple audience files on the same system, you will need to keep track of which files contain which audience names.

      You cannot have more than one audience file per sub-folder.

   IMPORTANT: Every primary or secondary subfolder for a Spectrum X must contain both a license.lic and license.aud file in order to add watermarking on that channel output.

4. Once you have copied all the license and audience files from Kantar, restart your Spectrum X system. If using Spectrum X in shared storage mode, restart both the Spectrum video server and any attached Spectrum X.

What to do next

Once you have restarted your system, you can configure audio watermarking for your Spectrum X channels.

NOTE: Any time you replace a Spectrum X chassis, you will need to acquire new license files for the replacement Spectrum X.

Configuring a Spectrum X channel for audio watermarking

Configure audio watermarking on a Spectrum X channel.

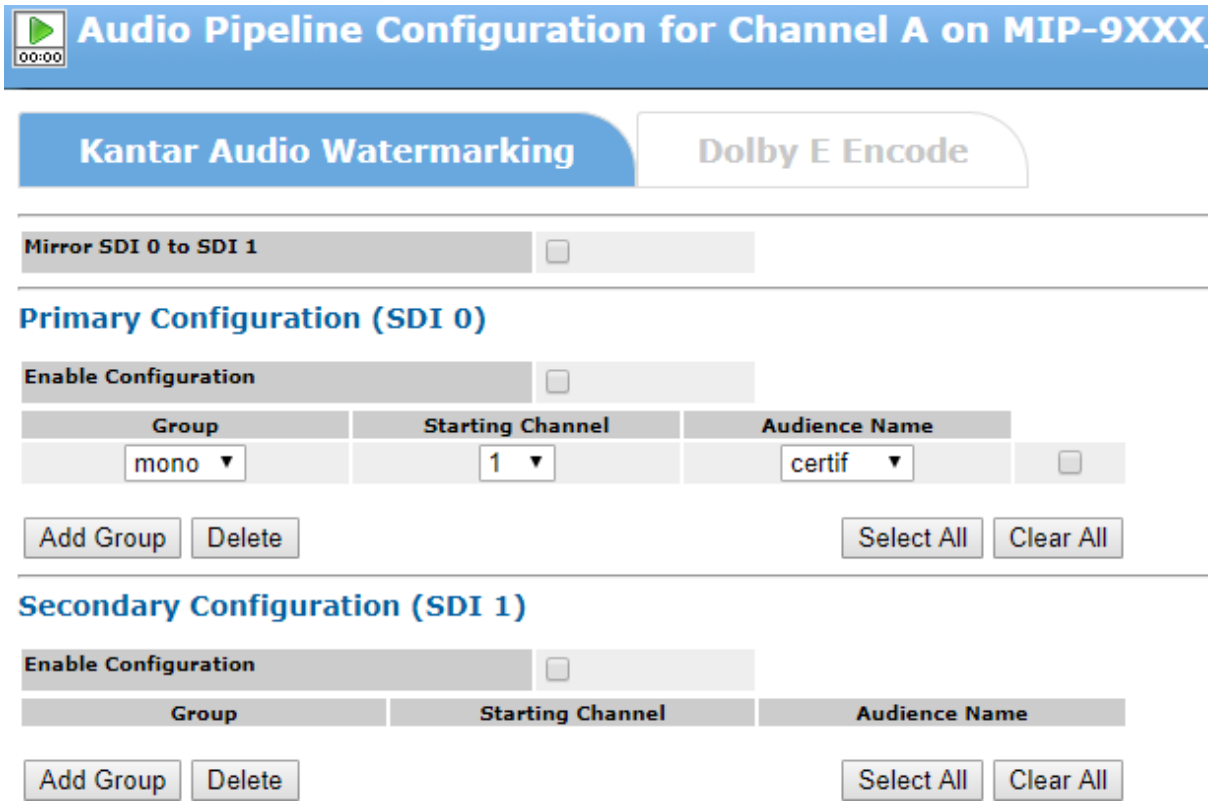
Before you begin

Make sure you have the necessary Harmonic and Kantar licenses installed on your system. If a license is missing, SystemManager will display an error message, and you will be unable to configure watermarking.

If possible, de-activate the associated player for the Spectrum X channel you want to configure.

NOTE: Spectrum supports audio watermarking on a total of 32 PCM audio channels per Spectrum X.

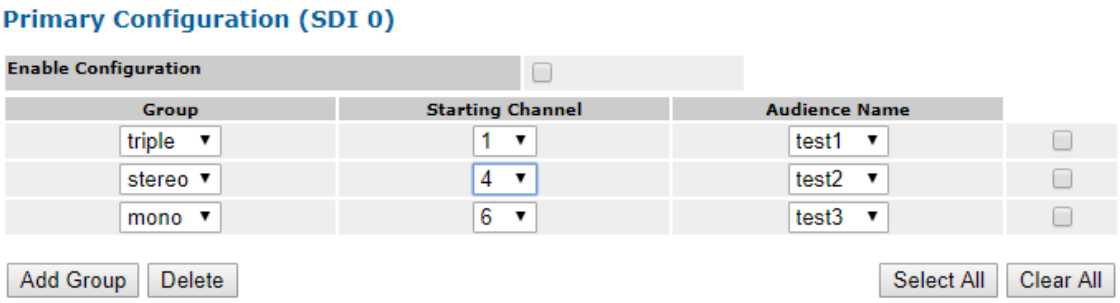
1. Navigate to the Channel Properties page for your Spectrum X
   a. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
   b. Click the Spectrum X icon to open its **Properties** page.
   c. Click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
2. In the **Configure Audio Processing Settings** section, click **Audio Processing Configuration** to open the **Audio Pipeline Configuration** page for that channel.



3. (Optional) If you want the audio watermarking settings on the Secondary output (SDI 1) to mirror the settings on the Primary output (SDI 0), click the **Mirror SDI 0 to SDI 1** check box. When this is selected, only the configuration options for **Primary Configuration (SDI 0)** will be visible, and the settings from SDI 0 will be applied to SDI 1.
4. For the Primary or Secondary output (SDI 0, SDI 1) of the Spectrum X channel, indicate which audio channels will receive a watermark by adding them in groups of one, two, or three (mono, stereo, or triple). To add a group of audio channels, click **Add Group**.
5. Configure groups as follows.
   a. From the **Group** drop-down menu, select **mono**, **stereo** or **triple** to indicate the number of channels in that group.
   b. From the **Starting Channel** drop-down menu, select the starting channel for that group.
   Note that once a group is added, SystemManager automatically adjusts the starting channel of the subsequent group so that channel groups do not overlap.

      NOTE: If two channel groups overlap, Spectrum will generate error messages and audio watermarking will not be applied.

      In the following example, the "triple" group includes channels 1, 2, and 3. For the next group, when "stereo" is selected, SystemManager automatically makes the starting channel 4 and includes channel 5. For the next group, when "mono" is selected SystemManager automatically makes the starting channel 6 and includes only that channel. Note that you can choose a starting channel of 1-16 as long as channels don't overlap, and as long as there are sufficient unassigned channels for the selected group type.



   c. From the **Audience Name** drop-down menu, select the audience name for that group. Note that the options in this menu are populated from the license.aud file in the sub-folder for the corresponding output.
   In the above example, the first three channels are watermarked with the audience name "test1," channels three and four are watermarked with the audience name "test2," and channel six is watermarked with the audience name, "test3."

   You can delete a group of channels by selecting the group and clicking **Delete**.
6. Once you have added all the audio watermarking groups for a channel. Click **Apply** to save the changes.
7. For watermarking to take effect, the associated player must be disabled and then re-enabled again. Audio watermarking will be added during playout.
8. If you de-activated the associated player prior to configuring this Spectrum X channel, activate it now for the changes to take effect. If you were not able to de-activate the associated player prior to configuring audio watermarking, de-activate it and then activate it for the changes to take effect.

NOTE: Audio watermarking is supported only on players configured for 25Hz/50Hz (PAL) frame rates.

NOTE: If you modify audio watermarking settings and save the changes, any associated players must be disabled and then re-enabled again for the changes to take effect.

Configuring Dolby® E encode

With Spectrum 8.3 or later, using a Spectrum X licensed for Dolby E encode, you can encode PCM audio channels and output them as compressed Dolby E audio during playout.

Note the following points about Spectrum support for encoding Dolby E audio.

- With the "DOLBY-ENCODE" license, Spectrum supports four Dolby E encode configurations per Spectrum X channel.
- Spectrum supports encode of two Dolby E program configurations: 5.1+ 2 and 5.1+1+1.
- When configured, Dolby E encode occurs after any audio changes made from audio profiles, and after any audio watermarking that has been configured for a channel.
- Once you have configured audio watermarking for a Spectrum X channel, the associated player must be de-activated and then activated again for the changes to take effect.

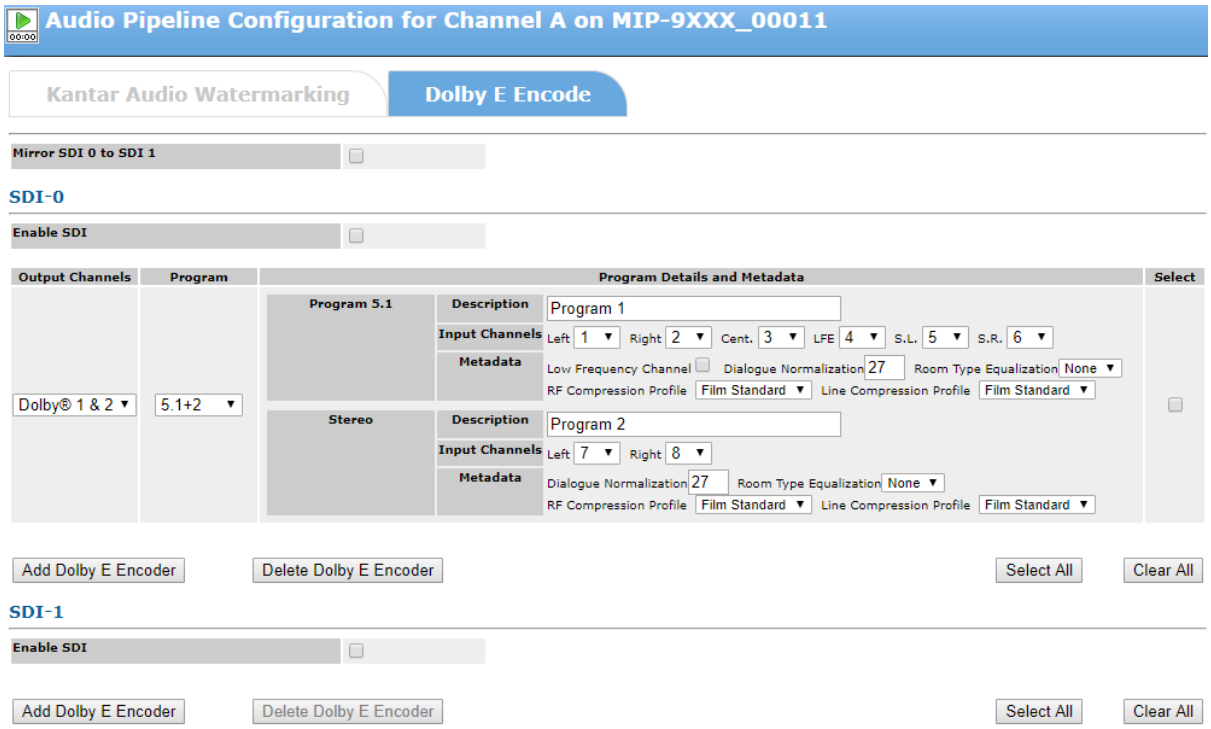
Configuring a Spectrum X channel for Dolby E encode

Configure Dolby E encode on a Spectrum X channel.

Before you begin

If possible, de-activate the associated player for the Spectrum X channel you want to configure.

1. Navigate to the Channel Properties page for your Spectrum X
   a. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
   b. Click the Spectrum X icon to open its **Properties** page.
   c. Click the **Configure Channel A** or **Configure Channel B** button to open the properties page for that channel.
2. In the **Configure Audio Processing Settings** section, click **Audio Processing Configuration** to open the **Audio Pipeline Configuration** page for that channel.
3. Click the **Dolby E Encode** tab.



4. (Optional) If you want the Dolby E encode settings on the Secondary output (SDI 1) to mirror the settings on the Primary output (SDI 0), click the **Mirror SDI 0 to SDI 1** check box. When this is selected, only the configuration options for **Primary Configuration (SDI 0)** will be visible, and the settings from SDI 0 will be applied to SDI 1.
5. For the Primary or Secondary output (SDI 0, SDI 1) of the Spectrum X channel, add a Dolby E encode configuration by clicking **Add Dolby E Encoder**.
6. Configure the Dolby E encoder as follows.

Output Channels	Select the Dolby stereo pair that you want to output for this encode configuration.
Program	Select the program configuration. Choose from **5.1+2**, which provides 5.1 plus stereo or **5.1+1+1**, which provides 5.1 plus two mono channels.

In the Program Details section, configure the following.

Description	Enter a description for the program.
Input channels	Select one of 16 PCM audio channels for each of the input channels for the program.
Metadata	◦ **Low Frequency Channel**: When clear, the low frequency channel (LFE) is muted. When selected, the LFE will be present. ◦ **Dialogue Normalization**: Enter the value required by your system. Note that the default value of 27 results in -27 decibels. ◦ **Room Type Equalization**: Select either **None**, **Large**, or **Small** as required by your system.

- **RF Compression Profile**: Select the value required by your system.
- **Line Compression Profile**: Select the value required by your system.

7. Once you have added all the Dolby E encode configurations for your Spectrum X channel, click **Save Configuration**.
   You can delete an encode configuration at any time by selecting it and clicking **Delete Dolby E Encoder**.
8. If you de-activated the associated player prior to configuring this Spectrum X channel, activate it now for the changes to take effect. If you were not able to de-activate the associated player prior to configuring Dolby E encode, de-activate it and then activate it for the changes to take effect.

Chapter 7

Player configuration

Configure and modify players in a Spectrum System.

IMPORTANT: When configuring Players on MediaDirectors 2100, 2101, 2102 and 2102B, it is important to remember that each Player is associated with a specific host, and each Player may only be connected to those MediaPorts attached to that selected host. A Player that resides on Host 0 cannot be connected to a MediaPort that resides on Host 1.

NOTE: SystemManager checks the firmware version on Spectrum systems and adjusts the player configuration user interface according to the features supported in the firmware version. If the firmware version of any component on your Spectrum system is too old to support this SystemManager feature, a warning message will appear in the **Player Properties** page asking you to upgrade to a supported firmware version for this release of SystemManager. Harmonic recommends that you upgrade to supported firmware versions soon after installing the latest SystemManager release.

- *Creating a player*
- *Configuring video tracks*
- *Configuring audio tracks*
- *Attaching devices and setting conversion options*
- *Changing the player state*
- *Player to player dubbing*
- *Disconnecting Devices*
- *Using Auto Input Sense recording*
- *Deleting players*
- *Copying a Player*
- *Configuring GPIO settings for players*
- *Adjusting output timing*
- *Creating multiple audio track players*
- *Moving players*
- *About allowing players to be enabled or disabled by automation*
- *About the player utility*
- *About VANC implementation in Spectrum*
- *About AFD support*
- *About Harmonic timecode behavior*
- *About Cue-to-Timecode with VDCP control*
- *About players created with Spectrum Management*

Creating a player

Create, configure, and activate a player.

1. From the **Configuration** tab, click **Player Configuration**, and then click the icon for a Spectrum video server to open the **Player List** page for that server.
2. Click **Create a Player**, type a name for the new player in the text box, and then click **Create**. Note that you cannot use the same Player name twice in a Harmonic system. Refer to “About Naming Files and System Elements” for naming conventions.
3. From the **Edit Player** page, configure player options moving from the top to the bottom of the page. See the “Edit Player options” section for reference.

   NOTE: Many options on the **Edit Player** page will change based on selections you make as you configure your player.
4. Click a video track button to add a video track to the player. Follow the procedure in "Configuring video tracks" that applies to your video track.
5. From the "Track" section for your player, click **Attach devices** to open the **Attach devices** page, and then select an I/O module to attach. Follow the steps in "Attaching devices and setting conversion options" to configure any conversion settings for your I/O module.
6. From the **Edit Player** page, click the **Audio** button to add an audio track. Attach a device to the audio track and configure audio settings. See "Configuring audio settings."
7. Add additional tracks as needed.
8. Activate and enable the player by clicking **Activate and Enable**. See "Changing the player state."

What to do next

Edit Player options

Configuring video tracks

Attaching devices and setting conversion options

Configuring audio tracks

Changing the player state

Edit Player options

The **Edit Player** page provides a number of options. Note that the player must be deactivated before configuring.

Name	Note that you cannot use the same Player name twice in a Harmonic system.
Frame Rate	Note that some track type options may be grayed out depending on the selected frame rate. **NOTE:** If you plan on doing cross conversion with this player, refer to “About Configuring for Cross Conversion” before selecting the frame rate.

Player Type

- **Branded**: Select if the player will be used to play branded content. Branded players are automatically set as “play only,” “EE Mode = Never,” and can only be attached to a ChannelPort or Spectrum X. For this player type, the **BNC config** setting on the Attach Devices page is configured as AES In by default.
- **Record**: Select for “record only” players.
- **Hybrid**: Select if the player may be used for play or record.

Mode

Select from **Play Only**, **Record Only**, or **Play or Record**.

Control

Note the I/O module receiving serial control commands does not have to be the same I/O module that plays or records media.

- **Manual**: Select this option if the player is not using an automation application for control.
-
- **VDCP**: If selected, select as follows:
  - **Signal Port**: Choose the port number that you want to control. Select from 0 to 127.
  - **MediaPort Name**: Select the desired I/O module you want to receive serial control commands.
  - **MediaPort Channel**: Select the desired I/O module channel.
  - **Advance-to-Cued**: Enter the minimum number of frame times the VDCP port should still on reaching the end of a clip and before advancing to the beginning of the next cued clip. The **Advance-to-Cued** option can be used in conjunction with the player **Last-Frame-Freeze** option. Setting the **Last-Frame-Freeze** option to a non-zero value “N” causes the output to go black after freezing on the last frame of the active clip for N frames. If the **Advance-to-Cued** option is set to a value “M” where M is larger than N, then the output will go black after N frames of freezing on the last frame and then advance to the cued clip after another M-N frames.

    IMPORTANT: The following options should not be selected unless directed by your automation vendor or Harmonic technical support:
  - **Cue-to-Timecode**: Select if applicable to your system
  - **ID Request**: Checks ID for presence of all media files.
  - **Play Cue** : Checks ID for presence of all media files.
- **PlayerAPI**: Select if the player will use the Spectrum Player API for control. For information on the Player API, see the *Spectrum Player API Programmer Guide*.
- **BVW**: If selected, configure as follows:
  - **MediaPort Name**: Select the desired I/O module you want to receive serial control commands.
  - **MediaPort Channel**: Select the desired I/O module channel.
- **Harmonic Playout**: Select if the player will use Polaris Play: Playlist Control for control.
- **Harmonic Delay**: Select if the player will implement the delay service, which adds real time program delay capability to the Spectrum system. With this

	licensed service, Spectrum can provide up to 24 simultaneous delayed outputs or delay channels for every ingest. • **Harmonic Playout Mirror**: Select if you want to configure a pair of playout channels to act as a main and a backup channel that provide redundancy in the event of a failure. When mirroring is enabled from one channel to the other, the channels automatically synchronize playlist updates. For example, if a playlist is added to the playlist folder for one of the paired channels, it propagates to the other channel. Likewise, if you use Polaris Play: Playlist (Playlist) to edit the playlist for one channel, the changes are applied to the paired channel, as well. This control mode requires the FW-POL-PLAY-MIRROR license.
Timecode Display Non-Drop Frame or Drop Frame	Note that this selection only applies to players configured as 525/29.97, 1080i/29.97, 525/29.97, or 720p/59.94. The default setting is **Drop Frame**.
Record Timecode Source	• **External**: Specifies that the timecode should be obtained from an external source. • **Internal (TCG on)**: Specifies that the timecode should be obtained from the server's Timecode Generator.
Playback Timecode Source	• **From Clip**: Specifies that the timecode should be obtained from the clip. • **Internal (TCG on)**: Specifies that the timecode should be obtained from the server's Timecode Generator. The default setting is **From Clip**. • **Timecode Generator Mode**: When either **Record** of **Playback Timecode Source** is set to Internal (TCG on), an additional set of options are available to configure timecode generation. ◦ **Hold**: Allows you to maintain timecode generation at a constant value specified using the Player API. ◦ **Free Run** : Specifies a continuous increase in value, starting from a value specified using the Player API. ◦ **Locked to Player Timeline**: Specifies that the timecode value is derived from the current position on the timeline. ◦ **Locked to Clip Position**: Specifies that the timecode is derived from the current position within the current clip. ◦ **Locked to Clip's First Timecode**: Specifies that the timecode is derived from the current clip's first timecode value. ◦ **Locked to VITC input reference**: Specifies that the timecode is derived from the reference input Vertical Interval Timecode (VITC).

NOTE: When "Play and Record" Players are configured for Internal Timecode Generator and Locked to Clip Timecode, recorded clips are produced with starting times of 00:00:00.00 with VITC times from the original source, not 00:00:00.00. For the MediaDirector 2202/2201, if a LTC timecode source is connected, the MediaDirector automatically uses that as the timecode source for any attached player. This setting overrides the reference VITC from the MediaPort for purposes of automation. However, if the attached player is configured with a different frame rate than that of the LTC input, then its reference will not be overridden. For example, a LTC input with a frame rate of 25 Hz would not override the reference for a player configured with a frame rate of 29.97 Hz.

Last Frame Freeze

0 indicates the last frame will be frozen until the next clip.

EE Mode

- **Normal**: When selected, the input video for the player is displayed in the video out (or video loop-through) whenever the player is stopped.
- **Never**: When selected, the input video for the player is never displayed in the video out (or video loop-through) regardless of the player state.
- **Record**: When selected, the input video for the player is displayed in the video out (or video loop-through) only when the player is recording.

Stop recording when disk is full

(Optional, if you have configured a **Record** player or a **Play or Record** player) Unchecked by default. Select if you wish players to stop recording when there is no disk space.

Stop recording when Input error occurs

(Optional, if you have configured a **Record** player or a **Play or Record** player) Unchecked by default. Select if you wish players to stop recording when there is an SDI video input error.

NOTE: To change “Stop recording...” settings for existing players created prior to SystemManager 5.23 and Spectrum 6.4.2, first deactivate the player then change these settings, and then reactivate the player.
To change these settings for all players in your system created with SystemManager 5.23 or later and Spectrum 6.4.2 or later, use the **Player Parameters** settings on the **Options** page.

Media Wrapper Format

For information on supported track and media wrapper format combinations, refer to *Spectrum Media and Wrapper Formats* included in the Spectrum documentation suite.

Default Clip Directory

Harmonic recommends that you leave this field empty. Doing so allows the Spectrum video server to determine the default location for clips

If you choose a different default directory, it must have been previously created, and the full path name must be used (for example, /fs0/mydirectory) in the Default Clip Directory field. To create directories on the Spectrum video server file system, ensure that you have first mapped the file system to a network drive. Once this is done, directories can be created in the normal way. The Spectrum video server expects directory names to be separated using forward slashes (‘/’,) not backward slashes as used within Microsoft Windows.

NOTE: Changing the Player's Clip Directory using Windows ClipTool will not affect the Clip Directory that is used by other ClipTools, nor will it affect the Clip Directory used by control applications (for example, VDCP and BVW).

NOTE: When configuring a player to preview from your Harmonic MediaGrid or NAS, make sure to enter the Default Clip Directory as follows:

- for omfs mounts: file:///mnt/nas/omfs/<*folder name*>
- for cifs mounts: file:///mnt/nas/cifs/<*folder name*>

Use 704 Up/Down Conversion

(Optional for players configured as "Play Only" or "Play and Record" with a frame rate of 25 Hz, and I/O module that supports up/down conversion attached). Select to up-convert or down-convert to output that is 704 samples wide rather than 720 samples wide. To make this the default selection for all new players, refer to "Configuring players to use 704 up/down conversion by default."

Ignore clip RP-186 AFD

(Optional for players configured as "Play Only" or "Play and Record) Select to ignore RP186 (chroma LSB) AFD data on clips being played out. To make this the default selection for all new players, in SystemManager, click **Home** > **Options** > **Ignore clip RP-186 AFD: Enabled**.

Ignore clip AFD

Select to ignore AFD data in clips being played out.

NOTE: This option works only for clips, not external inputs, and is only available in the following cases:

- For players attached to a Spectrum X in standard channel mode
- For players with a frame rate of 29.97 Hz

Frame Still

Select to cause material that is stilled (or frozen) during playout to be a frame rather than a single field. Stilled playout includes cued mode, play at rate of zero, and when the player position hits the end of the timeline). Note that a frame-still provides higher spatial resolution but at the cost of motion artifacts if there is much motion between the pair of fields that comprise the frame.

Subtitle Handling

(For any player configured for 25 or 50 Hz frame rate)

NOTE: For subtitles or teletext that use the OP-47 standard, up converting or down converting is a MediaPort-wide setting. For the MediaPort 7000 series, in order to convert OP-47 subtitles, on the I/O Module Properties page, you must first set OP-47 subtitle to/from SD to “Enable” before configuring the options in this step.

- **Disable Conversion/Insertion**: Disables the conversion or insertion of subtitle information.
- **Up-convert to SMPTE-2031/Down-convert**: Up-converts or down-converts subtitles to SMPTE-2031. This option is only available if the player is configured for 25 or 50 Hz frame rate.
- **Up-convert to OP-47/Down-convert**: Up-converts or down-converts subtitles to OP-47. This option is only available if the player is configured for 25 or 50 Hz frame rate.
- **Always output OP-47 Packets**:
  - If checked, Spectrum will output OP-47 packets regardless of whether subtitles are present in the SD clip. If there are no SD subtitles, Spectrum will output empty OP-47 packets.
  - If clear, Spectrum will only output OP-47 packets on fields where subtitles are present in the SD clip.
- **Onboard Subtitle Insertion**: Inserts subtitle information in the player. This option is only available if the player is configured for 25 or 50 Hz frame rate. If you have purchased the subtitle insertion license for this channel, the **Configure Caption** button will be activated.

Closed Caption Handling

(For any player configured for 59.94 or 29.97 Hz frame rate)

- **Disable Insertion**: Disables the conversion or insertion of subtitle information.
- **Onboard Closed Caption Insertion**: Inserts subtitle information in the player. This option is only available if the player is configured for 59.94 or 29.97 Hz frame rate. If you have purchased the closed caption insertion license for this channel, the **Configure Captions** button will be activated.

Open Caption Handling

(For Spectrum X or ChannelPort channels licensed for Open Caption insertion.)

- **Disable Insertion**: Disables the conversion or insertion of open caption information.
- **Open Caption Insertion**: Inserts open caption information in the player. When selected, the **Configure Open Captions** button will be activated.

Record AFD/AR Override

(Optional. For Record players on Spectrum systems with 7.3.1 and later.)

- **Always**: when selected, the specified values in the **AFD override** and **Aspect Ratio override** fields will be applied to the input regardless of whether or not AFD or aspect ratio information is present.
- **Only if missing**: when selected, if AFD or aspect ratio information is detected on the ingest stream, that information will be stored in the clip. You may specify values in the **AFD override** and **Aspect Ratio override**

fields but those values will only be used if AFD or aspect ratio information is absent from the ingest stream.
- **Never**: select to disable AFD and aspect ratio override fields.

SDI input AFD override	(Optional. For Record players on Spectrum systems with 7.3.1 and later.) Enter a value between 8 to 15. This is the AFD code to be used as the override setting.
SDI input Aspect Ratio override	(Optional. For Record players on Spectrum systems with 7.3.1 and later.) Select the aspect ratio (4x3 or 16x9) to be used as the override setting.

NOTE: AFD/AR override settings for a player will also apply to proxy tracks for that player.

Related information

About naming files and system elements
Configuring video tracks
Configuring subtitle insertion
Configuring closed caption insertion
Configuring open caption insertion
About Cue-to-Timecode with VDCP control
Configuring players to stop recording when the disk is full
Configuring players to stop recording when an input error occurs
About Harmonic timecode behavior
Configuring players to use 704 up/down conversion by default
Configuring players to ignore RP186 (chroma LSB) AFD
Configuring audio tracks

Wrapper format notes

Note any restrictions that apply to the wrapper format you are using.

Notes on MXF ARD_ZDF_HDF Wrapper Formats

Selecting an MXF ARD_ZDF_HDF wrapper format automatically adds a video and audio track, which do not include **Remove** button unlike other players. This is to ensure that there is at least one video track and one audio track.

MXF ARD_ZDF_HDF01a (XDCAM HD, 1080i25, 8 mono tracks)	Available with Record players at 25 Hz, this wrapper adds an MPEG-2 XDCAM HD track and an audio track with 8 channels.
MXF ARD_ZDF_HDF01b (XDCAM HD, 1080i25, 16 mono tracks)	Available with Record players at 25 Hz, this wrapper adds an MPEG-2 XDCAM HD track and an audio track with 16 channels.
MXF ARD_ZDF_HDF02a (AVCI, 1080i25, 8 mono tracks)	Available with Record players at 25 Hz, this wrapper adds an AVC I-frame (AVC-Intra) 1080i track and an audio track with 8 channels.

MXF ARD_ZDF_HDF02b (AVCI, 1080i25, 16 mono tracks)	Available with Record players at 25 Hz, this wrapper adds an AVC I-frame 1080i track and an audio track with 16 channels.
MXF ARD_ZDF_HDF03a (AVCI, 720p50, 8 mono tracks)	Available with Record players at 50 Hz, this wrapper adds an AVC I-frame 720p track and an audio track with 8 channels.
MXF ARD_ZDF_HDF03b (AVCI, 720p50, 16mono tracks)	Available with Record players at 50 Hz, this wrapper adds an AVC I-frame 720p track and an audio track with 16 channels.

Notes on MXF OP1a Wrapper Formats

Note some points specific to MXF OP1a wrapper formats.

- **MXF OP1a (Internal-eVTR, Low Latency)** Only appears if the selected Frame Rate is 25 or 29.97.
- **MXF OP1a (Standard, Low Latency)** Only appears if the selected Mode includes Record, and the Spectrum video server firmware is 5.1 or later.
- For players using either the **MXF OP1a (Internal-eVTR, Low Latency)** wrapper or the **MXF OP1a (SMPTE RDD9)** wrapper, the video track and first audio track will not display a **Remove** button unlike other players. This is to ensure that there is at least one video track and one audio track. To remove the video and audio track, change the wrapper to something other than MXF OP1a (Internal-eVTR, Low Latency) or MXF OP1a (SMPTE RDD9). The **Remove** button will reappear

Notes on the MXF AS-02 2011 Wrapper Format

Note some points specific to **MXF AS-02 2011** wrapper formats.

- AS-02 2011 allows you to treat a directory as a clip. To take advantage of this feature, Spectrum provides two modes that can be used for record players. When you select **MXF AS-02 2011** for a record player, an additional drop-down menu appears. If you select the default option, "**when recording, create subdirectory with .mxf extension**," only directories with a ".mxf" extension will be treated as clips. If you select "**when recording, create subdirectory with no extension**," any directory present in a player's active directory will be treated as a clip regardless of name or extension. However, ".dir" is a reserved directory extension (that is, "clip.dir" will never be seen as a clip).

IMPORTANT: If you select "when recording, create subdirectories with no extension," make sure you do not store non-clip directories within a player's active directory. Doing so may result in automation systems treating a directory as a clip and inadvertently deleting it.

- Spectrum only supports Simple AS-02 2011 Bundles (that is, single op1b files in a package).
- Modifying an AS-02 2011 Bundle via access of the OP1b wrapper directly will treat the clip as AS-02 2009, which will not update the manifest .xml file. This can cause the AS-02 2011 bundle to be invalid.

Notes on the GXF Wrapper Format

Note some points specific to the **GFX** wrapper format.

- At this time, Spectrum supports only playout of GXF-wrapped content, not record.

- Spectrum supports GXF for the following media types:
  - MPEG-2: 525, 625 and 720p, 1080i
  - DV25 and DVCPRO50: 525, 625
  - DVCPRO HD
  - AVC I-frame (AVC-Intra)
- When selecting VBI or VANC for a video track with the GFX wrapper, note that the field name may appear as **VBI**, **VANC**, or **VBI/VANC** depending on attached MediaPort and track type. In all cases, select **GFX Data Track** to play out VBI or VANC data

Configuring video tracks

Configure any video tracks for your player.

NOTE: You can add tracks of different video formats to the same player or add multiple tracks of the same video format. When creating a Player. However, any values you enter or options you select must be supported by the I/O module to which the Player is attached.

Configuring a DV track

You can add a DV (25 Mbps) track with two channels of embedded audio to the Player.

1. From the **Edit Player** page, click **DV 25** to add a DV video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support DV 25, see the *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."
3. From the **Configuration** drop-down menu, choose between the **Simple**, **Advanced**, or **Advanced Back to Back** configuration.
   - The **Simple** configuration programs a DV 25 Player that records and plays back only a *single type* of clip.

     If you select Simple, the Player records and plays back a single type of clip only. No other configuration is necessary.
   - Depending on the attached MediaPort, you may configure the player as **Advanced** or **Advanced Back to Back**. An **Advanced** player can switch between different types of clips, such as DV/DVCPRO and MPEG-2. To switch, you must first stop the player, eject the clips from the timeline and then load the new format clips. An **Advanced Back to Back** player can playback a mix of clip types without having to stop.

     The **Advanced** configuration programs a DV 25 Player that records a single type of clip but plays back *different types* of DV, DVCPRO, or MPEG clips.

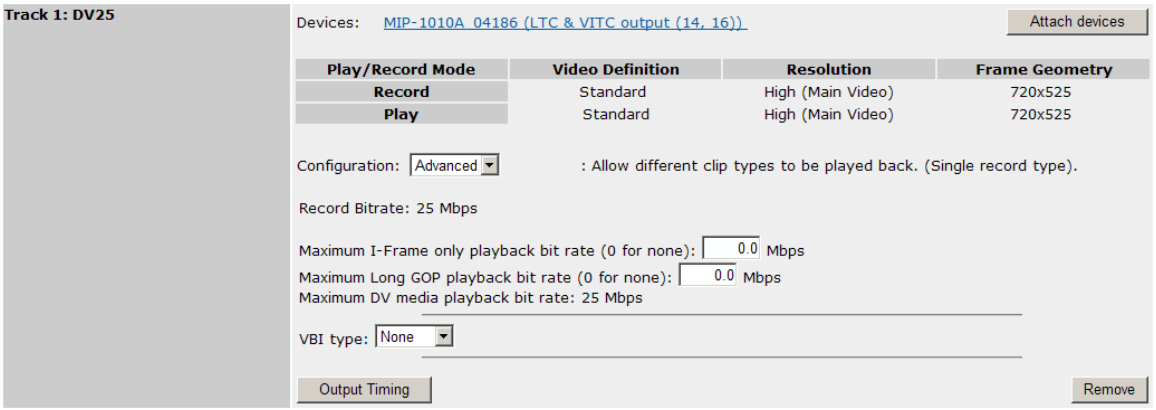


Figure 7-1: Creating a DV Player—Advanced Configuration

If you select **Advanced** or **Advanced Back to Back**, the player records a single type of clip but plays back *different types* of DV, DVCPRO, or MPEG clips. Configure as follows according to Player mode:

- **Play only** or **Play and Record** mode:
  - Set the I-frame playback rate in the **Maximum I-Frame only playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no I-frame playback, enter 0.
  - Set the Long GOP playback rate in the **Maximum Long GOP playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no Long GOP playback, enter 0.
  - Select the clip type from the **Maximum DV media playback Bitrate...** drop-down menu. If no DV media types are to be played back, select **None**. If using DV 25 or DVCPRO media only, select **25 Mbps**. If using DVCPRO 50 media, select **50 Mbps**.
- **Record Only** mode: No additional configuration is needed.

4. As required, click **DV 25** again to add more DV tracks to the Player. This procedure would be required, for example, if you wanted *one* Player to handle more than one signal, such as a key signal and a fill signal simultaneously.

   If you added a video track by mistake, click the **Remove** button adjacent to the track.

5. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. To preserve VBI data, you may select **VBI File.**

   For some I/O modules, if the Media Wrapper Format is MXF OP1a (Standard) or MXF OP1a (Standard, Low Latency), you may also select **SMPTE 436M Track**.

   If the player is configured to record, a series of eight drop-down boxes appears. Select the lines that you wish to record. A minimum of one must be selected, otherwise the Player cannot be activated.

   Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

6. As required, add an additional video track of the same or different format.

   NOTE: Spectrum supports players that have two attached video tracks of the same format (DV 25, DVCPRO 50, or MPEG 25 I-frame).

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options

Configuring a DVCPRO Player

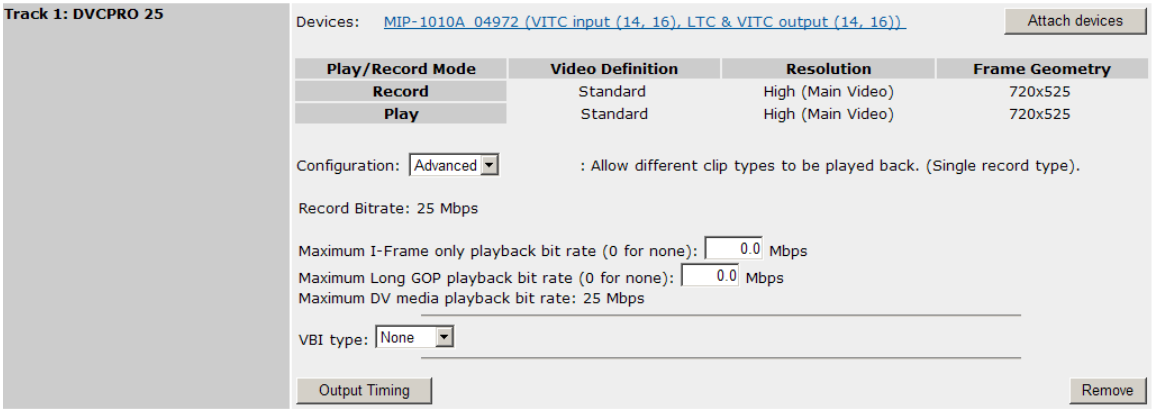
You can add a DVCPRO (25 Mbps) video track to your player.

1. From the **Edit Player** page, click **DVCPRO** to add a DVCPRO 25 video track to the Player.
2. Connect the track to the appropriate I/O module by clicking **Attach devices**. To verify which I/O modules support DV 25, see the *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."
3. From the **Configuration** drop-down menu, choose between the **Simple**, **Advanced**, or **Advanced Back to Back** configuration.
   - The **Simple** configuration programs a DVCPRO 25 Player that records and plays back only a *single type* of clip.

     If you select **Simple**, the Player records and plays back a single type of clip only. No other configuration is necessary. Please continue to step 5.
   - Depending on the attached I/O module, you may configure the Player as **Advanced** or **Advanced Back to Back**. An **Advanced** Player can switch between different types of clips, such as DV/DVCPRO and MPEG-2. To switch, you must first stop the Player, eject the clips from the timeline and then load the new format clips. An **Advanced Back to Back** Player can playback a mix of clip types without having to stop.

     The **Advanced** configuration programs a DVCPRO 25 Player that records a single type of clip but plays back *different types* of DV, DVCPRO, or MPEG clips.

     Figure 7-2: Creating a DVCPRO 25 Player—Advanced Configuration



     If you select **Advanced**, the Player records a single type of clip but plays back *different types* of DV, DVCPRO, or MPEG clips. Configure as follows according to Player mode:

   - **Play only** or **Play and Record** mode:

- Set the I-frame playback rate in the **Maximum I-Frame only playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no I-frame playback, enter 0.
- Set the Long GOP playback rate in the **Maximum Long GOP playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no Long GOP playback, enter 0.
- Select the clip type from the **Maximum DV media playback Bitrate...** drop-down menu. If no DV media types are to be played back, select **None**. If using DV 25 or DVCPRO media only, select **25 Mbps**. If using DVCPRO 50 media, select **50 Mbps**.

- **Record Only** mode:

  An Xfer Speed drop-down box appears only when the mode is set to “Record Only” and only when the Frame Rate is set to “29.97”. Select between 1x and 4x. When set to 1x, the track may only be connected to DV/MPEG I/O modules for normal speed ingest of SDI material, or to the SDI/SDTI I/O module for 1x ingest of DVCPRO material carried over SDTI. When set to 4x, the track may only be connected to the SDI/SDTI I/O module for 4x ingest of DVCPRO material carried over SDTI.

4. As required, click **DVCPRO** again to add more DVCPRO tracks to the Player.

   If you added a video track by mistake, click the **Remove** button adjacent to the track.

5. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. To preserve VBI data, you may select **VBI File**.

   For some I/O modules, if the Media Wrapper Format is MXF OP1a (Standard) or MXF OP1a (Standard, Low Latency), you may also select **SMPTE 436M Track**.

   If the player is configured to record, a series of eight drop-down boxes appears. Select the lines that you wish to record. A minimum of one must be selected, otherwise the Player cannot be activated.

   Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

6. As required, add a video track of a *different* format, or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating a DVCPRO 50 Player

You can add a DVCPRO 50 (Mbps) video track with four channels of embedded audio to the Player.

1. From the **Edit Player** page, click **DVCPRO 50** to add a DVCPRO 50 video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support DV 50, see the *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see “Attaching devices and setting conversion options.”
3. From the **Configuration** drop-down menu, choose between the **Simple**, **Advanced**, or **Advanced Back to Back** configuration.

- The **Simple** configuration programs a DVCPRO 50 Player that records and plays back only a *single type* of clip.

  If you select **Simple**, the Player records and plays back a single type of clip only. No other configuration is necessary.
- Depending on the attached I/O module, you may configure the Player as **Advanced** or **Advanced Back to Back**. An **Advanced** Player can switch between different types of clips, such as DV/DVCPRO and MPEG-2. To switch, you must first stop the Player, eject the clips from the timeline and then load the new format clips. An **Advanced Back to Back** Player can playback a mix of clip types without having to stop.

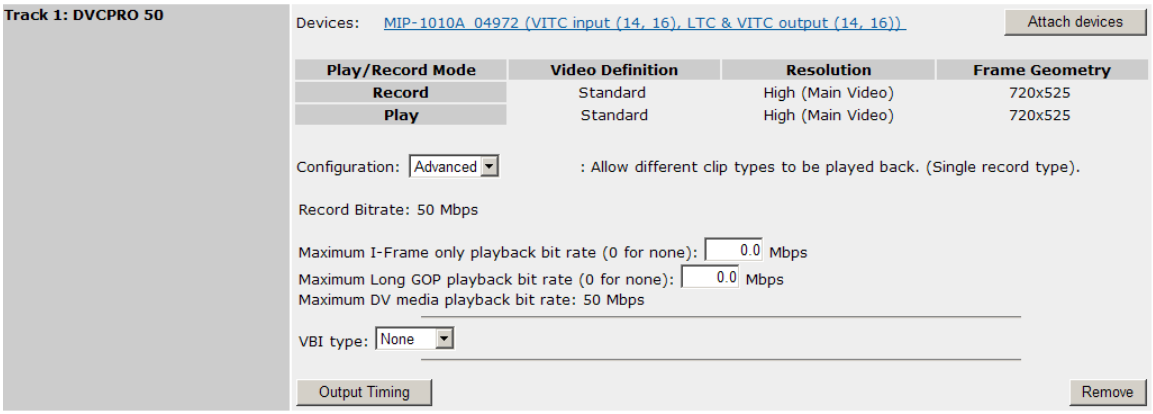


Figure 7-3: Creating a DVCPRO 50 Player—Advanced Configuration

If you select **Advanced** or **Advanced Back to Back**, the Player records a single type of clip but plays back *different types* of DV, DVCPRO, or MPEG clips. Configure as follows according to Player mode:

- **Play only** or **Play and Record** mode:
  - Set the I-frame playback rate in the **Maximum I-Frame only playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no I-frame playback, enter 0.
  - Set the Long GOP playback rate in the **Maximum Long GOP playback bitrate...** field. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. For no Long GOP playback, enter 0.
  - Select the clip type from the **Maximum DV media playback Bitrate...** drop-down menu. If no DV media types are to be played back, select **None**. If using DV 25 or DVCPRO media only, select **25 Mbps**. If using DVCPRO 50 media, select **50 Mbps**.
- **Record Only** mode: No additional configuration is needed.

4. As required, click **DVCPRO 50** again to add more DVCPRO 50 tracks to the Player. This procedure would be required, for example, if you wanted one Player to handle more than one signal, such as a key signal and a fill signal simultaneously.

   If you added a video track by mistake, click the **Remove** button adjacent to the track to delete it.

5. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. To preserve VBI data, you may select **VBI File**.

   For some I/O modules, if the Media Wrapper Format is MXF OP1a (Standard) or MXF OP1a (Standard, Low Latency), you may also select **SMPTE 436M Track**.

If the player is configured to record, a series of eight drop-down boxes appears. Select the lines that you wish to record. A minimum of one must be selected, otherwise the Player cannot be activated.

Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

6. As required, add an additional video track of the same or different format or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Creating a DVCPRO 50 Player
Attaching devices and setting conversion options
Configuring audio tracks

Creating a DVCPRO HD player

You can configure a **DVCPRO HD** player.

1. From the **Edit Player** page, click **DVCPRO HD** to add a DVCPRO HD video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support DVCPRO HD, see the *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."

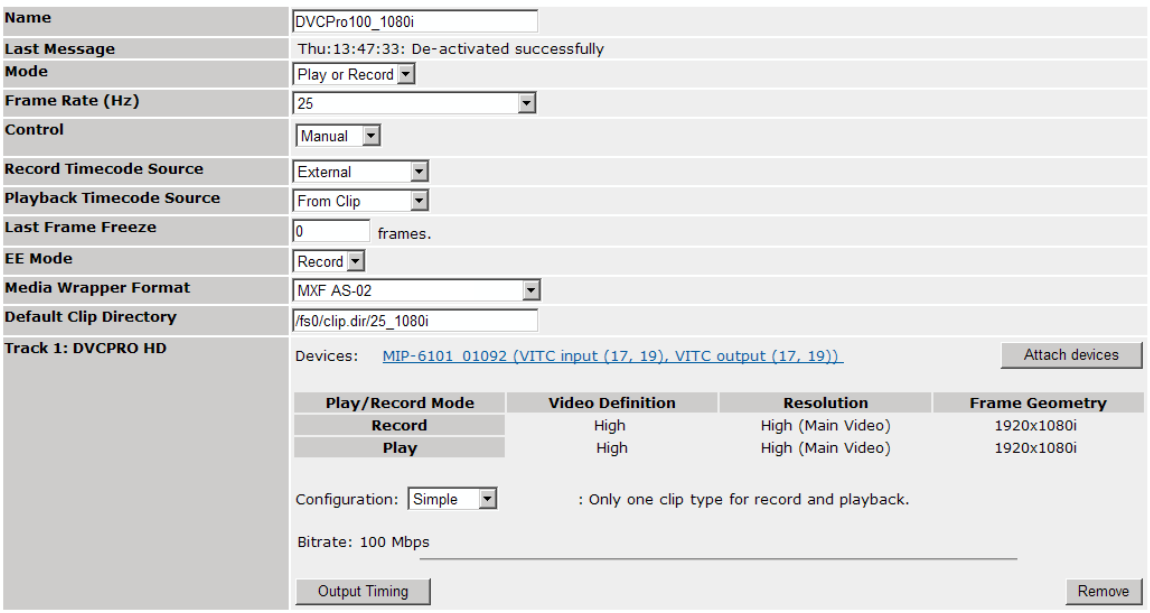


Figure 7-4: Creating a DVCPRO HD player

If you added a video track by mistake, click the **Remove** button adjacent to the track.

3. As required, add a video track of a *different* format, or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating a DV MPEG SD Player

You can configure a Player, which can play DV and MPEG video tracks back to back.

1. From the **Edit Player** page, click **MPEG-2** to add an MPEG video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support DV and MPEG SD, see the *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."
3. From the **Configuration** drop-down box, select **Advanced Back to Back** as shown in the following figure.

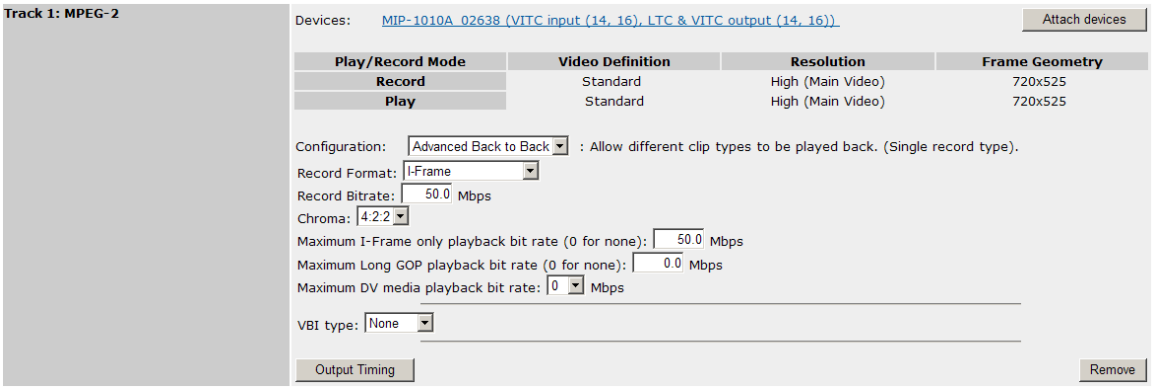


Figure 7-5: Creating a DV MPEG SD Player

NOTE: Advanced Back to Back is only available on MPEG base video tracks.

4. From the **Record Format** drop-down box, select from **I-Frame**, **Long GOP**, or IMX.

   When Long GOP is selected as the record format, you can select **Enable Open GOP** if you wish to record Open GOP.

5. Both **Play only** and **Play and Record** Player Modes are supported for DV MPEG Players. Depending on the Mode selected, proceed as follows:

   - **Play and Record mode**

   - From the **Format** drop-down menu, choose the required format: **I-Frame**, **Long GOP**, or **IMX**.
   - In the **Bitrate** field specify a valid bitrate for the selected format. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*.
   - Select the required **Chroma** setting. Choose from **4:2:2** or **4:2:0**.
   - In the **Maximum I-Frame playback bitrate...** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.

- In the **Maximum Long GOP playback bitrate...** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum DV media playback Bitrate...** drop-down menu, select the maximum bandwidth of DV type media you expect to play back. If using DV 25 or DVCPRO media only, choose **25 Mbps**. If using DVCPRO 50 media, choose **50 Mbps**.
- **Play only mode**
- From the **Format** drop-down menu, select the required format: **I-Frame**, **Long GOP**, or **IMX**.
- In the **Maximum I-Frame only playback bitrate** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum Long GOP playback bitrate** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum DV media playback Bitrate...** drop-down menu, choose the maximum bandwidth of DV type media you expect to play back. If using DV 25 or DVCPRO media only, choose **25 Mbps**. If using DVCPRO 50 media, choose **50 Mbps**.

6. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. If you want to preserve or play back VBI data, select **VBI File** or **Internal**.

   A DV MPEG Player cannot include embedded VBI. However, if the VBI data option is selected, the Player can play back both separate and embedded VBI, if embedded VBI is present.

   For some I/O modules, if the Media Wrapper Format is MXF OP1a (Standard) or MXF OP1a (Standard, Low Latency), you may also select **SMPTE 436M Track**.

   NOTE: For clips created with non-Harmonic equipment, Harmonic recommends that you select **Internal**.

   If the player is configured to record, a series of eight drop-down boxes appears. Select the lines that you wish to record. A minimum of one must be selected, otherwise the Player cannot be activated.

   If you are configuring VANC, note that the following selections reduce the number of available VBI lines:

   - If the player frame rate is 29.97 Hz, this reduces available VBI lines by one.
   - If VITC capture is selected from the Attach Devices page, this reduces available VBI lines by two.
   - Line 21 Closed Captioning reduces available VBI lines by one.

     Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

7. If you want to preserve or playback VANC data, select an option from the **VANC type** drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M Track**.

   IMPORTANT: Avoid selecting VANC for SD video without assistance from Harmonic technical support.

   NOTE: SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules for playout with SD material.

   In the **Maximum number of VANC data** field, enter the desired bytes per frame value. For more information about VANC for SD video, contact Harmonic technical support. VANC capture adjustments (number of bytes) can only be controlled by some I/O modules. Adjusting the number of bytes for other I/O modules is not supported.

8. Continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating an MPEG SD Player

You can add an MPEG video track (with selectable bitrates) to a Player for SD output.

1. From the **Edit Player** page, click **MPEG-2** to add an MPEG video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support MPEG-2, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see “Attaching devices and setting conversion options.”

   NOTE: For the MediaPort 5320 series, if you selected **Record Only** or **Play and Record** for the **Mode**, make sure that, in the **Video Definition** drop-down menu, **Standard** is selected. Attempting to encode MPEG-2 Long GOP video which contains difficult content, such as “strobe” or heavily flashing lights, at a bit rate of 18 Mb/s, may result in encoder errors on the MediaPort 5320 series. These errors may include video artifacts when the recorded content is played back. If the attached I/O module does not support the selected player settings, then the following message appears: “Specified combination of video parameters is not supported by the attached device.” For a description of valid bitrates and formats for your I/O module, refer to *Spectrum Media and Wrapper Formats*.

   NOTE: For play-only players with frame rates set at 25 or 29.97, you have the choice of selecting a **Video Definition** of **High** or **Standard**.

3. From the **Configuration** drop-down box, select between the **Simple**, **Advanced**, or **Advanced Back to Back** configuration.
   - The **Simple** configuration allows you to design an MPEG Player that records and plays back only a *single type* of MPEG clip.

     Clip type is selected using the **Format** or **Record Format** field. The bitrate for both the encoded and the decoded clip must be the same.
   - Depending on the attached MediaPort, you may configure the Player as **Advanced** or **Advanced Back to Back**. An **Advanced** Player can switch between different types of clips, such as DV/DVCPRO and MPEG-2. To switch, you must first stop the Player, eject the clips from the timeline and then load the new format clips. An **Advanced Back to Back** Player can playback a mix of clip types without having to stop.

     The **Advanced Back to Back** configuration allows you to design an MPEG Player that records and plays back *different types* of MPEG and DV clips

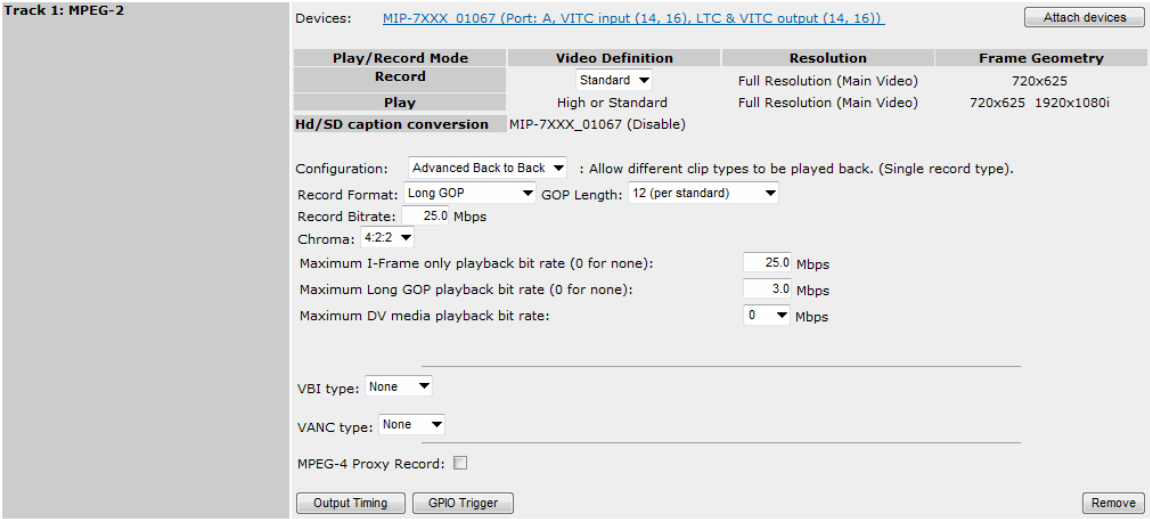


Figure 7-6: Creating an MPEG SD Player—Advanced Configuration

The encoded clip type is selected using the **Record Format** field, and the decoded clip types are selected using two **Playback Bitrate** fields; one for **I-Frame** only clips and one for **Long GOP** clips. With this configuration, you can play back clips that were encoded at different bitrates. However, by supporting different playback bitrates, the Player utilizes a larger IEEE 1394 bandwidth.

NOTE: The Advanced or Advanced Back to Back configuration page changes based on the selected Player Mode: If **Play and Record** is selected, both the **Record Bitrate** and **Playback Bitrate** fields appear. If **Record Only** is selected, only the **Record Bitrate** field appears. If **Play only** is selected, only the **Playback Bitrate** fields appear.

4. Depending on the configuration selected, proceed as follows:

- If you selected **Simple**, in the **Format** or **Record Format** and **Bitrate** fields, choose the required format and specify a bitrate for that format. Continue to step 6. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.

  NOTE: When Long GOP is selected as the record format, and the selected frame rate is 25Hz, the **GOP Length** drop-down menu appears. You may select a GOP length of 12 (recommended) or 15.When Long GOP is selected as the record format, you can select **Enable Open GOP** if you wish to record Open GOP.

- If you selected **Advanced** or **Advanced Back to Back**, your entries now depend on the Player mode:

  - **Play and Record** mode:

    - In the **Record Format** and **Bitrate** field choose the required format and specify a bitrate for that format.

      NOTE: When Long GOP is selected as the record format, and the selected frame rate is 25Hz, the **GOP Length** drop-down menu appears. You may select a GOP length of **12 (per standard)** or **15 (not recommended)**.When Long GOP is selected as the record format, if you wish to record Open GOP, you can select **Enable Open GOP**.

- In the **Maximum I-Frame only playback bitrate...** fields, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum Long GOP playback bitrate...** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum DV media playback Bitrate...** drop-down menu, choose the maximum bandwidth of DV type media you expect to play back. If using DV 25 or DVCPRO media only, choose **25 Mbps.** If using DVCPRO 50 media, choose **50 Mbps**.

◦ **Record Only** mode:

- In the **Record Format** and **Bitrate** fields, choose the required format and specify a bitrate for that format.

  NOTE: When Long GOP is selected as the record format, and the selected frame rate is 25Hz, the **GOP Length** drop-down menu appears. You may select a GOP length of **12 (per standard)** or **15 (not recommended)**.When Long GOP is selected as the record format, if you wish to record Open GOP, you can select **Enable Open GOP**.

◦ **Play only** mode:

- In the **Maximum I-Frame playback bitrate...** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum Long GOP Bitrate** field, enter the desired maximum decoding bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.
- In the **Maximum DV media playback Bitrate...** drop-down menu, choose the maximum bandwidth of DV type media you expect to play back. If using DV 25 or DVCPRO media only, choose **25 Mbps**. If using DVCPRO 50 media, choose 50 Mbps.

5. Select the required **Chroma** setting. Choose from **4:2:2** or **4:2:0**.
6. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. If you want to preserve or play back VBI data, from the **VBI Type** drop-down menu, select either **Internal** or **VBI File**.

   For some I/O modules, if the **Media Wrapper Format** is **MXF OP1a (Standard)** or **MXF OP1a (Standard, Low Latency)**, you may also select **SMPTE 436M Track**.

   NOTE: For clips created with non-Harmonic equipment, Harmonic recommends that you select **Internal**.

   If the player is configured to record, a series of eight drop-down boxes appears. Select the lines that you wish to record. A minimum of one must be selected, otherwise the Player cannot be activated.

   For some I/O modules, if you are also configuring VANC for SD video, note that the following selections reduce the number of available VBI lines:

   - If the player frame rate is 29.97 Hz, this reduces available VBI lines by one.
   - If VITC capture is selected from the Attach Devices page, this reduces available VBI lines by two.
   - Line 21 Closed Captioning reduces available VBI lines by one.

     Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

7. If you want to preserve or playback VANC data, select an option from the **VANC type** drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M Track**.

   IMPORTANT: Avoid selecting VANC for SD video without assistance from Harmonic technical support.

   NOTE: SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules for playout with SD material.

   In the **Maximum Number of VANC** data field, enter the desired bytes per frame value. For more information about VANC for SD video, contact Harmonic technical support.

   VANC capture adjustments (number of bytes) can be controlled for some I/O modules.

   NOTE: Depending on the attached I/O module, an option for **MPEG-1 Proxy Record** (for 'Record Only' or 'Play and Record' players) may be available.

8. As required, add an additional video track of the same or different format.
9. Continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks
About recording proxies with the MediaPort 5000 series
Recording proxies with the Spectrum X or the MediaPort 7000 series
About VANC implementation in Spectrum

Creating an MPEG HD Play only Player

You can add an MPEG video track (with selectable bitrates) to a Player for HD output.

1. From the **Edit Player** page, click **MPEG-2** to add an MPEG video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support MPEG HD, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."

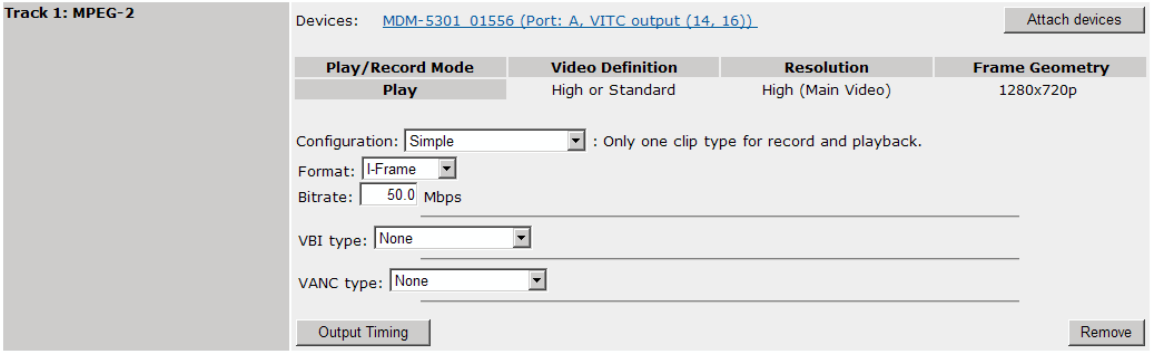


Figure 7-7: MPEG HD Play only player

3. If you want to preserve or play back VBI data, select an option from the **VBI Type** drop-down menu: **Internal**, **VBI File**, or **SMPTE 436M Track** (options will vary based on wrapper format).

NOTE: For clips created with non-Harmonic equipment, Harmonic recommends that you select **Internal** or **SMPTE 436M** Track. SMPTE 436M is only available for MXF clips, and is only supported some I/O modules with playout.

4. If you want to preserve or playback VANC data, select an option from the VANC Type drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M** Track.

   In the **Maximum number of VANC data** field, enter the desired bytes per frame value. VANC capture adjustments (number of bytes) can be controlled for some I/O modules.

5. If you wish to adjust Output Timing, click the **Output Timing** button.

6. As required, add an additional video track of the same or different format or: continue by adding an audio track.

Related information

Creating a player
Edit Player options
Configuring audio tracks
Adjusting output timing
About VANC implementation in Spectrum
Attaching devices and setting conversion options

Creating an MPEG HD Record only Player

You can add an MPEG video track to a Player for HD ingest.

1. From the **Edit Player** page, make sure the **Mode** is set to **Record Only**.

2. Click **MPEG-2** to add an MPEG video track to the Player.

3. From the **Record Format** drop-down box, select the media format to use. Choose between **I-Frame**, **Long GOP**, **IMX**, or a preset format. The following preset formats can be used to create clips, which can be edited by non-linear edit software on your own computer. Make sure to select the correct wrapper type required by your non-linear edit software.

   NOTE: When Long GOP is selected as the record format, you can select **Enable Open GOP** if you wish to record Open GOP.

   Preset formats include:

   HDV 720. This format automatically enters a bitrate of **19 Mbps** and a chroma of **4 2:0 .**

4. **XDCAM EX for NLE**. This format automatically enters a bitrate of **35** Mbps and a chroma of **42:0**.

5. **XDCAM HD for NLE**.

   - If you have selected a frame rate of 25 or 29.97, then you can select between bitrates of **18**, **25**, **35**, or **50**. Bitrates of 18, 25, and 35 enter a chroma of **4:2:0**. Bitrate of 50 enters a chroma of 4:2:2.
   - If you have selected a frame rate of 50 or 59.94, then this format automatically enters a bitrate of **50** and a chroma of **4:2:2**

     NOTE: The available formats vary depending on the selected Mode, Frame Rate, and Configuration.

6. Connect the track to the appropriate I/O module. To verify which I/O modules support MPEG HD record, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see “Attaching devices and setting conversion options.”

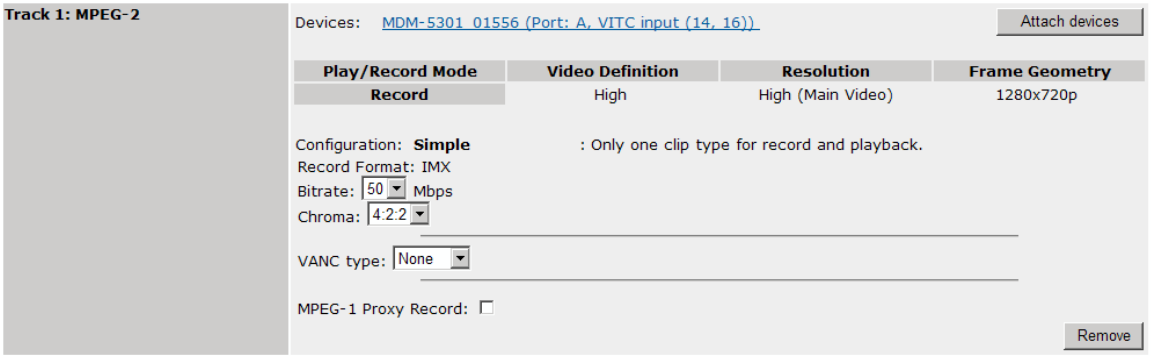


Figure 7-8: Creating an MPEG HD Record Only Player

7. In the Bitrate drop down box, specify the required bitrate.

   NOTE: The bitrate ranges/values listed for I-Frame, Long GOP, and IMX are those supported by a Spectrum system in general. A particular type of I/O module attached to a Spectrum video server may have stricter limits. Refer to *Spectrum Media and Wrapper Formats* for detailed information according to I/O module type.

8. Select the required **Chroma** setting. Choose from **4:2:2** or **4:2:0**. Depending on previous selections this value may be entered automatically.

9. If the video definition of the track is Standard or both High and Standard, the **VBI Type** drop-down menu will appear. If you want to preserve or play back VBI data, select an option from the **VBI Type** drop-down menu: **Internal**, **VBI Data**, or **SMPTE 436M Track** (options will vary based on wrapper format).

   NOTE: For clips created with non-Harmonic equipment, Harmonic recommends that you select **Internal** or **SMPTE 436M Track**.
   SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules.

   Using the eight drop-down VBI line selection boxes, select the lines that you wish to record. A minimum of one line must be selected.

   Note that the VBI line selection only affects recording. When clips are played back, all VBI lines that were previously recorded will be inserted into the outgoing signal.

10. If you want to preserve or playback VANC data, select an option from the **VANC Type** drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M Track**.

    NOTE: SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules.

    In the **Maximum number of VANC data** field, enter the desired bytes per frame value. VANC capture adjustments (number of bytes) can be controlled for some IO modules.

    NOTE: Depending on the attached I/O module, the option for **MPEG-1 Proxy Record** may be available.

11. As required, add an additional video track of the same or different format, or continue by adding an audio track. Refer to for instructions on selecting audio tracks.

Related information

Creating a player
Edit Player options
Recording proxies
Configuring audio tracks
Attaching devices and setting conversion options
About VANC implementation in Spectrum

Creating an MPEG SD Player to Demux Transport Streams and VBI Data

You can create an MPEG SD Player to demux transport streams and VBI data.

1. Follow the procedure to create an MPEG SD player.
2. As required, add a video track of a *different* format, or continue by adding an audio track. Note the following important points regarding audio tracks:
   - AES3 elementary streams must comply with SMPTE 302M (one Packetized Elementary Stream (PES) packet per frame, one 302 header per PES packet).
   - A maximum of two Program Identifiers (PIDs) containing 2, 4, or 8 channels per PID, with 1, 2, 4, or 8 channels per file are supported where the minimum channels per PID is greater than or equal to the number of channels per file.
   - There is no need to match the channel count of the Player and stream since record no longer terminates and black is inserted if the stream is absent.
3. Connect the tracks to the MediaPort 4010.

   Additional information about demuxing:

   - Only one program can be demuxed at one time.
   - If no **Program Selection** number has been assigned using the **Attach Devices** page of the SystemManager application, the first program found will be demuxed by the MediaPort 4010.
   - When configuring Record players to demultiplex ATSC streams using the MediaPort 4010, the player must be configured with the exact number of audio channels present in the feed. If the Demux player is configured for 4 channels of audio and only two channels are present, the stream will not be recorded.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating an MPEG HD Player to Demux Transport Streams

To create an MPEG HD Player to demux transport streams:

1. Follow the procedure to create an MPEG HD player.
2. As required, add a video track of a *different* format, or continue by adding an audio track. Note the following important points regarding audio tracks:

- AES3 elementary streams must comply with SMPTE 302M (one Packetized Elementary Stream (PES) packet per frame, one 302 header per PES packet).
- A maximum of two Program Identifiers (PIDs) containing 2, 4, or 8 channels per PID, with 1, 2, 4, or 8 channels per file are supported where the minimum channels per PID is greater than or equal to the number of channels per file.
- There is no need to match the channel count of the Player and stream since record no longer terminates and black is inserted if the stream is absent.

3. Connect the tracks to the MediaPort 4010.

   Additional information about demuxing

   - Only one program can be demuxed at one time.
   - If no **Program Selection** number has been assigned using the **Attach Devices** page of the SystemManager application, the first program found will be demuxed by the MediaPort 4010.
   - When configuring Record players to demultiplex ATSC streams using the MediaPort 4010, the player must be configured with the exact number of audio channels present in the feed. If the Demux player is configured for 4 channels of audio and only 2 channels are present, the stream will not be recorded.

Related information

Creating a player
Edit Player options
Configuring audio tracks
Attaching devices and setting conversion options

Creating an Uncompressed (SD only) player

You can add an Uncompressed (SD only) video track to a player.

1. From the **Edit Player** page, click **Uncompressed (SD only)** to add a 10-bit SDI video track to the Player. This media type does not include embedded audio.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support Uncompressed SD, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see “Attaching devices and setting conversion options.”
3. As required, click **Uncompressed (SD only)** again to add more Uncompressed (SD only) tracks to the Player.
4. If you added a video track by mistake, click the **Remove** button adjacent to the track.
5. As required, add a video track of a different format, or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Configuring audio tracks
Attaching devices and setting conversion options

About Recording and Playing Back XDCAM HD Clips

You can record XDCAM HD compatible clips by setting up an external encoder and recording ASI using a MediaPort 4010, or by using the Spectrum X, MediaPort 7300 or 5320 series.

These MediaPorts have a multi-rate MPEG-2 HD encoder that can encode video at the following ranges: I-frame 50-100 Mbps and Long GOP 18-85 Mbps. They can support either the 4:2:0 (main) or 4:2:2 (studio) compression profiles. Each Spectrum X SDI I/O card, MediaPort 7300 series module and MediaPort 5321 has two HD inputs and the MediaPort 5322 has four.

Using the SystemManager application, you can set up a player that will record at the XDCAM HD operating points with 1440 sampling, if desired.

Creating an XDCAM HD or XDCAM EX Player

You can create an XDCAM HD or XDCAM EX player, which is compliant with several non-linear editors, including Final Cut Pro,

1. From the **Edit Player** page, make sure the **Mode** is set to either **Record Only** or **Play or Record**.
2. Click **MPEG-2** to add an MPEG video track to the Player.
3. From the **Record Format** drop-down box, select the media format to use. Choose between **XDCAM HD for NLE**, or **XDCAM EX for NLE**. The following preset formats can be used to create clips, which can be edited by non-linear edit software on your own computer. Make sure to select the correct wrapper type required by your non-linear edit software.
   - **XDCAM EX for NLE**: This format automatically enters a bitrate of **35** Mbps and a chroma of **4:2:0**.
   - **XDCAM HD for NLE**:
     - If you have selected a frame rate of 25 or 29.97, then you can select between bitrates of 18, 25, 35, or 50. Bitrates of 18, 25, and 35 enter a chroma of 4:2:0. Bitrate of 50 enters a chroma of 4:2:2.
     - If you have selected a frame rate of 50 or 59.94, then this format automatically enters a bitrate of 50 and a chroma of 4:2:2.

   NOTE: The available formats vary depending on the selected Mode, Frame Rate, and Configuration.
4. Connect the track to the appropriate I/O module. To verify which I/O modules support XDCAM HD or XDCAM EX, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."

   NOTE: For the MediaPort 5320 series, make sure that, in the **Video Definition** drop-down menu, **High** is selected.
5. In the **Configuration** drop-down menu, select either **Simple**, **Advanced**, or **Advanced Back to Back**.

   NOTE: To play Final Cut Pro-exported XDCAM-HD 422 50 Mb clips and record clips editable by Final Cut Pro, Harmonic recommends that you create two separate players using the Simple configuration: one player for record set at 50 Mbps, and another player for play out, with the bit rate set high enough to account for any variances in the exported file (60 Mbps or above).

   - The **Simple** configuration allows you to design an MPEG Player that records and plays back only a *single type* of MPEG clip.

Clip type is selected using the **Format** or **Record Format** field. The bitrate for both the encoded and the decoded clip must be the same.

- Depending on the attached MediaPort, you may configure the Player as **Advanced** or **Advanced Back to Back**. An **Advanced** Player can switch between different types of clips, such as DV/DVCPRO and MPEG-2. To switch, you must first stop the Player, eject the clips from the timeline and then load the new format clips. An **Advanced Back to Back** Player can playback a mix of clip types without having to stop.

  The **Advanced** configuration allows you to design an MPEG Player that records and plays back *different types* of MPEG and DV clips.

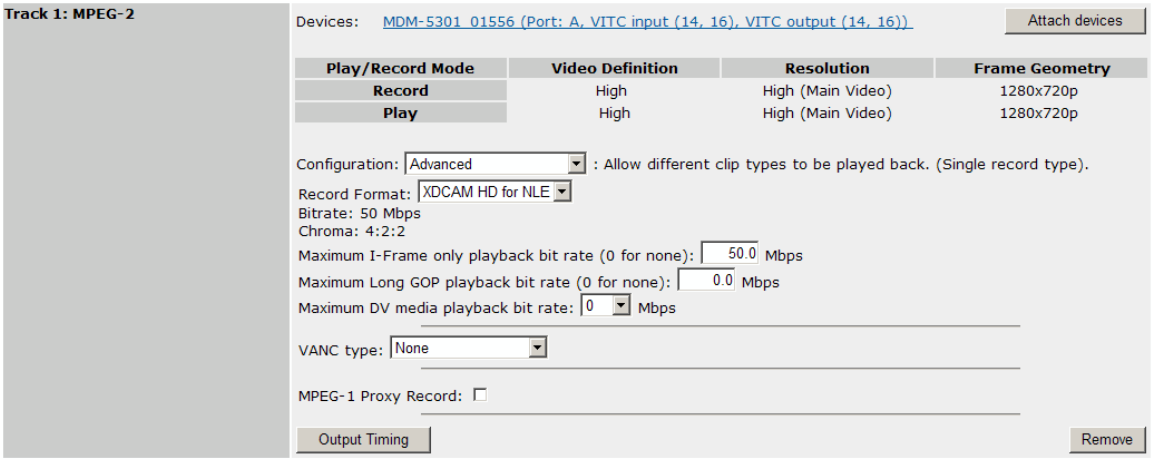


Figure 7-9: Creating an XDCAM HD Player—Advanced Configuration

The encoded clip type is selected using the **Format** or **Record Format** field, and the decoded clip types are selected using two **Playback Bitrate** fields; one for **I-Frame** only clips and one for **Long GOP** clips. With this configuration, you can play back clips that were encoded at different bitrates. However, by supporting different playback bitrates, the Player utilizes a larger IEEE 1394 bandwidth.

IMPORTANT: The available fields in the Advanced configuration change according to the selected Player mode: If “Play and Record” is selected, both the Record Bitrate and Playback Bitrate fields appear. If “Record Only” is selected, only the Record Bitrate field appears. If “Play Only” is selected, only the Playback Bitrate fields appear.

6. Depending on the configuration selected, proceed as follows:

   - If you selected **Simple**, enter a valid bit rate for the selected format. Note that your options may vary depending on previous selections. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*.
   - If you selected **Advanced** or **Advanced Back to Back**, your entries now depend on the Player mode:
     - **Play or Record** mode:
       - In the **Maximum I-Frame only playback bitrate...** field, leave the value as 0.
       - In the **Maximum Long GOP playback bitrate...** field, enter a valid bitrate. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.

    - In the **Maximum DV media playback Bitrate...** field, leave the value as **None**.
  - **Record Only** mode:
    - In the **Record Format** and **Bitrate** fields, make sure the required format and bitrate for that format is entered. See step 3.

7. If necessary, select the required **Chroma** setting. Choose from **4:2:2** or **4:2:0**. In most cases, this setting will be automatically entered.
8. If you want to preserve or playback VANC data, select an option from the VANC Type drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M** Track.

   NOTE: SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules.

   In the **Maximum number of VANC data** field, enter the desired bytes per frame value. VANC capture adjustments (number of bytes) can be controlled for some I/O modules.

   NOTE: Depending on the attached I/O module, an option for **MPEG-1 Proxy Record** (for 'Record Only' or 'Play and Record' players) may be available.
9. As required, add an additional video track of the same or different format.

   NOTE: Support is provided for Players which have two attached video tracks of the same format (MPEG 25 I-frame).
10. Continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks
About recording proxies with the MediaPort 5000 series
Recording proxies with the Spectrum X or the MediaPort 7000 series
About VANC implementation in Spectrum

Creating an XDCAM-HD RDD9 Player

You can create an RDD9 compliant XDCAM-HD player (inter-operable with Sony XDCAM-HD devices).

Note the following restrictions with XDCAM-HD RDD9 players.

- This player is only available in a simple configuration, meaning it will record and play back only a single type of MPEG-2 clip.
- This player type only allows one MPEG-2 video track. Once the MPEG-2 video track appears, buttons for all other video tracks are grayed out.
- The only available audio file type is .wav.
- Audio channels are recorded with 1 channel per file
- For record, you must have a minimum of 2 audio channels and a maximum of 16.
- If the bit rate for the video is 18, 25, or 35 Mbps, then the record sample size for the audio track is set to 16 bps. If the bit rate for the video is 50 Mbps, then the record sample size for the audio track is set to 24 bps.

1. From the **Edit Player** page, make sure the **Mode** is set to either **Record Only** or **Play or Record**.

2. From the **Media Wrapper Format** drop down menu, select one of the following:

   - **MXF OP1a (SMPTE RDD9)**
   - **MXF OP1A (Internal, early Sony style XDCAM-HD RDD9)**

   The first option, **MXF OP1a (SMPTE RDD9)**, will work with most editors. If you are using an editor, such as Edius, that requires the early Sony RDD9 format, then select **MXF OP1A (Internal, early Sony style XDCAM-HD RDD9)**. If you are unsure of which one to select, first try **MXF OP1a (SMPTE RDD9)** and, only if it does not work, then try **MXF OP1A (Internal, early Sony style XDCAM-HD RDD9)**.

   This automatically adds an MPEG-2 video track and a .wav audio track.

3. Connect the track to the appropriate I/O module. To verify which I/O modules support MPEG-2, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see “Attaching devices and setting conversion options.”

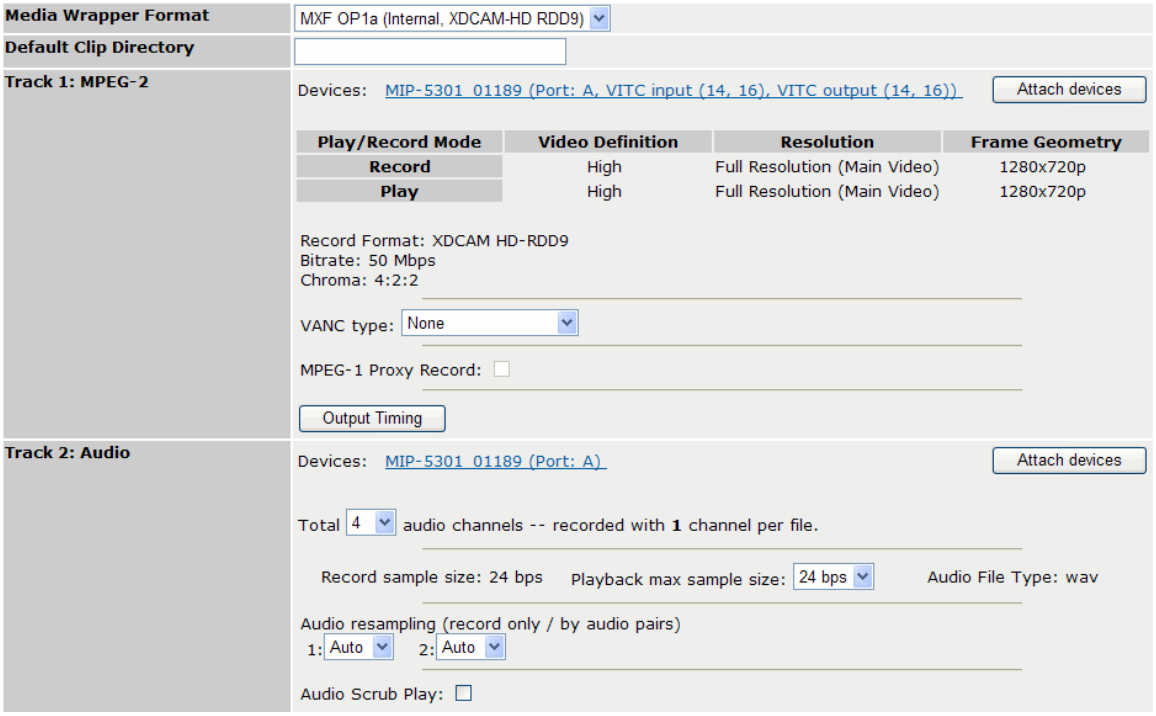


Figure 7-10: Creating an XDCAM-HD RDD9 player

NOTE: To play Final Cut Pro-exported XDCAM-HD 422 50 Mb clips and record clips editable by Final Cut Pro, Harmonic recommends that you create two separate players using the Simple configuration: one player for record set at 50 Mbps, and another player for play out, with the bit rate set high enough to account for any variances in the exported file (60 Mbps or above).

4. If it is not already specified, in the **Bitrate** drop down box, specify the required bitrate.

   The **Chroma** is determined automatically by the bit rate setting. A bit rate of 18, 25, and 35 Mbps results in chroma: 4:2:0. A bit rate of 50 Mbps results in chroma: 4:2:2.

5. If you want to preserve or playback VANC data, select an option from the **VANC Type** drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M** Track.

NOTE: SMPTE 436M is only available for MXF clips, and is only supported on some I/O modules with playout.

In the **Maximum number of VANC data** field, enter the desired bytes per frame value. VANC capture adjustments (number of bytes) can only be controlled for some I/O modules.

NOTE: Depending on the attached I/O module, an option for **MPEG-1 Proxy Record** (for 'Record Only' or 'Play and Record' players) may be available.

6. As required, add an additional audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks
About recording proxies with the MediaPort 5000 series
Recording proxies with the Spectrum X or the MediaPort 7000 series
About VANC implementation in Spectrum

Creating a DNxHD/VC-3 player

You can add a DNxHD/VC-3 video track to the Player.

1. From the **Edit Player** page, click **DNxHD/VC-3** to add a **DNxHD/VC-3** video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support VC-3, *Spectrum Media and Wrapper Formats* document. For details on attaching devices, see "Attaching devices and setting conversion options."
3. In the **Configuration** drop-down menu, select either **Simple** or **Advanced Back to Back**.
   - The **Simple** configuration allows you to design a Player that records or plays back only a *single type* of DNxHD/VC-3 clip.
   - An **Advanced Back to Back** player can switch between different types of clips, such as DNxHD/VC-3 and MPEG-2 without having to stop.

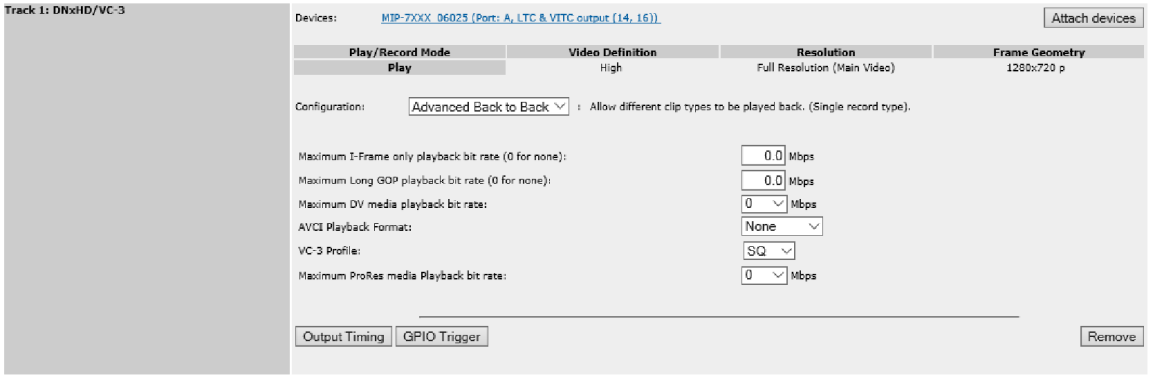


Figure 7-11: Creating a DNxHD/VC-3 Player—Advanced Configuration

The decoded clip types are selected using the **Playback bit rate** fields. With this configuration, you can play back clips that were encoded at different bitrates. However, by supporting different playback bitrates, the Player utilizes a larger IEEE 1394 bandwidth.

4. Select the **VC-3 profile** from the drop-down menu. Choose from:
   - **LB**: Low bandwidth. This option only appears if the frame raate is 50 or 59.94 and the video definition is 3G.
   - **SQ**: Standard quality.
   - **HQ**: High quality.
   - **HQX**: High quality extended.
5. If you selected **Simple** from the **Configuration** drop-down menu, continue to the next step.

   If you selected **Advanced Back to Back** from the **Configuration** drop-down menu, enter the valid bit rates for the selected format. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates lower than the entered value can also be played.

   If the **VC-3 media playback** field is available for the I/O module, the bit rate will be entered automatically depending on the player frame rate:
   - For NTSC frame rates (59.94Hz or 29.97Hz), the bit rate will be 145 Mbps.
   - For PAL frame rates (50Hz or 25Hz), the bit rates will be 120 Mbps.
6. As required, click **DNxHD/VC-3** again to add more DNxHD/VC-3 tracks to the Player. If you added a video track by mistake, click the **Remove** button adjacent to the track.
7. As required, add a video track of a different format, or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating a Data Player (DVB/ASI)

You can add a Data track to the Player, for use in DVB/ASI applications.

1. From the **Edit player** page, click **Data** to add a data track to the Player.
2. Connect the track to the MediaPort 4010 for recording and playing.
3. Enter a bitrate value in the **Maximum Bitrate** field. The valid bitrate field is 2 -100.0 Mbps.
4. If you added a track by mistake, click the **Remove** button adjacent to the track.

   NOTE: Audio tracks should not be added to a Data Player.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options

Creating an AVC I-frame Player

You can add an AVC I-frame video track to the Player.

1. From the **Edit Player** page, click **AVC-Intra** to add an **AVC I-frame** video track to the Player.

2. Connect the track to the appropriate I/O module by clicking **Attach Devices**. To verify which I/O modules support AVC I-frame, see *Spectrum Media and Wrapper Formats*. For details on attaching devices, see “Attaching devices and setting conversion options.”

   NOTE: To play out 3G on the Spectrum X, you must select 1080p/50 for the Primary/ Secondary Output Video Format on the Attach Devices page.

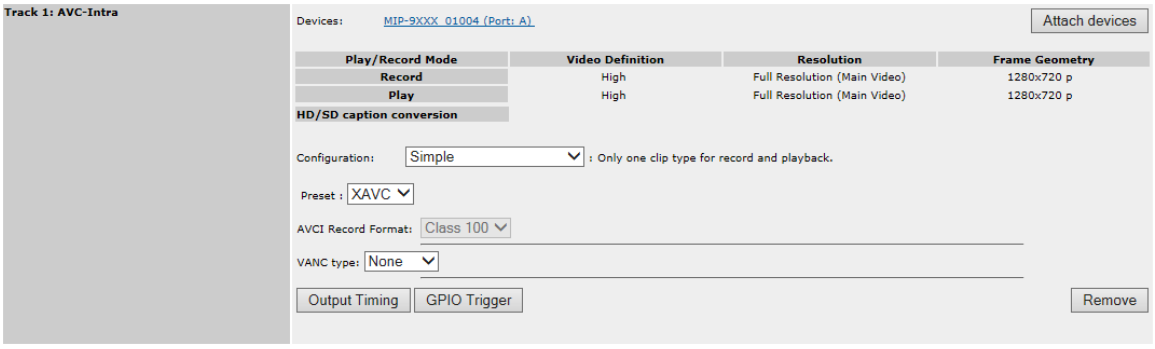


   Figure 7-12: Creating an AVC I-frame player

3. For Record or Play and Record players at 50 or 59.94 Hz, select the Record Video Definition: **High** or **3G**.

4. Depending on the player mode, the **Configuration** field may appear. Select **Simple** to allow only one clip type for record and playback. Select **Advanced Back to Back** to allow different clip types to be played back. Note this setting only allows one clip type for record.

5. In the **Preset** field, you may select the following options: **XAVC**, **AVCU**, or **AVC**.

   NOTE: For the MediaPort 7000 series, you may create a player for playout of the XAVC media format, which is supported with the AVCI-PLAY license and Spectrum 7.7 or later.

6. In the **AVCI Record Format** field, select either **Class 50** or **Class 100** as required.

7. If you want to preserve or playback VANC data, select an option from the **VANC Type** drop-down menu. Depending on your wrapper format, you may select **Internal** or **SMPTE 436M Track**. If you select an option for VANC, enter a value for the number of bytes of VANC data per frame to be preserved.

   NOTE: Depending on the properties of the attached I/O module, the option for **MPEG-1 Proxy Record** may be available.

8. If you have attached a MediaPort 7600 and have selected a **Frame Rate** of either 25 Hz or 29.97 Hz and a **Video Definition** of High, a **PsF video input** check box appears. Check this option if you wish to record progressive segmented frame content (1920x1080/25PsF or 1920x1080/29.97PsF).

   NOTE: With Spectrum 8.0 and later, the **PsF video input** option is not available.

9. For **Advanced Back to Back** players, select the play back bit rates:

   - Set the I-frame playback rate in the **Maximum I-Frame only playback bitrate...** field. For a description of valid bitrates for your device, refer to *Spectrum Media and Wrapper Formats*. For no I-frame playback, enter 0.
   - Set the Long GOP playback rate in the **Maximum Long GOP playback bitrate...** field. For a description of valid bitrates for your device, refer to *Spectrum Media and Wrapper Formats*. For no Long GOP playback, enter 0.

- Select the clip type from the **Maximum DV media playback Bitrate...** drop-down menu. If no DV media types are to be played back, select **None**. If using DV 25 or DVCPRO media only, select **25 Mbps**. If using DVCPRO 50 media, select **50 Mbps**
- Select the **AVCI Playback Format**: select either **Class 50** or **Class 100** as required.

  NOTE: For record AVC I-frame players that use an MXF wrapper type, you may select to record SPS (Sequence Parameter Set) and PPS (Picture Parameters Set) data in each frame. To do this, you must select **Record SPS/PPS in every frame of AVCI clips that use MXF wrapper** on the Properties page for the connected Spectrum server.

10. As required, add a video track of a different format, or continue by adding an audio track.

Related information

Creating a player
Attaching devices and setting conversion options
Attaching devices and setting conversion options
Configuring audio tracks
About VANC implementation in Spectrum
About recording proxies with the MediaPort 5000 series
Recording proxies with the Spectrum X or the MediaPort 7000 series

Creating an AVC I-frame only UHD player

UHD playout and record is supported on the Spectrum X for AVC I-frame only players with the MXF OP1a wrapper.

Before you begin

For the I/O module that will be attached to this player, make sure:

- The video and audio I/O is connected as described in the "Spectrum X SDI I/O connectors: UHD channel" section of the *Spectrum X Quick Reference Guide*.
- The **Channel Configuration** option on the I/O Module Properties page is set to **Ultra**.

NOTE: For UHD Record players, Harmonic only supports encode of the UHD format. This means the input must be a UHD raster.

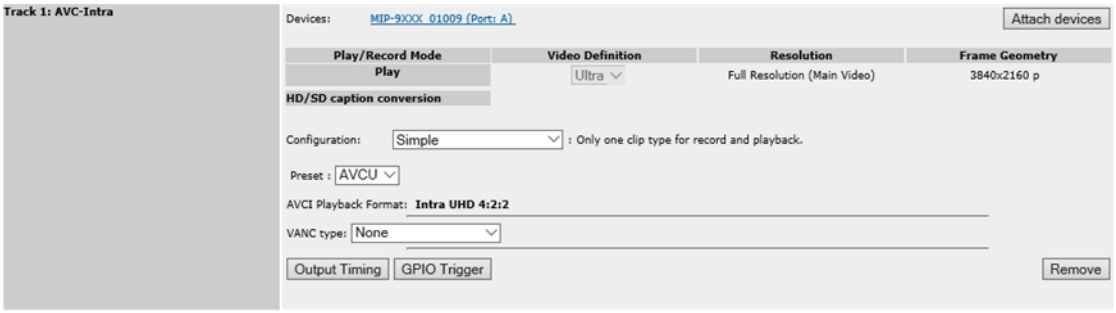
1. From the **Edit Player** page, for **Frame Rate**, select either **50 or 25** or **59.94 or 29.97**.
2. For **Player Type**, select **Branded**, **Record**, or **Hybrid**.
3. Configure **EE Mode** as follows:.
   - For Play only players, **EE Mode** is set to **Never** by default.
   - For Record only players, for optimal performance, Harmonic recommends that you set the player to **Normal**.
   - For Play and Record players, Harmonic recommends that you set the player to **Never**.
4. For **Media Wrapper Format**, select **MXF OP1a (Standard)**.
5. Click **AVC-Intra** to add an **AVC I-frame** video track to the Player.
6. In the AVC-Intra track section, select **AVCU** or **XAVC** for the **Preset**. The **AVCU** preset is not available for Record players.

7. For the **AVCI Playback Format** drop-down menu:
   - If you selected the **XAVC** preset, select **Intra 4:2:2**.
   - If you selected the **AVCU** preset, select **Intra UHD 4:2:2**.
8. Connect the track to the appropriate I/O module by clicking **Attach Devices**. For details, see "Attaching devices and setting conversion options."
9. On the **Attach Devices** page, in the **Primary Output Video Format** column, select either **Interleaved** or **square division** depending on the requirements of your downstream equipment.
10. As required, add a video track of a different format, or continue by adding an audio track.

Result:

The following shows a sample AVC I-frame track configured for UHD.

Figure 7-13: AVC I-frame UHD track



Related information

About UHD Channel mode
Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks
About VANC implementation in Spectrum

Creating an AVC-Long GOP player

You can add an AVC-Long GOP video track to the Player. Use this track type for AVC-Long GOP material or when playing PitchBlue® AVC clips.

IMPORTANT: Spectrum ChannelPort supports playout of AVC at PitchBlue operating points and AVC I-frame operating points only. Attempting to play other AVC clips may result in a failure to play.

NOTE: If you are configuring an AVC player to play PitchBlue AVC clips, you must use an NTSC frame rate (59.94Hz or 29.97Hz).

1. From the **Edit Player** page, click **AVC-Lgop** to add an AVC Long GOP video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support AVC-Long GOP, see *Spectrum Media and Wrapper Formats*. For details on attaching devices, see "Attaching devices and setting conversion options."

NOTE: To play out 3G on the Spectrum X, you must select 1080p/50 for the Primary/ Secondary Output Video Format on the Attach Devices page.

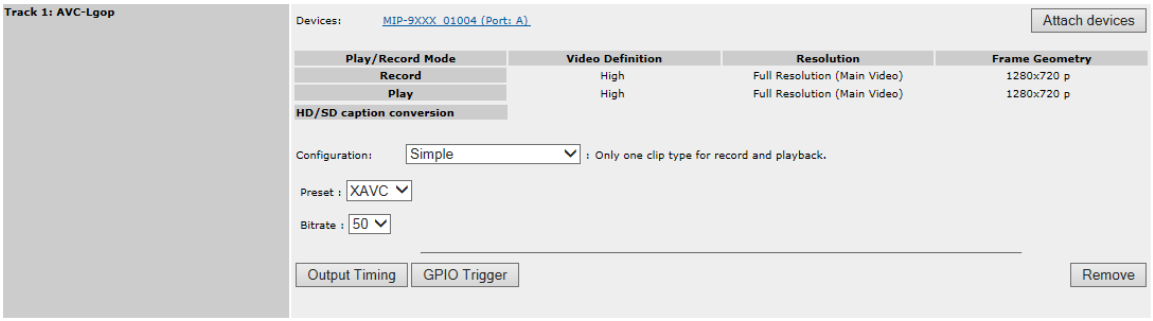


Figure 7-14: Creating an AVC-Long GOP player

3. Depending on the player mode, the **Configuration** field may appear. Select **Simple** to allow only one clip type for record and playback. Select **Advanced Back to Back** to allow different clip types to be played back. Note this setting only allows one clip type for record.
4. For Record or Play and Record players, under **Video Definition**, select **Standard** or **High**. The options will vary depending on the player frame rate.

   NOTE: Spectrum does not support 3G AVC Long GOP record at this time.

5. In the **Preset** field, you may select the following options: **XAVC**, **AVCU**, or **AVC**.
   - For the **AVCU** preset, select from **ClassG12**, **ClassG25**, or **ClassG50** . The options will vary depending on the video definition.
   - For the **XAVC** and **AVC** presets, select the desired **Bitrate** and **Sampling** options from the respective menus.
6. If you want to preserve or playback VANC data, select an option from the **VANC Type** drop-down menu. With the MXF OP1a (Standard) wrapper type, you may select **None** or **SMPTE 436M Track**. If you select an option for VANC, enter a value for the number of bytes of VANC data per frame to be preserved.
7. For **Advanced Back to Back** players, select the play back bit rates:
   - Set the I-frame playback rate in the **Maximum I-Frame only playback bitrate...** field. For a description of valid bitrates for your device, refer to *Spectrum Media and Wrapper Formats*. For no I-frame playback, enter 0.
   - Set the Long GOP playback rate in the **Maximum Long GOP playback bitrate...** field. For a description of valid bitrates for your device, refer to *Spectrum Media and Wrapper Formats*. For no Long GOP playback, enter 0.
   - Select the clip type from the **Maximum DV media playback Bitrate...** drop-down menu. If no DV media types are to be played back, select **None**. If using DV 25 or DVCPRO media only, select **25 Mbps**. If using DVCPRO 50 media, select **50 Mbps**
   - Select the **AVCI Playback Format**: select either **Class 50** or **Class 100** as required.
8. As required, add a video track of a different format, or continue by adding an audio track.

Related information

Creating a player

Edit Player options

Attaching devices and setting conversion options
Configuring audio tracks
About VANC implementation in Spectrum

Creating a ProRes Player

You can add a ProRes video track to the Player.

1. From the **Edit Player** page, click **ProRes** to add a **ProRes** video track to the Player.
2. Connect the track to the appropriate I/O module. To verify which I/O modules support ProRes, see *Spectrum Media and Wrapper Formats*. For details on attaching devices, see “Attaching devices and setting conversion options.”
3. In the **Configuration** drop-down menu, select either **Simple** or **Advanced Back to Back**.
   - The **Simple** configuration allows you to design a Player that plays back only a *single type* of ProRes clip.
   - An **Advanced Back to Back** player can switch between different types of clips, such as ProRes and MPEG-2 without having to stop.

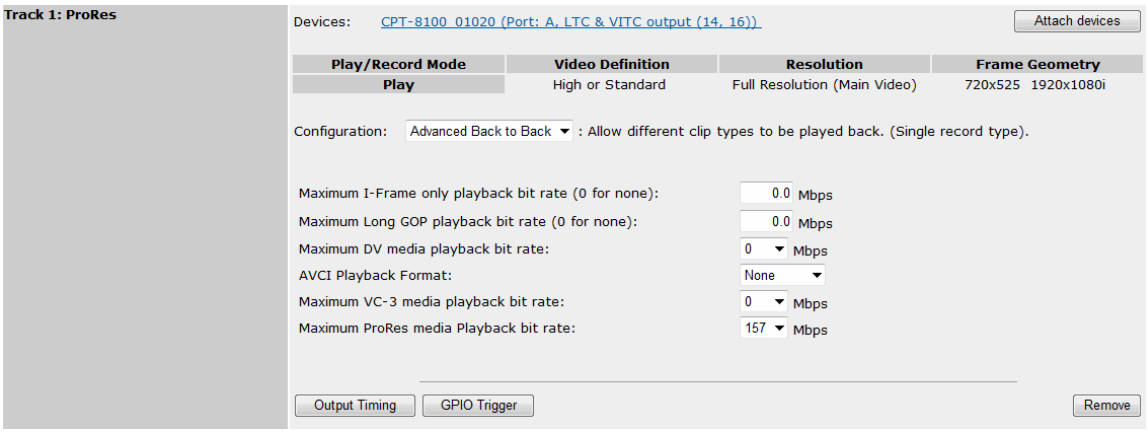


Figure 7-15: Creating a ProRes Player—Advanced Configuration

The decoded clip types are selected using the **Playback bit rate** fields. With this configuration, you can play back clips that were encoded at different bitrates. However, by supporting different playback bitrates, the Player utilizes a larger IEEE 1394 bandwidth.

4. Depending on the configuration selected, proceed as follows:
5. If you selected **Simple**, continue to the next step.

   If you selected **Advanced Back to Back**, enter a valid bit rate for the selected format. For a description of valid bitrates for your I/O module, refer to *Spectrum Media and Wrapper Formats*. Clips with bitrates below the entered value can also be played.

   For **Maximum ProRes media Playback bit rate**, the bit rate will be entered automatically depending on the player frame rate:

   - For NTSC frame rates (59.94Hz or 29.97Hz), the bit rate will be 157 Mbps.
   - For PAL frame rates (50Hz or 25Hz), the bit rates will be 122 Mbps.
6. As required, click **ProRes** again to add more ProRes tracks to the Player. If you added a video track by mistake, click the **Remove** button adjacent to the track.

7. As required, add a video track of a different format, or continue by adding an audio track.

Related information

Creating a player
Edit Player options
Attaching devices and setting conversion options
Configuring audio tracks

Creating a Compressed Stream Player

With Spectrum 8.3 and later, you can configure a Compressed Stream Player to record a selected program from a network transport stream, wrapped as .MXF or .MXF low latency to the Spectrum file system.

Before you begin

Follow the first four procedures described in *Configuring transport stream ingest*.

Note the following points about compressed stream players:

- Compressed stream players are supported only on Spectrum X in internal storage mode.
- A compressed stream player records directly to the video server and is not attached to an I/O module.
- Spectrum decodes MPEG or AAC compressed audio to PCM audio.
- Spectrum will rewrap ARIB captions or metadata if present in the program source

1. Create a player as described in the first three steps of "Creating a player." From the **Edit Player** page, click **Compressed Stream Player**. Note that the **Add Track** buttons will be grayed out as well as some player options.
2. Scroll to the bottom of the list of player options, and verify that the **Required Licensed Features** field shows **FW-MIP-9000-TS-INGEST**, and that **Current Available Licenses** shows at least 1. If this license is not available, contact your Harmonic representative to acquire a license.
3. For the **Default Clip Directory**, either leave empty to ingest to clip.dir or enter a directory on the Spectrum file system to be used for transport stream ingest.

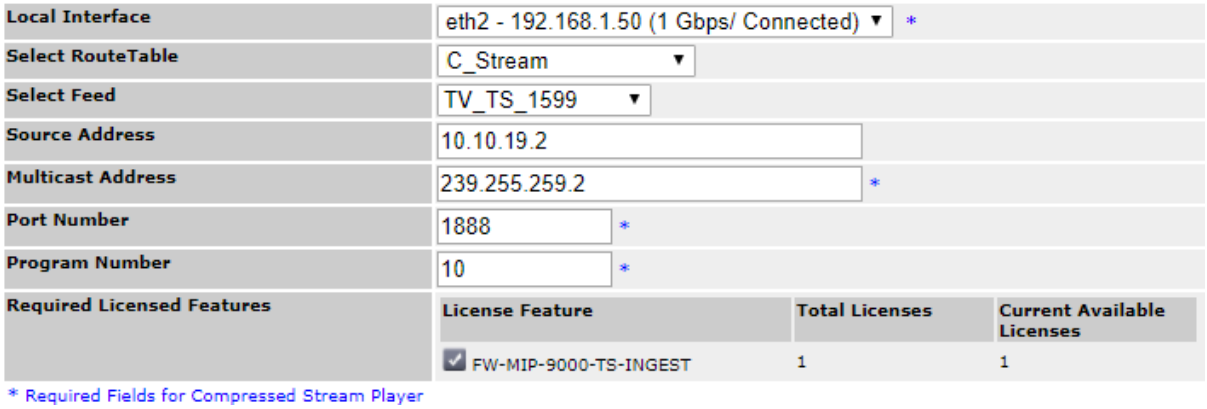
   Note that the directory must be created prior to configuring the player, and the full path name must be used (for example, /fs0/mydirectory) in the Default Clip Directory field. To create directories on the Spectrum video server file system, ensure that you have first mapped the file system to a network drive. Once this is done, directories can be created in the normal way. The Spectrum video server expects directory names to be separated using forward slashes (‘/’,) not backward slashes as used within Microsoft Windows.

   NOTE: If you have a configured a Watch Folder on your system, do *not* specify that folder for your Default Clip Directory.

4. Edit the following player options that relate to transport stream ingest:

Local Interface	Select the Ethernet interface that you want to use for the transport stream player. Use only **eth2**, **eth3**, **eth4**, and **eth5** on the Spectrum X. Interfaces that are not connected or configured will be not be selectable in this menu.
Select RouteTable	If you have configured a RouteTable for your transport stream ingest, select it from the drop-down menu.

Select Feed	If you have selected a RouteTable, select a feed specified in your RouteTable from the drop-down menu. **NOTE:** Selecting a RouteTable feed will automatically populate the remaining transport stream fields with the parameters specified in the RouteTable. Changing the settings after selecting a feed does not automatically change the RouteTable settings. You can only modify RouteTables from the RouteTable configuration page.
Source Address	(Optional) If the IP address for the source transport stream is available, enter that IP address. If not, leave this field empty.
Multicast Address	Enter the Multicast address for the transport stream.
Port Number	Enter the port number for the transport stream.
Program Number	Enter the program number (not PID) for the player. This identifies the program within the compressed stream.



5. Activate and enable the player by clicking **Activate** and **Enable**.

Related information

Configuring transport stream ingest

Configuring subtitle insertion

If you have purchased a license for onboard subtitle insertion and configured a player for 25 or 50 Hz frame rate, Spectrum allows you to insert and configure subtitle information for that player.

Spectrum supports the following file types for subtitle or teletext: STL, PAC, and 890.

In order to use subtitle insertion, make sure to follow the procedures in this section:

1. Create a subtitle directory in the clip.dir folder on your video server that you can use to copy subtitle files to your system.
2. Verify that the filetypes.conf file on your video server supports subtitles..
3. Configure subtitle insertion from the **Edit Player** page.

Related information

Creating the subtitles directory on the video server
Verifying that filetypes.conf supports subtitle/open/closed caption insertion
Configuring subtitle insertion from the Edit Player page

Creating the subtitles directory on the video server

By default, Spectrum looks for subtitle files in clip.dir/subtitle.dir on the video server file system. This folder is not created automatically.

1. From SystemManager, click the **Disk Utilities** icon in the left-hand column to open the **Disk Utilities** page.
2. From the **Disk Utilities** page, click the hyperlink for your video server to open the corresponding Disk Utilities page.
3. In the **Logical View** area, click **Explore Filesystem file://**...

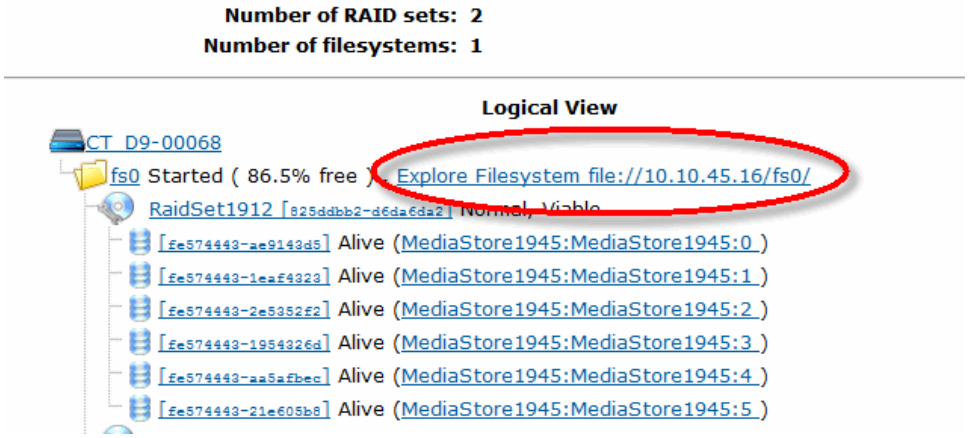


Figure 7-16: File System, Logical View

4. When prompted, enter the user name and password for your video server file system. The root directory of the video server file system will appear in a new Explorer window.

   Note that if the root directory does not appear or a message appears indicating the browser is unable to connect, you may need to add the IP address of your SystemManager to the list of trusted sites in Internet Explorer.

   a. From Internet Explorer, click **Tools** > **Internet Options** > **Security** > **Trusted Sites** > **Sites** to open the **Trusted sites** dialog box.
   b. In the **Add this website to the zone** field, enter your SystemManager IP address (preceded by “http://”), and then click **Add.**
   c. Click **Close** and then click **OK**. Retry the Explore Filesystem link.

5. Using Windows Explorer, create a new folder named **subtitle.dir** in the clip.dir directory on the file system.

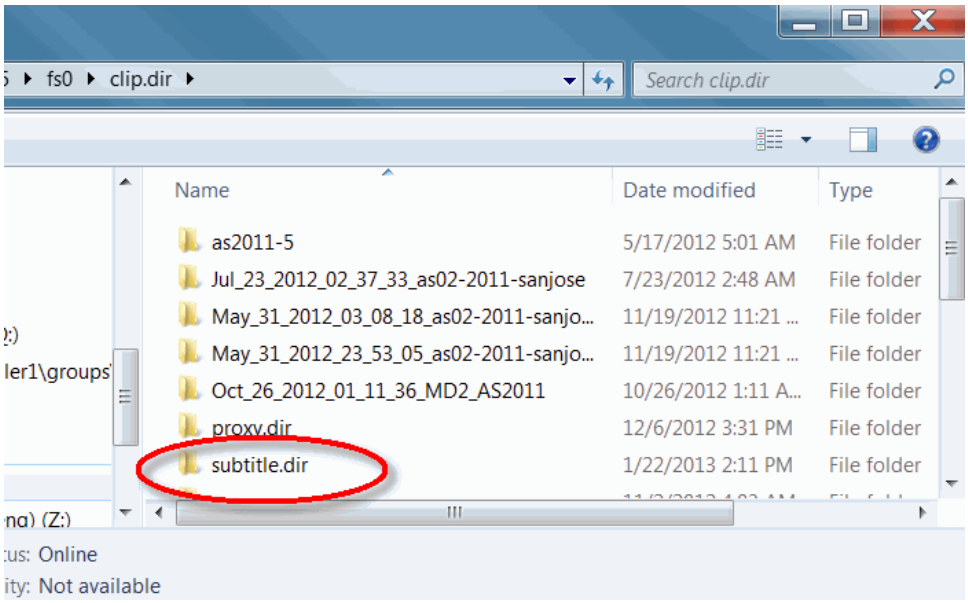


Figure 7-17: Creating subtitle.dir

Verifying that filetypes.conf supports subtitle/open/closed caption insertion

Before copying any subtitle or open or closed caption files to the subtitle directory on video server, check that they are supported.

To do so, make sure that the filetypes.conf configuration file on the video server includes the following line:

```
none /subtitle.dir/.*$
```

NOTE: For newer video servers, this line may already be present. For older video servers, you may need to add it. The previous version of this guide instructed that you set this line to “small.” Harmonic now recommends changing this line to “none” to reduce disk space used by subtitle files.

To modify the filetypes.conf file, navigate to the Properties page for your video server and, under Change Settings, click **Edit filetypes.conf**.

Configuring subtitle insertion from the Edit Player page

Configure subtitle insertion settings for a player.

1. Create a player, as described in “Creating a Player.”
2. From the **Edit Player** page, in the **Subtitle Handling** field, select **Onboard Subtitle Insertion**. The **Configure Caption** button will be activated.
3. Click **Configure Captions** to open the Configure Captions page.
4. From the **HD Transmission mode** drop-down menu, select either **OP47** or **SMPTE2031**. This mode will apply to all streams and services that you configure on this page.
5. Click **Add Stream** to open the stream section of the page. You may add 8 streams per player.

6. In the stream section of the page, select the VBI lines that will be used for the down-converted output of the subtitle stream. Make sure to select enough VBI lines to accommodate the subtitle information.

   If you are unsure which VBI lines to select, start with 21. Adding one line for each service will likely provide enough bandwidth to support all of your subtitles. For example, if three services are added, then selecting VBI lines 20, 21, and 22 for both Field 1 and Field 2 will probably work.

7. If required by your system, you may select **Dummies** to insert “dummy” packets when subtitle information is not present in the stream.

   NOTE: The OP42 operating practice requires dummy packets. In this case, only VBI line 21 is allowed.

8. Click **Add Service** to add a subtitle service to the stream. You may add multiple services to a stream.

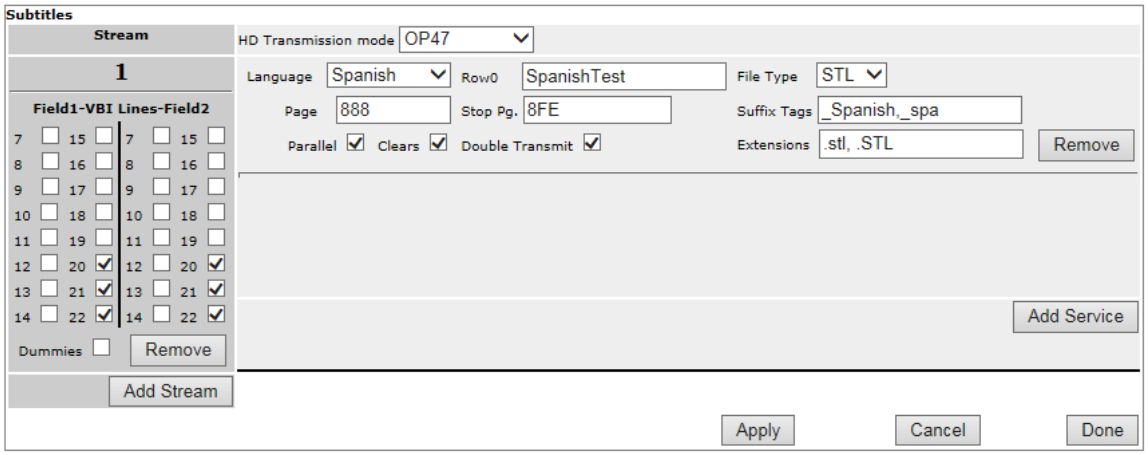


Figure 7-18: Configure Subtitles

9. Configure the service as follows:

Language	Select the desired language.
Row0	Type a label for this subtitle service. Note that this text will not be visible to a viewer watching the subtitles.
Page	Type the required page number based on your language selection. This will be a hexadecimal number between 100 and 8FF that corresponds to the Teletext page number. Note that page numbers are defined according to your region. Also note that OP42 requires subtitles to be on page 888. Other pages should only be used if you understand your particular system requirements.
Stop pg.	Type the page number used for the packets that terminate a subtitle submission. This will be a hexadecimal number between 00 and FF. The teletext specification reserves page FF for this purpose though some systems use different numbers.
File Type	Select the file type for this service. Select from the following: ◦ STL ◦ PAC ◦ 890

Suffix Tags	(Optional) If you wish to include suffix tags for this service, type them in this field. Suffixes may begin with any valid character or be empty (for example, .en,_en,,en) Note that two commas together may be used to indicate a blank tag.
Extensions	(Required) Type the extensions to be used for your subtitles. Extensions must begin with a period and be separated by commas (for example, .stl,.pac). **NOTE:** When searching for subtitle and teletext files, Spectrum will start with the first suffix tag listed and look for each extension in the order listed until it finds a matching file. For example, for the service shown in the preceding figure, if you have files named “Clip” Spectrum will locate them in the following order: Clip_Spanish.cap, Clip_Spanish.CAP, Clip_spa.cap, and Clip_spa.CAP.
Parallel	(Checked by default) Harmonic recommends that you leave this option selected. Make sure that your selection is the same for all services and streams. Note that this option may be required when using certain brands of downstream equipment, including TVLogic* monitors. **CAUTION:** Clearing this option causes the subtitles to be transmitted in Serial mode (one after the next) rather than in parallel. This may result in some subtitles not appearing at the correct time in relation to the video, and should only be cleared if you are sure that the target system requires magazine serial transmission.
Clears	If selected, a clear screen packet will be transmitted every 10 seconds to ensure subtitle text is automatically removed from the screen. This setting doesn't have effect if there is no file to insert, and subtitle data will be passed through.
Double Transmit	Select to transmit all caption packets twice, as required by the OP42(3.d) standard. Only leave this option clear if you are certain that your system does not require subtitle packets to be transmitted twice.
Remove	Click to remove a service.

10. Click **Apply** to apply the changes or click **Add Stream** to add another subtitle. If you wish to remove a stream, you may click the **Remove** button in the Stream section of the page.
11. When finished configuring, click **Done** to return to the **Edit Player** page.

Configuring closed caption insertion

If you have purchased a license for onboard closed caption insertion and configured a player for 29.97 or 59.94 Hz frame rate, Spectrum allows you to insert and configure closed caption information for that player.

Spectrum supports the following file types for captioning: Cheetah, NCI, and SCC.

In order to use closed caption insertion, make sure to follow the procedures in this section:

1. Create a subtitles directory in the clip.dir folder on your video server that you can use to copy caption files to your system.
2. Verify that the filetypes.conf file on your video server supports subtitles, and open or closed captions.
3. Configure closed caption insertion from the **Edit Player** page.

Related information

Creating the subtitles directory on the video server
Verifying that filetypes.conf supports subtitle/open/closed caption insertion
Configuring Closed Caption Insertion from the Edit Player page

Configuring Closed Caption Insertion from the Edit Player page

Configure closed caption insertion for a player.

1. Create a player, as described in “Creating a Player.”
2. From the **Edit Player** page, in the **Closed Caption Handling** field, select **Onboard Closed Caption Insertion**. The **Configure Captions** button will be activated.
3. Click **Configure Captions** to open the Configure Captions page.

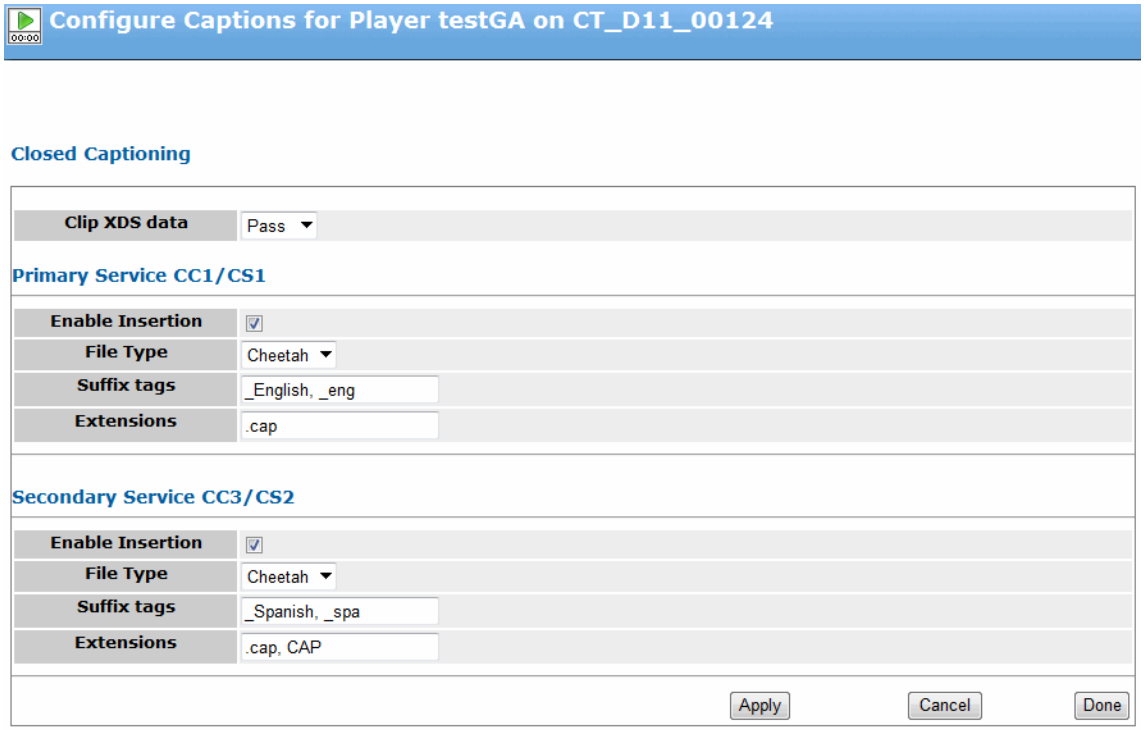


Figure 7-19: Configure Captions

4. Under “Closed Captioning, ” for **Clip XDS data**:
   - Select **Pass** to keep any extended data services (XDS) information in the clip (for example, rating or V-chip) and pass it through.
   - Select **Block** to block any XDS information in the clip.

5. Under “Primary Service CC1/CS1,” configure the service for Closed Caption Channel 1 (EIA-608) and DTV Caption Service 1 (EIA-708). Configure the following options:

   Enable Insertion — Select to enable the service to be inserted (overwriting existing services CC1 & CC2 for CC1 insertion and CC3 & CC4 for CC3 insertion).

   File Type — Select the file type for this service. Select from the following:

   - Cheetah
   - NCI
   - SCC

   NOTE: Both Cheetah and NCI files can use the .cap extension. If using .cap files, make sure to verify if they are Cheetah or NCI.

   Suffix tags — (Optional) If you wish to include suffix tags for this service, type them in this field. Suffixes may begin with any valid character or be empty (for example, .en,_en,,en) Note that two commas together may be used to indicate a blank tag.

   Extensions — (Required) Type the extensions to be used for your subtitles. Extensions must begin with a period and be separated by commas (for example, .cap,.scc)

   NOTE: When searching for caption files, Spectrum will start with the first suffix tag listed and look for each extension in the order listed until it finds a matching file. For example, for the Secondary Service shown in the preceding figure, if you have files named “Clip” Spectrum will locate them in the following order: Clip_Spanish.cap, Clip_Spanish.CAP, Clip_spa.cap, and Clip_spa.CAP.

6. Under “Secondary Service CC3/CS2,” configure the service for Closed Caption 3 (EIA-608) and DTV Caption Service 2 (EIA-708). Configure the options as described in the previous step.
7. Click **Apply** to apply the changes.
8. When finished configuring, click **Done** to return to the **Edit Player** page.

Configuring open caption insertion

Spectrum 7.6 and later supports onboard open caption insertion for a I/O module channel with the open caption license.

With this feature, you may insert and configure open caption information for a player of any frame rate attached to a licensed channel.

Spectrum supports the following file types for captioning: EBU-STL and Cavena 890.

1. Copy your open caption templates to the graphics directory on your Spectrum video server, /fs0/gfx.dir.
2. Create a player, as described in “Creating a Player.”
3. From the Edit Player page, in the **Open Caption Handling** field, select **Open Caption Insertion**. The **Configure Open Captions** button will be activated.

4. Click **Configure Open Captions**to open the Configure Open Captions page.

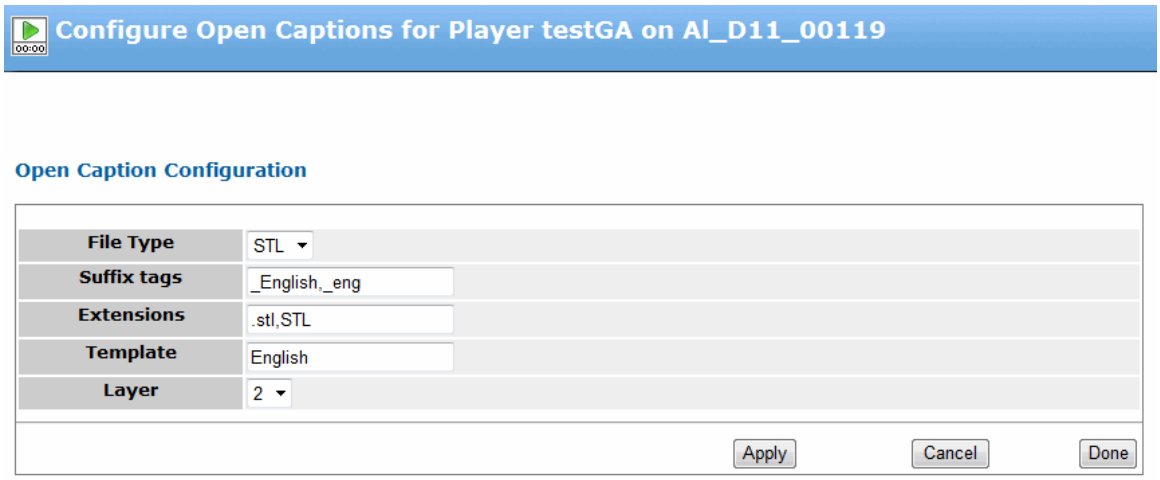


Figure 7-20: Configuring Open Captions

5. Under “Open Caption Configuration” configure as follows:

File Type — Select the file type for this service from the following options:

- **STL** (EBU-STL format)
- **890** (Cavena 890 format)

Suffix Tags — (Optional) If you wish to include suffix tags for this service, type them in this field. Suffixes may begin with any valid character or be empty (for example, .en,_en,,en) Note that two commas together may be used to indicate a blank tag.

Extensions — Type the extensions to be used for your subtitles. Extensions must begin with a period and be separated by commas (for example, .stl,.890).

NOTE: When searching for caption files, Spectrum will start with the first suffix tag listed and look for each extension in the order listed until it finds a matching file. For example, for the open caption in the preceding figure, if you have files named “Clip,” Spectrum will locate them in the following order: Clip_English.stl, Clip_English.STL, Clip_eng.stl, and Clip_eng.STL.

Template — Type the name of the template (including extension) in your graphics directory to be used for open captions.

Layer — Select the graphics layer to be used for the open captions template.

6. Click **Apply** to apply the changes.
7. When finished configuring, click **Done** to return to the **Edit Player** page

NOTE: Once a clip with open captions is playing, if you wish to stop the open captions from displaying without interrupting the playing clip, note that you must fade down the layer that contains the open caption template using either FXTool or the appropriate Oxtel command via automation.

Best practices for Spectrum Open Caption templates

Note the best practices for using Spectrum Open Caption templates.

Spectrum Open Caption templates are designed to be on the highest available graphics layer. Once an Open Caption template is configured on the top layer, it will persist and Open Captions will fade up or down as appropriate. If an Open Caption template is removed via Oxtel, Spectrum will re-load the template automatically.

The Player API does provide an extension to override a Spectrum Open Caption template. However, Harmonic does not recommending doing so at this time. If you need to override an Open Caption template, contact your Harmonic representative for assistance.

Recording proxies

A proxy is a low-resolution version of recorded video content. Some Spectrum I/O modules allow you to record proxies to your Spectrum system.

Recording proxies with the Spectrum X or the MediaPort 7000 series

The Spectrum X and the MediaPort 7000 series 7101, 7301, and 7601 allow you to record proxies to your Spectrum system.

For each Spectrum X or MediaPort module, you can have two channels configured to record proxies.

Once a player is configured to record proxies, when the player records, it will simultaneously write a proxy file to the **proxy.dir** directory located in the main clip directory on your file system, which is **clip.dir** by default. Proxy files will retain the same base name as the source clip and use the extension **.mxf** or **.mov** depending on your configuration.

1. Configure a **Record Only** player or **Play and Record** player (SD or HD).
2. Connect the track to the appropriate I/O module. For the Spectrum X this will be a MIP-91x1. For the MediaPort 7000 series, this can include MediaPorts 7601, 7301, or 7101.

   NOTE: When attaching the MediaPort, you may select either Channel A or Channel B as the Connection Port.

   A check box for **MPEG-4 Proxy Record** will appear as shown.

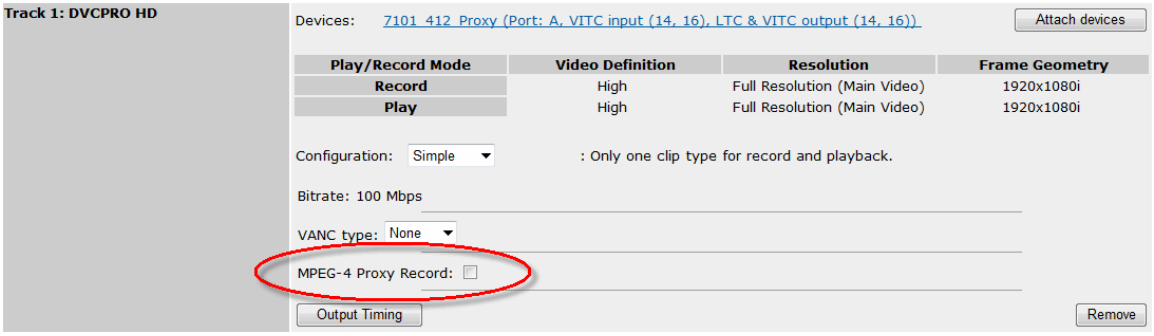


   Figure 7-21: MPEG-4 Proxy Record check box

3. Select the **MPEG-4 Proxy Record** check box. A separate track called **Proxy H.264** will appear.

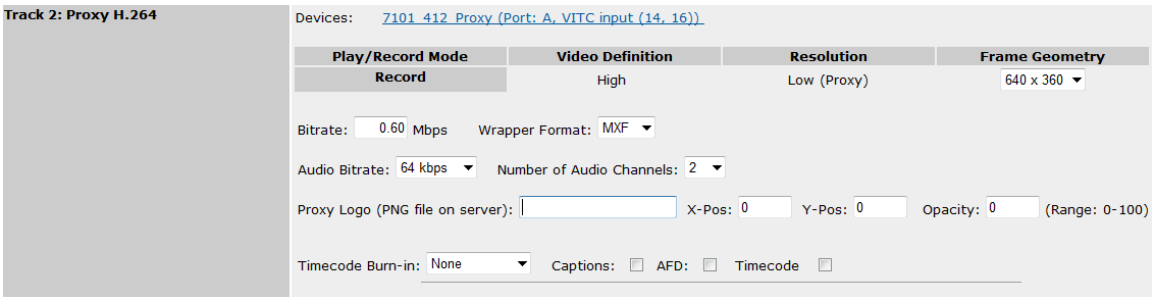


Figure 7-22: Proxy H.264 track

4. Configure the proxy track options as described in the "Proxy options" section.

About recording proxies with the MediaPort 5000 series

The 5320, 5220, and 5620 series MediaPorts and 5320 and 5220 series MediaDeck Modules allow you to record proxies to your Spectrum or MediaDeck system.

For each of the 5320, 5220, and 5620 series MediaPorts you can have two channels configured and enabled to record proxies.

In order to configure a player to record proxies, the attached MediaPort or MediaDeck Module must first be set for Proxy mode. Once the MediaPort or MediaDeck Module and attached player is configured to record proxies, when the player records, it will simultaneously write a proxy file to the **proxy.dir** directory located in the main clip directory, which is **clip.dir** by default. Proxy files will retain the same base name as the source clip and use the extension **.mpg**.

Note that in order to enable the proxy feature, any players configured for audio scrub must be deactivated due to bandwidth constraints. Perform the following procedures in the order listed below.

Configuring a MediaPort 5000 series to record proxies

Configure your I/O module to record proxies.

NOTE: Note this section applies only to the MediaPort 5320, 5220, and 5620 series.

1. From the **System Diagram** page, click the icon for the MediaPort or MediaDeck Module you will use to record proxies. Its **I/O Module Properties** page appears.
2. Under **General Information**, scroll to the **Proxy Record Mode versus Audio Scrub Play Mode** section.

   This section will show either **Proxy Record** mode enabled or **Audio Scrub** mode enabled. They cannot both be enabled at the same time. If the status under **After Next Reboot** and **After Last Reboot** shows **Proxy Record** then continue to the next section.

   If the status shows **Audio Scrub Play** then do the following:

   a. Click **Set Proxy Record Mode**. A warning message appears indicating that all players attached to this MediaPort which are configured for Scrub Audio must be deactivated before you record proxies, otherwise their performance will be affected. Click **OK**.
   b. If you have players that are configured for Audio Scrub, deactivate those players at this time.
   c. Restart the MediaPort or MediaDeck Module in order for the changes to take affect.

What to do next

Configuring a Player for a MediaPort 5000 Series to Record Proxies

Related information

Activating and deactivating players

Rebooting the I/O module

Configuring a Player for a MediaPort 5000 Series to Record Proxies

Configure a player to record proxies.

1. Configure an **MPEG Record Only** player or **Play and Record** player **(**SD or HD).
2. Connect the track to the appropriate MediaPort. The following MediaPorts 5xxx Series support proxies: MediaPort 5320, 5220, and 5620.

   NOTE: When attaching the MediaPort 5320, 5220, and 5620 you may select either Channel A or Channel B as the Connection Port.

3. Add an audio track. Once you have added an audio track, the check box for **MPEG-1 Proxy Record** will be enabled.

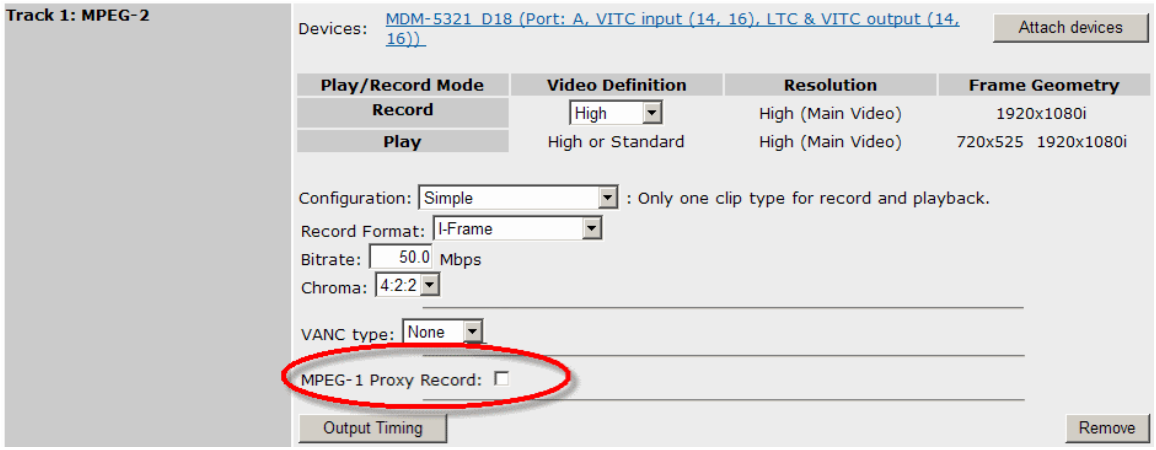


Figure 7-23: MPEG-1 Proxy Record check box

4. Select the **MPEG-1 Proxy Record** check box.

   An MPEG-1 track, identified as a **Low Resolution Proxy**, will appear below the audio track.

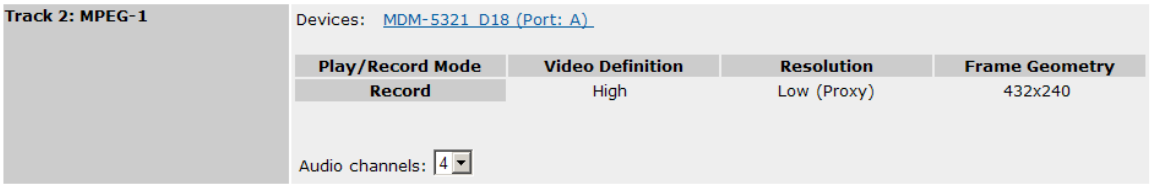


Figure 7-24: Low Resolution Proxy

   By default, the proxy track shows the same number of audio channels as the audio track for this player. This number can be changed but may not exceed 8 channels.

5. Activate the player.

When used to record, this player will simultaneously write a proxy file to the **proxy.dir** directory located in the main clip directory, which is **clip.dir** by default. Proxy files will retain the same base name as the source clip and use the extension **.mpg**.

Related information

Attaching devices and setting conversion options
Configuring audio tracks
Activating and deactivating players

Proxy options

When recording a proxy there are a number of configuration options available.

Video Definition column	Note that this value will reflect the Video Definition you have selected for the associated video track.
Frame Geometry	From the drop-down menu, select the frame geometry for the proxy. Note that the options will change depending on whether the player is configured for Standard, Enhanced, or Ultra High Definition, and depending on the selected frame rate of the player.
Bitrate	Enter the desired video bit rate for the proxy. Select from 0.6, 3.0, or 6.0 Mbps.
Wrapper Format	Select either MXF or MOV for the wrapper format.
Audio Bitrate	Select 64, 96, or 128 kbps for the audio bit rate.
Number of Audio Channels	Select the desired number of audio channels.
Proxy Logo	Enter the path of any logo you wish to appear on the proxy. Note that the logo must be a .PNG file and must reside on your Spectrum file system. • **X-Pos**: Enter a value for the horizontal placement of logo. The value will depend on the selected frame geometry. For example, if the frame geometry is 352 x 288, the X-Pos value will be between 0 and 352. • **Y-Pos**: Enter a value for the vertical placement of logo. The value will depend on the selected frame geometry. For example, if the frame geometry is 352 x 288, the Y-Pos value will be between 0 and 288. • **Opacity**: Enter a value for the desired percentage of opacity of the logo. **NOTE:** The **Proxy Logo** option is not available for the MIP-91x1.
Timecode Burn	Select an option for the placement of the timecode on the proxy. The default is none. The graphic in the following figure illustrates each of the options.

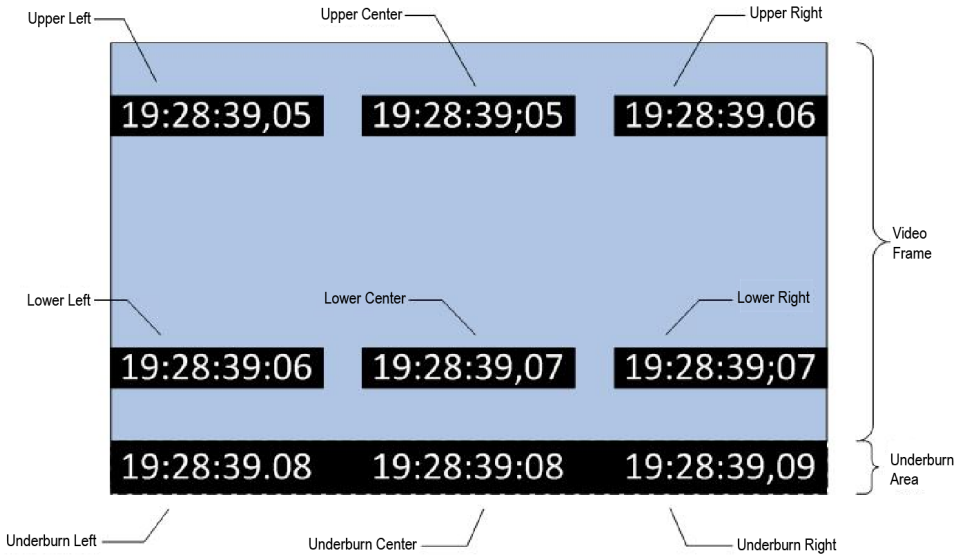


Figure 7-25: Timecode Burn locations

Captions

Select if you wish to embed closed caption information in the proxy.

NOTE: The **Captions** option is not available for the MIP-91x1.

AFD

Select if you wish to store Active Format Description (AFD) as ancillary data in the proxy.

NOTE: The **AFD** option is not available for the MIP-91x1.

Timecode

Select if you wish to embed the timecode in the proxy wrapper.

NOTE: The **Timecode** option is not available for the MIP-91x1.

IPV Compliant Proxy

Select if you wish to create a proxy track that can be used with IPV SpectreView*.

NOTE: The **IPV Compliant Proxy** option is not available for the MIP-91x1.

Enable Transfer to SpectreView

(Available if you have selected **IPV compliant Proxy**). Select if you wish to enable transfers to SpectreView. Once selected, additional fields for configuration with SpectreView appear. Configure them as follows:

- **Server IP**: Enter the IP address of the SpectreView Server.
- **Server port**: Enter the port number for the SpectreView server. Note that the default value of 8000 is the correct port number for connecting via Spectrum.
- **FTP User Name**: Enter the FTP user name required for transferring files with SpectreView.
- **FTP Password**: Enter the FTP password required for transferring files with SpectreView.
- **URL Path**: Enter the URL path for performing clip transfers into SpectreView.

- **Replace existing clip**: Select if you wish to overwrite any existing proxy file of the same name.
- **Create Daily Folder**: Select if you would like the IPV server to create a new subdirectory each day within the FTP destination folder, which will be named according to the month, day, and year.

  NOTE: Spectrum does not perform any checks to make sure file names are compliant with the IPV SpectreView server, and will not generate any errors or messages if you have specified a file name that is not compliant. For information on accepted file names, refer to the IPV SpectreView documentation.

Configuring audio tracks

Audio tracks can be added to any Player (except Data Players), in addition to the default “interleaved” audio tracks that are present only in DV, DVCPRO and DVCPRO 50 Players.

These tracks can be recorded in **.aiff** or **.wav** format. Note the following important points regarding interleaved audio:

- DV and DVCPRO video files (**.dv**) by default include two channels of interleaved audio.
- DVCPRO 50 video files (**.dv**) by default include four channels of interleaved audio.
- HDCAM (**.hdcam**) video files do not include interleaved audio.
- MPEG (**.mpg**) video files do not contain interleaved audio.

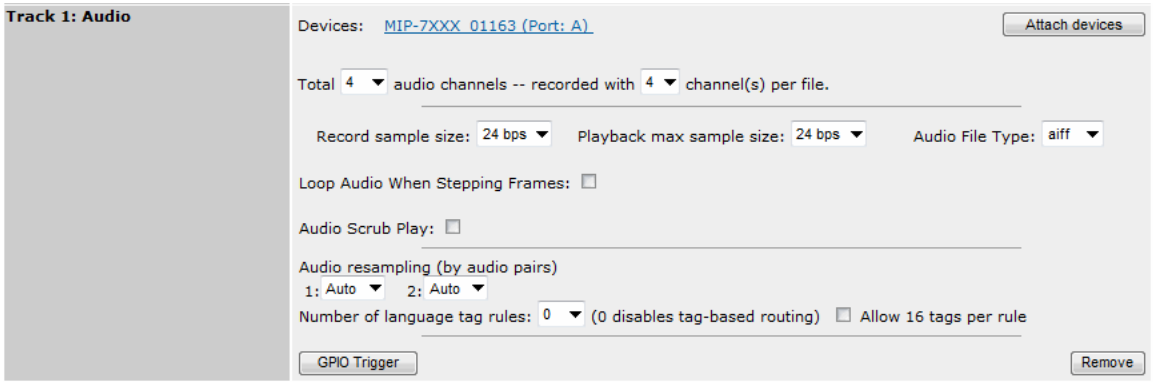


Figure 7-26: Adding a separate audio track

1. On the **Edit Player** page, click the **Audio** button to add an audio track.
2. Connect the Audio track to an I/O module.

   NOTE: When configuring Record players to demultiplex ATSC streams using the MediaPort 4010, the player must be configured with the exact number of audio channels present in the feed. If the Demux player is configured for 4 channels of audio and only 2 channels are present, the stream will not be recorded. An advanced feature is available that allows you to configure a single Player with multiple audio tracks. In this configuration, each audio track is associated with its own individual I/O module. Refer to “Creating Multiple Audio Track Players” for details.

3. In the Total drop-down box, choose the total number of audio channels that you wish to record in the *entire* track.
4. In the **Recorded with** drop-down box, choose the number of audio channels that you wish to record in each file. Select between 2, 4, 6, 8, or 16 channels per file. Note that not all choices are available, depending upon your selection in the "**Total**" drop-down. The "About Audio Track Combinations" section includes additional information on what possibilities are offered in these settings.
5. Select the maximum sample size variable for the audio data played back or recorded by this player. Depending on the type of player one or both of the following menu options will appear:
   - **Record sample size**: choose between 16-bit or 24-bit samples.
   - **Playback max sample size**: choose between 16-bit, 24-bit, and 32-bit samples.
6. In the **Audio File Type** drop-down box, choose between **.aiff** or **.wav** formats. Select the appropriate file type, based on your individual requirements. There is no difference in performance between the two file types.
7. For MediaPorts 7000 series (with Spectrum 6.4 or later) and Spectrum X, the **Loop Audio When Stepping Frames** check box appears. When this option is checked, if you pause the player, the audio for the paused frame and the following nine frames will play in a continuous loop.
8. Depending on the type of I/O module, the Audio Scrub Play check box may appear (for 'Play Only' or 'Play and Record' players).
9. The **Audio Resampling** section appears in all players attached to a MediaPort or Spectrum X, and record-enabled players attached to any other I/O module used for record. The number of drop-down boxes changes dynamically, depending upon your selection in the **Total** drop-down box.

   For each audio pair:

   - Choose **Auto** to record normal PCM audio data, or correctly flagged non-PCM data (for example, Dolby AC-3, Dolby E). Normal PCM audio data will be re-sampled so that it is clock-synchronized with video. Non-PCM data will be passed unchanged.
   - Choose **None** to force audio resampling off. Use this selection if your playback equipment does not properly tag non-PCM data.
   - The **Number of language tag rules** drop-down box allows you to apply language tag rules for the playout of audio files associated with the audio tracks of a particular Player.
10. If you added an audio track by mistake, click the **Remove** button adjacent to the track.

NOTE: Spectrum cannot record audio simultaneously from multiple MediaPorts into a MPEG-2 MXF OP1a track at 29.97/59.94 Hz. When recording this wrapper format and frame rate, all audio must come from a single MediaPort. This limitation does not apply to other wrapper formats or frames rates.

Related information

Attaching devices and setting conversion options
Creating multiple audio track players
Configuring audio scrub
Configuring track tag rules for an audio track
About selectable audio tracks
About audio track combinations

About selectable audio tracks

For separate audio tracks, there are some points to note.

- All separate audio files associated with a single audio track must have the same number of channels, sample size and file format.
- When recording Dolby E or Dolby AC3, do not configure the Player's audio track as single-channel files. All channels must be recorded with a minimum of two channels per file. If you record as a single-channel file, the Dolby data will be corrupted.
- Each separate audio file may hold 1, 2, 4, 6, 8, 10, 12, 14, or 16 channels.
- Players must be configured to match the maximum expected bandwidth of clips to be played on that output. If a clip exceeds the maximum expected bandwidth, during playback the Player will fail — producing either silence or a reduced number of audio tracks limited by the Player.
- Back-to-back playout of mixed audio formats (**.aiff** or **.wav**) is supported.

About audio track combinations

Note the possible audio track combinations that may be created.

- If 1 total channel, then 1 channel per file
- If 2 total channels, then 1, 2 channels per file
- If 4 total channels, then 1, 2, 4 channels per file.
- If 6 total channels, then 1, 2, 6 channels per file (existing)
- If 8 total channels, then 1, 2, 4, 8 channels per file
- If 10 total channels, then 1, 2, 10 channels per file (new)
- If 12 total channels, then 1, 2, 4, 12 channels per file (new)
- If 14 total channels, then 1, 2, 14 channels per file (new)
- If 16 total channels, then 1, 2, 4, 8, 16 channels per file

Note that the number of available channels per file divides evenly into the total number of channels.

Configuring audio scrub

Audio scrub requires different configuration steps depending on the type of I/O module you are using.

About audio scrub

Audio scrub mode provides a higher quality audio output, helpful to video editors and operators when jogging or shuttling through content.

Audio scrub mode is supported on the MediaPort 5320, 5220, 5400, 5500, 5620, 7000 series, and Spectrum X.

The audio scrub feature works for up to four channels of audio. When scrub mode is enabled, regardless of how the audio tracks are grouped, the first four channels are scrubbed and the remaining channels are muted.

For the MediaPort 7xxx series and Spectrum X, audio scrub does not require any I/O module configuration. For the MediaPort 5xxx series, in order to configure a player with audio scrub, the attached MediaPort or MediaDeck Module must first be set for Audio Scrub Mode. Note that in order to enable the Audio Scrub feature, any players configured for Proxy Record must first be deactivated due to bandwidth constraints. The two modes cannot be configured at the same time.

Once a player has been enabled for audio scrub, the output audio is scrubbed whenever the player is operating between 1/16th and 2x play, forward or backward. Those regions are shown in green in the following figure.

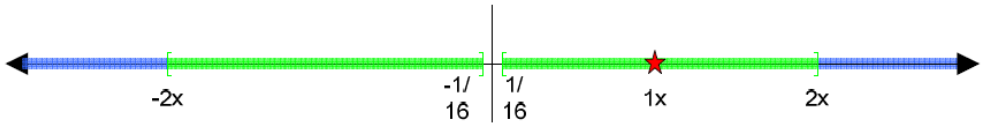


Figure 7-27: Audio Scrub Rates

Above 2x forward or below -2x backward, the player reverts to “CD audio”, which is the same off-speed audio behavior used for non-audio scrub players. Those regions are shown in blue. Below 1/16th (for example, at 1/32nd), the player is muted rather than reverting to CD audio.

The red star in the figure marks the special case of normal, 1x playback. If the player jumps directly to 1x from a non-scrubbable rate (such as paused or greater than 2x), it will leave scrub mode and revert to normal audio play with all channels

Related information

Activating and deactivating players
Rebooting the I/O module

Configuring a MediaPort for audio scrub

For the MediaPort 5220, 5320, and 5600 series, you must configure the MediaPort for audio scrub if you wish to use it.

NOTE: This procedure applies to the 5220, 5320, and 5600 series MediaPorts only. If you are using a different I/O module, continue to “Configuring a Player for Audio Scrub”.

1. From the **System Diagram** page, click the icon for the MediaPort or MediaDeck Module you will use to play audio scrub material. Its **I/O Module Properties** page appears.
2. Under **General Information**, scroll to the **Proxy Record Mode versus Audio Scrub Play Mode** section.

   This section will show either **Proxy Record** mode enabled or **Audio Scrub** mode enabled. They cannot both be enabled at the same time. If the status under **After Last Reboot** and **After Next Reboot** shows **Audio Scrub Play Mode** then continue to the next section.

   If the status shows **Proxy Record** then do the following:

   a. Click **Set Audio Scrub Play Mode**. A warning message appears indicating that all players attached to this MediaPort which are configured for Proxy Record must be deactivated before you activate players configured for Audio Scrub, otherwise their performance will be affected. Click **OK**.
   b. If you have players that are configured for Proxy Record, deactivate those players at this time.
   c. Restart the I/O module in order for the changes to take effect.

Related information

Activating and deactivating players
Rebooting the I/O module

Configuring a Player for Audio Scrub

Configure a player for Audio Scrub.

1. Configure an **MPEG Play Only** or **Play and Record** player **(**SD or HD).
2. Connect the track to the appropriate I/O module. The following I/O modules support audio scrub: MediaPort 5620, 5500, 5400, 5320, 5220, 7000 series, and Spectrum X.
3. Add an audio track.
4. Attach the audio track to the appropriate I/O module.
5. The audio track includes the **Audio Scrub Play** check box.

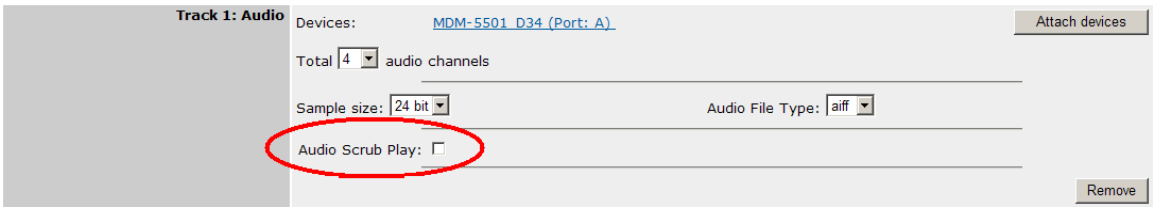


Figure 7-28: Audio Scrub Play check box

6. Click the **Audio Scrub Play** check box.

> **NOTE:** If the check box for Audio Scrub Play does not appear, double-check that you have followed the steps in “Configuring your MediaPort or MediaDeck Module for Audio Scrub.”

7. Activate the player.

Related information

Creating a player
Attaching devices and setting conversion options
Configuring audio tracks
Activating and deactivating players

Configuring track tag rules for an audio track

You can apply language tag rules for the playout of audio files associated with the audio tracks of a particular Player.

Before you begin

> **NOTE:** The **Number of Language Tag Rules** field only appears if you have enabled **Player Track Tagging** from the SystemManager **Options** page.

Editing track tags

Once you have edited a Track Tag File (according to the “Editing track tags” section) and added an audio track to a player, you can use the language tag section of the Edit Player page to create rules, which associate the player’s audio track with language tags on the clip to be played. The rules specify which language tag on the clip the Spectrum system looks for, and in what order. When Spectrum matches the language tag specified in the rule with a tag on the clip, it assigns all audio channels on the clip to

the next available channel of the audio track for that player. Once all channels on the audio track are assigned, Spectrum stops looking for rules.

1. Create a player.
2. From the **Edit Player** page, click **Audio** to add an audio track to the Player.
3. From the language tag rules drop down box, select the number of rules you wish to institute. Select from **0** to a maximum of **16** rules to be applied to audio file playout. Note the following:
   - Track Tags are only available if you have already edited and saved the Track Tag File (see “Editing track tags”) If you have not edited the Track Tag File, Language Tag selections do not appear and audio tracks in a clip will play back in the order they were recorded (or as rearranged by TrackTool).
   - If you select zero (0) rules, then track tagging is disabled for this Player; and audio tracks in the clip will play out in the order in which they were recorded, or “stacked” by the TrackTool application.
   - Depending on the number of language tag rules selected, SystemManager displays a corresponding number of rows from which you can select up to six language tags. The selections in the language tag drop-down menus determine the order that SystemManager will search for audio tracks to play back, starting with **Tag 1** and ending with **Tag 6**. If the audio track in **Tag 1** is not found, then SystemManager attempts to play the audio track in **Tag 2** and so forth.
4. If you would like to configure more than 6 tags per rule, select the **Allow 16 tags per rule** check box to increase the number of tags per rule.
5. For each rule, make your track selections. Note the following:
   - If tags are not specified for a particular rule, the SystemManager sets these tags to **None**.
   - The numbering scheme for "tracknum" tags starts with zero. To select the first audio track in the clip’s track stack, set the tag to **tracknum0**.

Track tag examples

Find guidelines and examples for track tag usage.

Note the following general guidelines about Track Tagging:

- If you want to specify the language tag for the audio to play out of a particular port, select silence as the last tag in each row..
- When applying tags, Harmonic recommends that all tracks have the same number of channels per file.
- If either Track Tagging is turned off on the Player, or there are no tags associated with a clip, the clip is loaded as if Track Tagging is disabled.
- Audio track tagging and rearranging is limited to audio tracks and *cannot* be applied to individual audio channels. A clip can contain one or more audio tracks; each of these tracks may contain one or more audio channels.

Example: Track tags with two audio channels

The following figure illustrates a configuration of two audio channels, with one language tag rule to be applied to channel output.

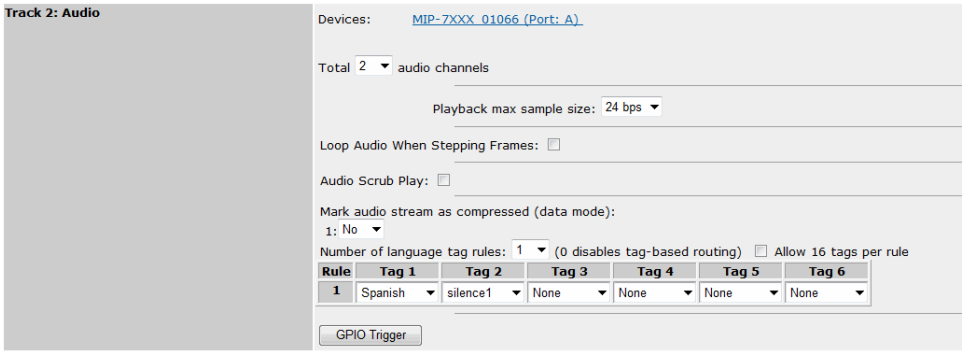


Figure 7-29: Sample track tag configuration with one rule

The configuration in the preceding figure dictates playout as follows:

- **Rule 1** stipulates that if an Spanish track is present in a clip, Spanish is played out. If no Spanish track is found, one channel of silence is the output.

Example: Track tags with four audio channels

The following figure illustrates a configuration of four audio channels, with four language tag rules to be applied to channel output.

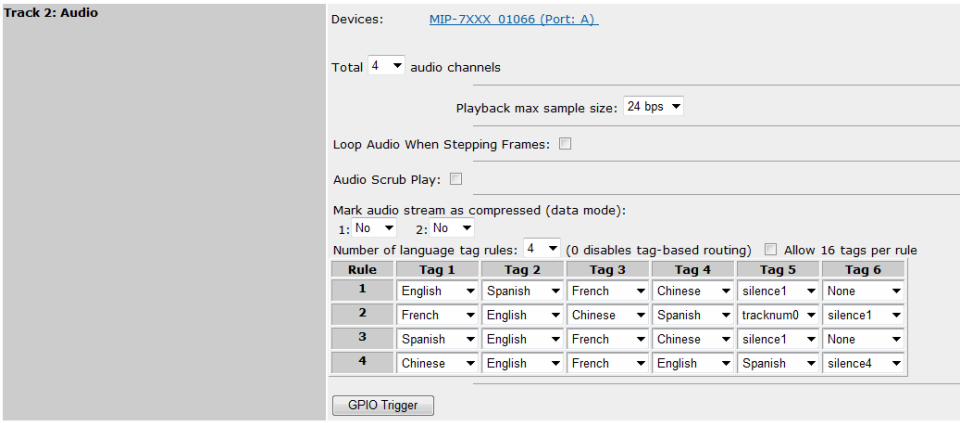


Figure 7-30: Sample track tag configuration with four rules

The configuration in the preceding figure dictates playout as follows:

- **Rule 1** stipulates that if an English track is present in a clip, English is played out. If no English track is found, a Spanish track is played out if present. If no Spanish track is found, a Chinese track is played out if present. If no Chinese track is found, one channel of silence is the output.
- **Rule 2** stipulates that if a French track is present in a clip, French is played out. If no French track is found, an English track is played out if present. If no English track is found, then a Spanish track is played back. If no Spanish track is found, then the first audio track in the clip's track stack would be played back. If no track is found, silence is the output.
- **Rule 3** stipulates that if a Spanish track is present in a clip, Spanish is played out. If no Spanish track is found, English is played out if present. If no English track is found, French is played out. If no French track is found, Chinese is played out. If no Chinese track is found, one channel of silence is the output.
- **Rule 4** stipulates that if a Chinese track is present in a clip, Chinese is played out. If no Chinese track is found, English is played out if present. If no English track is found, French is played out. If no French track is found, English is played out. If no English track is found, Spanish is played out if present. If no Spanish track is present, one channel of silence is the output.

Attaching devices and setting conversion options

When configuring a player, connect the player to an I/O module.

1. From the **Edit Player** page, for each track, click the **Attach Devices** button (within each track section) to display the **Attach Devices** page.

   Note that the available fields and columns on this page will vary based on the I/O module.

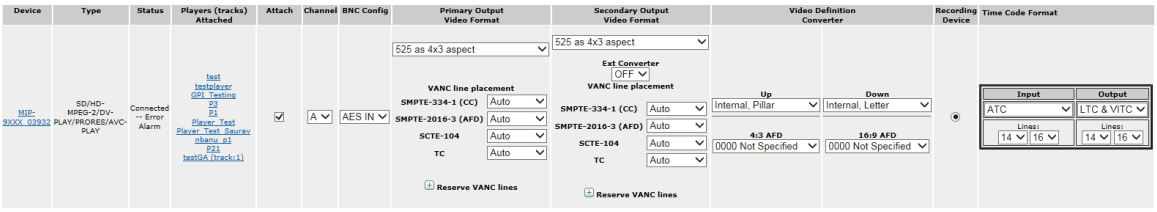


Figure 7-31: Attach Devices page options

2. In the **Attach** column, click the check box adjacent to the I/O module that you wish to connect. The name of the current Player will appear in the **Players (tracks) attached** column. Repeat this selection for any other listed devices that you want to attach to this track.

   NOTE: In SystemManager, all MediaPort 5XX2 series (for example, 5002, 5222, or 5322) appear as two separate 5XX1 MediaPorts respectively.

3. The **Channel** column displays the available channels for attaching MPEG tracks. Click the drop-down arrow to select a different channel.

4. When attaching a video track to the Spectrum X, if the player type is set to **Hybrid**, the **BNC Config** column appears. Select the configuration you wish to use for the corresponding MFIO connector on Spectrum X breakout cable. The following table shows possible configurations for the MFIO connectors on the Spectrum X breakout cable.

MFIO Connector	Function in Standard Channel Mode	Function in Enhanced Channel Mode
MF#1	Channel A AES In / Channel A LTC In	AES In / LTC In
MF#2	Channel A LTC Out	LTC Out
MF#3	Channel B AES In/Channel B LTC In	Unused
MF#4	Channel B LTC Out	Unused

   NOTE: The information in the following step only applies to the MediaPort 4100, 5400, 5500, and 7000 series, ChannelPort, and Spectrum X. For all other MediaPorts, continue to step 7.

5. Configure up or down conversion options.

6. If you are working with a record-capable Player, in the **Recording Device** column, click the radio button for the *one device* (MediaPort or Third-party Device) that you want to use as the source of media during recording.

7. When attaching video tracks to the MediaPort 5320 for recording HD content at frame rates of 25 or 29.97 Hz, the **Horizontal Sample Rate** column appears. Select the sample rate (either **1920** or **1440**) that applies to the content you are recording.

8. If you are attaching audio or video tracks to a MediaPort 4010, the **Program Number** field appears. This field specifies the number for the program which should be extracted from the transport stream and demuxed. Enter a string of up to four characters in length, where each character is a hex digit (0-9, a-f, or A-F).

NOTE: The information in Step 8 only applies to the MediaPort 4100, 5400, 5500, and 7000 series, and ChannelPort. For all other MediaPorts, continue to step 9.

9. If you are working with an audio track and the device is capable of embedding and de-embedding audio in the SDI signal, a drop-down menu will appear in the **Audio Embedding** column. Note that this column only appears for AES/EBU tracks, or for all DV tracks without an accompanying AES/EBU track. Choose the desired embedding option:
   - **None**—Audio information is transmitted and received on the MediaPort's AES/EBU connectors only.
     - For recording, audio will not be de-embedded from the SDI input signal. It will instead be recorded from the AES/EBU connectors.
     - For playback, audio will not be embedded in the SDI output signal. It will instead be played out from the AES/EBU connectors.
   - **Embedded**—The MediaPort uses audio data that is embedded in the SDI signal for recording and playback.
     - For recording, audio will be de-embedded from the SDI input signal. Any signal on the AES/EBU connectors will be ignored.
     - For playback, all eight audio channels (at full 24-bit resolution) will be embedded in the SDI output signal.
   - **Limited**—The following actions occur:
     - For recording, all audio data will be de-embedded from the SDI input signal. Signals on the AES/EBU connectors will be ignored.
     - For playback, the MediaPort only embeds two pairs of audio channels (at 20-bit resolution) into the SDI output signal.
10. If the Player is record capable, the Player's **Record Timecode Source** is "**External**," and the recording device is capable of recording LTC timecode, under **Time code Format**, in the timecode **Input** drop-down box, select **LTC only**, **ATC**, or **Reference VITC**.
    - **LTC only**: select to accept LTC input over the MediaPort's LTC input connector.

      NOTE: LTC as a Record timecode source is not available for HDCAM configured players. External timecode for HDCAM always comes from the ancillary/horizontal data in the HDCAM SDTI stream.
    - **ATC**: select to read ATC from the MediaPort's SDI input connector. If selected, you must also select the desired Line number.
    - **Reference VITC**: if selected, the timecode is derived the reference input VITC.
11. If the Player is play capable, the Player's **Playback Timecode Source** is "**From Clip**," under **Time code Format**, in the **Output** drop-down box, select either **LTC only** or **VITC & LTC**.

    NOTE: For SD players, Spectrum will output LTC, ATC, and VITC. For HD players, Spectrum will output LTC and ATC.

    - Select **LTC only** to output LTC only to the MediaPort's LTC output connector.
    - Select **VITC & LTC**, and then select the desired Line number to insert timecode into those lines on the MediaPort's SDI output connector.

      NOTE: For the MediaPort 5320 and 5220, the output timecode options that you select on the **Attach Devices** page apply to the channel that you have selected in the **Assignable LTC Output** field of the **I/O Module Properties** page for the attached MediaPort.

12. Click **Done** to return to the **Edit Player** page. At this point, the player's selected track is connected to the selected devices. The devices will be listed in the track section.

Related information

Up/down conversion options for MediaPort 7000 series, ChannelPort, and Spectrum X

Up/down conversion options for MediaPort 5400 and 5500 series

Up/down conversion options for MediaPort 7000 series, ChannelPort, and Spectrum X

The **Attach devices** page provides up/down conversion options for some I/O modules.

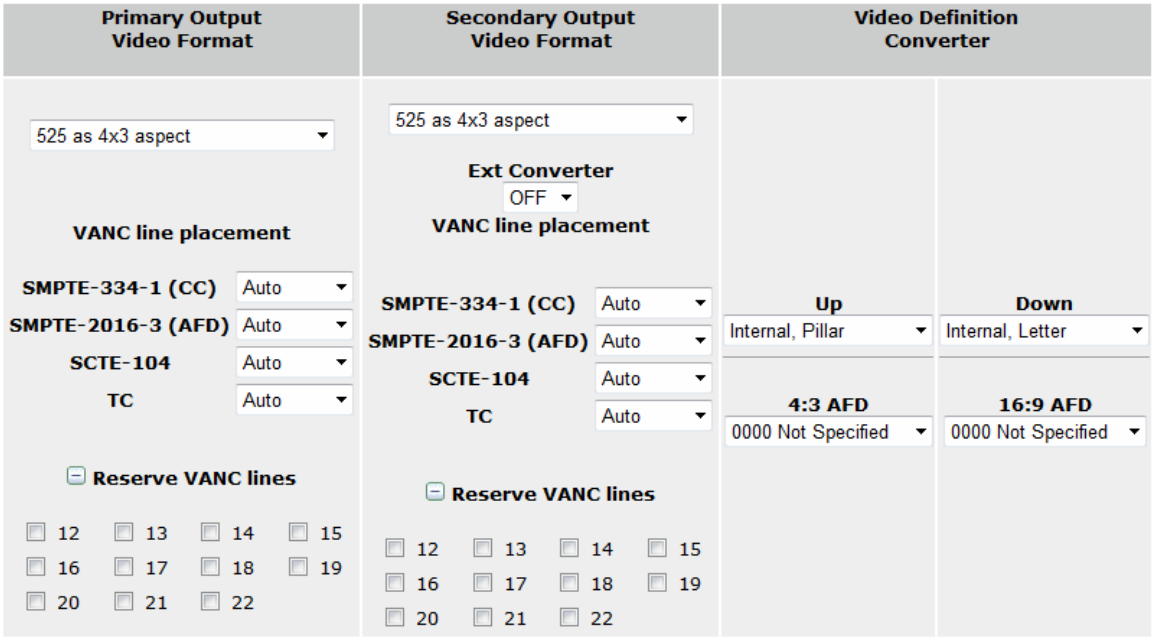


Figure 7-32: Up/Down Conversion Options

In the **Primary Output Video Format** column, you can select a video format or select Native, which will output the same format as the video clip that is playing. For example, when SD material is playing, the output is SD SDI and when HD material is playing, the output is HD SDI.

IMPORTANT: Harmonic recommends using Native Mode for preview only, and not for live, on-air playout. When a player is in Native Mode and different clip types (with different formats or frame rates) are loaded on the timeline, there will be some delay between transitions.

The video source designated in the Player Properties page will be converted, or passed through, as selected. For example, if you selected a standard definition format on the Player Properties page, and a high definition format in the Primary Output Video Format menu, the video would be up-converted. Note that for standard definition formats, you may also choose the desired aspect ratio: 4x3, 16x9, or mixed aspect.

For UHD, select either **Interleaved** or **square division** depending on the requirements of your downstream equipment.

Under **VANC line placement**, you can specify VANC line placement for the Primary Output by configuring the following settings.

OP-47 (for 25 or 50 Hz only)	Select the VANC line to be used for OP-47 data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the closed caption data to be suppressed.
SMPTE-2031(for 25 or 50 Hz only)	Select the VANC line to be used for SMPTE-2031 data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the closed caption data to be suppressed.
SMPTE-334-2 (CC)	Select the VANC line to be used for closed caption data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the closed caption data to be suppressed.
SMPTE-2016-3 (AFD)	Select the VANC line to be used for AFD data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the AFD data to be suppressed.
SCTE-104	Select the VANC line to be used for SCTE-104 data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the SCTE-104 data to be suppressed.
TC	Select the VANC lines to be used for ATC data. Selecting **Auto** will allow Spectrum to automatically select the VANC line. Selecting **Suppress** will cause the ATC data to be suppressed.
Reserve VANC lines	Click to open a list of check boxes that correspond to VANC lines. Select the check boxes for the VANC lines that you wish to reserve for a specific use. Any VANC lines that are not selected may be used for VANC types other those indicated in the **VANC line placement** drop-down menus.

NOTE: For UHD formats, VANC plackets are only embedded on link A. **VANC line placement** corresponds to the 1080p line number on link A.

In the **Secondary Output Video Format** column, select the desired video format or Native for the secondary output.

VANC line placement	Specify VANC line placement for the Secondary Output.
Ext Converter	(For MediaPort modules only) If using an external converter, use the drop-down menu to specify the number of reference fields of external processing delay to be used when connecting to an external converter to perform up or down conversion. Select a value between 1 and 12. The default is OFF. Note the following guidelines when performing external conversion: • To use an external converter, connect the secondary output connector for each channel to the converter, and then connect the output from the converter to the input connector for that channel. • You must specify the video format for the secondary output. This will identify what kind of input is accepted by the external converter. • The video format that you specify for the primary output defines the output of that connector. • You must configure the external converter to provide an output format that matches the chosen primary output format. • Make sure to specify the up/down conversion settings for the primary output. The Spectrum I/O module internal conversion will be used on the

primary output for any conversions that don't match the configuration of the external converter. For example, the external converter may perform 720p to 1080i conversion, and the internal converter may perform SD to 1080i up-conversion.

In the **Video Definition Converter** column, select the appropriate up and down conversion options by reviewing the following information.

Up

This menu displays aspect ratio adjustment options when frames are being up converted from SD to HD. Click the drop-down arrow to select from the following:

- **Internal, Pillar** specifies that black bars should be inserted on the sides as necessary to fill the screen.
- **Internal, Crop** specifies that the top and bottom of frames should be cropped and black bars should be inserted on the sides as necessary to fill the screen. When a frame is too large horizontally, the sides of the frame should be cropped and black bars inserted on the top and bottom to fill the screen.
- **Internal, Full** specifies that black bars should be inserted above and below the frame to maintain the aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Anamorphic** specifies that frames should be stretched horizontally and vertically to fill an entire 16:9 aspect ratio HD screen.
- **Internal, NonLinear** specifies that frames should be stretched in a non-linear fashion with the stretch occurring more at the edges of the picture, and less as you move toward the center.

  NOTE: The **Internal, NonLinear** stretch option works only for clips, not external inputs. It produces up-converted video with the AFD setting of "Full." This option is only available in the following cases:

  - For players attached to a Spectrum X in standard channel mode
  - For players with a frame rate of 29.97 Hz

4:3 AFD

This menu allows you to choose the AFD value you wish to apply to the video output. The options are shown in the following table.

Table 7-1: AFD Values

AFD value	Definition
0000	Not Specified
1000	4x3 image full frame (same as coded frame)
1001	4x3 image full frame
1010	16x9 image as letterbox
1011	14x9 image as letterbox
1101	4x3 image with alt. 14x9 center

AFD value	Definition
1110	16x9 image with alt. 14x9 center as letterbox
1111	16x9 image with alt. 4x3 center as letterbox

Down

This column displays aspect ratio adjustment options when frames are being down converted from HD to SD. Click the drop-down arrow to select from the following:

- **Internal, Crop** specifies that the top and bottom of the frame should be cropped and black bars should be inserted on the sides as necessary to fill the screen. When a frame is too large horizontally, the sides of the frame are cropped and black bars are inserted on the top and bottom to fill the screen.
- **Internal, Letter** specifies that when a frame fails to fill a screen vertically, black bars should be inserted above and below the frame to maintain the original aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Full** specifies that black bars should be inserted above and below the frame to maintain the aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Anamorphic** specifies that frames should be compressed horizontally and vertically to fit into a 4:3 aspect ratio SD screens.

16:9 AFD

This menu allows you to choose the AFD value you wish to apply to the video output. The options are shown in the following table.

Table 7-2: 16:9 AFD Values

AFD value	Definition
0000	Not Specified
1000	16x9 image full frame
1001	4x3 image as pillarbox
1010	16x9 image as frame protected
1011	14x9 image as pillarbox
1101	4x3 image with alt. 14x9 center as pillarbox
1110	16x9 image with alt. 14x9 center
1111	16x9 image with alt. 4x3 center

NOTE: Up converting or down converting subtitles or teletext that use the OP42 and OP47 standards is now an I/O module-wide setting, which affects all players attached to that I/O module. It can be enabled from the **I/O module Properties** page.

Related information

About Native Mode

Enabling OP-47 subtitle conversion
About up conversion and down conversion options
About SCTE-104 proxy insertion
About connecting external up/down converters to Spectrum MediaPorts

Up/down conversion options for MediaPort 5400 and 5500 series

The **Attach devices** page provides up/down conversion options for some I/O modules.

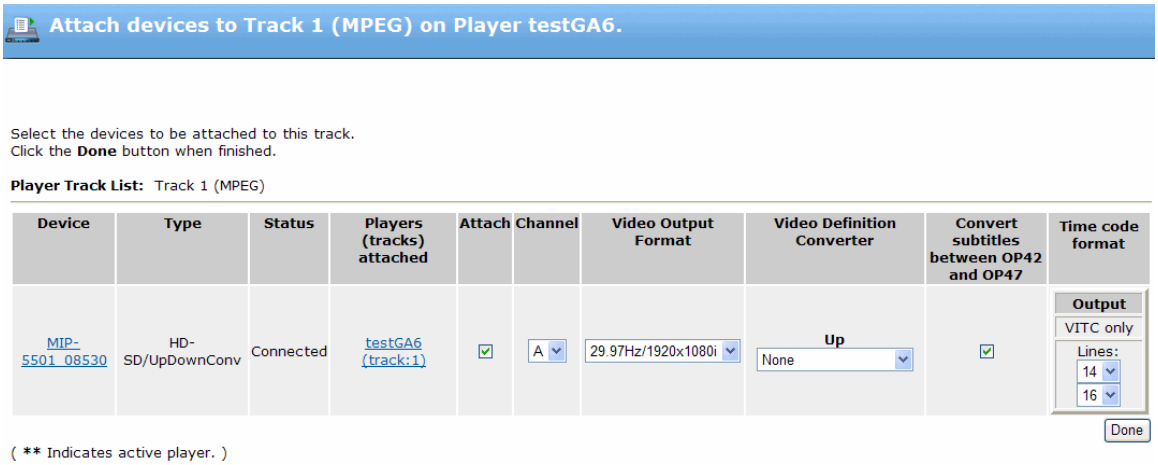


Figure 7-33: Up/Down Conversion options

In the **Video Output Format** column, you can select a video format or select Native, which will output the same format as the video clip that is playing For example, when SD material is playing, the output is SD SDI and when HD material is playing, the output is HD SDI.

IMPORTANT: Harmonic recommends using Native Mode for preview only, and not for live, on-air playout. When a player is in Native Mode and different clip types (with different formats or frame rates) are loaded on the timeline, there will be some delay between transitions.

The video source designated in the Player Properties page will be converted, or passed through, as selected. For example, if you selected a standard definition format on the Player Properties page, and a high definition format in the Primary Output Video Format menu, the video would be up-converted. Note that for standard definition formats, you may also choose the desired aspect ratio: 4x3, 16x9, or mixed aspect.

In the **Video Definition Converter** column, select the appropriate up and down conversion options by reviewing the following information.

Up

This menu displays aspect ratio adjustment options when frames are being up converted from SD to HD. Click the drop-down arrow to select from the following:

- **None** Specifies that no up conversion adjustment should take place.
- **Internal, Pillar** Specifies that black bars should be inserted on the sides as necessary to fill the screen.
- **Internal, Crop:** Specifies that the top and bottom of frames should be cropped and black bars should be inserted on the sides as necessary to fill the screen. When a frame is too large horizontally, the sides of the frame

should be cropped and black bars inserted on the top and bottom to fill the screen.

- **Internal, Full** Specifies that black bars should be inserted above and below the frame to maintain the aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Anamorphic:** Specifies that frames should be stretched horizontally and vertically to fill an entire 16:9 aspect ratio HD screen.

Down

This column displays aspect ratio adjustment options when frames are being down converted from HD to SD. Click the drop-down arrow to select from the following:

- **None:** Specifies that no down conversion aspect ratio adjustment should take place.
- **Internal, Crop** Specifies that the top and bottom of the frame should be cropped and black bars should be inserted on the sides as necessary to fill the screen. When a frame is too large horizontally, the sides of the frame are cropped and black bars are inserted on the top and bottom to fill the screen.
- **Internal, Letter:** Specifies that when a frame fails to fill a screen vertically, black bars should be inserted above and below the frame to maintain the original aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Full** Specifies that black bars should be inserted above and below the frame to maintain the aspect ratio of the original source (usually a picture of 16:9 aspect ratio or wider).
- **Internal, Anamorphic** Specifies that frames should be compressed horizontally and vertically to fit into a 4:3 aspect ratio SD screens.

NOTE: With this release of SystemManager, up converting or down converting subtitles or teletext that use the OP47 standards is now a MediaPort-wide setting, which affects all players attached to that MediaPort. It can enabled from the **I/O Module Properties** page.

Related information

About Native Mode
About up conversion and down conversion options
Configuring OP-47 subtitle conversion for the MediaPort 5000 series

About SCTE-104 proxy insertion

Note the standards and features of Spectrum SCTE-104 proxy insertion.

Spectrum adheres to the following standards document: *SCTE- 104 2012 Automation System to Compression System Communications Applications Program Interface (API)*.

A Spectrum system licensed for SCTE-104, does the following:

- Provides a SCTE Proxy Injector compliant server
- Adheres to the SCTE client-server protocol.
- Manages the TCP/IP connection for the SCTE proxy service
- Accepts a TCP/IP carried request

- Inserts the SCTE-104 request on in VANC

The Spectrum, as a proxy injector server, immediately passes on valid requests in VANC. It does not change the timing of a request, and it does not delay it for a specific target time.

Downstream, a SCTE-104 recipient acts as SCTE-104 injector, typically a Distribution Encoder. The injector's job is to place the SCTE-104 payload into an MPEG Transport Stream as a SCTE35 packet.

Note the following:

- The Spectrum SCTE-104 service uses the IP address of the Spectrum video server on which it is installed. This IP address and the SCTE-104 license are both shown on the Spectrum Server Properties page in SystemManager.
- The TCP port for SCTE-104 is 5167.

The SCTE-104 protocol uses a message field name, “DPI Index,” to identify the output device associated with a given request. The DPI Index value to be used by automation systems can be derived from the physical connection from video server to the I/O module, as shown in the following table.

Spectrum server port connected to ChannelPort	ChannelPort channel	Primary Output DPI PID index	Secondary Output DPI PID index
com0	A	101	102
com0	B	103	104
com1	A	201	202
com1	B	203	204

External Automation provides the SCTE Proxy Injector Client and will connect to the Service via the video server's IP address and Port Number and, typically, will have a configuration to map the DPI-index for the specific channel SDI output. Note that both the primary and secondary output have independent DPI-indices.

Note that licensing is enforced on the video server, where the service resides. One SCTE-104 license maps to one value in the dpi_pid_index field of the protocol, which maps to one primary channel on a specific physical I/O module. That licensed connection could reference any single dpi_pid_index value. The number of licenses is the limit on the total number of simultaneous connections, or uses of SCTE-104. If you attempt one more connection than your license supports, that extra connection will be refused, and a message will appear on the syslog.

Configuring SCTE-104 proxy insertion

Configure SCTE-104 proxy insertion for your Spectrum system.

1. Verify that your Spectrum video server is licensed for SCTE-104. From the **Spectrum Server Properties** page, under **General Properties**, verify that SCTE-104 appears in the **Additional Licensed features** field.
2. For a new or existing player, navigate to the **Attach Devices** page, and select the VANC line to be used for SCTE-104 data, or select **Auto** to allow Spectrum to automatically select the VANC line.

   If your Spectrum video server is licensed for SCTE-104, the service starts automatically.

Related information

About SCTE-104 proxy insertion

Up/down conversion options for MediaPort 7000 series, ChannelPort, and Spectrum X

About Native Mode

Selecting Native Mode causes the player to set the format of the video output to the same format of the video clip that is playing.

For example, when SD material is playing, the output is SD SDI, and when HD material is playing, the output is HD SDI. This feature is supported on the MediaPort 5320, 5500, 5600, and 7000 series.

IMPORTANT: Harmonic recommends using Native Mode for preview only, and not for live, on-air playout. When a player is in Native Mode and different clip types (with different formats or frame rates) are loaded on the timeline, there will be some delay between transitions.

Note that players only play clips with matching or half-rate frame rates. For example, a 50Hz player can play 50Hz and 25Hz clips. Whereas, a 25Hz player can only play 25Hz clips. This means a 50Hz player can play 625, 1080i25, and 720p50 clips while a 25Hz player configured for native mode can only play 625 and 1080i/25 clips.

Make sure to load clips on the timeline before the player is cued for play. The video output format cannot be changed midstream so, for MediaPorts that support up/down conversion, playing non-matching clips back-to-back will result in the clips being up-converted or down-converted. For MediaPorts that do not support up/down conversion, an attached player in Native Mode will only play clips with matching frame rates (for example, a 50Hz player only plays 720p50 clips). For these MediaPorts, if you play successive non-matching clips, the output will be black.

The following table shows the Native Mode playout options for each supported MediaPort and player configuration.

Table 7-3: Native Mode Limitations

MediaPort	Player Frame Rate	Native Play types
MediaPort 5320	Interlaced	SD, 1080i
MediaPort 5320	Progressive	720p
MediaPort 5500	Interlaced	SD, 1080i
MediaPort 5500	Progressive	SD, 720p
MediaPort 5600	Interlaced	1080i
MediaPort 5600	Progressive	720p
MediaPort 7000	Interlaced	SD, 1080i
MediaPort 7000	Progressive	SD, 1080i, 720p

About configuring for cross conversion

The MediaPort 7000 series is capable of playing out different video frame rates on the same timeline continuously, which is known as cross conversion.

To configure a player to do cross conversion, you must select the higher of the two possible frame rates. For example, if you want to play out both 720p and 1080i on the same timeline, you must select a frame rate of 50Hz rather than 25Hz. Likewise, for NTSC, if you want to play out both 59.94Hz and 29.97Hz on the same timeline, you must select 59.94Hz as the player frame rate in SystemManager.

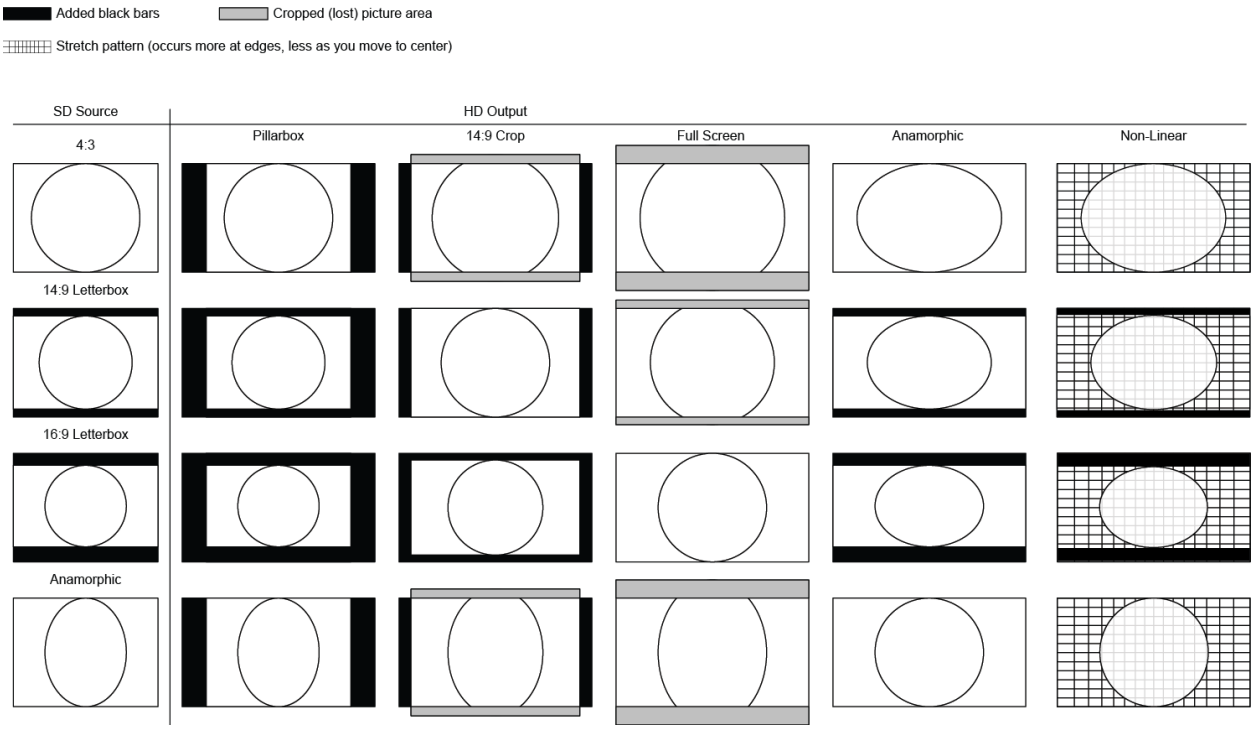
About up conversion and down conversion options

Review the output results for up conversion and down conversion options.

For some video content that contains AFD information, the aspect ratio conversion options are contained within the clip. For more information about AFD support, refer to “About AFD Support.” The following diagrams illustrate the frame output for up or down conversion.

The following diagram displays frame output associated with each Up Conversion Aspect Ratio option.

Figure 7-34: Up conversion aspect ratio results



The following diagram displays frame output associated with each Down Conversion Aspect Ratio option.

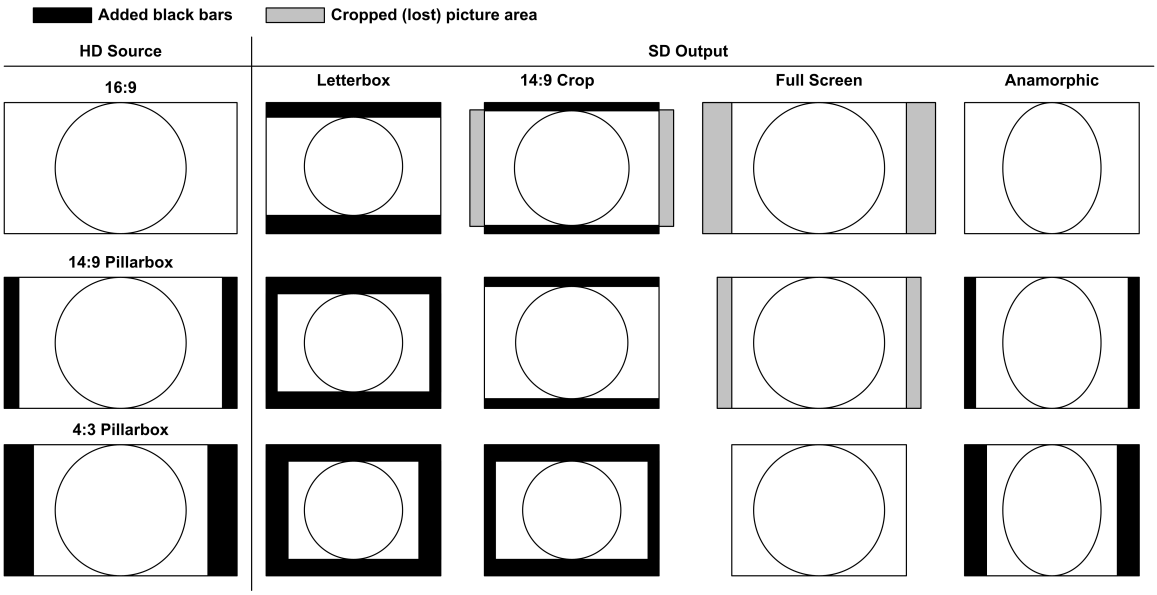


Figure 7-35: High definition down conversion aspect ratio results

Related information

Attaching devices and setting conversion options
About AFD support

About connecting external up/down converters to Spectrum MediaPorts

Note the I/O ports to use when connecting an external up/down converter to a MIP-7000 series MediaPort.

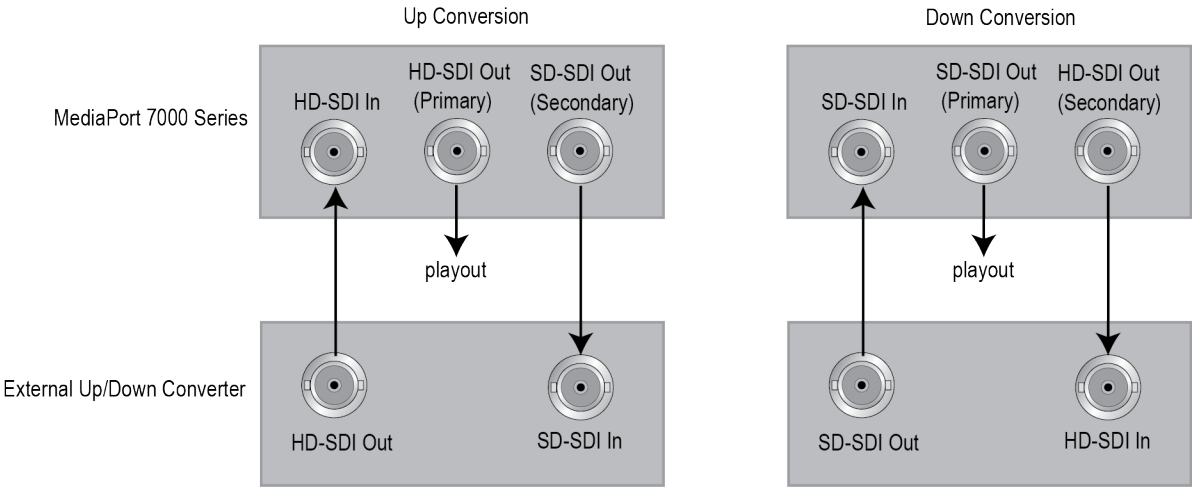


Figure 7-36: Attaching an Up/Down Converter to MediaPort 7000 series

Note that only the primary output connector for each channel of the MediaPort is available. The secondary output connector and the input connector on the MediaPort are connected to the external converter as shown.

Related information

Attaching devices and setting conversion options

Changing the player state

Change the player state to activate or deactivate, and enable or disable the player.

About activating, deactivating, enabling, and disabling

In order to use a player to play or record, you must activate it and enable it using the **Activate and Enable** button on the**Edit Player** page or the **Enable** option on the **Player List** page.

You can activate multiple players per I/O module channel at a time, allowing an automation system to switch between players and enable or disable a player as needed. To take advantage of this functionality, refer to “Using Auto Input Sense Recording.”

Note the following important points:

- An activated player can be either enabled or disabled. You may have several players activated per MediaPort channel at a time but ONLY ONE can be enabled.
- A player must be activated and enabled in order to play or record. A disabled player cannot be used.
- This release includes an **Activate as disabled** button on the **Edit Player** page, which sends the player definition to the Spectrum device but does not enable the player. This may be useful if you are using an automation system to automatically enable different players at different times.
- If a player state has been changed by some means other than SystemManager (for example by automation or by using the Player API), SystemManager will not detect that change until you click on the **Refresh Player List** button on the **Player List** page.

NOTE: When License Enforcement is enabled, SystemManager will display an error message if you attempt to activate a player attached to Spectrum X that exceeds your license limit. To review your installed licenses, from the **Spectrum Server Properties** page, click **View Licensed features**

Related information

Using Auto Input Sense recording

Activating and deactivating players

You can use more than one method to activate or deactivate a player.

- To activate from the **Player List** page, click the **Enable** hyperlink for the desired Player, or select multiple Players and click the **Enable Selected** button. This activates and enables the selected players. If the Player cannot be activated, an **Error Message** appears that details the reasons.

  NOTE: Only one player can be activated and enabled per MediaPort channel at a time.

- To activate from the **Edit Player** page, click **Activate and Enable** or **Activate as disabled** at the bottom of the page.

Clicking **Activate as disabled** sends the player definition to the Spectrum device. This may be useful if you are using an automation system to automatically enable different players at different times.

- To deactivate a Player from the **Player List** page, click the **Deactivate** hyperlink for the desired Player, or select multiple Players and click the **Deactivate Selected** button.
- To deactivate a Player from the **Edit Player** page, click the **Deactivate** button at the bottom of the page.

Enabling and disabling players

You can use more than one method to enable or disable a player.

- To enable a player from the **Player List** page, click the **Enable** hyperlink for the desired Player, or select multiple Players and click the **Enable Selected** button. This activates and enables the selected players. If the Player cannot be enabled, an error message appears that details the reasons.

  NOTE: Only one player can be activated and enabled per I/O module channel at a time.
- To enable a player from the **Edit Player** page, click **Activate and Enable** at the bottom of the page.
- To disable a Player from the **Player List** page, click the **Disable** hyperlink for the desired Player, or select multiple Players and click the **Disable Selected** button.
- To disable a Player from the **Edit Player** page, click the **Disable** button at the bottom of the page.

Player to player dubbing

Dub from one player to another using the Player-to-Player Dubbing feature.

1. From the **Player List** page, ensure that the player you wish to use as your Source player is shown as **Inactive**, and that the player you wish to use as your Target player is also shown as **Inactive**.
2. Click the **Edit** link for the Source player to open the **Edit Player** page. Then scroll to the bottom of the page to locate the **Player-to-Player Dubbing Configuration** section, as shown in the following figure.

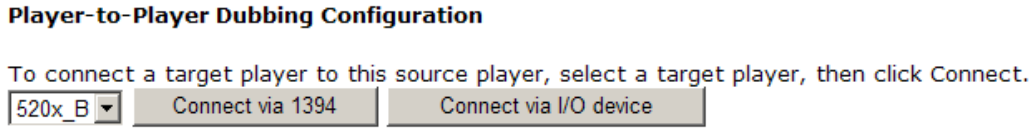


Figure 7-37: Connecting to a Target Player

3. Using the drop-down box, select the Target player. Then, depending on your system configuration, click either **Connect via 1394** or **Connect via I/O device**.
4. Activate the Source player by clicking the **Activate** button at the bottom of the **Edit Player** page. This will also activate the Target player.

The **Player Properties** page for both the active Source and Target players will display a message indicating the Source and Target players, including a hyperlink to each player.

The **Player List** page will also indicate which player is a Source and Target.

Disconnecting Devices

Disconnect devices from tracks on a Player.

1. Make sure the player is deactivated.
2. On the **Edit Player** page, locate the track that you want to disconnect, and click the **Attach Devices** button to display the **Attached Devices** page.
3. On the **Attach Devices** page, clear the box in the **Attach Device** column for the devices you want to disconnect. Note that you can disconnect one device and leave others connected.
4. Click **Done** to return to the **Edit Player** page.
5. Repeat steps 2 and 3 for other tracks you wish to disconnect.
6. Click **Done** to return to the **Player List**.

Related information

Activating and deactivating players

Using Auto Input Sense recording

You can attach several players to a single I/O module channel and allow the server to automatically select one for recording.

Note the following important points:

- The Spectrum server will automatically select an appropriate player from a set of players attached to a I/O module once it detects either a CueRecord command or that a new clip is attached to an empty, stopped timeline, and the players are correctly configured to record.
- The video input must be stable and correct at the time the server detects a CueRecord or that a new clip is attached on an empty stopped timeline. Note that the I/O module should sense the new video input within a half second of a stable input. This may add up to a half second to process the above commands.
- Make sure only one player in a set of players attached to an I/O module channel is enabled at one time. Spectrum does not prevent you from enabling multiple players, which will result in record/playback problems.
- Spectrum only switches players automatically when the currently active player is stopped and the timeline is empty. For example, this means automation must stop and eject all clips after recording in order for Spectrum to switch to the correct player for playout.
- Make sure the set of players attached to the I/O module are all be configured for the same frame rate family. All attached players must either be 25 Hz and 50 Hz, or they must all be 29.97 Hz and 59.94 Hz. You cannot mix a 25 Hz players with 29.97 Hz players.

1. Make sure all the players you wish to use are attached to the same I/O module channel and configured to record. If you wish to play after recording, make sure the first player you wish to use is configured for play and record.

NOTE: If you wish to use the Auto Sense feature to play and record media with multiple frame rates (within the same frame rate family), do not configure multiple Play and Record players. Instead, configure only one player for Play and Record and make sure the frame rate set is set high enough to play out all the necessary frame rates. And then create multiple Record players configured to record the desired frame rates. The Auto Sense Recording feature will not work correctly with multiple Play and Record players.

2. Activate and Enable the first player by using the **Activate** and **Enable** buttons.
3. For all subsequent players, configure them as **Activated** and **Disabled** by using the **Activate as disabled** button.

Related information

Creating a player
Attaching devices and setting conversion options
Changing the player state

Deleting players

You can delete a player from the **Player List** page.

1. From the **Player List**, make sure that the players to be deleted have been deactivated.
2. Once deactivated, click the **Delete Hyperlink** for the desired Player, or select multiple Players and click **Delete Selected**. A warning dialog appears.
3. Click **OK** to delete the players.

Copying a Player

SystemManager allows you to create a new player by copying an existing player.

For certain player configurations, SystemManager will copy *all* player settings including all track and device information. Note the following requirements a player must adhere to in order for all player settings to be copied:

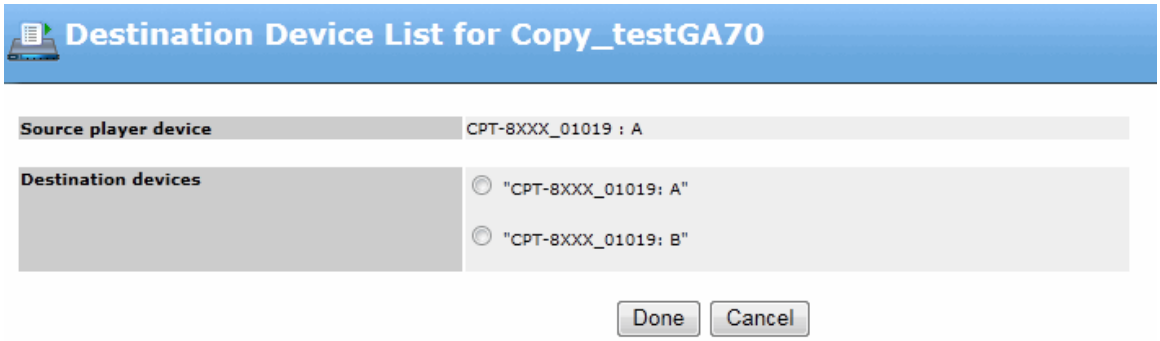
- The player is configured with no more than one video track, one audio track, and one proxy track.
- The player is attached to at least one I/O module but not more than one (for example, if there were multiple tracks attached to separate devices).
- Any MediaPort attached to the player is either a 5000 series or 7000 series, and any ChannelPort attached to the player is either a 7000 series or 8000 series.

IMPORTANT: For players that do not follow the above requirements, the following settings will not be copied: Track configuration such as Simple or Advanced; Proxy tracks; Attached device information; Closed Caption or Subtitle settings.

1. Click the **Configuration** tab, and then click **Player Configuration i**n the left-hand column to open the **Player Configuration** page.
2. Click the video server that contains the players you wish to copy to open the **Player List** page.

3. From the **Player List** page, select the player you wish to copy and click **Copy Selected**.
4. From the **Copy Player** page, enter the name of the new player, and then click **Copy**.

   Note that when you make a copy, by default, the new player retains the base name of the original player but includes a prefix of “Copy_” and a numeric suffix starting with “0.” For example, if you have a player named “Player” and you make three copies, SystemManager will name them Copy_Player0, Copy_Player1, and Copy_Player2.
5. From the **Destination Device** page, click the device channel you wish to attach the new player to, and then click **Done**.



NOTE: The **Destination Device** page will only display devices within the same family of the attached device for the original player. For example, if the original player is attached to a ChannelPort 8000 series, the Destination Device page will only display available ChannelPort 8000 series channels even if there are other I/O modules in your system.

6. Verify that the new player appears on the **Player List** page. The new player is inactive and disabled by default.
7. Double-check the settings of the new player before activating to ensure that all settings are correct.

Related information

Creating a player

Configuring GPIO settings for players

You can configure your Spectrum system to control players via GPIO.

If you wish to use GPIO triggers for player control, first configure GPIO settings for the I/O module on its respective Properties page, configure and attach the player to that I/O module, and then follow the steps in this procedure to map the GPIO triggers to your player.

1. Once you have attached a player to the I/O module, navigate to the **Player Properties** page or **Edit Player** page for that player.
2. From the Track section of the page, click the **GPIO Trigger** button to open the **Change GPIO Player Configuration** page.

   The **Change GPI Player Configuration** page displays the player name, frame rate, video format and definition, and name of the attached I/O module in the top section of the page.

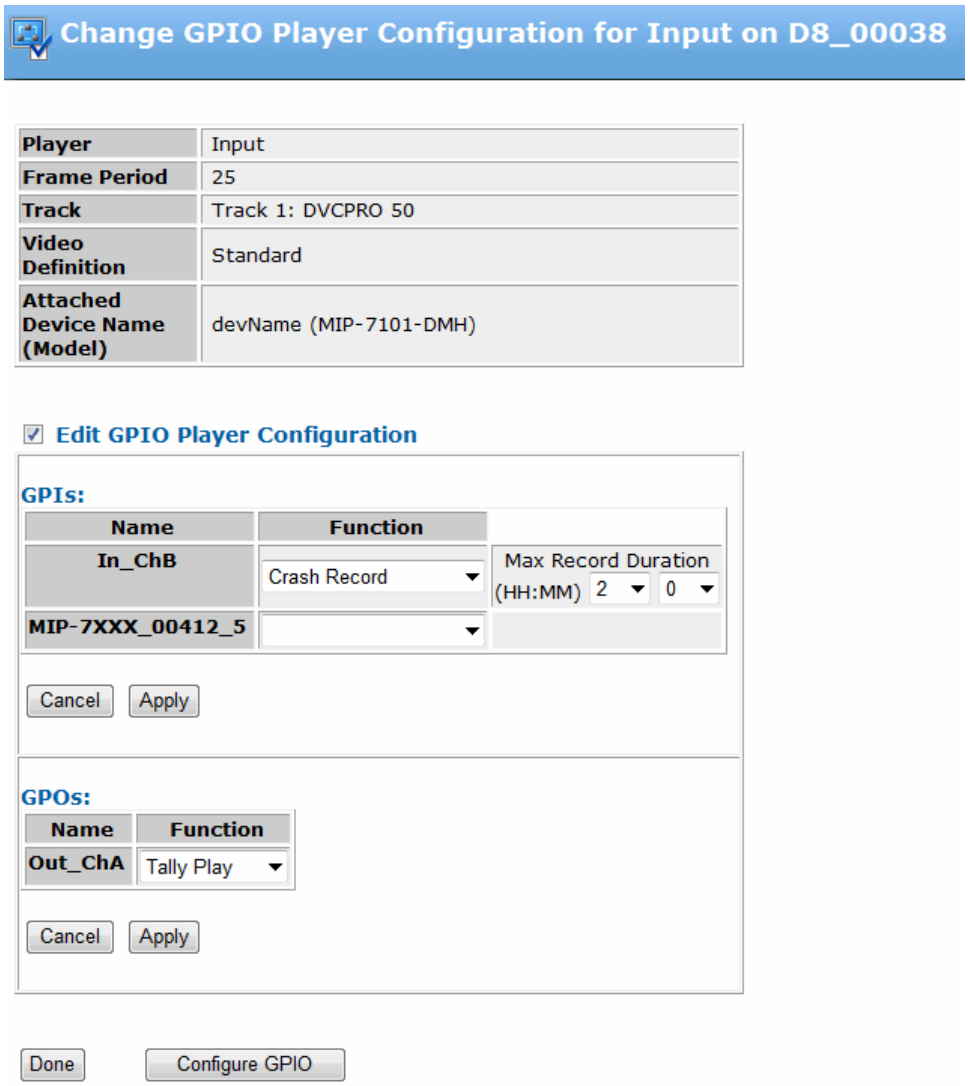


Figure 7-38: Change GPI Player Configuration page

3. Click the **Edit GPIO Player Configuration** check box to configure the functionality for each GPI line.
4. Edit the Trigger Mapper section as follows. Then click **Apply** to save settings or **Cancel** to return to default values.
   If you have configured a GPI line for Input, the **GPIs** section will be available. The **Name** column displays the name of the trigger. In the **Function** column, select as follows:

<blank>	If selected, the trigger ignores any signal and takes no action.
Play Pause/Continue	If selected, the signal will cause the player to Play and then toggle between Pause and Continue with each signal.Note that, for this action, the Trigger State on the I/O Module Properties page should be set to Activating or Deactivating.

Record Start/Stop	If selected, the trigger will cause a player in the “cue record” state to go to the “record” state. It will also cause a player in the “record” state to go to the “stop” state.
Play Take Next	If selected, the signal will cause the player to play and then advance to the next clip with each following signal. If the last clip is present the player will advance to the end of the clip. Note that, for this action, the Trigger State on the I/O Module Properties page should be set to Activating or Deactivating.
Crash Record	If selected, you must also select the Max Record Duration in hours and minutes. The signal will cause the player to record as long as the GPI trigger is asserted or until the specified duration is reached.Note that, for this action, the Trigger State on the I/O Module Properties page should be set to Active.

NOTE: When using Crash Record, the resulting clip is named with the current date/time of the crash record: YYYYMMDD-HHMMSS

ARC Control	If selected, the signal will be used to change the aspect ratio for the currently playing clip. The ARC for the player will be reset to the player ARC configuration on the next clip. From the drop-down menu, select the desired aspect ratio to be used for ARC control. Note that the “default” selection applies whatever aspect ratio was present on the channel before the latest ARC Control event.

If you have configured a GPI line for Output, the **GPOs** section will be available. The **Name** column displays the name of the trigger. In the **Action** column, select as follows:

<blank>	If selected, the trigger ignores any signal and takes no action.
Tally Play	If selected, the player drives the GPO signal while it is playing.
Tally Record	If selected, the player drives the GPO signal while it is recording.

5. Click **Done** to return to the **Player Properties** page. To return to the **I/O Module Properties** page at any time, you can click **Configure GPIO**.
6. Perform steps 1 through 5 for all attached players.

Related information

Overview of configuring GPIO triggers

Adjusting output timing

You can adjust a player’s output timing if needed.

A Player’s output timing can be adjusted in two different locations:.

- An active Player's output timing can be adjusted on the **Player Properties** page.
- An inactive Player's output timing can be adjusted on the **Edit Player** page.

IMPORTANT: Only qualified video technicians should use this procedure. Before commencing, ensure that you have the proper test and measurement equipment on hand, and that it is properly connected to the I/O module.

1. On the **Player Properties** page or the **Edit Player** page, click **Output Timing** to display the **Adjust Output Timing** page.

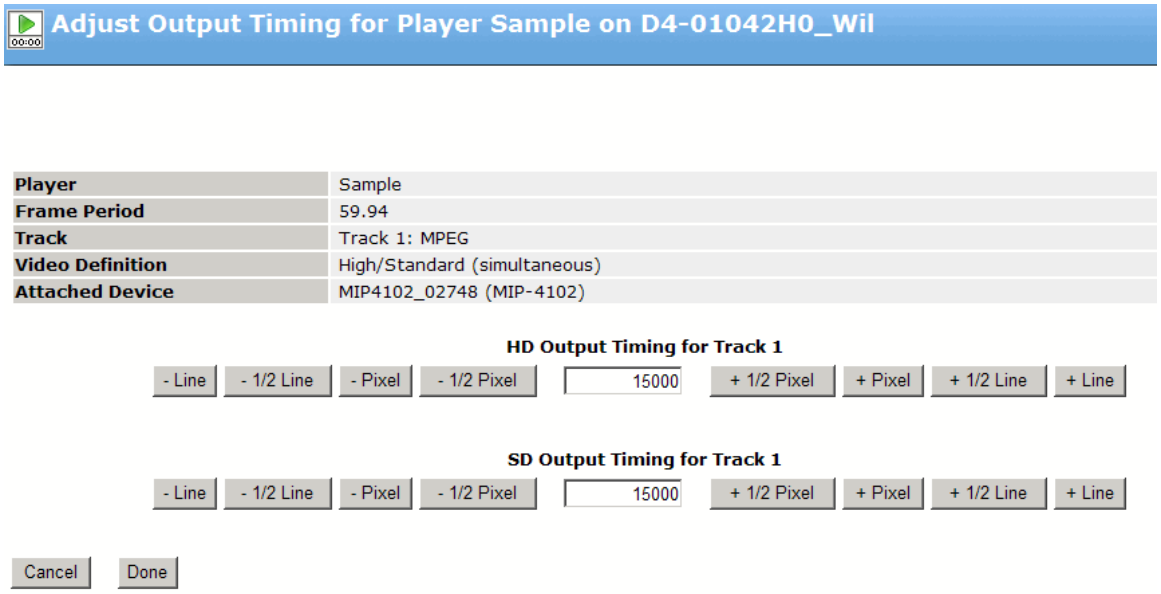


Figure 7-39: Adjust Output Timing

NOTE: Whether the display for Output timing shows **HD Output Timing** or **SD Output Timing**, or both, will vary depending on the attached device and video standard configured.

2. Depending on the desired output, in the **HD Output Timing for...** or **SD Output Timing for...** fields, enter the desired output timing, or click the desired timing buttons to increment or decrement the output timing—by lines, half-lines, pixels and half pixels.

NOTE: If you manually type an output timing value in the field, you must press Enter for the new value to register.

3. When the adjustments are complete, click **Done** to return to the original page (**Player Properties** page or **Edit Player** page). Click **Cancel** to return to the original page without making (or accepting) any changes—the original timing value will be restored.

Creating multiple audio track players

You can configure a single player with multiple audio tracks and associate the player with multiple I/O modules.

In this configuration, each audio track is associated with its own individual I/O module. For example, you wish to create a Player that has a single DV video channel, and 12 audio channels. This configuration cannot be accomplished using a single I/O module. Instead, the Player must be connected to two I/O modules.

NOTE: Spectrum supports up to 96 audio tracks, 48 embedded pairs per video clip. Up to 48 audio tracks can now be played simultaneously.

1. Ensure that all I/O modules that you wish to connect to the new Player are all connected to the same Spectrum video server. This can be verified on the SystemManager's **System** diagram.
2. Ensure that the input video signal is distributed to the SDI input connectors on all Spectrum video servers. This step is necessary in order to synchronize all audio tracks to the same video.
3. Create a player.
4. From the **Edit Player** page, click the button for the desired video track media type. Optionally, you may choose to add VBI.
5. For the selected video track, click **Attach Devices** to display the **Attach Devices** page.
6. In the **Attach the Device** column, click the check box for the first I/O module that you wish to connect to the Player.
7. Click **Done** to return to the **Edit Player** page.
8. Click **Audio** as many times as necessary, until the desired number of channels are achieved — also taking into account the number of I/O modules available. For example, if you want to use 14 channels, click **Audio** twice. Select 8 channels in the first track, and 6 channels in the second track.
9. Click **Attach Devices** for each audio track, and attach the track to one of the selected MediaPorts. Ensure that each track is connected to a unique MediaPort. Click **Done** within the **Attach Devices** page for each track.
10. On the **Edit Player** page, click **Done** to complete the procedure and return to the **Player List**. The Player may now be activated and used in the normal manner.

    The following figure illustrates a multi-track player with 14 audio channels.

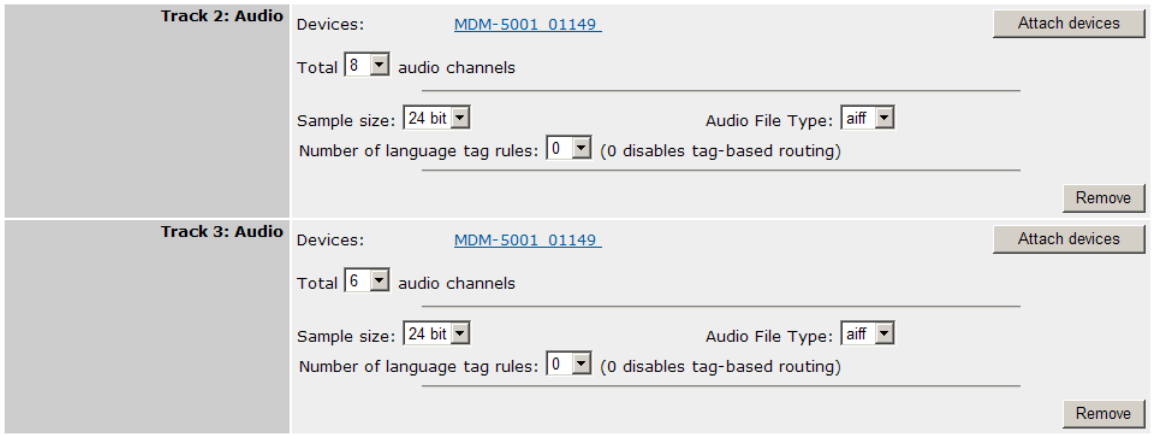


Figure 7-40: Multiple Audio Track Players Configuration Example

Related information

Creating a player
Configuring audio tracks
Activating and deactivating players

Moving players

You can move one or more Players from one Spectrum server to another.

Additionally, Players may be moved from Spectrum servers that are not responding. This feature is useful when MediaPorts are moved between Spectrum servers (thus requiring you to move the MediaPorts' associated Players), and when Spectrum servers need to be serviced.

1. Navigate to the **Player List** for the destination Spectrum server. At the bottom of the page, select the source Spectrum server from the drop-down box.
2. Click **Select Players** to display the **Select Players** page.
3. Choose the Players that you wish to move between Spectrum servers by clicking the appropriate check boxes. You can also click **Select all Players** or **Clear Selection** as desired.
4. Click **Move** to perform the move function between Spectrum servers . The selected Players will disappear from the list.
5. Click **Done** to complete.

About allowing players to be enabled or disabled by automation

SystemManager allows players on your Spectrum system to be enabled or disabled using an automation system. If you wish to configure your system for automation control of players, contact your automation vendor to find out if they have implemented this capability.

CAUTION: In order to allow automation control of players, the player resource safety check in SystemManager must be disabled (see “Configuring the player resource check”). When the player resource check is disabled, SystemManager no longer resolves conflicts between players competing for bandwidth and I/O module resources automatically. Instead, you must verify on your own that conflicting players are not activated simultaneously.

Related information

Configuring the player resource check

About the player utility

Note the minimum time between recording to a Spectrum server and viewing the clip.

Keep the following important points in mind:

- Note the minimum safe zone between the “Record” Player and a “Playout” Player viewing the clip being recorded on a Spectrum video server:
  - The minimum safe zone for Players on the same host of the same Spectrum video server is 10 seconds.
  - If the “Record” Player is on a different Spectrum video server or a different host of the same MediaDirector than the “playout” Player, the minimum safe zone in all cases is 40 seconds.
- In order to prevent queuing or playing a clip in a Playout Player in violation of the minimum safe zone, the software notifies the playout control application that the clip is unavailable until it is greater than 10 seconds or 40 seconds in duration (or recording is finished) if the players are on the same host or on

different hosts, respectively. The actual time from crash record to availability of playout may be several seconds longer, owing to record startup and automation polling latencies. For VDCP controllers, the NOT READY TO PLAY BIT in the VDCP ID Request command is used. For Omnibus controllers, QServ gets this status from the Spectrum video server and reports that such a clip is not load-able, and further reports an error if a load is attempted.

About VANC implementation in Spectrum

Note how Spectrum implements VANC for HD video.

NOTE: This section deals with VANC for HD video. If you wish to preserve VANC data for SD video, please contact Harmonic technical support for assistance.

In a Spectrum System, Vertical Ancillary Data (VANC) is, by default, ignored during the recording of HD material. Using the SystemManager application, you can preserve information in the stored clip by specifying a non-zero value, up to a maximum of 6000 bytes on the **Edit Player** page as shown in the following figure.

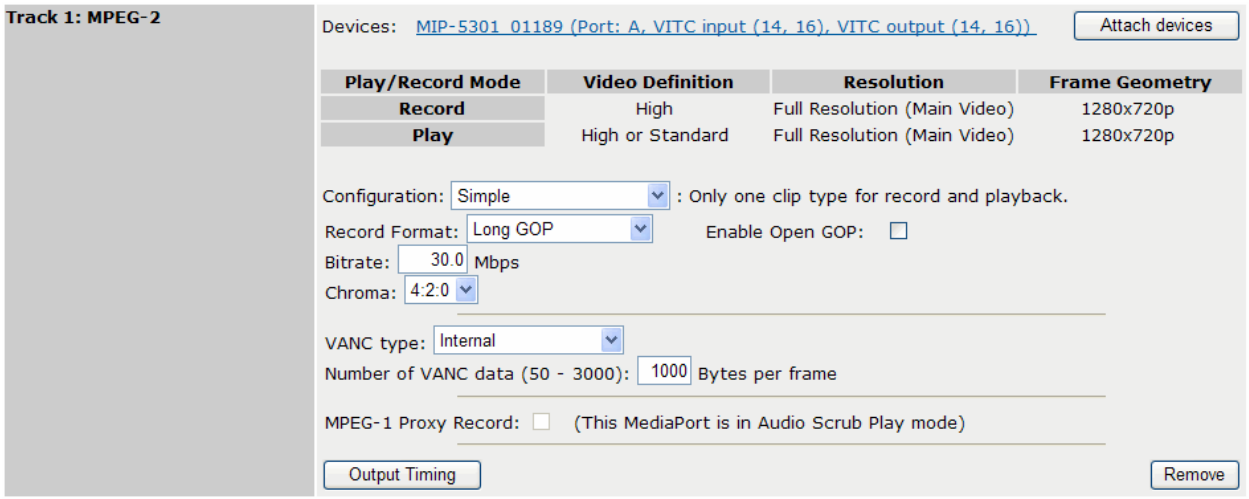


Figure 7-41: Edit Player—VANC Implementation

The number of bytes specified per frame is saved with the recording. If the clip is later played on a Spectrum System, it is reconstructed as VANC in the HD baseband output. Bytes in excess of the specified value will not be recorded.

Preserving VANC data in a recording consumes bandwidth. Bandwidth requirements for VANC-328M, which applies if you select **Internal** as your VANC type for an MPEG-2 track, are listed in the following table.

Table 7-4: Bandwidth requirements for VANC-328M data

Bandwidth Required for VANC-328M (Mbps)				
VANC Bytes Preserved per Frame	**Frame Rate (fps)**			
	25	**29.97**	**50**	**59.94**
1000	0.2	0.2	0.4	0.5

Bandwidth Required for VANC-328M (Mbps)				
2000	0.4	0.5	0.8	1.0
3000	0.6	0.7	1.2	1.4
4000	0.8	1.0	1.6	1.9
5000	1.0	1.2	2.0	2.4
6000	1.2	1.4	2.4	2.9

a Spectrum System automatically decreases the video recording bit rate by the amount shown so that the total bit rate (VANC plus video) does not exceed the value configured into the Player. You should take this information into account when setting the bit rate in order to achieve the desired video quality. No adjustment is needed for playback-only Players because the clip will conform to the settings used for recording, that is, a Player set for “X” Mbps playback will accommodate any VANC as long as the Player used to record the clip used the same bit rate or less.

Notes about VANC for AVC I-frame

- The AVC I-frame format reserves a fixed amount of space for VANC data regardless of whether or not VANC is present. Therefore, the space used for AVC I-frame clips is independent of how much VANC is captured.
- For 1080i resolution, 5760 bytes are reserved for VANC. For 720p resolution, 2880 bytes are reserved for VANC.
- Each VANC packet has **DC** (data count) bytes of payload. Storing a VANC packet in AVC I-frame uses **DC + 7** bytes of the reserved space.

Equation for VANC-328M

The VANC-328M equation can be used to determine the number of bytes required to store VANC data for SMPTE-328M encoding.

The following equation can be used to determine the number of bytes required to store VANC data for SMPTE-328M encoding.

Key:

- **N** = number of VANC packets
- **DCn** = data count for VANC packet n (this data count is the number of user data words in the VANC packet)

$$\sum_{n=0}^{N-1}\left(5+8\left\lceil\frac{1+23\left\lceil\frac{8(7+DC_n)}{22}\right\rceil}{8}\right\rceil\right)$$

Equation for VANC-436M

The VANC-436M equation can be used to determine the number of bytes required to store VANC data for SMPTE-436M.

Key:

- **N** = number of VANC packets
- **DCn** = data count for VANC packet n (this data count is the number of user data words in the VANC packet)

$$2 + \sum_{n=0}^{N-1} 4\left\lceil \frac{17 + DC_n}{4} \right\rceil$$

About AFD support

Note how Spectrum handles AFD data.

The Active Format Description or AFD is a standard set of codes that can be inserted in the baseband SDI video signal which carries information about their aspect ratio and active picture characteristics. Standard AFD codes provide information to video devices about where in the coded picture the active video is and also the “protected area” which is the area that needs to be shown. Outside of the protected area, edges at the sides or the top can be removed without the viewer missing anything significant. Video decoders and display devices can then use this information, together with knowledge of the display shape and user preferences, to choose a presentation mode. The AFD codes are described by SMPTE-2016-1 and RP-186-1995 for HD and SD video respectively.

Spectrum supports AFD for both HD and SD video on the MediaPort 5220, 5320, 5400, 5500, and 7000 series, as well as ChannelPort and Spectrum X.

If the MediaPort you are using supports AFD and you are playing content that contains AFD information, the AFD value in that content will override your player configuration settings in SystemManager. However, even if you are playing content that contains AFD information, make sure to configure the up/down conversion options for your player in SystemManager. This is necessary for the internal converter to be activated. If no AFD information is found in your video content, then the aspect ratio settings selected in SystemManager will be used by default.

NOTE: If you are recording HD video that contains AFD information in the VANC data, make sure to preserve a sufficient amount of VANC data in the stored clip by specifying the appropriate value (up to a maximum of 6000 bytes) on the **Edit Player** page. If you do not set a high enough value, you may lose AFD information.

When playing a clip with AFD values, a Spectrum system looks for the AFD information in the order described in the following table, and then plays out the first AFD value that it finds. This priority is applied when the clip is loaded in order to determine the aspect ratio of the internal up or down converter.

Table 7-5: AFD Priority Table

Priority	Description
1st	**Harmonic aspect ratio flag**
2nd	Encoda aspect ratio flag
3rd	MXF AFD picture essence descriptor value
4th	AFD information in 436M track

NOTE: You can use the Media API to obtain or change the AFD value in a clip.

The following table summarizes all of the Encoda to Harmonic aspect ratio mappings. Note that “Ana” refers to “Anamorphic.”

Table 7-6: Encoda AFD to Harmonic Aspect Ratio Table

TV Width Code (Encoda)	Harmonic Aspect Ratio
(blank)	**Player or Clip Tag Default**
W	Wide (16:9); Up = Ana, Down = Letter
16	16:9; Up = Ana, Down = Letter
14	14:9; Up = Crop, Down = Crop
4	4:3; Up = Pillar, Down = Full
1	AFD = 1, 4:3; Up = Pillar, Down = Full
2	AFD = 2, 16:9; Up = Full, Down = Letter
3	AFD = 3, 14:9; Up = Crop, Down = Crop
5	AFD = 5, 4:3/14:9; Up = Crop, Down = Crop
6	AFD = 6, 16:9/14:9; Up = Crop, Down = Crop
7	AFD = 7, 4:3; Up = Pillar, Down = Full

The following table shows the mapping between Harmonic Aspect Ratio Conversion values and SMPTE 2016 AFD codes.

Table 7-7: Harmonic Aspect Ratio to SMPTE 2016 and RP186 AFD codes

Harmonic Aspect Ratio	AFD Codes for Standard Definition
Anamorphic	**1000/1**
Crop	1011/0
Full	1010/0
Pillar	1001/0

Harmonic Aspect Ratio	AFD Codes for Standard Definition
Anamorphic	**1000/1**
None	Invalid
Harmonic Aspect Ratio	AFD Codes for High Definition
Anamorphic	1000/1
Crop	1011/1
Full	1001/1
Letter	1010/1
None	Invalid

For diagrams of the Harmonic up conversion and down conversion aspect ratio options refer to “About up conversion or down conversion options.”

Related information

About up conversion and down conversion options

About Harmonic timecode behavior

Harmonic has extensive timecode management capabilities for selecting sources, encoding lines, and generating/regenerating timecode at record, and playback time.

Timecode sources may come from the Player’s LTC input connection, be extracted from the vertical interval (VI) of the Player’s source video, or may be automatically generated internally from the system’s MediaDirector reference input (as selected on the **Properties** page in the **General Properties** sections).

Irrespective of Player type - whether Record or Play, a timecode source must be chosen for each Player.

For **Record** Players:

On the **Edit Player** page, the **Record Timecode Source** selection determines if the timecode will be generated internally, or externally.

- If **External** is selected, the source can be either **LTC** or **VITC** (as selected on the **Attach Devices** page).
- If **Internal (TCG on**) is selected, timecode is obtained from the server’s Timecode Generator.

Regardless of the “Input” timecode source, the record input timecode data will be saved as part of the video media file. If the Player is configured to preserve “**VBI data**” (as selected in the **Track Section** of the **Edit Player** page), up to 8 selected lines of information are also recorded with the media file. This option is available for DV 25, DVCPRO 25, DVCPRO 50, and MPEG tracks only.

For **Play** Players:

On the **Edit Player** page, the **Playback Timecode Source** selection determines if the timecode will be generated internally (regardless of recorded data) for each clip — or from the recorded media.

From Clip	Allows you to output the timecode stored inside the clip itself. The timecode is read frame-by-frame from the clip and output using the MediaPort.
Internal (TCG on)	Allows you to output timecode from the server's Timecode Generator. When **Internal (TCG on)** is selected for either Record or "Play" Players, an additional set of options are available to configure timecode generation. The choices are: • **Hold** Allows you to maintain timecode generation at a constant value specified using the Player API. • **Free Run** Allows you to define a continuous increase in value starting from a value specified using the Player API. • **Locked to Player Timeline** Timecode is generated based on the timeline position. Typically, timecode will start from 00:00:00:00 and will be continuous thorough the entire back-to-back clip sequence. • **Locked to Clip's First Timecode** Timecode is generated by the internal Timecode Generator (TCG) but the TCG is re-initialized at the beginning of each clip with the clip's start timecode value, offset by the difference between the "clip in" value used when attaching the clip (OmPlrAttach) and the first frame value of the clip (OmPlrClipGetInfo). When the timeline position reaches the next clip, the TCG again re-initializes to a value based on the clip's start timecode and how the clip was attached. **NOTE:** This option is undefined for a Record Player; selecting this option inserts valid but indeterminate timecode. • **Locked to Clip Position** Timecode is generated by the internal timecode generator (TCG) but the TCG is re-initialized to a value based on how the clip was attached (OmPlrAttach). When the timeline position reaches the next clip, the TCG again re-initializes to a value based on how the clip was attached. • **Locked to VITC input reference**: Timecode is derived from the Vertical Interval Timecode (VITC) in the reference input.

Comparing "From Clip" with "Locked to Player Timeline"

When a clip is recorded with timecode, the timecode values are stored in the wrapper file and media essence file. The wrapper file only holds the start timecode while the media essence file holds all timecode values, frame-by-frame.

The timecode output from a MediaPort can be produced from the media essence file or generated by the MediaDirector's internal Timecode Generator (TCG).

The following figure illustrates a scenario where there are three PAL (625) clips A, B and C, each recorded for 10 seconds (250 frames), and all loaded on to the timeline.

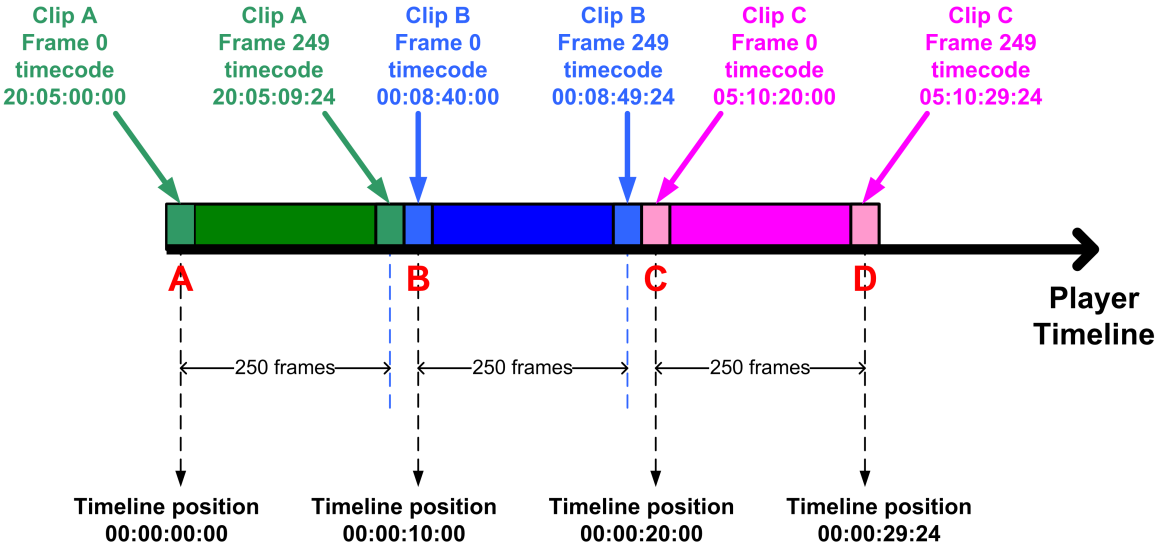


Figure 7-42: Comparing Multiple Clip Timecodes on a Timeline

To output the actual timecode stored inside the media essence file, the Player's **Playback Timecode Source** must be set to "**From Clip**". The timecode is read frame-by-frame from the media essence file and output using the MediaPort. In a back-to-back playback, the timecode output will change when a different clip starts to play. Referencing the previous figure, the From Clip timecode value at points A, B, C, & D are listed in the following table.

Table 7-8: From Clip Timecode Values

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	20:05:00:00
B	00:00:10:00	00:08:40:00
C	00:00:20:00	05:10:20:00
D	00:00:29:24	05:10:29:24

If the Player's **Playback Timecode Source** is set to **Internal (TCG on)** and **Timecode Generator Mode** is set to **Locked To Player Timeline** then the timecode output is generated based on the timeline position. The actual timecode stored inside the media essence file is no longer being used. Typically the timecode output will start from 00:00:00:00 and will be continuous throughout the entire back-to-back. Referencing previous figure, the Locked to Player timecode values at points A, B, C, & D are listed in the following table. .

Table 7-9: Locked to Player Timeline Timecode Values

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	00:00:00:00
B	00:00:10:00	00:00:10:00
C	00:00:20:00	00:00:20:00

Point	Timeline Position	MediaPort Timecode Output
D	00:00:29:24	00:00:29:24

About "Locked to Clip's First Timecode"

If the Player's **Playback Timecode Source** is set to **Internal (TCG on)** and **Timecode Generator Mode** is set to **Locked to Clip's First Timecode** then the internal timecode generator is reinitialized at the beginning of each clip with the start timecode from that clip.

The timecode value is not read frame-by-frame from each clip. The start timecode is read from the wrapper file and used to extrapolate the remaining timecode for the particular clip. As the playback of one clip reaches the end and a new clip begins to play, the Timecode Generator repeats the action by reading the start timecode of the new clip and extrapolates the remaining timecode for that new clip.

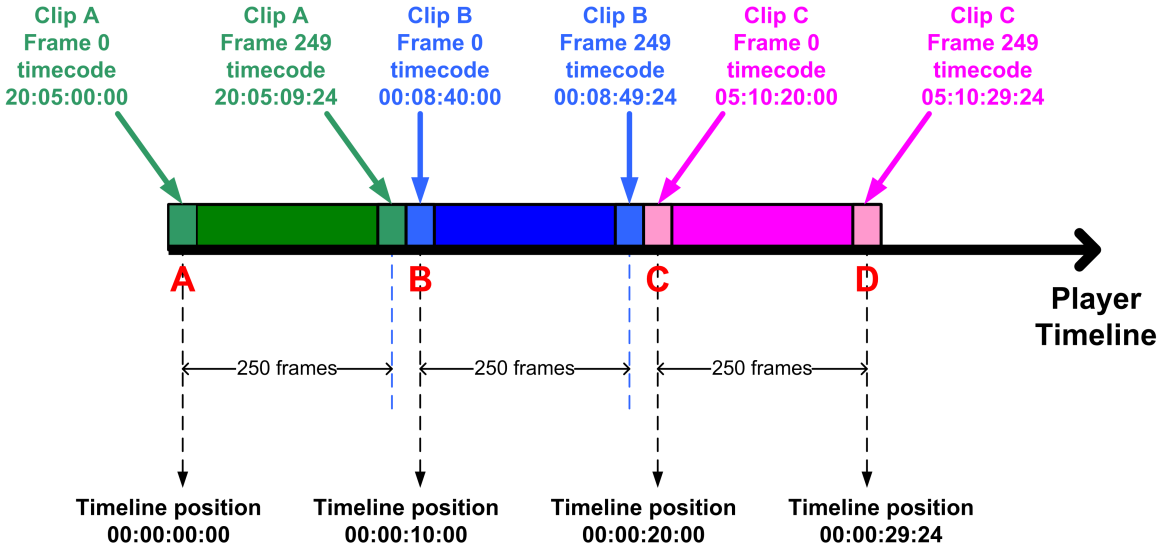


Figure 7-43: Comparing Multiple Clip Timecodes on a Timeline

Referencing the previous figure, the **Locked to Clip's First Timecode** values at points A, B, C, & D are listed in the following figure.

Table 7-10: Locked to Clip's First Time Code Values

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	20:05:00:00
B	00:00:10:00	00:08:40:00
C	00:00:20:00	05:10:20:00
D	00:00:29:24	05:10:29:24

If the timecode stored inside the media essence file has discontinuity, that discontinuity will not affect the MediaPort's timecode output because the timecode output is extrapolated from the wrapper file's start

timecode instead of reading frame-by-frame from the media essence file. This is the main difference between **From Clip** and **Locked To Clip's First Timecode**.

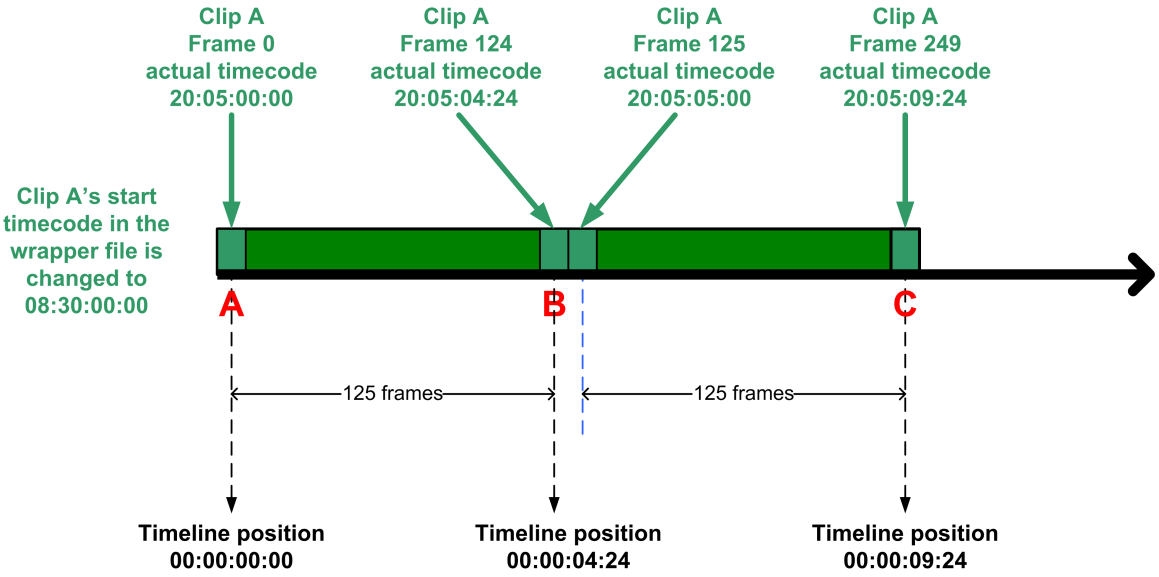


Figure 7-44: Locked to Clip's First Time Code Timeline

Harmonic API commands can be used to modify the wrapper file start timecode without affecting the actual timecode stored inside the media essence file.

For example, clip A's wrapper file start timecode was changed from the original value of 20:05:00:00 to a new value of 08:30:00:00. Referencing the previous figure, "Locked to Clip's First Time Code Timeline," if **Timecode Generator Mode** is set to "**Locked to Clip's First Timecode**" and clip A was loaded and playback, then the timecode output is listed in the following table.

Table 7-11: Modifying Timecode using Harmonic API Commands

Point	Timeline Position	MediaPort Timecode Output	Actual Timecode in Media Essence File
A	00:00:00:00	08:30:00:00	20:05:00:00
B	00:00:04:24	08:30:04:24	20:05:04:24
C	00:00:09:24	08:30:09:24	20:05:09:24

Comparing "Locked to Clip's First Timecode" and "From Clip"

Note the differences between the **Locked to Clip's First Timecode** and **From Clip** options.

The following figure shows a single PAL (625) clip that has been recorder for 30 seconds (750 frames) and with discontinuous timecode.

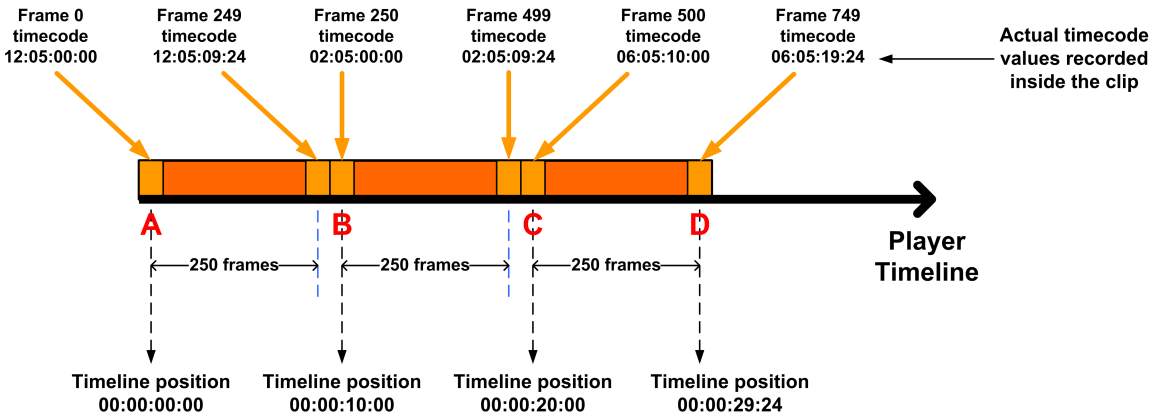


Figure 7-45: Locked to Clip's First Timecode timeline

When the **Timecode Generator Mode** is set to **Locked to Clip's First Timecode**, the internal Timecode Generator only reads the start timecode from the wrapper file and extrapolates the remaining timecode for the same clip.

Referencing the previous figure, the timecode value at points A, B, C, & D are listed in the following table.

Table 7-12: Locked to Clip's First Timecode Values

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	12:05:00:00
B	00:00:10:00	12:05:10:00
C	00:00:20:00	12:05:20:00
D	00:00:29:24	12:05:29:24

When the **Playback Timecode Source** is set to **From Clip**, the timecode is read frame-by-frame from the media essence file and output using the MediaPort. Referencing the previous figure, the timecode value at points A, B, C, & D are continuous as listed in the following table.

Table 7-13: From Clip Timeline

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	12:05:00:00
B	00:00:10:00	02:05:00:00
C	00:00:20:00	06:05:10:00
D	00:00:29:24	06:05:19:24

About "Locked to Clip Position"

If the Player's **Timecode Generator Mode** is set to "Locked to Clip Position" then the internal Timecode Generator is reinitialized at the beginning of each clip, with the IN point of each clip.

For example, if there are two PAL (625) clips A and B, and each clip has a duration of 5 minutes (7500 frames), each clip is trimmed down as shown in the following figure.

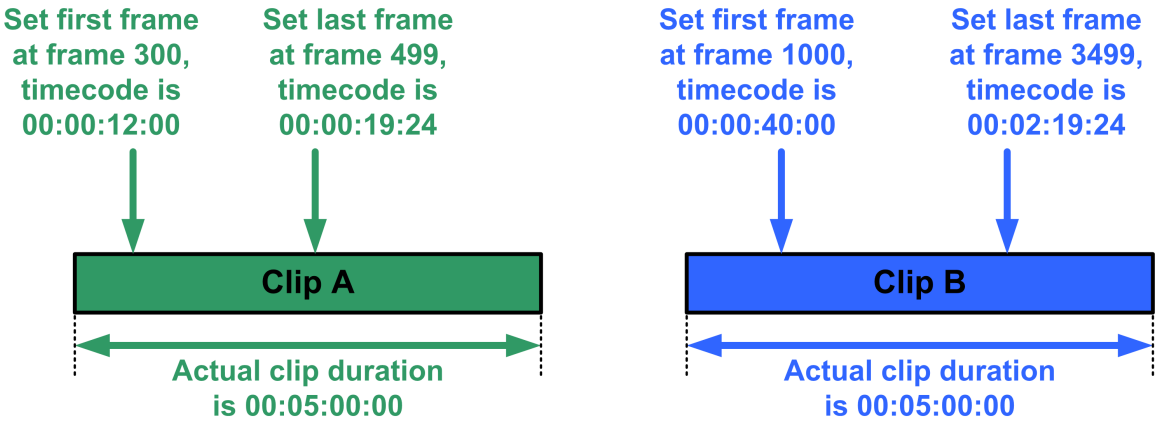


Figure 7-46: Locked to Clip Position Timeline

In the following figure, when the two clips are loaded on to the timeline and playback, the timecode output at points A, B and C are listed in the table that follows..

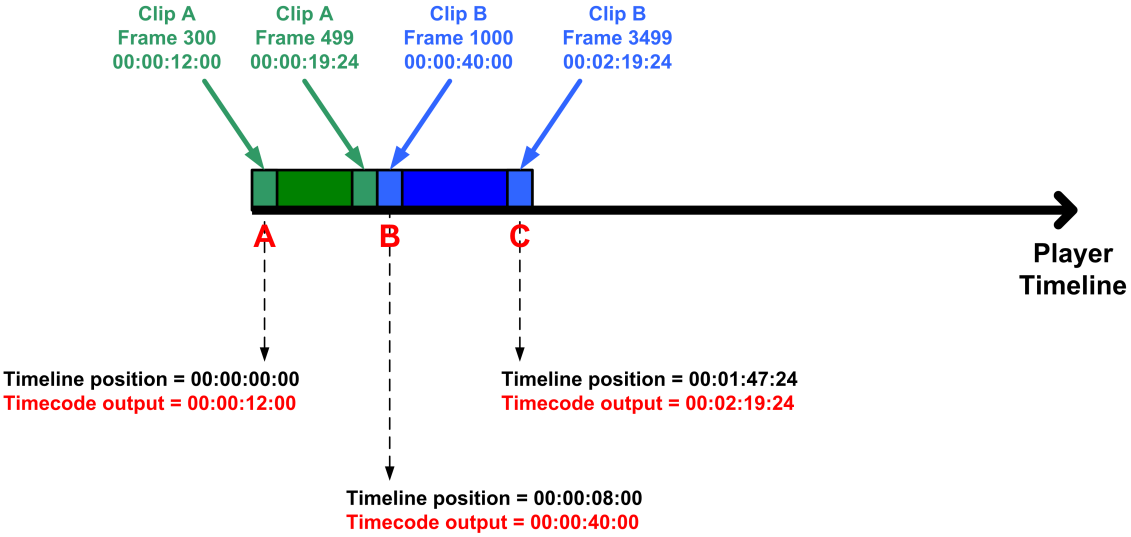


Figure 7-47: Not Locked to Clip Timeline

Table 7-14: Locked to Clip

Point	Timeline Position	MediaPort Timecode Output
A	00:00:00:00	00:00:12:00
B	00:00:08:00	00:00:40:00

Point	Timeline Position	MediaPort Timecode Output
C	00:01:47:24	00:02:19:24

The timecode value is not read frame-by-frame from each clip. Instead the IN point of each clip is read and used to extrapolate the remaining timecode for the particular clip. As the playback of one clip reaches the end and a new clip begins to play, the Timecode Generator repeats the action by reading the IN point of the new clip and extrapolates the remaining timecode for that new clip.

About Cue-to-Timecode with VDCP control

Note some important points about the “Cue-to-Timecode” selection, when choosing VDCP control for a player.

IMPORTANT:

Examples of Cue-to-Timecode Enabled and Disabled

Note examples of Cue-to-Timecode being enabled and disabled.

For both of the following examples, a clip with an ID of “XYZ” has been created with the following metadata:

Clip Length: 00:01:00.00

Start Position: 02:00:00.00

Start Timecode: 12:00:00.00

Example: Example: Cue-To-Timecode disabled

In the following table, with the Cue-To-Timecode setting *disabled*, the first VDCP command will work fine. But the second VDCP command will fail because the decoder is using 02:00:00.00 as the first frame of video, and the start position for that command indicates frame12:00:00.00 as the start.

Table 7-15: Cue-To-Timecode disabled

VDCP Command	ID	Start Position	Length	Will it work?
Cue With Data	XYZ	02:00:00.00	00:01:00.00	Yes
Cue With Data	XYZ	12:00:00.00	00:01:00.00	No

Example: Example: Cue-To-Timecode enabled

In the following table, with the Cue-To-Timecode setting *enabled*, the first VDCP command will work fine. But the second VDCP command will fail because the decoder is using 12:00:00.00 as the first frame of video, and the start position for that command indicates frame 02:00:00.00.

Table 7-16: Cue-To-Timecode enabled

VDCP Command	ID	Start Position	Length	Will it work?
Cue With Data	XYZ	12:00:00.00	00:01:00.00	Yes
Cue With Data	XYZ	02:00:00.00	00:01:00.00	No

About players created with Spectrum Management

With Spectrum 7.6 and later, you may use the Spectrum Management application on the MediaDeck 7000, or (with 8.0 and later) Spectrum X to create players.

IMPORTANT: Players created with Spectrum Management cannot be modified, deleted, activated, or deactivated using SystemManager.

SystemManager will display players created with Spectrum Management in read-only mode, and will not allow any modifications or other functionality. To modify, activate/deactivate, or delete these players, use Spectrum Management.

Chapter 8

Playout channel configuration

Configure a Playout Channel on your Spectrum video server, and configure any services including Polaris Play: Playlist Control (Playlist Control), Polaris Play: Media Fetch (Media Fetch), and Traffic and Billing.

- *About playout channels*
- *About Polaris Play: Playlist Control*
- *Configuring a playout channel*
- *Media Fetch configuration overview*
- *Traffic and Billing*
- *Configuring SNMP critical error traps for Playlist Control*
- *Configuring Delay Service*

About playout channels

A Playout Channel is a process that runs on a Spectrum video server, which provides control for players and graphics, allowing you to preview graphics with PreviewTool as well as control a player attached to an I/O module.

When you use PreviewTool to preview graphics, the Playout Channel retrieves clips from the clips directory and graphics from the graphics directory on the Spectrum video server. Each I/O module channel can be connected to one Playout Channel. The following table shows how many Playout Channels are available per video server.

Table 8-1: Playout Channels per Video Server

Video Server	# Playout Channels
MediaDirector 2201	12
MediaDirector 2202	24
MediaCenter configured with two public networking ports	12
MediaCenter configured with four public networking ports	8
MediaCenter 2200B	20
Spectrum X	4

Video Server	# Playout Channels
MediaDeck 7000	4
MediaDirector 2251B and 2251	12
MediaDirector 2252B and 2252	24

About Polaris Play: Playlist Control

Playlist Control is an optional, licensed Spectrum system feature that provides unattended playout of clips and graphics driven by a channel's traffic schedule.

Playlist Control controls the Playout Channel and graphics plane of a Spectrum system, but it is not a full-featured automation system: each instance of Playlist Control controls only the channel for which it has been configured.

Playlist Control consists of software present on a Spectrum system and tools for monitoring channels and creating traffic schedules including Playlist and Scheduler. For information on Playlist Control and Playlist Control tools, refer to the *Polaris Play: Playlist User Guide*. A Spectrum system that is licensed for Playlist Control can use the Traffic and Billing service and, optionally, the Media Fetch service as well. PreviewTool uses the Playout Channel to retrieve clips from the clips directory and templates from the graphics directory on the Spectrum video server.

NOTE: In order to use Playlist Control to control a player, you must first configure that player to use “Harmonic Playout” for control.

Configuring a playout channel

Configure a playout channel on the Spectrum video server.

Note that when you configure a Playout Channel using the Playout Channel Properties page, you must associate the Playout Channel with an active player only, not an inactive one.

1. In SystemManager, click the **Video Server Services** icon in the left-hand column to open the Video Server Services page as shown in the following figure.

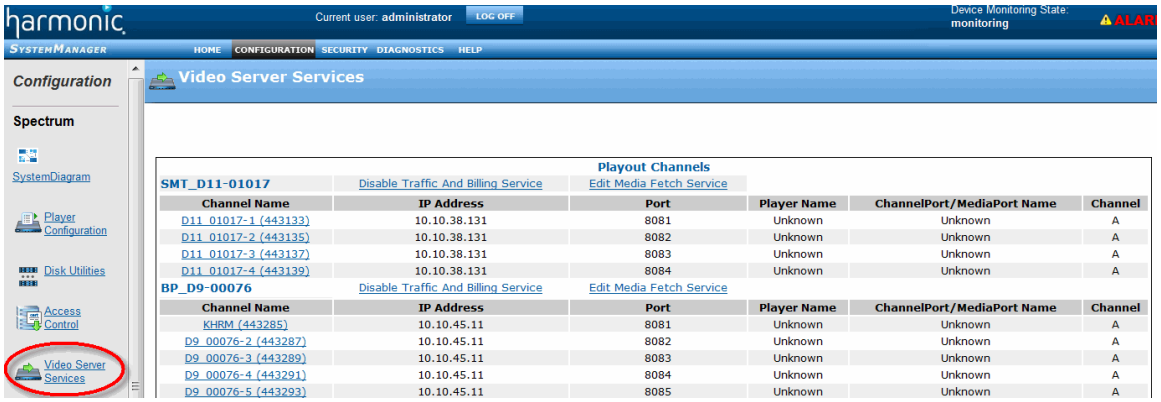


Figure 8-1: Video Server Services Page

From the Video Server Services page, under Playout Channels, you can view details of all the Playout Channels grouped according to video server. For each video server Playout Channel, you can view the following:

- **Channel Name**: Displays the name of the Playout Channel.
- **IP Address**: Displays the IP address of the Spectrum video server on which the Playout Channel is running.
- **Port**: Displays the network port for the Playout Channel. This is the port that PreviewTool and SystemManager use to connect to a Playout Channel.
- **Player Name**: Displays the name of the active player associated with the Playout Channel.
- **I/O Module Name**: Displays the name of the I/O module, which is connected to the Playout Channel.
- **Channel**: Displays the I/O module channel used by the Playout Channel.

2. From the **Channel Name** column click a Playout Channel to open the **Playout Channel Properties** page.
3. On the **Playout Channel Properties** page, configure playout channel settings as necessary.

NOTE: Applying any changes to the Playout Channel causes the channel to restart.

NOTE: When License Enforcement is enabled, SystemManager will display an error message if you attempt to save a Playout Channel that exceeds your license limit. To review your installed licenses, from the **Spectrum Server Properties** page, click **View Licensed features**

Before configuring Media Fetch and Traffic and Billing settings, refer to *Media Fetch configuration overview* and *Traffic and Billing*.

Related information

Player configuration
Enabling and configuring global Traffic and Billing Settings
Media Fetch configuration overview

Configuring channel properties

Configure channel properties for your Playout Channel.

Channel Name	If you wish to change the name of the playout channel from the default, enter the new name. Note this name must match the channel name used in your Playlist Control playlists.
Description	As needed, enter text to describe the playout channel.
Time Zone	Select the desired time zone for this channel from the drop-down menu.
Channel Type	• **Preview**: If selected, this channel can be used with the PreviewTool to run short playlists of video clips or optionally external video with graphic overlays and play them on an I/O module. A Spectrum X or ChannelPort is required if the playlist contains external video or graphics. • **Playout**: If selected, this channel can be used for 24/7 on-air playout of video clips and graphics. The channel can also use the Traffic and Billing

and Media Fetch services. Note that this option is only available with a Playlist Control license.

Startup Offline

When selected, the Playout Channel will start up in Offline Mode. In Offline Mode, the Playout Channel (or Playlist Control) no longer controls the player or graphics on the I/O module. This may be useful if you wish to use Playlist Control as a back-up automation system. When the Playout Channel is offline, and Startup Offline is selected, you may still configure the Playout Channel, load and run playlists or schedules but the Playout Channel will not interfere with external automation control of the player and graphics. Note that the Playlist application can also be set to offline mode.

Playout Channel icons

Playlist Control allows you to load icons to distinguish each channel in Playlist and Scheduler. If you do not provide an icon, Playlist Control will use a default icon. If you provide an icon that is not the correct size, Playlist Control will scale it to the expected size.

- **Small Icon**: To load an icon for use on the channel tab of the Playlist Control tools GUI, click **Browse** and navigate to the desired icon. This option supports .PNG files that are 16x16 pixels or smaller.
- **Large Icon**: To load an icon for use in the single channel event list view and in the multi-channel timeline view in the Playlist Control tools GUI, click **Browse** and navigate to the desired icon. This option supports .PNG files that are 48x36 pixels or smaller.

About Offline mode and Startup states

You can set Playlist to run in offline mode as a back-up automation system.

In Offline mode, Playlist Control may be configured and loaded with schedules or playlists but does not actively control the Spectrum X or ChannelPort. Note that when setting Offline mode, you must also configure the Startup state of the Playout Channel in SystemManager to **Startup Offline** so that when the Playout Channel restarts (which occurs whenever it is configured), it does so in Offline mode, and does not take control of the player or graphics attached to the Spectrum X or ChannelPort.

In SystemManager, from the Playout Channel Properties page, in the Channel section, select **Startup Offline**.

In the Playlist application, select **Playlist Control** > **Offline mode**.

In Playlist, the Offline Mode icon turns yellow when Offline mode is enabled.

NOTE: Applying changes to a Playout Channel instance causes it to restart.

IMPORTANT: External automation systems may require VDCP for player control. When switching to Playlist Control for automation, make sure that you have selected **Harmonic Playout** for Control in your Player settings in SystemManager.

Location

Find information about the location of the Playout Channel.

Host Name	Displays the name of the Spectrum video server.
Network Port	Displays the network port for this Playout Channel. This is the port that PreviewTool and SystemManager use to connect to a Playout Channel.
Client Network Port	Displays the network port that Playlist uses to connect to a Playout Channel. Playlist uses this to transfer playlists and as-run log files.

Selecting controlled devices

Configure the Controlled Devices settings and select the active players to be controlled by Playlist Control.

If your I/O module is in Enhanced Channel mode, you can select two players (channels A and B) to be controlled, as shown in the following figure. Playlist Control allows you to mix between the two players to a single output on the I/O module. If you select two players to be controlled, any Playlist Control transitions that you configure will apply to transitions between those players. In order to configure two controlled players, note the following requirements:

- Enhanced Channel must be enabled on the I/O module.
- The two players must be configured for compatible frame rates and latency.
- Both players must be activated.
- Both players must be configured on the same I/O module but separate channels. For example, if player 1 is configured on Channel A, player 2 must be configured on Channel B.
- Both players must be configured for the same clip directory.

1. Under **Instance 1**, in the **Player Name** field, select the player that will be associated with this Playout Channel. Only players that have a video track attached to an I/O module will be available to select.

   Note the following points:

   - If you have selected **Channel Type: Preview**, all active players will be available in the in Player Name drop-down menu. If you have selected **Channel Type: Playout,** only players configured for **Control: Harmonic** on the Player Properties page will be available.
   - Only active players will be available in Player Name drop-down menu, not inactive ones.

2. (Optional) If Enhanced Channel is enabled, under **Enhanced Channel Instance 2**, in the **Player Name** field, select the player that will be associated with this Playout Channel. The same restrictions described in the previous step apply.

   The remaining empty fields will be automatically filled based on the player settings

Current Player	Displays the name of the player currently associated with this Playout Channel.
Player Name	Select the active player to be controlled by this playout channel.
I/O Module Name	This field automatically displays the name of the I/O module attached to the player shown in the Player Name field.
Current Frame Rate	This field displays the frame rate of the player shown in the Current Player field.

Playout Frame Rate	This field automatically displays the frame rate of the player shown in the Player Name field.
Channel	This field automatically displays the name of the Channel used by the player in the Player Name field.

Related information

Player configuration

Player for Time Reference

The options in the Player for Time Reference section provide time reference configuration for the playout channel.

Same as Player Above	Select this option if you want the current player for this Playout Channel to be used as a time reference for the Playout Channel.
Current Player	Displays the name of the player currently associated with this Playout Channel.
Reference Player Name	From the drop-down menu, select from the list of activated players. The selected player will be used as a time reference for the Playout Channel. Use this setting if you want to use a different player to provide the time reference than the playout channel's current player.
Time Zone	Select the time zone to be used for the reference player. Make sure this matches the timezone reference (house clock). UTC is often the preferred timezone for reference time, but, in some cases, you may have time reference in local time.
Discontinuity Warning	Enter the threshold value used by Spectrum to generate a warning if it detects a discontinuity in the timecode for the I/O module reference. For example, if this value is set to 0, any discontinuity in the timecode will result in warning.
Current Frame Rate	Displays the frame rate for the current player.
Reference Frame Rate	This field automatically displays the frame rate of the reference player shown in the Reference Player Name field.
DST Transition Range	Enter the threshold value used by Spectrum to generate a warning if the daylight savings time transition occurs differently than expected.

Error Checking

The Error Checking settings are used by Spectrum to determine when to send error messages.

Playlist Warning Threshold	Enter the threshold value to be used by Spectrum before sending a warning if there is a problem in the playlist (for example, missing material, or schedule gap). If the time from the current on-air time to time of error is less than threshold, Spectrum will generate a warning.
Schedule Gap Error Threshold	Enter the threshold value to be used by Spectrum before sending an error if there is a gap in the playlist. If there is a schedule gap in the playlist greater than the threshold, then Spectrum will generate an error.

Generate Error on Empty Playlist	When selected, if there are not enough events in the playlist to extend past the time indicated in the Playlist Error Threshold field, Spectrum will generate an error.
Enable Duration Update	When selected, Spectrum automatically checks the duration of a clip on the Spectrum video server and displays this value in Playlist or Scheduler.
Enable Duration Override	When selected, Spectrum checks the duration of a clip on the Spectrum video server and adjusts event durations when the scheduled duration does not match the actual clip duration.
Playlist Error Threshold	Enter the threshold value to be used by Spectrum before sending an error if there is a problem in the playlist (for example, missing material, or schedule gap). If the time from the current on-air time to time of error is less than threshold, Spectrum will generate a error.
Schedule Overlap Error Threshold	Enter the threshold value to be used by Spectrum before sending an error if there is an overlap in the playlist. If there is a schedule overlap in the playlist greater than the threshold, then Spectrum will generate an error.
Missing Material Scan Time	Enter the amount of time Spectrum will look ahead in the playlist when searching for events with missing material.

Graphic Fade Rates

The Graphic Fade Rates section determines fade rates for graphic templates.

Slow Fade Duration (seconds)	Enter the duration you want a slow fade of a template to last. This time duration can be entered as a decimal.
Medium Fade Duration (seconds)	Enter the duration you want a medium fade of a template to last. This time duration can be entered as a decimal.
Fast Fade Duration (seconds)	Enter the duration you want a fast fade of a template to last. This time duration can be entered as a decimal.
Default Fade In Rate	Click the drop-down arrow, and select Slow, Medium, Fast, or Cut to set the default fade in rate of templates.
Default Fade Out Rate	Click the drop-down arrow, and select Slow, Medium, Fast, or Cut to set the default fade out rate of templates.

Transitions

The Transitions section includes settings for primary event transitions

NOTE: This section applies only to primary events, which include clips and external SDI input.

Add or remove transitions as needed using the **Add Transition** and **Remove** options.

Transition Name	Enter the name of the transition. Note this is the same name that is used in the “Transition” field of the Playlist Control playlist.
Transition Type	Select between the following transition types: • **Simple Fade**: Sets the video and audio transition types to Fade.

	• **Simple Mix**: Sets the video and audio transition types to Mix • **Custom Mix**: Allows you to select different video and audio transition types for this transition.
Video Transition Type	Select between Fade, Mix, or Cut.
Video Fade Up	Enter the time from the midpoint of the video transition to the end point of the video transition. This sets the rate for the second half of the video transition.
Video Fade Down	Enter the time from the start point of the video transition to the mid point of the video transition. This sets the rate for the first half of the video transition.
Audio Transition Type	Select between Fade, Mix, or Cut.
Audio Fade Up	Enter the time from the midpoint of the audio transition to the end point of the audio transition. This sets the rate for the second half of the audio transition.
Audio Fade Down	Enter the time from the start point of the audio transition to the mid point of the audio transition. This sets the rate for the first half of the audio transition.
Audio Transition Lag	Enter the number of seconds that the audio transition will lag behind video transition, referenced to the mid point of both. You may enter a negative value if you wish the audio transition to precede the video transition.
Default Transition	Select the transition to be used if the playlist does not specify a transition.

Channel Control

The Channel Control section provides a number of features for controlling a channel.

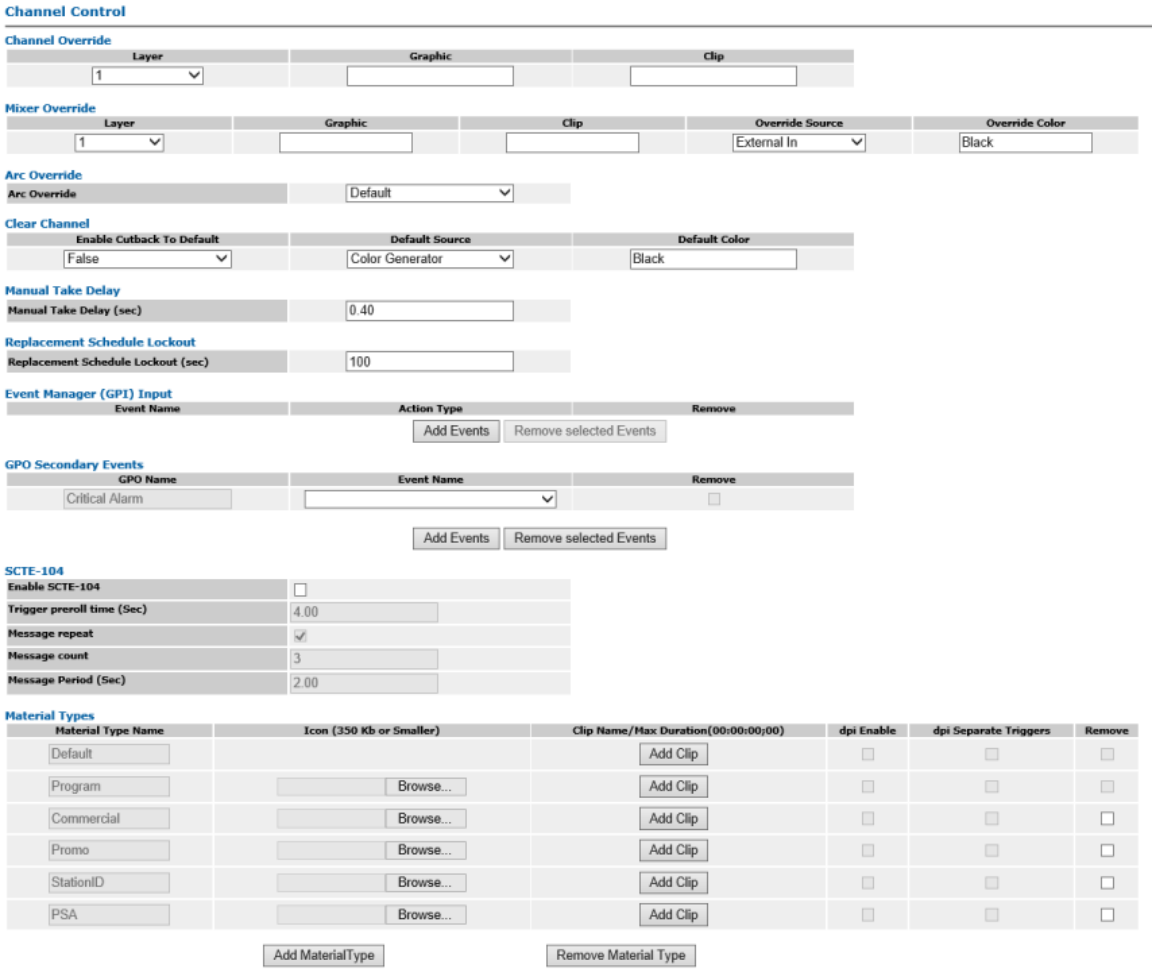


Figure 8-2: Playout Channel Properties

Channel Override

With the Channel Override feature, you can configure the layer, and the graphic or the clip to use when the Channel Override button in Playlist is clicked.

If this section is configured and you click the **Channel Override** button using Playlist, Playlist Control will switch the channel to black, locate the specified graphic or clip, and load it on the specified layer for this channel.

NOTE: If both the Graphic and the Clip fields are empty when the Channel Override button is clicked, the video output will go to black.

Layer	Select the layer to be used to load the specified graphic or clip when a channel is overridden with the **Channel Override** button in Playlist.
Graphic	Type the name of the default graphic template to use when a channel is overridden with the **Channel Override** button (for example, template.swf). The specified graphic must be present in the graphics directory.
Clip	Type the name of the default clip to use when a channel is overridden with the **Channel Override** button (for example, evergreen.mpeg). The specified clip must be present in the clip.dir directory.

Mixer Override

With the Mixer Override feature, you can configure the layer and template to use when the Mixer Override button in Playlist is clicked.

If you click the **Mixer Override** button using the Playlist, and Mixer Override is configured, Playlist Control will switch to the source indicated in the override fields, locate the template specified in this Graphics Template field and load it on the specified layer for this channel.

NOTE: If both the **Graphic** and **Clip** fields are left empty, when the **Mixer Override** button is clicked, the video output will go to black.

Layer	Select the graphics layer to be used when a channel is overridden with the Mixer Override button.
Graphic	Enter the name of the default template to be used when a channel is overridden with the Mixer Override button (for example, *template.swf*). Note that the specified template must be present in the graphics directory. If this field is left empty, when the Mixer Override button is clicked, the video output will go to black.
Clip	Enter the name of the default clip to be used when a channel is overridden with the Mixer Override button (for example, *evergreen.mpeg*). Note that the specified clip must be present in the clip.dir directory. If this field is left empty, when the Mixer Override button is clicked, the video output will go to black.
Override Source	Select the override source to be used when a channel is overridden. Note that available sources depend on your I/O model and channel mode (for example, standard channel or enhanced channel).
Override Color	If **Color Generator** is selected as the Override Source, type a color to be used as the Override Color. Valid options include any color defined by CSS3 (*http://www.w3.org/TR/css3-color/*).

ARC Override

The ARC Override feature allows you to change the aspect ratio of a clip during playout. This may be useful if there is an unexpected issue with a clip.

If you click the ARC Override button in Playlist, the aspect ratio of the current clip will change to the ARC Override setting and last for the duration of the clip.

ARC Override	Select the desired aspect ratio option from the drop-down menu.

Clear Channel

The Clear Channel feature allows you to configure Playlist to clear the playlist and switch to a default source.

Enable Cutback to Default	Select one of the following: • **True**: if selected, enables cutback to a default source after “Clear playlist” is selected in Playlist. • **False**: if selected, no cutback will occur.
Default Source	Select the source to be used when a channel playlist is cleared and “Enable Cutback to Default” is selected. Note that available sources depend on your I/O module and channel mode (for example, standard channel or enhanced channel).
Default Color	If you have selected **Color Generator** as the Default Source, enter the color to be played. Valid options include any color defined by CSS3 (*http://www.w3.org/TR/css3-color/*).

Manual Take Delay

The Manual Take Delay setting specifies the delay time between the current clip and the next clip once **Take Next** is selected in the Playlist.

Note the following considerations when setting this value:

- For V-fade transitions, this value should be greater than the fade down time specified in the Transitions section.
- Transition time will vary according to player load time.
- Transition time will vary according the graphics load time.

Manual Take Delay	The minimum number of seconds required for the Manual Take Delay setting is automatically calculated and displayed as the default. The calculated value is based on the number of frames required for the device in which the player is attached and the frame rate and the latency values configured for the player. The value is editable, so you can increase the value in seconds.

Replacement Schedule Lockout

The replacement schedule lockout time indicates the period of time during which a dropped-in playlist cannot modify the current playlist..

Replacement Schedule Lockout	Enter the desired lockout time in seconds. A valid time is between 8 and 3600 seconds.

NOTE: For the *Backup* channel in a mirrored set up, Harmonic recommends that you leave the **Replacement Schedule Lockout** set to the minimum value of 8 seconds.

NOTE: The on-air event cannot be modified by a dropped-in playlist. To modify the on-air event, use the “modify on-air event” option in the Playlist application.

Event Manager (GPI) Input

The Event Manager (GPI) Input feature allows you to map GPI triggers to Playlist operations.

NOTE: GPI triggers must be configured for the I/O module before they can be mapped.

Add Events	Click to add an event.
Event Name	Select the GPI trigger to be used for a Playlist operation.
Action Type	Select the desired Playlist operation. For details on any of the Playlist operations, see the Playlist Help system or the *Polaris Play: Playlist User Guide*.

Action type options

TakeNext	This activates the Take Next operation in Playlist
ExternalCue	This allows you to trigger events through a GPI.
ToggleOverride	This action toggles the Channel Override operation in Playlist.
SetOverride	This activates Channel Override operation in Playlist until the GPI is de-asserted.
ToggleStopStart	This action starts or stops a playlist in Playlist.
SetStopStart	This action starts or stops a playlist in Playlist until the GPI is de-asserted.
ToggleMixerOverride	This action toggles the Mixer Override operation in Playlist.
SetMixerOverride	This activates the Mixer Override operation in Playlist until the GPI is de-asserted.
ToggleArcOverride	This action toggles the ARC Override operation in Playlist.
SetArcOverride	This activates the ARC Override operation in Playlist until the GPI is de-asserted.
ToggleHoldNext	This activates the Hold Next operation in Playlist.
SetHoldNext	This activates the Hold Next operation in Playlist until the GPI is de-asserted.
DropNext	This activates the Drop Next operation in Playlist.
ChannelClear	This activates the Channel Clear operation in Playlist.
ToggleOffline	This action toggles the Offline mode in Playlist.
SetOffline	This action activates the Offline mode in Playlist.

Related information

Overview of configuring GPIO triggers

GPO Secondary Events

The GPO Secondary Events feature allows you to map secondary events (graphics) to GPO triggers.

NOTE: GPO triggers must be configured for the I/O module before they can be mapped.

Add Events	Click to add an event.
GPO Name	Enter the name that will be used to identify this GPO in the playlist. • **Critical Alarm**: Default GPO trigger. If you wish to receive critical Playlist Control errors via GPO, click the **Event Name** drop-down menu, and then select the GPO trigger to be used for the Critical Alarm event.
Event Name	Select the GPO trigger to be used for the secondary event. If you have not yet configured GPO triggers, this menu will be empty.

Related information

Overview of configuring GPIO triggers

Configuring SCTE-104 for downstream program insertion

With Spectrum 8.2 and later and the SCTE-104 license, you can configure SCTE-104 settings to trigger downstream program insertion (DPI) for certain material types.

The SCTE-104 protocol is used by automation systems to communicate with an "Injector" that inserts SCTE-35 messages into a program stream, providing the downstream DPI information needed to "splice" a different program or commercial material into the program stream. Spectrum acts as a proxy device to accept SCTE-104 messages and place the appropriate ones into the VANC area of the associated SDI video supplied to the injector.

Note the following about Spectrum support for SCTE-104 triggering:

- Splice messages are sent for events, based on the event's material type. Material type configuration determines which events will generate splice requests.
- The splice time is the event start time, and the duration is the event duration.
- Multiple back-back events can optionally generate a single splice request (configured by material type), with a duration that is the sum of the events' durations.
- Spectrum sends a fixed "avail" number of zero for each break, and supports only simple, linear break triggering.
- Spectrum sends a "program ID" of zero in each splice request.
- Spectrum sends splice messages only on the primary output of the I/O module, not on the secondary output.

First, configure the following SCTE-104 settings, and then configure material type settings to enable SCTE-104 triggering.

1. Configure the following SCTE-104 settings.

Enable SCTE-104	Select to enable/disable SCTE-104 triggering.
Trigger preroll time	Indicates the pre-roll time in seconds to be sent in the SCTE-104 splice request.
Message repeat	When enabled, the splice request message will be sent multiple times.
Message count	Indicates the number of times that the splice request message will be sent.
Message Period	Indicates the length of the interval (in seconds) between splice request messages.

Example: If the following settings are configured:

- Trigger preroll time = 4 seconds
- Message repeat = selected
- Message count = 3
- Message period = 2 seconds

Then three splice requests will be sent:

- The first request is sent 8 seconds before the event. (Preroll time + two message periods = 8)
- The second request is sent 6 seconds before the event. (Preroll time + one message period = 6)
- The third request is sent 4 seconds before the event. (Preroll time = 4)

2. In the **Material Types** enable SCTE-104 triggering and configure SCTE-104 settings as follows.
   - **dpi Enable**: Select to enable SCTE-104 triggers for the selected material type.
   - **dpi Separate Triggers**: Select to indicate that separate SCTE-104 triggers should be sent for every event of the selected material type. Note if this option is *not* selected for a given material type, multiple back-to-back events of that same material type will generate a single splice request with a duration that is the sum of the events' durations.

     For example:

     If **dpi Separate Triggers** is *selected*, and two back-to-back events of the same material type are on the timeline, two separate splice request messages will be sent, one for each event.

     If **dpi Separate Triggers** is *not selected*, and two back-to-back events of the same material type are on the timeline, only one splice request message will be sent for both events.

Configuring Material Types

The Material Types feature allows you to associate a material type with an icon or clip, which will appear in Playlist or Scheduler to identify the type of material for a Playlist Control primary event.

The following material types are configured by default: Program, Commercial, Promo, StationID, and PSA.

Material types can be configured with a default clip that plays instead of the scheduled clip if Playlist Control detects any of the following conditions:

- The scheduled clip is missing.
- The scheduled clip is still transferring and not ready for playout.
- The scheduled clip has the wrong frame rate.
- An error occurs when trying to attach the clip to the timeline.

The substitution occurs when the event is added to the timeline. If Playlist Control detects any of the conditions described above, it places the default clip that matches the material type and duration of the scheduled event on the timeline

- To add an icon for a material type, click the **Browse** button for that material, and then navigate to and select the icon you wish to use.
- To add a default clip that will be used in case a substitution is needed for the respective Material type, click **Add Clip** to open two fields.

  1. In the first field, enter the clip name.

2. In the second field, enter the maximum clip duration.
3. Click **Add Clip**.

- Configure SCTE-104 downstream program insertion options as follows:
  - **dpi Enable**: Select to enable SCTE-104 triggers for the selected material type.
  - **dpi Separate Triggers**: Select to indicate that separate SCTE-104 triggers should be sent for every event of the selected material type. Note if this option is *not* selected for a given material type, multiple back-to-back events of that same material type will generate a single splice request with a duration that is the sum of the events' durations.

    For example:

    If **dpi Separate Triggers** is *selected*, and two back-to-back events of the same material type are on the timeline, two separate splice request messages will be sent, one for each event.

    If **dpi Separate Triggers** is *not selected*, and two back-to-back events of the same material type are on the timeline, only one splice request message will be sent for both events.
- To add a new material type, click **Add Material Type**.

  In the **Material Type Name** field for the new material type field, type a name. Add an icon or a default clip, as described in the previous steps.

  NOTE: The **Default** and **Program** material types cannot be removed.

Traffic Settings

Under Traffic Settings you can configure the **Playlist Load Time** by entering the number of hours before the start time of the playlist that the playout channel will load the playlist.

Media Fetch configuration overview

The Media Fetch service is a licensed service that runs on your Spectrum video server and coordinates the transfer of media such as video clips, audio files, or graphical elements from a remote file system to the local file system on your video server via FTP.

Once Media Fetch is configured and enabled for a Playout Channel, Media Fetch will search the FTP servers configured on the Media Fetch Configuration page for any material on the playlist detected by the Playout Channel as missing from the local file system and retrieve that material.

Note the following limitations:

- Media Fetch supports connections to a maximum of four FTP servers.
- Media Fetch supports a maximum of four simultaneous transfers.
- Media Fetch does not support the AS02 wrapper type.
- If a media file is specified without a file extension, Media Fetch will search for it using the following file extensions based on the specified media type:
  - Video files: .mov, .mxf
  - Audio files: .wav, .aiff
  - Graphic files: .swf, .png, .jpg, .jpeg, .bmp, .tga, .mp4, and .flv

- Media Fetch assumes that only media files with extensions of .mov and .mxf may reference additional media files.
- If you have configured subtitles for a player, Media Fetch will search for associated subtitle files based on the subtitle file extensions.

To configure Media Fetch, perform the following procedures in order.

1. *Configuring Media Fetch for the video server*
2. *Configuring Media Fetch for a Playout Channel*

About File System Management

The File System Management feature allows you to manage file space on the video server file system to make room for new media.

Once enabled, File System Management will delete older media files to make room for new media files. It determines which files to delete based on which files are the largest, and then the oldest, and deletes those files first. It also follows the parameters that you set in the **Cleanup Threshold Percent** and **Protected Files** fields. For example, if the Cleanup Threshold is set to 90, once the video server file system is at least 90 percent full, File System Management will delete the largest and least recently used files to maintain 10% disk free space. However, it will not delete any files specified in the **Protected Files** field.

Note the following:

- File System Management only deletes files on video server directories that are currently being accessed by the Playout Channels on the video server. For a given Playout Channel, this includes the directory used by the player shown in the **Current Player** field on the Playout Channel Properties page. By default, these locations include /fs0/clip.dir for video and /fs0/ gfx.dir for graphic and audio files.
- The video server logs the history of all file deletions at /fs0/<dirname>/logs.
- In order for File System Management to work effectively, Media Fetch must be enabled on all Playout Channels. Otherwise, it could delete a file that is used by a non-enabled channel.

Configuring Media Fetch for the video server

When configuring the Media Fetch service, first configure it on the Spectrum video server.

1. From the **Video Server Services** page, locate the video server you wish to configure, and then click the corresponding **Edit Media Fetch** link to open the Media Fetch Service Configuration page as shown in the following figure.

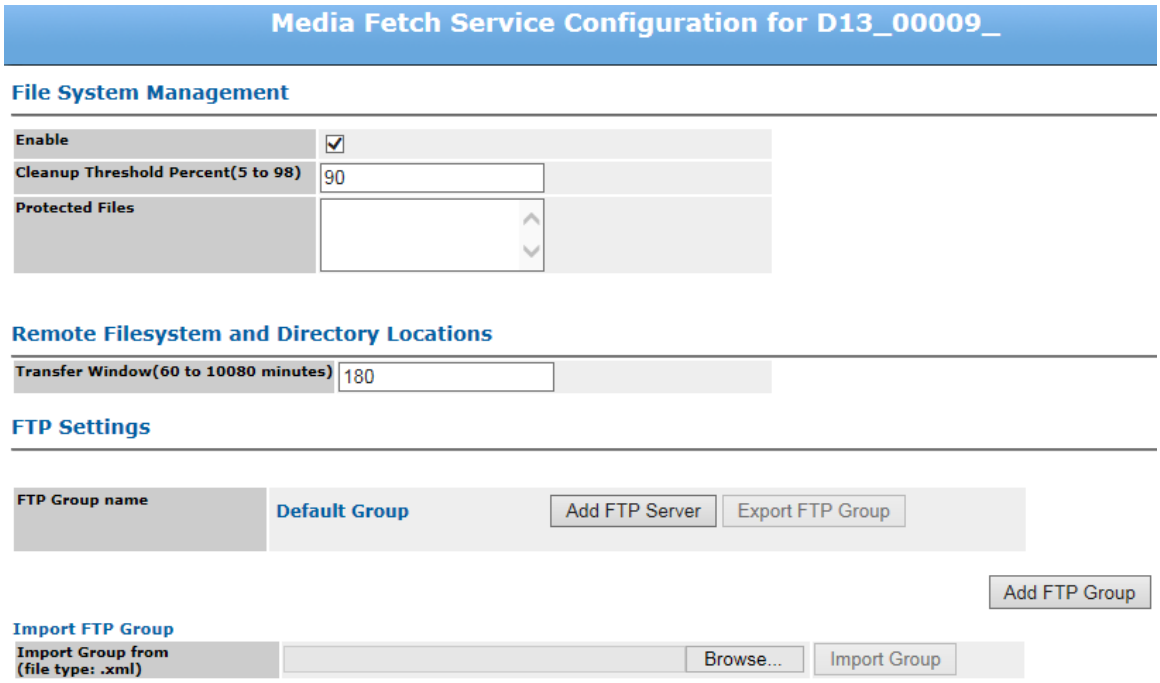


Figure 8-3: Media Fetch Service Configuration Page

2. Configure the **File System Management** section as follows:
   - **Enable**: Click to enable File System Management.
   - **Cleanup Threshold Percent**: Enter the percent of disk space that marks when file system management should start. The default value is 90 percent.
   - **Protected Files**: Enter the names of any files that you wish to not be deleted by file system management (separated with commas or semicolons).
3. In **Remote File System and Directory Locations** > **Transfer Window** enter the number of minutes prior to scheduled air time that a missing file will transfer
4. In the **FTP Settings** section, you can configure FTP groups with one or more FTP servers, import an FTP Group, or export an FTP Group. Once you have configured an FTP group, you may map a playout channel to that group from the Playout Channel Properties page.
5. Click **Apply** to save your changes.

Configuring an FTP Group

With SystemManager 6.3 and later, you can configure one or more groups of FTP servers to use with the Media Fetch service.

Creating multiple FTP groups and mapping your channels to the appropriate group is one way to ensure that each channel accesses the correct assets. For example, you may have duplicate names for assets that exist on multiple servers. Using FTP groups allows you to group assets as needed, and then map your channels to those groups appropriately.

1. In the **Default Group** section, click **Add FTP Server**.

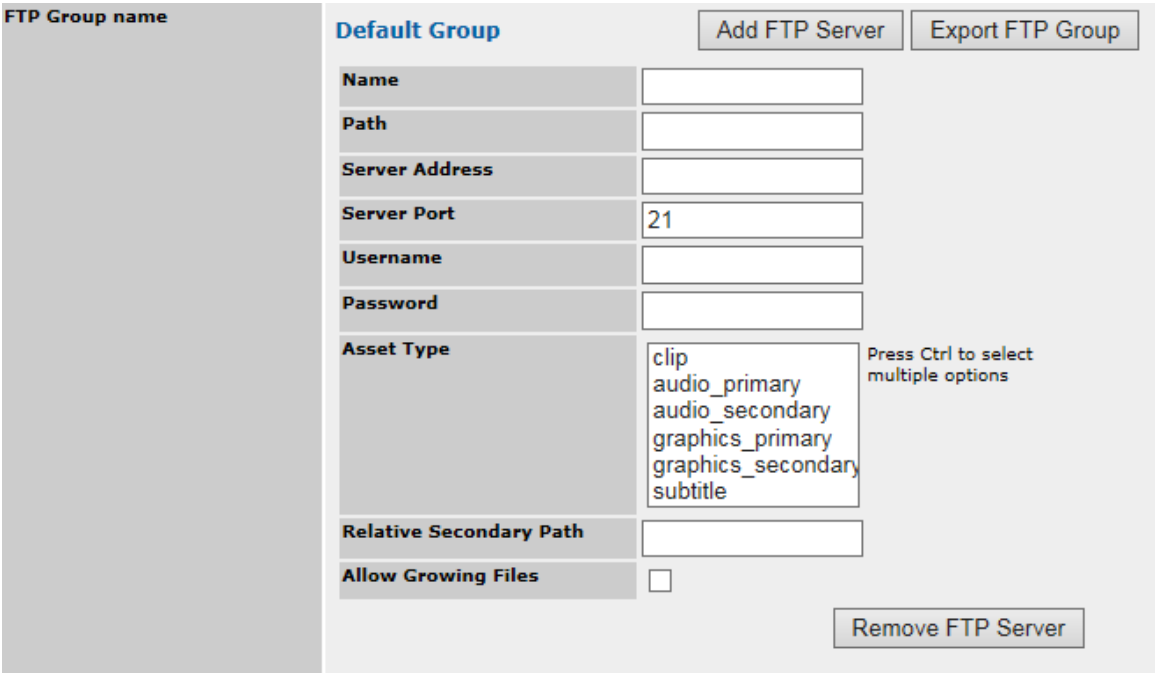


Figure 8-4: Media Fetch Service Configuration—FTP Settings

2. Configure your FTP settings as follows:
   - **Name**: Enter the name of the FTP server you wish to use.
   - **Path**: Enter the path that Media Fetch will us to access files on your FTP server.
   - **Server Address**: Enter the IP address or host name of the FTP server.
   - **Server Port**: Enter the port number for your FTP server that will be used by Media Fetch. The default is port 21.
   - **Username**: Enter the user name for your FTP server.
   - **Password**: Enter the password for your FTP server.
   - **Asset Type**: Select the file types supported by this FTP server. Media Fetch will search the FTP for the selected asset types. Press the **Ctrl** key to select multiple options.
   - **Relative Secondary Path**: If using Independent Branding and organizing the graphics by folder, enter the relative secondary path for independent branding graphics.
   - **Allow Growing Files**: Select to allow download of files that are actively being copied to the FTP server (that is, their file size is growing). Note if you chose this option, the FTP server must support transfer of growing files and the asset model must be Low Latency.
3. Add any additional FTP servers as desired by repeating steps 1-2. You may also import or export an FTP group.
   - To export an FTP Group:
     1. Click the **Export FTP Group** button for the FTP group you wish to export. A message appears asking if you wish to save or open the corresponding XML file.
     2. Save the corresponding XML file for the FTP group to your desired location.
   - To import an FTP Group:
     1. Under **Import FTP Group**, click the **Browse** button to browse to the XML file for the FTP group you wish to import.

2. Click **Import Group**.
3. Verify that the FTP group details appear, and then click **Apply** to save your changes.

4. Click **Apply** to save your changes.

Configuring Media Fetch for a Playout Channel

Configure the Media Fetch service for a single playout channel.

1. From the Playout Channel properties page, make sure you have selected **Channel Type**: **Playout**.
2. From the Media Fetch section of the Playout Channel properties page, make sure the **Enable Media Fetch** check box is selected.
3. In the **Media Fetch** > **FTP Group** field, select the FTP group you have configured in the previous procedure or leave the default.

About mirroring playout channels

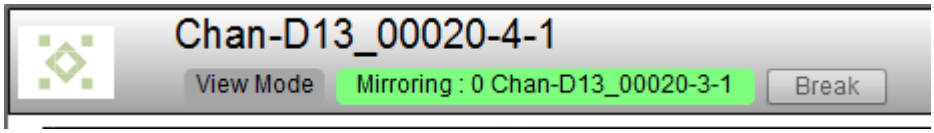
With Spectrum 8.4 and later, you can configure a pair of playout channels to act as a main and a backup channel to provide redundancy in the event of a failure.

When mirroring is enabled from one channel to the other, the channels automatically synchronize playlist updates. For example, if a playlist is added to the playlist folder for one of the paired channels, it propagates to the other channel. Likewise, if you use Playlist to edit the playlist for one channel, the changes are applied to the paired channel as well.

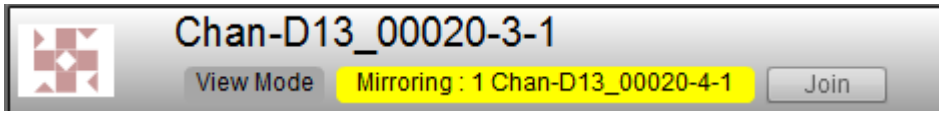
Once the main and backup channels are configured with SystemManager or Spectrum Management, Playlist displays the mirroring status of the two channels and allows you to enable or disable mirroring with a **Join**/**Break** button.

In Playlist, the term “Mirroring” appears next to the channel name for the main or backup channel. The text field changes colors as follows depending on the connection and mirroring status of the paired channel.

- Green: the channel is currently mirroring.

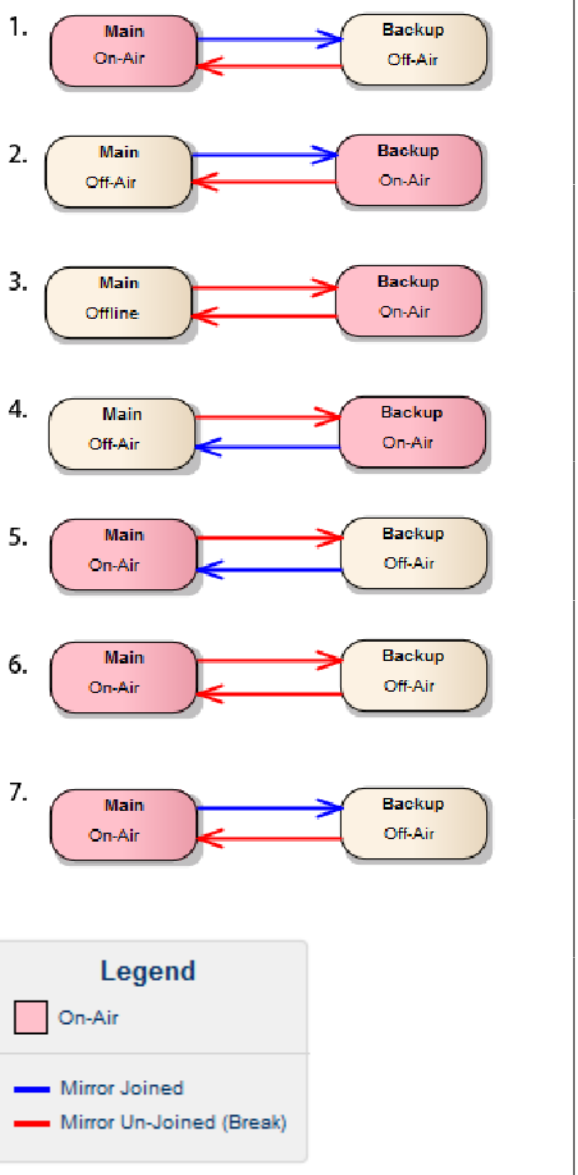


- Yellow: the channel is connected to but not currently mirroring the paired channel.



- Red: there is no connection between the paired channels.

The following diagram shows the suggested recovery sequence in the event of a failure.

1. Normal operation. On Main, the status is yellow and the **Join** button is enabled. On Backup, the status is green and the **Break** button is enabled.	
2. An issue with Main occurs. The on-air system is switched to Backup.	
3. While Main is offline, break mirroring. From Backup, the operator clicks **Break** to break mirroring. The status for both channels becomes red.	
4. When Main is back online, enable mirroring. From Main, the operator clicks **Join** to enable mirroring and synchronize with Backup.	
5. On-air system is switched back to Main. On Main, the status is green and the **Break** button is enabled. On Backup, the status is yellow and the **Join** button is enabled.	
6. Main and Backup are in sync. From Main, the operator clicks **Break** to break mirroring.	
7. Return to normal operation. From Backup, the operator clicks **Join**. The status returns to normal operation (see 1.) for both Main and Backup.	

For instructions on configuring a main and a backup playout channel, see "Configuring main and backup playout channels" in the *SystemManager User Guide* or the Spectrum Management Help system.

Configuring main and backup playout channels

Configure a pair of playout channels to serve as a main channel and a backup channel.

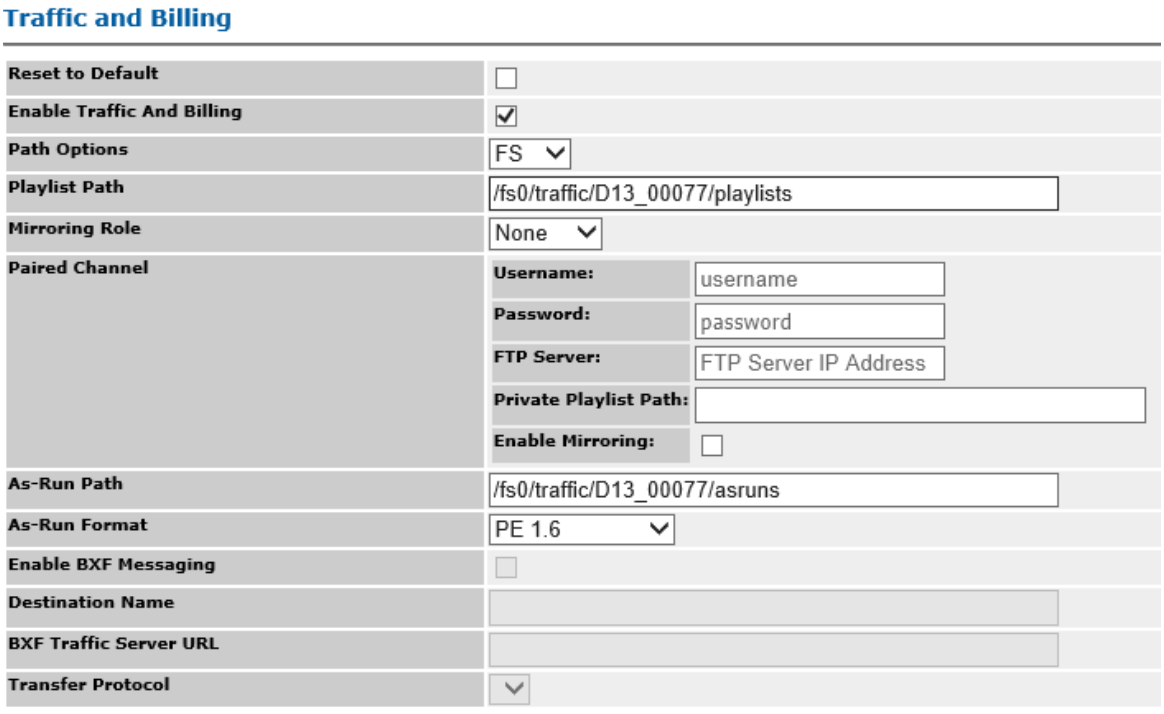
Before you begin

Identify which playout channel to designate as the Main channel and which one to designate as the Backup channel.

NOTE: Harmonic recommends that you designate main and backup channels on separate video servers connected via FTP.

1. Navigate to the **Playout Channel Properties** page for the playout channel to designated as the Main channel.
   a. From the **Configuration** tab, click **Video Server Services**, and then click the name of the playout channel.
2. In the **Traffic and Billing** section of the page for the *Main* channel, configure the following options for mirroring.
   a. **Mirroring Role**: select **Main**.
   b. **Paired Channel**:

Username	Enter the user name for the FTP server (20 character limit).
Password	Enter the password for the FTP server (20 character limit).
FTP Server	Enter the IP address of the FTP server.
Private Playlist Path	Enter the playlist path for the *Backup* channel. Note the default path: `fs0/traffic/[<video server name>]/playout-[<backup channel number>]/Chan-1/playlists`
Enable Mirroring	Select this option only for the “Backup” channel, not the “Main.”



3. Click **Apply** to save your changes.
4. Navigate to the **Playout Channel Properties** page for the *Backup* channel, and configure as follows.

a. **Mirroring Role**: select **Backup**.
b. **Paired Channel**:

Username	Enter the user name for the FTP server (20 character limit).
Password	Enter the password for the FTP server (20 character limit).
FTP Server	Enter the IP address of the FTP server.
Private Playlist Path	Enter the playlist path for the *Main* channel. Note the default path: `fs0/traffic/[<video server name>]/playout-[<main channel number>]/Chan-1/playlists`
Enable Mirroring	Select this option only for the “Backup” channel, not the “Main.”

5. Click **Apply** to save your changes.

Traffic and Billing

Configure specific locations to be used for the playlist or as-run log files.

Note the following:

- In order to use the Traffic and Billing feature, it must be enabled on the video server.
- Multiple Playout Channels may use the same locations for the playlist or as-run log files on a video server. The default locations are shared by all Playout Channels on a video server.
- Note the following default location on your video server for loading your playlists:

```
//<IP address>/fs0/traffic/<serial number>/playlists
```

  - IP address: The IP address of your Spectrum video server.
  - Serial number: The serial number of your Spectrum video server

    Both the IP address and serial number of your video server can be found on the Video Server Properties page.
- Note the following default location on your video server for storing your as-run logs:

```
//<IP address>/fs0/traffic/<serial number>/asruns
```

  - IP address: The IP address of your Spectrum video server.
  - Serial number: The serial number of your Spectrum video server

    Both the IP address and serial number of your video server can be found on the Video Server Properties page.

Related information

Enabling and configuring global Traffic and Billing Settings
Viewing Spectrum video server properties

Enabling and configuring global Traffic and Billing Settings

You may enable and configure traffic and billing for all playout channels on a Spectrum video server.

The traffic and billing service is an integral part of the Playlist Control feature that allows you to upload to your Spectrum system a playlist of primary and secondary events (such as video clips, audio, and graphics) for a specified channel and to retrieve a corresponding as-run file. Once traffic and billing is enabled, you can configure traffic and billing settings and override the default locations of playlist and as-run folders using the Playout Channel Properties page.

Note that any settings you configure for an individual playout channel will override the global settings on the “Edit Traffic And Billing Services” page.

1. Make sure you have created the player you wish to use for Playlist Control and configured it to use “Harmonic Playout” for Control.
2. Make sure you have attached the player you wish to use for Playlist Control to your I/O module, and then activated it.
3. In SystemManager, click the **Video Server Services** icon in the left-hand column to open the Video Server Services page.
4. Under Playout Channels, click **Enable Traffic and Billing Service** for the desired video server to enable and configure Traffic and Billing for all channels on the video server.
5. Configure as follows:
   - **Path Options**: Select **FS** to use a playlist watch folder on the local Spectrum file system. Select **FTP** to use a playlist watch folder on an FTP server. If FTP is selected, enter the following details:
     - **Username**: Enter the user name for the FTP server (20 character limit).
     - **Password**: Enter the password for the FTP server (20 character limit).
     - **FTP Server**: Enter the IP address of the FTP server.
   - **Playlist Path**: Enter the path of the playlist watch folder on the local Spectrum file system to be used for loading your playlist to the video server. Fill in this field only if you wish to configure a different path than the default location. Note that you must use forward slashes in the path name. Back slashes are treated as escape characters and will result in an invalid path.

     NOTE: If this field is changed from the default path, Spectrum will ignore any channel name specified in the playlist file XML and force this channel to be used when the playlist is sent to the Playout Channel.
   - **As Run Path**: Enter the path to be used for storing your as-run files on the video server. Fill in this field only if you wish to configure a different path than the default location. Note that you must use forward slashes in the path name. Back slashes are treated as escape characters and will result in an invalid path.
   - **As-Run Format**: Select the format for the as-run log file:
     - **BXF 2.0**: Select for general BXF compatibility.
     - **BXF 2.0 Myers**: Select for compatibility with the Myers traffic system.
     - **PE 1.2**: Select for Spectrum Playlist Control version 7.6.
     - **PE 1.3**: Select for Spectrum Playlist Control version 7.7 and 7.8.
     - **PE 1.4**: Select for Spectrum Playlist Control version 8.0 and 8.1.
     - **PE 1.5**: Select for Spectrum Playlist Control version 8.2.
     - **PE 1.6**: Select for Spectrum Playlist Control version 8.3.
     - **PE 1.7**: Select for Spectrum Playlist Control version 8.4.

- **Enable BXF Messaging**: Click to enable integration with a BXF traffic system and to receive BXF messages.
- **Destination Name**: Enter the name of the BXF traffic system. If you have selected BXF 2.0 Myers in the As-Run Format field, **Myers ProTrack** is entered automatically.
- **BXF Traffic Server URL**: Enter the IP address of the BXF traffic server.
- **Transfer Protocol**: Select either **REST** or **SOAP** depending on your BXF traffic server. If you have selected BXF 2.0 Myers in the As-Run Format field, SOAP is entered automatically.

6. Click **Apply** to apply all playout channel settings.

   For instructions on creating and loading a Spectrum Playlist Control playlist and retrieving a Spectrum as-run list, refer to “Using Polaris Play: Playlist Control” in the *Polaris Play: Playlist User Guide* .

Related information

Creating a player
Attaching devices and setting conversion options
Changing the player state

Configuring Traffic and Billing for a single playout channel

You can configure settings for an individual playout channel that override the default settings for your Spectrum video server.

Harmonic recommends that you enable and configure default Traffic and Billing settings for all playout chanels on a Spectrum video server first. Then, once you have done that, follow the instructions to change the settings for an individual playout channel, which will override the default settings.

1. From the **Video Server Services** page, click a Playout Channel to open the **Playout Channel Properties** page.
2. In the **Traffic and Billing** section of the page, configure settings as follows:

Reset to Default	Select to configure the Playout Channel to use the default playlist and as-run log locations.
Enable Traffic and Billing	Click to enable or disable the Traffic and Billing service for this channel. Note that Traffic and Billing can be configured per channel or globally for all playout channels on a video server. Note that if you configure Traffic and Billing settings for an individual channel, those settings override the global settings.
Path Options	Select **FS** to use a playlist watch folder on the local Spectrum file system. Select **FTP** to use a playlist watch folder on an FTP server. If FTP is selected, enter the following details: ◦ **Username**: Enter the user name for the FTP server (20 character limit). ◦ **Password**: Enter the password for the FTP server (20 character limit). ◦ **FTP Server**: Enter the IP address of the FTP server.
Playlist Path	Enter the path of the playlist watch folder on the local Spectrum file system to be used for loading your playlist to the video server. Fill in this field only if you wish to configure a different path than the default location. Note that you must use forward slashes in the path name. Back slashes are treated as escape characters and will result in an invalid path.

NOTE: If this field is changed from the default path, Spectrum will ignore any channel name specified in the playlist file XML and force this channel to be used when the playlist is sent to the Playout Channel.

Enable Mirroring	Click the check box to enable mirroring on the paired channel.
As-Run Path	Enter the path to be used for storing your as-run files on the video server. Fill in this field only if you wish to configure a different path than the default location. Note that you must use forward slashes in the path name. Back slashes are treated as escape characters and will result in an invalid path.
As-Run Format	Select the output format to be used for the as-run file ◦ **BXF 2.0**: Select for general BXF compatibility. ◦ **BXF 2.0 Myers**: Select for compatibility with the Myers traffic system. ◦ **PE 1.2**: Select for Spectrum Playlist Control version 7.6. ◦ **PE 1.3**: Select for Spectrum Playlist Control version 7.7 and 7.8. ◦ **PE 1.4**: Select for Spectrum Playlist Control version 8.0 and 8.1. ◦ **PE 1.5**: Select for Spectrum Playlist Control version 8.2. ◦ **PE 1.6**: Select for Spectrum Playlist Control version 8.3. ◦ **PE 1.7**: Select for Spectrum Playlist Control version 8.4.
Enable BXF Messaging	Click to enable integration with a BXF traffic system and to send and receive BXF messages.
Destination Name	Enter the name of the BXF traffic system. If you have selected BXF 2.0 Myers in the As-Run Format field, **Myers ProTrack** is entered automatically.

- **BXF Traffic Server URL**: Enter the IP address of the BXF traffic server.
- **Transfer Protocol**: Select either **REST** or **SOAP** depending on your BXF traffic server. If you have selected BXF 2.0 Myers in the As-Run Format field, SOAP is entered automatically.

3. Click **Apply** to apply all playout channel settings.

Related information

Enabling and configuring global Traffic and Billing Settings

Configuring SNMP critical error traps for Playlist Control

You can configure a Spectrum video server to send trap messages to one or more client systems via SNMP when a critical error occurs on a Playlist Control channel.

1. From the System Diagram, click your Spectrum video server heading (or icon) to open the **Physical Configuration** page.
2. Click the picture of the Spectrum video server to display the **Properties** page.
3. In the **Host Properties** section of the page, in the **Change Settings** field, click **Configure SNMP Traps**. The **Configure SNMP Critical Error Traps for Playlist Control** page appears.

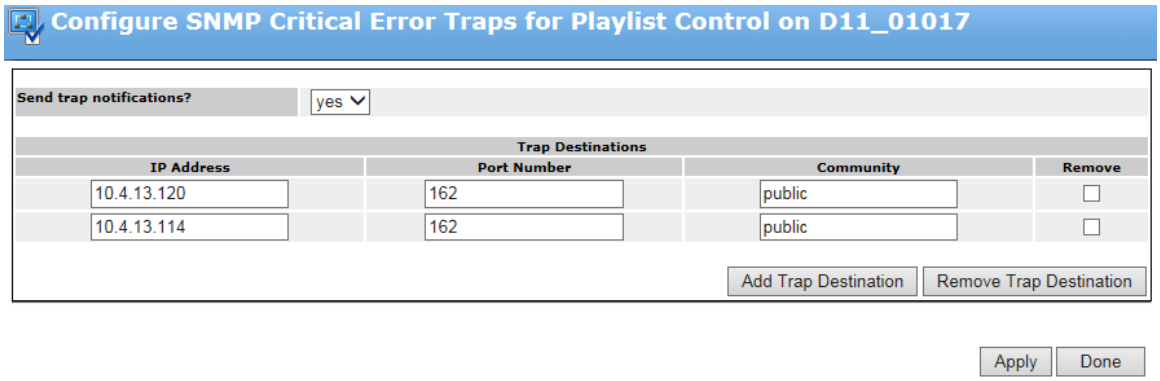


Figure 8-5: SNMP Critical Error Trap Configuration

4. To enable trap notifications, in the **Send trap notifications?** menu, select **Yes**.
5. To add a destination client system, click **Add Trap Destination**.
6. In the **IP Address** field, enter the IP address for the client system.

   For the **Port** and **Community** fields, leave the default values.

   NOTE: Do not change the default values for the Port and Community fields unless instructed by Technical Support.

   4. Click **Apply** to save your changes.

   You may add more trap destinations at any time. To remove a trap destination, click the **Remove** check box and then click **Remove Trap Destination**.

Configuring Delay Service

Delay Service adds real time program delay capability to the Spectrum system. With this licensed service, Spectrum can provide up to 24 simultaneous delayed outputs or delay channels for every ingest.

About Delay Service clips

As Delay Service ingests material, it generates clips with file names that include the name of delay channel and a counter value.

For initial ingest, the file name is in this format:

`delayChannelName_xxx0`

The configured size of the clip segment created during ingest and the maximum amount of delay for the selected playout channels determine how the clip name is processed and incremented. Clips matching the configured clip size will continue to generate until the configured maximum amount of delay is reached. Once this occurs, the oldest clip is deleted every time a new clip is created

For example, if the clip size is set at 15 minutes and the maximum delay is set for 1 hour, the clips generated are named and incremented as follows:

`delayChannelName_xxx0` to `delayChannelName_xxx5`

When `delayChannelName_xxx6` is generated, `delayChannel_xxx0 clip` is deleted.

Two additional clips are generated as a buffer to ensure no clips are deleted when playout is delayed, but close to the time configured for the maximum amount of delay and the time when clips are attached prior to recording.

A clip name for a delay channel can increment up to 3000 times.

Launching Delay Service from SystemManager

You can launch Delay Service directly from the Spectrum video server properties page in SystemManager.

1. From the **System Diagram**, click the Spectrum video server heading (or icon) to reach the **Physical Configuration** page, and then click the video server icon to display the **Properties** page.
2. Under **Host Properties**, in the **Change Settings** field, click **Launch Delay Service**.

Logging in to Delay Service

You can access Delay Service from a web browser on a client computer by using the IP address of your Spectrum video server, or by launching it from SystemManager.

Access the landing page by logging in with either the "user" level account or the "admin" level account.

NOTE: For Delay Service, there is no difference in permissions between the two accounts. However, for Spectrum Management there is. For more details, see the Spectrum Management Help system.

1. Type the IP address of your Spectrum server in your browser.
   The Log in page appears.
2. Type the credentials for the user or admin account, and click **Log in**.

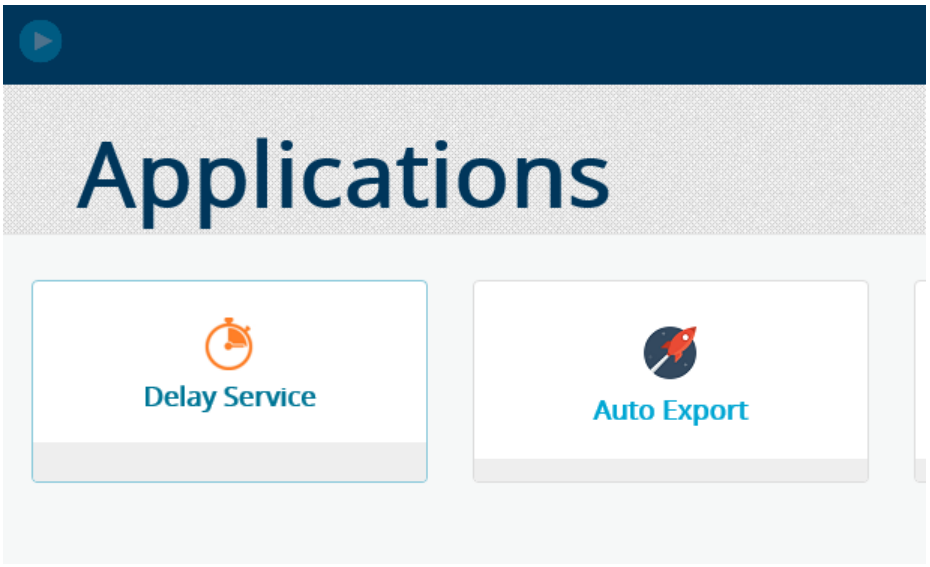
   "user" log in:

   - User name: user
   - Password: user

   "admin" log in:

   - User name: admin
   - Password: omneon

   The landing page appears.



Once you are logged in, you can change your user name and password, by clicking the account icon in the upper-right hand corner of the landing page, and selecting **Change Password**.

3. Click the **Delay Service** icon to open Delay Service.

About Delay Service models

Delay Service provides two different models of delay. Review the different models before configuring your system.

Spectrum delay model

In the spectrum delay model, the same Spectrum video server ingests material and plays it out with a specified delay.

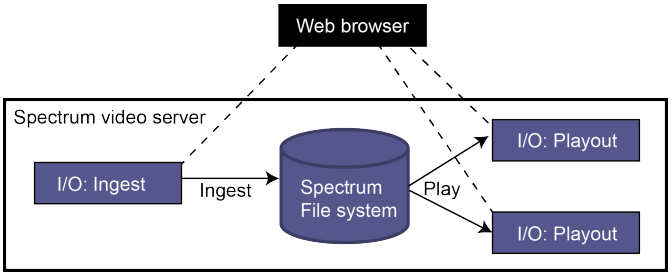


Figure 8-6: Spectrum delay model

Delay Service is licensed per player. The spectrum delay model is supported on any Spectrum video server with Spectrum 8.4 or later installed.

Grid delay model

In the grid delay model, a Spectrum X ingests material and exports it, using Auto-Export, to the Harmonic MediaGrid. Other Spectrum X systems access the material via Media Fetch, and play it out with a specified delay.

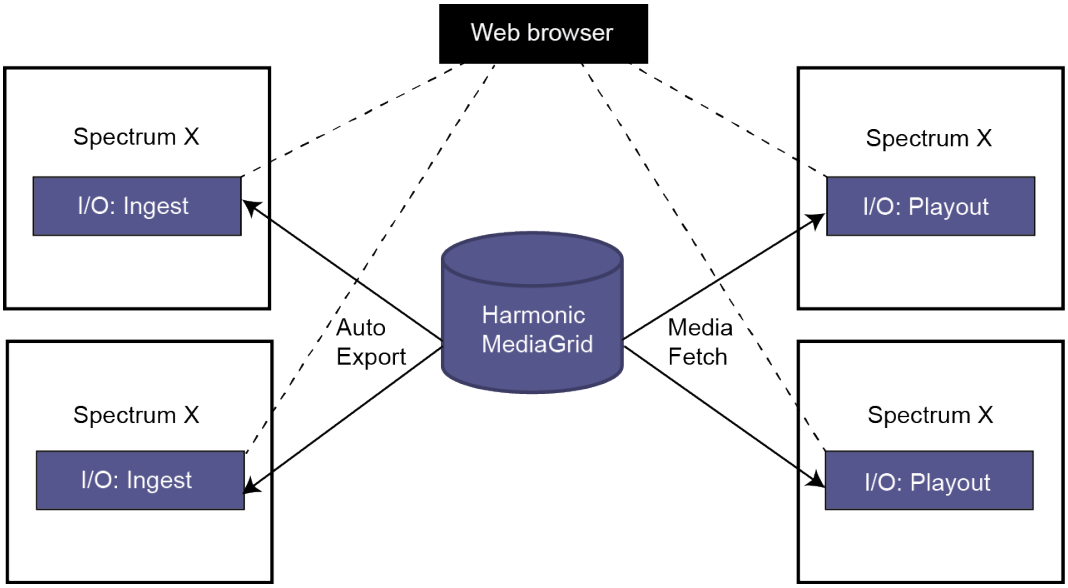


Figure 8-7: Grid delay model

The grid delay model is only supported by the Spectrum X video server running Spectrum 8.3 or later, and a Harmonic MediaGrid system with the ContentServer 4000 series.

Delay Service is licensed per player. In the grid delay model, every Spectrum X must also have an Auto-Export and Media Fetch license installed.

NOTE: Both Media Fetch and Auto-Export are configured automatically when you configure the channels for your system.

Configuration overview

To configure Delay Service, you must also configure the Spectrum Players and Playout Channels that will be used for delay.

1. Using SystemManager or Spectrum Management, configure the Record and Play Players you want to use for delay as **Control**: **Harmonic Delay**.
2. In SystemManager or Spectrum Management, configure the Playout Channel for your Spectrum server as **Channel Type/Type**: **Delay**.
3. Log in to Delay Service and set up your Spectrum video server or multiple servers, depending on the delay model you choose.
4. Using Delay Service, add delay channels to your Spectrum video servers.

SystemManager configuration for Delay Service

Using SystemManager, configure any Players and Playout Channels for that you will use for Harmonic Delay.

Configuring a player for Delay Service using SystemManager

To use a player with Delay Service, the player must be configured for Harmonic Delay.

NOTE: Scroll to the **Required Licensed Feature** section at the bottom of the **Edit Player** page to verify that there is an available Delay Service license on the video server.

1. Navigate to the **Edit Player** page for the Record or the Playout player you want to use with Delay Service.
2. From the **Control** drop-down menu, select **Harmonic Delay**.
   Note that **Default Clip Directory** will be disabled.

   NOTE: Set any Record players that will be used in "grid" delay mode with a Harmonic MediaGrid to a low-latency format.
3. Once you have finished configuring the player, activate it.

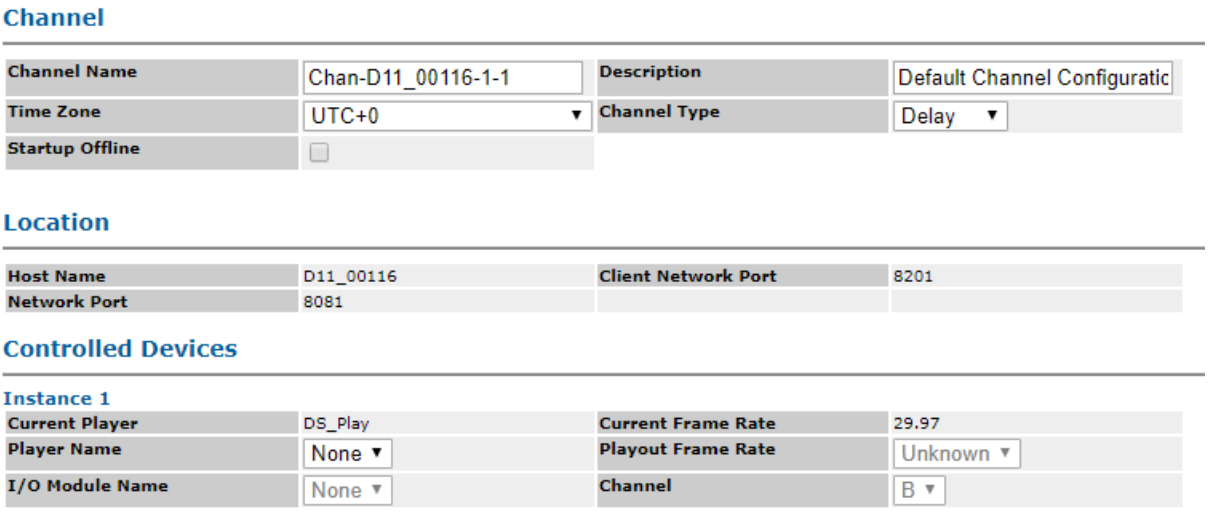
Configuring a Playout Channel for Delay Service using SystemManager

In order to configure a Playout player with Delay Service, it must be controlled by a playout channel.

NOTE: This procedure is not required for Record players.

1. Navigate to the **Playout Channel Properties** page for the playout channel you wish to use with Delay Service.
   To open the **Playout Channel Properties** page, click the **Video Server Services** link in the left-hand column, locate your Spectrum video on the **Video Server Services** page, and then click the playout channel link under the **Channel Name** column.
2. Under **Channel**, in the **Channel Type** field, select **Delay**.
3. Under **Controlled Devices**, click the **Player Name** drop-down menu and select the player to be controlled by this playout channel.

   NOTE: Only active players will appear in this menu.
4. Verify that the player name appears in the **Current Player** field.



Note that Media Fetch is automatically enabled.

NOTE: The **Material Types** section of the **Playlist Control** is where you can configure the backup content to be used in the event the Record player fails. For details, see "Configuring Material Types" in the *SystemManager User Guide*.

5. Click **Apply** to save the changes.

Setting up Delay Service

Delay Service setup varies depending on which model of delay you are using.

Setting up Delay Service for spectrum delay

Configure Delay Service for the spectrum delay model on your Spectrum video server.

NOTE: If DNS names are available, you can enter DNS names instead of specifying IP addresses for your Spectrum or Harmonic MediaGrid devices. However, if you use DNS names, you will need to run the web browser on the same domain as the Spectrum X.

1. From the Delay Service home page, click **Setup**.
2. Under **Configuration**, in the **Delay Model** drop-down menu, select **spectrum**.
3. (Optional) In the **Purge files older than (in hours)** field, enter the number of hour you want Delay Service to wait before purging ingested files from the Spectrum video server.
4. Under **Spectrum servers to configure**, enter the IP address for your Spectrum video server.

   NOTE: If you have an Extended File System (EFS) configuration, make an entry for each Spectrum video server in your EFS that will use Delay Service and enter the IP address for each one.

5. Click **Save** to save the setup and return to the Delay Service home page.
   You can view your setup values at a later time by clicking **Setup**.

What to do next

Continue to "Creating a delay channel."

Setting up Delay Service for grid delay

Configure Delay Service for the grid delay model on your Spectrum video servers.

NOTE: If DNS names are available, you can enter DNS names instead of specifying IP addresses for your Spectrum or Harmonic MediaGrid devices. However, if you use DNS names, you will need to run the web browser on the same domain as the Spectrum X.

1. From the Delay Service home page, click **Setup**.
2. Under **Configuration**, in the **Delay Model** drop-down men, select **grid**.
3. (Optional) In the **Purge files older than (in hours)** field, enter the number of hour you want Delay Service to wait before purging ingested files from the Spectrum video server.
4. Under**Grid Setup**, configure the following values.

MediaGrid Host	Enter the IP address for your ContentDirector.
MediaGrid User Name	Enter the user name for your Harmonic MediaGrid system.
MediaGrid Password	Enter the password for your Harmonic MediaGrid system.

5. Under **Spectrum servers to configure**, click **Add** to make an entry for each Spectrum video server that will be used in the delay channel, and then enter the IP address for each one. This includes the Spectrum video servers recording the content to be delayed with this delay channel, as well as the video servers that are playing out.
   For example, if you have one Spectrum server recording the content to be delayed and two Spectrum servers playing out the content with delay, you will need to add an entry for all three.

   NOTE: Make sure any players and playout channels on those Spectrum servers are configured for Harmonic Delay.

6. Click **Save** to save the delay model configuration and return to the Delay Service home page.
   You can view your setup values at a later time by clicking **Setup**.

Creating a Delay Channel

Create a delay channel for the Spectrum system.

1. From the Delay Service home page, click **Add** to open the **Create a Delay Channel** page.
2. Configure the Delay Channel settings as follows.

Name	Type the name of the Delay Channel.
Delay Channel Stop	◦ **Playback Stop**: When selected, the clip will stop playing once the Delay Channel stops. ◦ **Playback Continue**: When selected, the clip will continue playing after the Delay Channel stops.

Max Allowable Delay	Enter the maximum amount of time that the clip can be delayed. The format for the time entry is HH:MM:SS:FF. The limit is 24 hours.
Delay Type	This field shows the delay model that was selected during setup.
Playout Channel Detach	◦ **Playback Stop**: When selected, the clip will stop playing once the Playout Channel is detached. ◦ **Playback Continue**: When selected, the clip will continue playing after the Playout Channel is detached.
Comment	(Optional) Enter a comment or description for the delay channel. The entered comment will display on the Delay Service home page.

3. Under **Record Player**, configure the following.

Spectrum	Select the IP address of the Spectrum server on which the Record Player is running from the drop-down menu.
Player	Select the Record Player from the drop-down menu. Only players that have been configured as **Control**: **Harmonic Delay** will appear.
Frame Rate	This field displays the Frame Rate of the selected player.
Comment	(Optional) Enter a comment or description for the Record Player.
Add	(Grid delay models only) Click to add a redundant Record Player.
Delete	(Grid delay models only) Click to delete a redundant Record Player.

4. In the **Playout Channels** section, click **Add** to add a Playout Channel, and configure the following.

Spectrum	Select the IP address of the Spectrum server on which the Playout Channel is running from the drop-down menu.
Playout Channel	Select the Playout Channel from the drop-down menu. Only Playout Channels that have been configured as **Channel Type**: **Delay** will appear.
Frame Rate	This field displays the Frame Rate of the player associated with the selected Playout Channel.

Delay	Enter the desired delay time between ingest and playout. Note the following limits according to delay model:
	◦ For spectrum delay:
	  ◦ The minimum value is 30 seconds.
	  ◦ The maximum is the value entered for "Maximum Allowable Delay."
	◦ For grid delay:
	  ◦ The minimum value is 12 minutes.
	  ◦ The maximum is the value entered for "Maximum Allowable Delay."
	NOTE: You cannot add the same Playout Channel more than once for one Delay Channel.

Standby	When selected, the Playout Channel will remain in Standby mode until you click **Attach** from the Running a Delay Channel page, at which point the status of the Playout Channel will change to cued.

Comment	(Optional) Enter a comment or description for the Playout Channel.
Add	Click to add playout channels.
Delete	Click to delete playout channels.

5. Click **Save** to save the Delay Channel and return to the home page.

Delay Service home page options

The Delay Service home page provides an overview of Delay Channels on the system. From here, you can also double-click the Delay Channel name to open the **Running Delay Channel** page and run the Delay Channel.

Filter	This field allows you to search for a specific Delay Channel name on the system.
Refresh	Click to update the Delay Channel list with the latest information.
Auto Refresh	Select from the Auto Refresh list the how often you want refresh to occur automatically. The choices are: • No auto refresh • Refresh every 10 secs • Refresh every 30 secs • Refresh every minute
Add	Click to open the **Create a Delay Channel** page where you can create and save a new Delay Channel.
Setup	Click to open the setup page where you can specify the Spectrum servers and Harmonic MediaGrid to be used and configure other settings such as delay model.
Delay Channel Name	Displays the name of any Delay Channels configured on the system. You can sort by name list by clicking the up/down arrows. Double-click the Delay Channel Name to access the **Running Delay Channel** page for that Delay Channel and run it.
Status	Displays the status of the Delay Channels on the system. You can sort by status by clicking the up/down arrows.
Comment	Displays the comment entered for the configured Delay Channel.
Modify	Click to open the **Modify Delay Channel** page. From this page, you can modify Delay Channel details.
Delete	Click to delete the corresponding Delay Channel.

Running a Delay Channel

From the **Running Delay Channel** page, you can run or stop the Delay Channel, add or delete Playout Channels, change Record Players or Playout Channels, and modify the delay.

1. From the Delay Service home page, move your cursor over the Delay Channel details to highlight it, and then double-click the highlighted area to open the **Running Delay Channel** page.

   NOTE: You can view configuration details for the Delay Channel by clicking the **Show Config** down arrow in the upper right-hand corner.

   From this page, you can run the Delay Channel, and also perform the following, regardless of whether the channel is running or stopped:

   - For Record Players, you can modify fields (to change the Spectrum server IP address, select a different player, or change the comments), start or stop the recording, and view related alarms.
   - For Playout Channels, you can add new playout channels by clicking **Add**. You can modify fields (IP address, Playout Channel name, delay, or comments), detach or attach, delete, or stop or start the Playout Channel, and view related alarms.

   For all changes, you must click **Save** in order for the changes to take effect.

2. Verify the details for your Delay Channel, and then click **Run** at the bottom of the page to start running the channel. When running, the Record players start recording, and the attached Playout Channels load material to the time line at the designated time.

   NOTE: If **Standby** is selected, the Playout Channel will remain in a stopped state until you click **Attach**, at which point it will change to cued.

   To stop the Delay Channel, click **Stop**.

   To return to the home page, click **Done**.

   NOTE: You can modify and save settings when a Delay Channel is running. Please be aware that if you reduce the playout delay, the change will not affect the output for 10 minutes.

Stopping or detaching players

From the **Running a Delay Channel** page, you can stop or detach players while the Delay Channel is running or stopped. Note the difference between the stop and detach operations.

For a Playout Channel, if **Playout Channel Detach: Playback Stop** is selected and you click **Detach**, the Playout Channel material is removed from the timeline, and the **Attach** button is enabled. When you click **Attach**, the material is re-loaded to the timeline without interrupting the Delay Channel.

When you click the red "stop" button, the Playout Channel material is removed from the timeline. In this case, the **Detach** button will be enabled. You can now detach the Playout Channel and then attach it to re-load the Playout Channel material to the timeline.

- To stop a Record player: click the red "stop" button to the right of the player details.
  If you have two Record players, you can stop one and the other will continue to record. Stopping a Record player will not stop the Delay Channel.
- To stop a Playout Channel: click the red "stop" button to the right of the Playout Channel details. This removes the Playout Channel material from the timeline.
- To detach a Playout Channel: click the **Detach** button to the right of the Playout Channel details.

NOTE: Depending on your selection for the **Playout Channel Detach** field on the **Create a Delay Channel** page, one of the following will occur:

- If **Playback Stop** is selected, the clip will stop playing once the Playout Channel is detached.
- If **Playback Continue** is selected, the clip will continue playing after the Playout Channel is detached.

- To attach a Playout Channel: click the **Attach** button to the right of the Playout Channel details. This re-loads the Playout Channel material to the timeline.

Viewing alarms

View alarms related to Record Players and Playout Channels by clicking on the alarm icons in the **Running a Delay Channel** page.

Note that an alarm icon is present even when there is no error.

A blue alarm icon indicates an informational message. This icon appears on the page even when the delay channel is stopped.

A blinking red icon indicates a warning, an error, or a critical alarm. This icon appears only when the delay channel is running and a message has been logged for these status types.

From the **Running a Delay Channel** page:

- Double-click the alarm icon to open the **Alarm** page for a Record Player or the Playout Channels. From this page you can view alarm details.
- Use the navigational buttons in the bottom left-hand corner if there are multiple pages to view.
- To acknowledge the alarm and reset the alarm status to normal, click **Done**. This also returns you to the **Delay Channel** home page. The Delay Channel status will show Running.

Chapter 9

Spectrum client configuration

Find advanced configuration and operation instructions for Spectrum video servers in a Spectrum system.

IMPORTANT: The procedures outlined in this section are written for qualified technical personnel, skilled at advanced networking procedures. If you have any questions, please consult with your facility's Information Service staff or contact Technical Support.

- *Setting IP addresses through vDHCP*
- *About the Domain Name System setup*
- *Adding a new Spectrum video server*
- *About NetBIOS naming*
- *About Spectrum video server network services*
- *About the File Server setup*
- *About client setup*
- *Browsing the Spectrum video server file system from a client*
- *Mapping a Spectrum video server file system to a Windows network drive*
- *Connecting a Macintosh to the Spectrum server using SMB*
- *Playing media files from a Spectrum video server on a Client PC*
- *Copying files from a Spectrum video server to a Client PC*
- *Copying files from a Client PC to a Spectrum video server*

Setting IP addresses through vDHCP

The Internet Protocol (IP) addresses used by Harmonic equipment can either be isolated, or part of a customer's existing network.

Please note the following important points:

- Consultation with your Information Service (IS) staff or a book on TCP/IP basics is *highly recommended* before this step.
- Because there are security implications, an Internet router might be configured as a firewall to prevent unauthorized access.
- The range of IP addresses assigned to the Ethernet is called an IP *subnet*.

IP address assignment is performed through the Dynamic Host Configuration Protocol (DHCP). The SystemManager Platform runs Microsoft Windows 7.

If the Harmonic equipment is part of an existing network that can provide DHCP service, the third party vDHCP server can be turned off. In this case, the customer's network will need to provide the appropriate IP addressing information to the SystemManager and MediaDirector devices.

Despite the word "Dynamic" in its name, vDHCP should be configured to make the IP addresses as permanent (static) as possible after the initial automatic assignment. This is commonly referred to as IP address "reservation." Setting up an IP address reservation for the MediaDirector ensures that it obtains the same IP address from the vDHCP server *every time*. Reserving the MediaDirector's IP address is recommended—but not mandatory.

NOTE: Each MediaDirector host must have a unique IP address.

1. Determine the MediaDirector's IP and Ethernet (or MAC) addresses. To do this, ensure that the MediaDirector is powered on.
2. If the MediaDirector is properly connected within your system and powered on, it has received a single IP address (MediaDirector 2100) or multiple addresses (MediaDirector 2101, 2102, or 2102B) from the vDHCP server. To find the IP addresses:
   a. Start the SystemManager application.
   b. Click the **Configuration** tab to display the **Configuration** page.
   c. In the **System** diagram, click a "single" MediaDirector host icon (not the dual host icon) to display the **Physical Configuration** page.
   d. Click the MediaDirector's picture to display the **Properties** page.
   e. At the top of the page, make a note of the selected host's IP address. The vDHCP server has assigned this IP address, but it is a dynamic IP address and not a static or "reserved" one.
   f. Repeat steps **b** through **e** for the additional MediaDirectors and subsequent MediaDirector hosts.
3. Launch the vDHCP application by double-clicking the small **vDHCP** icon located in the bottom right corner of the desktop, on the Task Bar.

   The **vDHCP Settings** window appears.

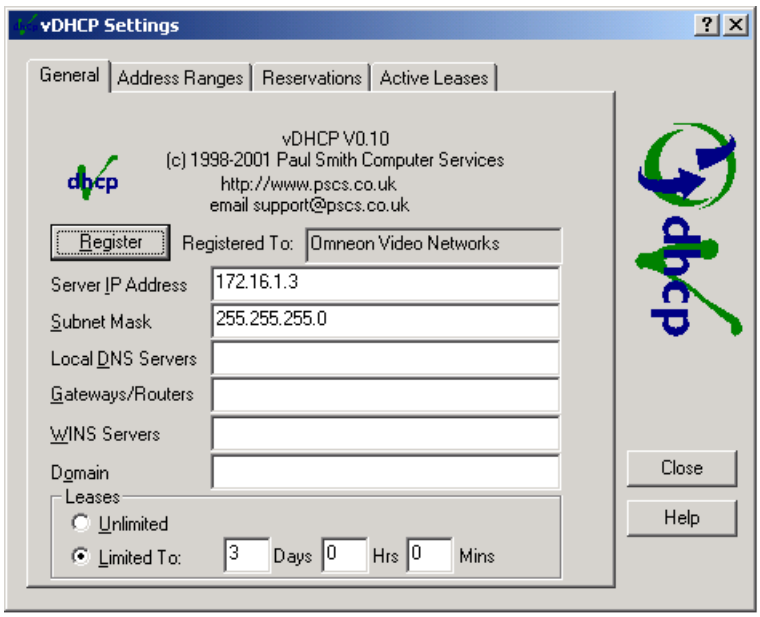


Figure 9-1: VDHCP Settings window

4. Click the **Active Leases** tab to display a list of all the IP address leases that have been assigned by the vDHCP server. A sample tab is shown below.

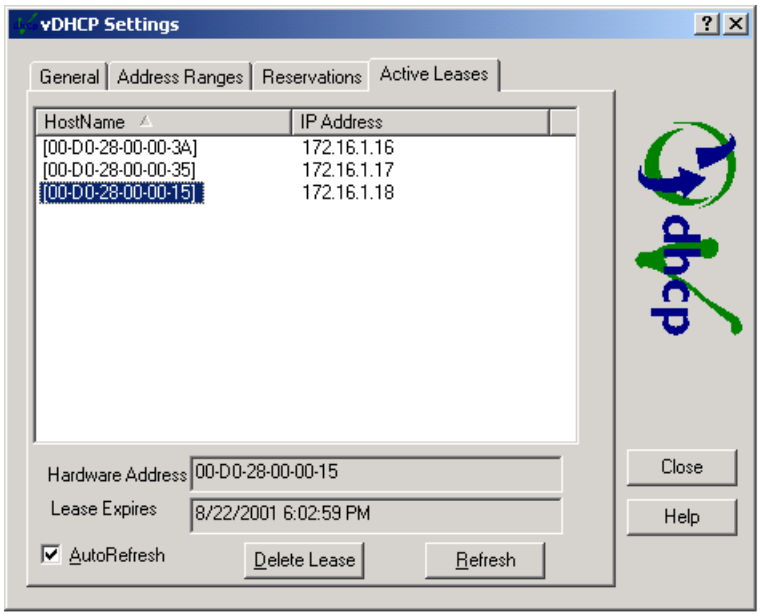


Figure 9-2: VDHCP Settings—Active Leases Tab

5. In the list, highlight the entry for the first host's IP address. Next, copy (CTRL+C) the Ethernet address that appears in the **Hardware Address** field.

   NOTE: It is recommended that you use the host's current IP address for the reservation. If you decide to use another IP address, ensure that the IP address is within the address range specified in the vDHCP UI's "Address Ranges" tab. The range is preceded by a green check mark. In addition, ensure that the IP address that you wish to use does not currently belong to any other device, and that it is not reserved. If required, click the Help button on the vDHCP UI for more information about ranges and reservations.

6. Click the **Reservations** tab, a sample of which is shown below.

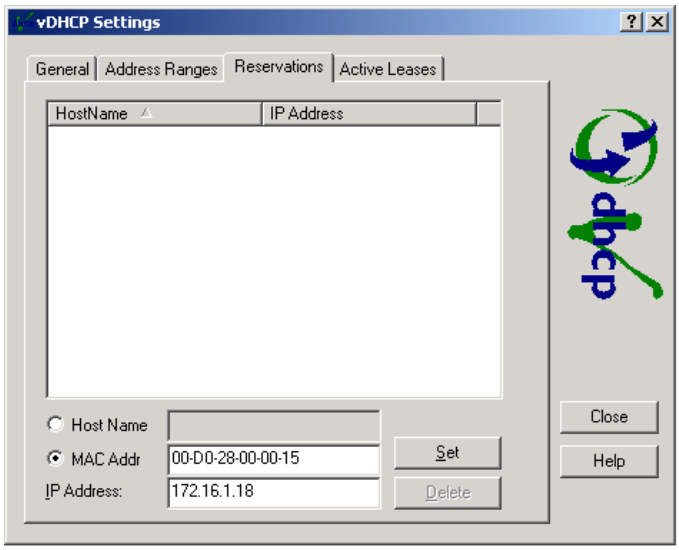


Figure 9-3: VDHCP Settings—Active Leases Tab

At the bottom, click the **Mac Addr** radio button, and paste (CTRL+V) in the Ethernet address. Next, click in the **IP Address** field and enter the host's IP address (as you noted in step 2).

IMPORTANT: Check your entries. The MediaDirector will not function properly if the Ethernet and IP addresses are incorrectly entered.

7. Click the **Set** button to activate the reservation for the selected host.
8. Repeat steps 4 through 7 for additional hosts.
9. Reboot the MediaDirector.
10. As outlined in step 2, navigate to each host's **Properties** page and ensure that the selected host has received the IP address that you just entered on the vDHCP **Reservations** tab.

NOTE: If you have a system that includes multiple MediaDirector, such as an EFS system, the procedure Changing Network/File System Performance Settings

About the Domain Name System setup

The Internet Domain Name System (DNS) can be used to allow Spectrum video server hosts to be named consistently across multiple Platforms, from anywhere on the Internet.

Having a DNS server is not mandatory for Harmonic devices to function. Any DNS server can be used to provide name service. You may skip the remainder of this section if you do not plan to use a DNS server.

Adding entries to the DNS database for Spectrum video server hosts allows name-based access to the hosts (as opposed to using IP addresses). In addition, the DHCP server should be configured to give out the address of a DNS server to Spectrum video servers, so that the hosts can name themselves. If the default DNS server is on another IP subnet than the Spectrum video server host, a default route must also be given on the DHCP server.

DNS names are case insensitive on look-up of addresses *from* names, but they preserve upper and lowercase on look-up of addresses *to* names. For example:

- If the name "SportsServer" is assigned IP address 1.2.3.4, "SPORTSSERVER" and "sportsserver" will also map to 1.2.3.4.
- If 1.2.3.4 is mapped to a name, SportsServer is returned.

Multiple names can be assigned to the same address, for example, for logical names. For best results, keep the names (up to the first dot) under 15 characters in length, and use only letters and digits — so that they match the NetBIOS names described below. Using descriptive names that match physical labels on the Spectrum video servers themselves is a good policy.

Adding a new Spectrum video server

Set up a new Spectrum video server on a TCP/IP network.

1. If you have a DNS server, create a name for the Spectrum video server in the DNS server. Create DNS entries in both directions, “**A**” records and “**PTR**” records. The “**A**” record maps a host name to an IP address in a DNS zone. Its counterpart (the **PTR** resource record) is used to map an IP address to a host name in a DNS reverse lookup.
2. Add the address (as assigned in step 1) to the DHCP server (**vDHCP**).
3. Connect the Spectrum video server to a network with a vDHCP server.

   For details, refer to the *Spectrum System Installation Guide*.
4. When power is applied, each Spectrum video server host attempts to obtain an IP address from the DCHP server. If it does not succeed, the Ethernet LED or LEDs (for one or both hosts) on the Spectrum video server’s front panel flash. The hosts continue to look for a DCHP server until they are successful, as indicated by the LEDs in a steady **ON** condition.

   Refer to **MediaDirector Orientation** in the *Spectrum Installation Guide* as required for a complete description of all front panel LED assignments.

   NOTE: A default route is also requested from the vDHCP server. This route is required if clients from more than the local network will access the server.
5. Once a host has an IP address, it attempts to get a name from the DNS server that corresponds to its IP address, using the “**PTR**” record added in step 1 above.
6. If there is no DNS server present, or if there is no entry for the host, the host will assign a name for itself. See “Default names for Spectrum video servers.”

   If the DNS names were not found on the first try, reboot the Spectrum video server again.
7. Use the vDHCP manager to mark the IP addresses that were assigned to the host Ethernet addresses as permanent.

Related information

Setting IP addresses through vDHCP

About NetBIOS naming

In addition to the standard Internet Domain Name System, the NetBIOS system is also used on Windows platforms.

Instead of being centrally administered, each device (such as a PC or a Spectrum video server) names itself and broadcasts "advertisements." A *master browser* on each subnet picks up these broadcasts automatically, to allow individual Windows users to see who is on the local subnet. In a small installation, this mechanism may be sufficient, thus avoiding the DNS set up. For best results, keep both names consistent (DNS and NetBIOS).

NOTE: When users assign a NetBIOS name to a host from the SystemManager, it should be unique on the network. This not only applies to the Spectrum video server host, but also to a Windows PC or any other device that advertises its NetBIOS name. Refer to "About Device Name Limitations" for additional information.

When Spectrum users talk about "seeing" a Spectrum video server, they are usually talking about browsing into it from a client. Please note the following important points:

- For mapping names to addresses, both DNS and NetBIOS are case insensitive. However, while DNS preserves the upper/lower case in the name, NetBIOS converts the name to all upper case.
- The name as seen in a Windows browser shows the first character upper case, and the remainder lowercase; the actual NetBIOS representation is all upper case.
- Although NetBIOS allows some other special characters in its names, using only letters and numbers is compatible with DNS. NetBIOS names are limited to 15 characters.
- The name displayed by the SystemManager is the NetBIOS name. Changing the Spectrum video server's name within the SystemManager only changes its NetBIOS name.
- Remember that the MediaDirectors 2101, 2102, and 2102B have multiple hosts, all of which may be browsed independently from a client. However, the hosts will display the same file information.

About Spectrum video server network services

Note the TCP/IP services that are implemented on the Spectrum video server.

- Network file access using the CIFS protocol.
- File Transfer Protocol (FTP). Many platforms (Microsoft Windows and others) include both command line FTP programs, and browsers that take URLs of the form ftp://MediaDirector Name/fs0.
- Monitoring and management. Private messages are sent from each Spectrum video server to the SystemManager.
- Network file access using the AFP (Apple File Sharing) protocol. This allows Macintosh computers to access media on a Spectrum video server.
- Spectrum Player Control Protocol. Messages are sent from each control application, such as the ClipTool — to and from the Spectrum video server being controlled.

NOTE: The services listed above are available from any single-host or multiple-host Spectrum video server. The first four services provide the same information regardless of which host is used. The "Player Control Protocol" service provides information that pertains only to Players configured on the individual host.

About the File Server setup

The Spectrum video server provides file server functionality similar to that of Microsoft Windows*.

The protocol by which such servers and clients exchange information is called the **Common Internet File System** (CIFS), but it is better known by its historical name, **Server Message Block** (SMB). CIFS is also referred to as **Samba** on UNIX systems that include a software suite that implements the SMB protocol.

The Spectrum video server's CIFS file server allows Windows, Macintosh, and Linux clients to access media on the Spectrum video server's file system in much the same way as they would access files on a standard Windows server. This allows customers to use many of the powerful software packages available for video production and media management, using industry standard computer platforms—in conjunction with content recorded on Harmonic products.

Note the following important points regarding MediaDirector 2101, 2102, and 2102B hosts:

- All hosts provide the same identical view of the MediaDirector's file system information.
- Each host runs a separate CIFS server, and each host's CIFS setup is configured individually.

About client setup

Note some important points regarding client setup.

- Microsoft Windows clients need no additional software to access a Spectrum video server.
- Macintosh OS 9 and earlier clients require a third-party software program such as DAVE, from Thursby Software Systems, Inc. to support SMB mounted file systems.
  - You should install DAVE on your Macintosh before proceeding.
  - Another approach is to use a PC emulator package, such as Virtual PC from Microsoft.
  - Macintosh OS X clients need no additional software to access a Spectrum video server.

    NOTE: Macintosh clients may also access Spectrum video servers using the AFP protocol, in addition to CIFS.

If you are mounting a Spectrum video server to a Linux client, Harmonic recommends that you use the “mount -t cifs” command and not the “mount -t smbfs” command.

Client platform-specific instructions are provided for accessing the Spectrum video server file system from both Windows and Macintosh OSX based computers. For specific help on the OS 9 Macintosh user interface, refer to the documentation and help provided by the vendor of the DAVE application. The instructions beyond accessing files in the following sections are specific to Windows clients, although the concepts are the same for Macintosh clients.

Clients should be configured to use a naming protocol (DNS or NetBIOS) that has been set up as described in this chapter. This is another reason to keep DNS and NetBIOS names consistent — clients are more likely to work no matter how they are setup.

Browsing the Spectrum video server file system from a client

Browse the file system from a client connected to a Spectrum video server.

1. Open the **Network and Sharing Center**.

2. Click **Entire Network** > **Microsoft Windows Network** > **Workgroup**. You will find an icon for each Spectrum video server host on your subnet. If the Spectrum video server hosts do not appear, enter the **\\MediaDirector Host Name** or **\\IP address** in the address bar.
3. Double-click the host icon to display a folder (share) typically called "fs0." This name corresponds to the Spectrum video server's File System name. There will be a share for each File System on the Spectrum video server. For an EFS (Extended File Sharing), a file system could be visible and accessible from all the MediaDirectors sharing the file system.
4. Double-click on the share to view the file system and folders as desired. The following figure illustrates a *sample* system that includes multiple MediaDirectors.

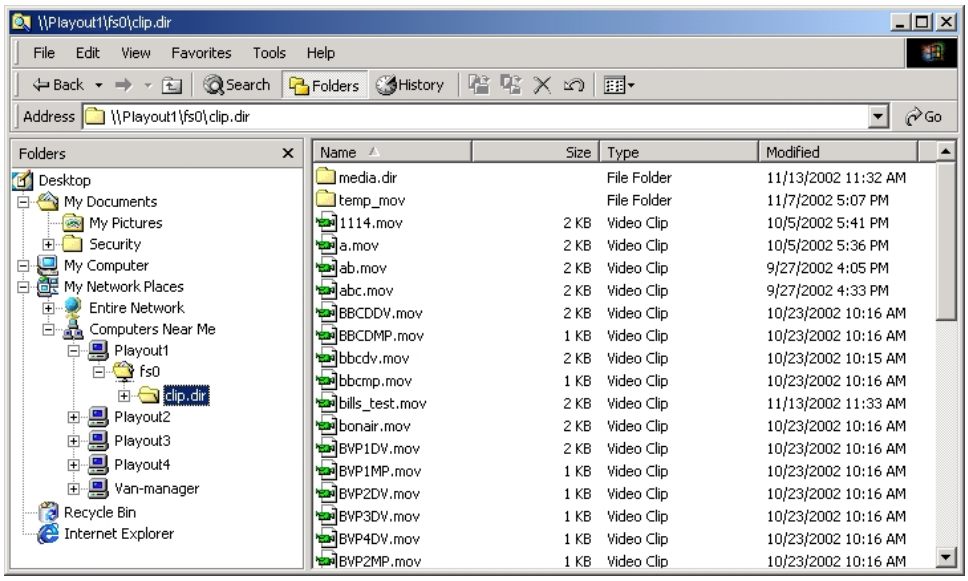


Figure 9-4: MediaDirector File System in Client Window

5. The properties of a folder or an individual file can be viewed by right-clicking on the corresponding icon.

   The following figure illustrates a sample **Properties** dialog for a .mov file. Only "**Created**" and "**Modified**" times are stored on a MediaDirector. The time given as "**Accessed**" is really the "**Modified**" time. Security attributes on files are not supported in the current release.

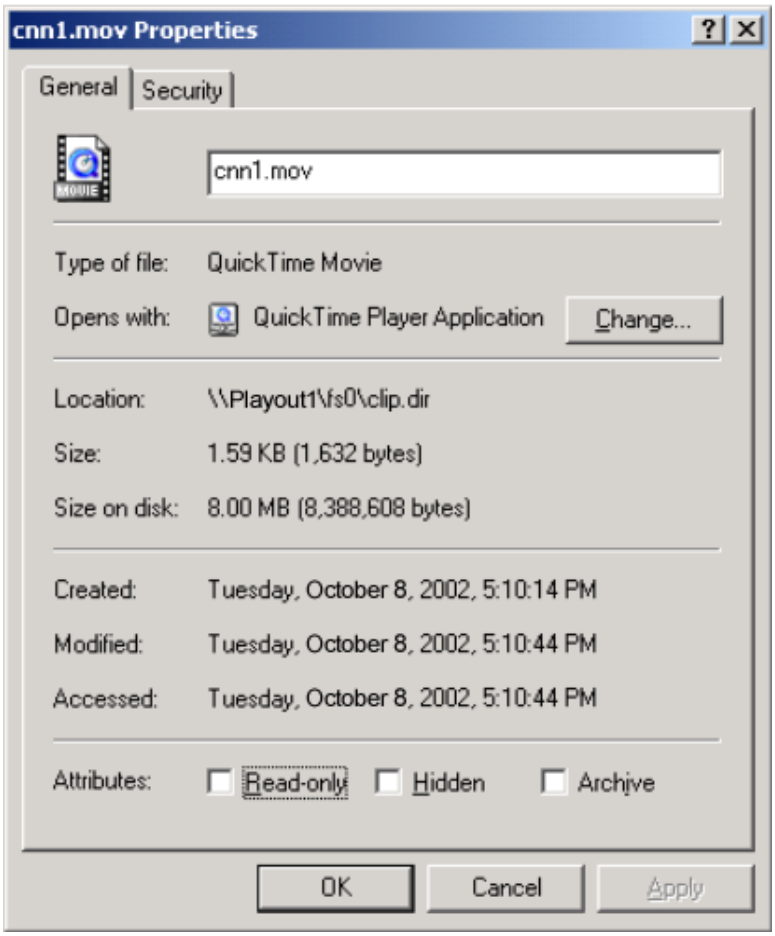


Figure 9-5: Properties Dialog

Note that the properties of the entire file system are not visible until the file system is mapped to a drive.

Mapping a Spectrum video server file system to a Windows network drive

Many applications require the Spectrum video server's file system to be mapped to a network drive.

1. Right-click on the fs0 icon (or the File System name icon) and select **Map Network Drive**.
2. The newly created network drive should be visible in **Explorer**. In the following figure, **fs0** on **Playout1** is mapped to the client's **E**: drive.

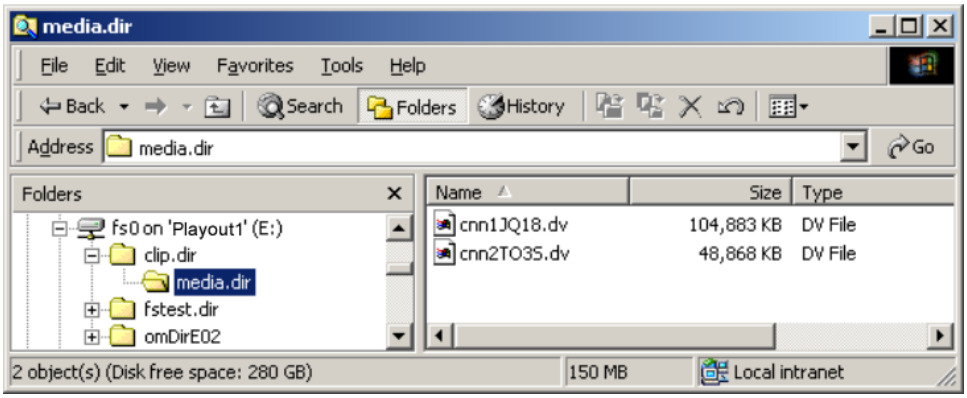


Figure 9-6: Mapping file system to network drive

3. The file system's properties are available by right clicking on the network drive icon.

   Note that the **File System** field reads **NTFS**, even though this is **not** an NTFS file system, but a Spectrum video server file system.

   The Spectrum video server file system does not have the restrictions of a FAT file system — names can be up to 255 characters and files can be many Gigabytes long. The amount of free and used space is not perfectly accurate, but it can be used as a guide.

   If the video server's file system is mapped as a network drive on a PC and the Spectrum video server is rebooted, the following error message may appear:

   "An error occurred while reconnecting <drive letter>: to <File System name>Microsoft Windows Network: The local device name is already in use. This connection has not been restored." and "Cannot copy <filename>: The specified network name is no longer available."

   To resolve this problem, click **OK**, then click on the file system icon on Windows Explorer. The red "x" on the file system icon will disappear after some seconds.

Connecting a Macintosh to the Spectrum server using SMB

Browsing or using Harmonic files on Macintosh OS X systems require the Spectrum video server's file system to be mounted.

1. From the Macintosh client, in Finder, click the **Go** pull-down menu and select the **Connect to Server** item. A dialog appears.
2. If the NETBIOS name server is found by the operating system, the host names will appear in the top pop-up menu. If so, select the desired host and click **Connect**.
3. If the desired host name does not appear in the pop-up, type in the IP address of the desired host preceded by "smb://" and, then click **Connect**.

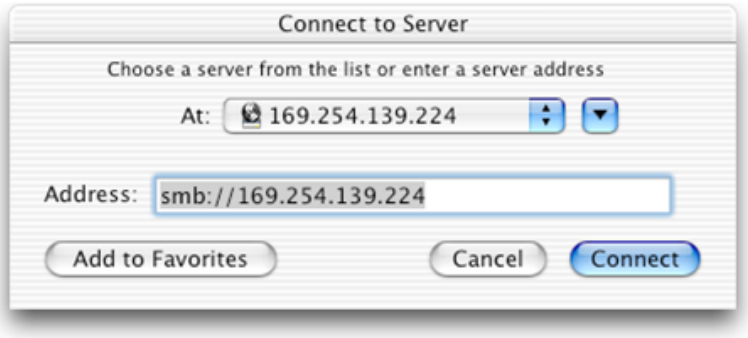


Figure 9-7: Selected host name in the Connect to Server Dialog

4. Once the operating system has located the desired server on the network, provide an appropriate user name and password and click on **OK**.
5. Upon successfully entering a user name and password, the **SMB Mount** dialog is displayed. Select a folder from the pop-up menu, typically called **fs0** and click **OK**. As in Windows, this name corresponds to the Spectrum video server's File System name.

Playing media files from a Spectrum video server on a Client PC

Play media files from a Spectrum video server on a Client PC.

1. Install an application on the client that supports the file format you intend to play. For example, clip files with the **.mov** extension (and containing DV media) and media files with a .**dv** extension may be played with **QuickTime™** version 5.0 or later. To download and install QuickTime™, go to *http://www.apple.com/quicktime/download.*

   Microsoft Windows Media Player is initially associated with .mov files, but since it only supports older variants of the QuickTime format, Windows Media Player will not play .mov files recorded on a Spectrum video server.

   As shown below, after QuickTime is installed, the icons representing DV files refresh to show that there is now an application associated with these files.

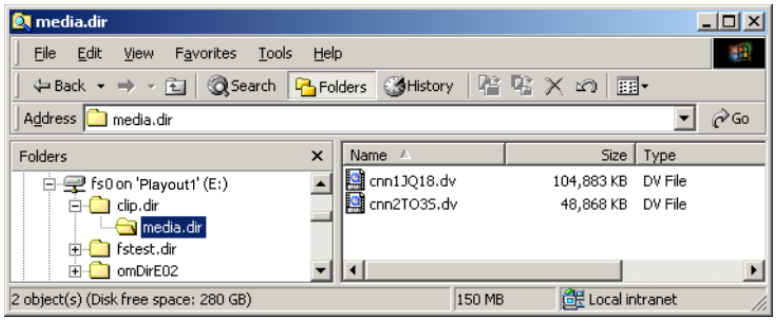


Figure 9-8: Media.dir Window

2. Double-click the file that you wish to play. This starts the execution of QuickTime.
3. Clicking the Play button in the QuickTime window plays the media file.

NOTE: Current CIFS File Server performance supports playing DV streams in real-time directly from the Spectrum video server, but the QuickTime player itself is not tolerant of network latency, so video frames may be skipped.

Copying files from a Spectrum video server to a Client PC

Copy files from a Spectrum video server to a Client PC.

1. Using Windows Explorer, find the file on the Spectrum video server that you wish to transfer.
2. Drag that file's icon from its location on the Spectrum video server, and drop it on the icon of the desired destination folder. For example,, in the following image, file cnn1JQQ18.dv has been copied to a folder named "Clips on My Computer" on local disk C.

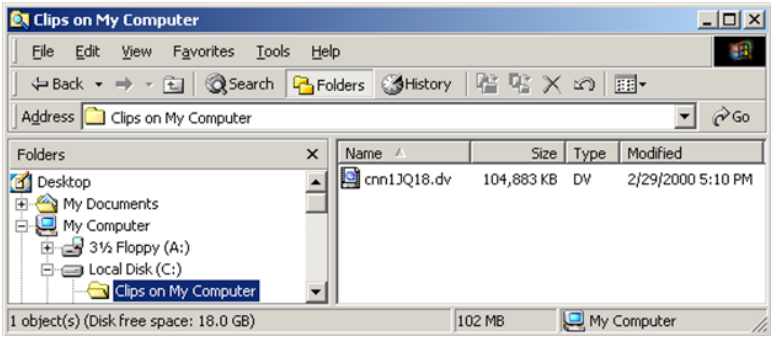


Figure 9-9: Clips on My Computer Window

3. To play the file, double-click its icon, and then click the Play button in the QuickTime window. Other Windows mechanisms for file transfer and linkage (cut, paste, copy, and shortcuts) may also be used.

NOTE: When copying a file using SMB to or from a Windows PC, the Windows progress dialog box incorrectly calculates time remaining to copy, first showing a reasonable and increasing value, and then showing a very large value for a considerable time. The copy eventually succeeds, despite the errant time remaining indication.

Copying files from a Client PC to a Spectrum video server

Copy files from a client PC to a Spectrum video server.

1. Find the file that you wish to transfer.
2. Drag the icon from its location on local disk, and drop it at the desired Spectrum video server location. You can use other Windows mechanisms for file transfer and linkage (cut, paste, copy, and shortcuts).

   Note that under certain conditions, you may experience poor throughput when copying a file from a Windows 7 client PC to a legacy Spectrum system (MediaDirectors 2100, 2101, 2102 or 2102B) using CIFS/Samba. The following recommendations may help alleviate this issue.

   - If possible, use FTP instead of CIFS for transferring large files.
   - You may experience slow transfers when overwriting an existing file. In this situation, it may be better to delete the previous version of the file, and then copy in the new version

- You may experience slow transfers when transferring a file into the root directory of the Spectrum file system. In this situation, it may be better to transfer the file into a temporary directory, and then once the transfer is complete, move the file to its final location.

Chapter 10

Spectrum system monitoring an troubleshooting

- *Viewing Spectrum video server properties*
- *Viewing Spectrum storage properties*
- *Viewing drive properties*
- *Viewing RAID set information*
- *Viewing general file system information*
- *Viewing I/O module properties*
- *Viewing I/O module alarms and events*
- *Viewing a snapshot of the Spectrum video server log*
- *Changing logging variable settings*

Viewing Spectrum video server properties

The Properties page for your Spectrum video server allows you to check the system properties and properties of devices that are connected to the Spectrum video server.

1. From the **System Diagram**, click any Spectrum video server heading (or icon) to reach the **Physical Configuration** page.

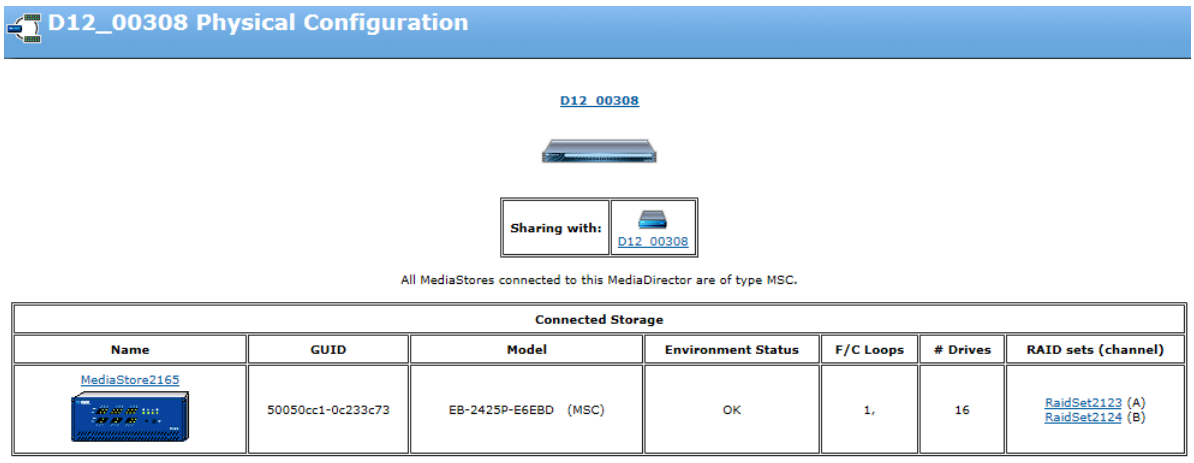


Figure 10-1: Spectrum video server physical configuration

This page displays the selected Spectrum video server along with the name, GUID, model type, environmental status, Fibre Channel loops, number of drives, and RAID sets in each MediaStore that is connected to the Spectrum video server. Several MediaStores may be shown depending upon your

configuration. From this page, you can click the MediaStore icon to open the MediaStore properties page or click the links for each RAID set to open the RAID utilities page.

NOTE: An MSC MediaStore cannot be combined with an MS or MSS MediaStore on the same Spectrum system. A warning message appears in SystemManager if you attempt an unsupported configuration such as this.

2. Click the picture of the Spectrum video server to display the **Properties** page.

Related information

Viewing Spectrum storage properties
Viewing RAID set information

Spectrum server: Host Properties

The **Host Properties** section at the top of the Spectrum Server Properties page varies according to the number of hosts supported by video server model.

Note that the Spectrum X, MediaDeck 7000, MediaCenter, and MediaDirector 2202, 2201, 2252, 2251, 2252B, and 2251B are all single host devices and the Properties page provides the same list of properties as those shown in the following figure.

Host Properties

Parameters	Host 0
Host Name	D13_00017 Change
Host Status	Connected -- Error Alarm
Host IP Address(es)	10.10.139.18/10.10.139.19/10.10.139.20/
Filesystem Low Priority Bandwidth Limits (per Spectrum Server)	FTP & Samba: 100 MB/sec; AFP: 40 MB/sec
Harmonic MediaGrid Accounts	No Accounts
Last Message	Tue:16:10:46: Got the ethernet port config 3 on D13_00017.
Change Settings	Network Settings Low Priority Bandwidth Settings Harmonic MediaGrid Accounts Access Control Settings Edit filetypes.conf Configure Watch Folder Update Logging variables Configure Audio Profiles Configure DDC File Configure Auto Export to Grid Edit Traffic and Billing Service Configure SNMP Traps Launch Delay Service Configure RouteTables Mount NAS/Grid File system

Figure 10-2: Spectrum video server single host properties

Host Name	This field lists the Spectrum video server's user-assigned host name, which appears in the System Diagram, page titles and other Spectrum video server-related fields. When you first start the SystemManager, it queries the name from the MediaDirector. The name defaults to the DNS name, but if that name is unavailable, the MediaDirector creates a name for itself using its serial number. If you change the MediaDirector host name and there is a DNS name available, the new name will not match the DNS name. However, the MediaDirector will use the new host name in preference to the DNS name. Note that having different names (internal vs. DNS) may cause confusion when trying to access the MediaDirector from a PC. **NOTE:** If you are using DNS to name Spectrum video servers, do not change the host name using the **Name** button.
Host Status	Describes the Spectrum video server's current status, such as "Connected," "Configuring," "Rebooting," or "Not Responding." This label also appears adjacent to the Spectrum video server's name in the System diagram. Note that it may take up to 30 seconds for the SystemManager application to reflect new status—for example, when a connection is lost or regained.
Host IP Address(es)	Lists the MediaDirector host's IP address. For single host Spectrum video servers, this shows the IP addresses of the Public Ethernet Interfaces.
Filesystem Low Priority Bandwidth Limits (per Spectrum Server)	Shows the File System low priority bandwidth limit for File System reads and writes of clips. **NOTE:** At this time, Harmonic does not recommend changing this value from the default setting.
Harmonic MediaGrid Accounts	Shows the ContentDirector, User name, and Domain of all the Harmonic MediaGrids connected to this video server.
Last Message	Displays the last message received that deals with the indicated Spectrum video server host.
Network Settings	Click to access the Network Settings page, which allows you to configure Ethernet settings for your Spectrum video server including IP addresses, DNS and NTP settings, and for some models, Ethernet Failover settings.
Low Priority Bandwidth Settings	Click to access the **Change Spectrum Server Network/Filesystem Performance Settings** page for the Spectrum video server where you can configure or change the low priority bandwidth limit for FTP, Samba, and AFP. **IMPORTANT:** Changing bandwidth settings can affect the loading of graphics.
Harmonic MediaGrid Accounts	Click to access the **Harmonic MediaGrid Accounts** page where you can enter Harmonic MediaGrid account information to connect to one or more Harmonic MediaGrid systems.
Access Control Settings	Click to display the **Access Control Settings** page for the selected host and configure authentication settings for your video server, which can be used to connect to a Lightweight Directory Access Protocol (LDAP) server or a SAMBA domain.

Edit Filetypes.conf	Click to display the **Edit Filetypes.conf** page for the selected host. Continuing down the page, the same **General Properties** type information appears for all Spectrum video server models.
Configure Watch Folder	Click to open the Harmonic Watch Folder page, where you can configure a watch folder for H.264 decode.
Update Logging variables	Use only if instructed by Harmonic technical support. Click to access the **Change Logging Variable Settings** page where you can specify logging settings for Spectrum.
Configure Audio Profiles	Click to open the Audio Profiles page where you can create, import, or export audio profiles for use with the Spectrum X or ChannelPort.
Configure DDC File	Click to access the Install DDC file page, which can be used to install a Harmonic-supplied drive that is newer than your current Spectrum firmware.
Configure Auto Export to Grid	Click to open the Auto-Export Watch Folders page, which you can use to automatically transfer files recorded directly to the Spectrum video server to one or more destination folders on your Harmonic MediaGrid or to another location via FTP.
Edit Traffic and Billing Service	Click to open the Edit Traffic And Billing Services page. From here you can enable and configure Traffic and Billing settings for all the playout channels on the Spectrum video server.
Configure SNMP Traps	Click to open the Configure SNMP Critical Error Traps for Playlist Control page. From here, you can configure Spectrum to send trap messages to one or more client systems via SNMP when a critical error occurs on a Playlist Control channel.
Launch Delay Service	Click to open the Spectrum Management login page in a new browser window. Once you log in, click the Delay Service icon to start using Delay Service.
Configure RouteTables	Click to configure RouteTables to be used with Transport Stream Ingest, or SMPTE 2022-6.
Mount NAS/Grid File System	Click to configure a NAS or Harmonic MediaGrid mount for this Spectrum video server.

Related information

Configuring network settings
Configuring access control settings for video servers
Editing the filetypes.conf file
Configuring watch folders
Changing logging variable settings
About audio profiles and audio profile groups
Installing a DDC file
Configuring Auto-export to Harmonic MediaGrid
Enabling and configuring global Traffic and Billing Settings
Configuring SNMP critical error traps for Playlist Control
Configuring Delay Service
Configuring RouteTables
Mounting a Harmonic MediaGrid or NAS file system

Spectrum server: General Properties fields

The General Properties section of the Spectrum Server page varies according to video server model.

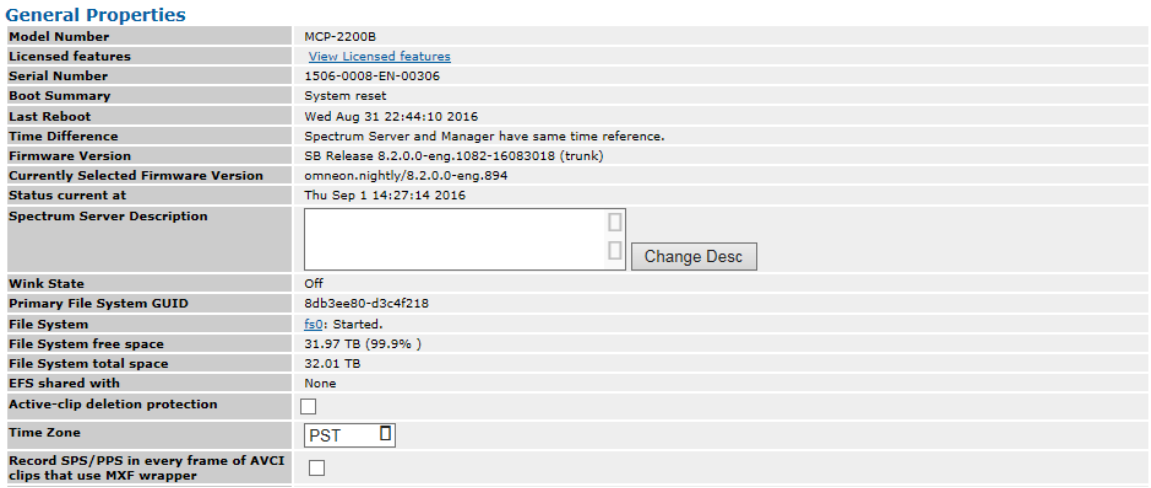


Figure 10-3: General properties for the Spectrum video server

Model Number	Lists the Spectrum video server's product model number.
Licensed features	Click **View Licensed features** to open the **Licensed Features** page for this video server, which lists all the licenses installed on the video server.
Serial Number	Lists the Spectrum video server's serial number.
Boot Summary	Displays the reason why the last reboot of the Spectrum video server occurred.
Last Reboot	Displays the date and time of the last reboot of the Spectrum video server.
Time Difference	Shows the time difference in seconds between the SystemManager clock and the Spectrum video server clock. This is useful when comparing SystemManager logs and monitor logs on a File System.
Firmware Version	Lists the current version of firmware that resides in the Spectrum video server's flash memory. Refer to "Upgrading MediaDirector and MediaCenter Firmware" in the *Spectrum System Installation Guide*.
Currently Selected Firmware Version	Lists the firmware version that is selected on the **Firmware Version Selection** page.
Status Current at	Lists the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
Spectrum Server Description	Displays a scrollable multi-line description of the Spectrum video server. This field is useful for entering data that clarifies the specific Spectrum video server's role in your system, particularly when multiple Spectrum video servers are in use.
Change Desc	Click to change the Spectrum video server's description.
Wink State	Describes the wink state of the Spectrum video server's light bar, either On or Off.

Primary File System GUID	Lists the File System's GUID (Globally Unique Identifier), as used by the SystemManager platform for network identification purposes.
File System	Displays a link to the Filesystem Utilities page and shows the status of the file system.
File System free space	Lists the space available on the File System in bytes, followed by the same value as a percentage of the total. The abbreviation GB stands for gigabytes (1 billion bytes); the abbreviation TB stands for terabytes (1 trillion bytes). Values that appear are the actual value, or the label "Unknown" appears if the File System has not been started.
File System total space	Describes the total amount of space available (in bytes) on the File System. Note that if there is more than one File System on the Spectrum video server, the additional File Systems can be viewed on the **Disk Utilities** page.
EFS shared with	Displays the name of the host (if any) with which the selected host shares a File System.
Active-clip deletion protection	Click to prevent any clips that have been loaded to a timeline (cued, idle, playing or recording) from being deleted or renamed. If this setting is checked on one video server in an EFS configuration, the setting will be applied to all video servers in the EFS.
Time Zone	Click the drop-down arrow to select the international time zone in which your facility is located. This ensures that the “date” stamp on recorded clips is correct, and also provides assistance for Harmonic technical support for remote troubleshooting.
Record SPS/PPS in every frame of AVCI clips that use MXF wrapper	Check if you will be recording MXF-wrapped AVC I-frame video content and wish to record SPS (Sequence Parameter Set) and PPS (Picture Parameters Set) data in each frame.
Local Disk Storage	For each file system on the Spectrum video server, the following are displayed: Name, Total Space (in KB), Used Space (in KB), Available Space (in KB), and percent used. **NOTE:** The information shown in this section applies only to the local file systems on the video server, not the file systems on networked MediaStores.
Process Monitoring	Displays the status of each process running on the Spectrum video server. This section is provided for troubleshooting purposes only.
Wink On/Off	Click to change the wink state of the Spectrum video server’s light bar.
Reboot	Click to reboot the Spectrum video server, as described in "Rebooting the Spectrum video server."
Shutdown FileSystem	Click to shut down the Spectrum video server file system
Shutdown Spectrum Server	Click to shut down the video server. This automatically shuts down the file system and the Spectrum video server.
Log Snapshot	Click to display a snapshot of the Spectrum video server's log, in a separate static window within the Browser. This function is designed for Technical

	Support personnel only. Note that this button only appears if you have clicked a single host name (or icon) on the System diagram.
Edit Track Tags	Click to add or edit the Track Tag File associated with the Spectrum video server.
Upgrade Firmware	Click to upgrade the Spectrum video server's firmware. Refer to "Upgrading Spectrum video server firmware" in the *Spectrum System Installation Guide*.
Upgrade License	Click to upgrade the Spectrum video server's license.
Done	Click to return to the system diagram.

Related information

Changing a Spectrum video server description
Changing the Spectrum video server wink state
Rebooting the Spectrum video server
Creating an AVC I-frame Player
Upgrading the Spectrum video server license
Editing track tags

Spectrum server: Public Ethernet Interfaces

The Public Ethernet Interfaces section of the Spectrum Server Properties page displays connection information for the public Ethernet interfaces on a Spectrum video server, which are not part of the MediaPort Ethernet array.

This section also displays connection information for Ethernet interfaces on any of the optional expansion cards.

NOTE: This section applies only to MediaDirectors 2252, , 2202, and 2201, MediaCenters, and MediaDeck 7000.

MediaDirector Public Ethernet Interface fields

Refer to the Public Ethernet Interface section of the Spectrum Server Properties page for details about the public Ethernet ports on your MediaDirector 2252B, 2251B, 2252, 2251, 2202, and 2201.

Interface Name	Displays the internal name for the Ethernet port.
Cabling	This displays the connection status of the Ethernet port.
DHCP	Displays whether DHCP is enabled.
IP Address	The IP address assigned to the Ethernet port
MAC Address	The MAC address assigned to the Ethernet port
Subnet Mask	The subnet mask for the Ethernet port.
Default Gateway	The IP address of the default gateway assigned to the Ethernet port
MTU	The maximum size of Ethernet packets.
	In the **Public Ethernet Pair Failover Settings** section:

Interface Pair	This field shows the failover pairs for each of the public Ethernet interfaces. For details about Ethernet failover on the MediaDirector 2252B, or 2251B, 2252, 2251, 2202, or 2201 refer to “Configuring Network Settings.”
Status	Displays whether failover is configured for each failover pair, and if not, what condition may be preventing failover selection. For instructions on configuring the Ethernet interface settings for your MediaDirector 2252B, or 2251B, 2252, 2251, 2202, or 2201, refer to “Configuring Network Settings.”

Related information

Configuring network settings

MediaCenter Public Ethernet Interfaces fields

The Public Ethernet Interface section of the Spectrum Server Properties page includes details for the public Ethernet ports.

Note that Interface 3 is named **bmc** (Baseboard Management Console). The BMC interface shares the same physical port as ETH0 and can be used by Harmonic technical support for troubleshooting purposes.

Set (4/2) Public Ports (button)	(for the MediaCenter 2200 only) Click **Set 4 Public Ports** to configure the MIP4 and MIP5 Ethernet ports on the rear panel of the MediaCenter as public networking ports. You must restart the MediaCenter in order for the change to take effect. Once configured, the two Ethernet ports will appear as **eth2** and **eth3**. Once MIP4 and MIP5 are configured as public networking ports, you can click **Set 2 Public Ports** to reconfigure them for MediaPort connectivity. For detailed instructions, refer to “Configuring Ethernet Interfaces on the MediaCenter.” **CAUTION:** Do not connect the MIP4 and MIP5 interfaces to your public network unless you have followed the steps in “Configuring Ethernet Interfaces on the MediaCenter.” to configure them for public networking. Connecting these interfaces to your network before you configure them properly may result in network problems.
Interface Name	Displays the internal name for the Ethernet port. Note that the BMC interface shares the same physical port as ETH0.
Cabling	This displays the connection status of the Ethernet port.
DHCP	Displays whether DHCP is enabled.
IP Address	The IP address assigned to the Ethernet port
MAC Address	The MAC address assigned to the Ethernet port
Subnet Mask	The subnet mask for the Ethernet port.
Default Gateway	The IP address of the default gateway assigned to the Ethernet port
MTU	The maximum size of Ethernet packets.
	In the **Public Ethernet Pair Failover Settings** section:

Interface Pair	This field shows the failover pairs for each of the public Ethernet interfaces.
Status	Displays whether failover is configured for each failover pair, and if not, what condition may be preventing failover selection.

Related information

Setting Ethernet interfaces on a MediaCenter 2200 or 2200A as public ports
Configuring network settings

MediaDeck 7000 Public Ethernet Interfaces fields

The Public Ethernet Interface section of the Spectrum Server Properties page includes details for the public Ethernet ports on the MediaDeck 7000.

Note that Interface 3 is named **bmc** (Baseboard Management Console). The BMC interface shares the same physical port as ETH0 and can be used by Harmonic technical support for troubleshooting purposes.

Interface Name	Displays the internal name for the Ethernet port. eth0 corresponds to the Ethernet port on Module A (on the left-hand side of chassis when facing the rear panel) and eth1 corresponds to the Ethernet port on Module B (on the right).
Cabling	This displays the connection status of the Ethernet port.
DHCP	Displays whether DHCP is enabled.
IP Address	The IP address assigned to the Ethernet port
MAC Address	The MAC address assigned to the Ethernet port
Subnet Mask	The subnet mask for the Ethernet port.
Default Gateway	The IP address of the default gateway assigned to the Ethernet port
MTU	The maximum size of Ethernet packets.
	In the **Public Ethernet Pair Failover Settings** section:
Interface Pair	This field shows the failover pairs for each of the public Ethernet interfaces. For details about Ethernet failover on the MediaDeck 7000, refer to “Configuring Network Settings.”

Related information

Configuring network settings

Spectrum X Public Ethernet Interfaces fields

The Public Ethernet Interface section of the Spectrum Server Properties page includes details for the public Ethernet ports on the Spectrum X.

Interface Name	Displays the internal name for the Ethernet port. eth0 corresponds to the left-hand port when facing the rear panel, and eth1 corresponds to the right-hand port when facing the rear panel.
Cabling	This displays the connection status of the Ethernet port.
DHCP	Displays whether DHCP is enabled.

IP Address	The IP address assigned to the Ethernet port
MAC Address	The MAC address assigned to the Ethernet port
Subnet Mask	The subnet mask for the Ethernet port.
Default Gateway	The IP address of the default gateway assigned to the Ethernet port
MTU	The maximum size of Ethernet packets.
	In the **Public Ethernet Pair Failover Settings** section:
Interface Pair	This field shows the failover pairs for each of the public Ethernet interfaces. For details about Ethernet failover on the Spectrum X, refer to “Configuring Network Settings.”

Related information

Configuring network settings

Connected I/O Modules for the Spectrum X and MediaDeck 7000

NOTE: For the Spectrum X, this section refers to installed SDI I/O cards.

The Connected MediaPort Modules section displays the name and status of the I/O modules installed in a Spectrum X or MediaDeck 7000.

Name	The name of SDI I/O card installed on the Spectrum X or the name each MediaPort module installed on the MediaDeck 7000. Click the link to open the Properties page for the corresponding I/O module.
Status	The network status for the displayed SDI I/O card.

Private Ethernet Interfaces fields

Find connection information for the MediaPort Ethernet array on the MediaDirectors 2252B, 2251B, 2252, 2251, 2202, and 2201, and MediaCenter.

NOTE: This section applies only to MediaDirectors 2252B, 2251B, 2252, 2251, 2202, and 2201, and MediaCenters.

Private Ethernet Interfaces

Private Ethernet Ports & Connections				
Ethernet Port			Connected MediaPort	
Number	Label	IP Address	Name	Status
0	com0	10.20.0.86	MIP-5321_09091	Connected -- Error Alarm
1	com1	10.20.1.2	MIP-5321_08598	Connected -- Error Alarm
2	com2	10.20.2.23	MIP-5001_01838	Connected -- Error Alarm
3	com3	10.20.3.2	MIP-5321_08888	Connected -- Error Alarm
4	com4	10.20.4.51	MIP-5001_01830	Connected -- Error Alarm
5	com5	10.20.5.79	MIP-5301_01518	Connected -- Error Alarm
6	com6	10.20.6.16	MIP-5301_01178	Connected -- Error Alarm
7	com7	10.20.7.65	MIP-5301_01515	Connected -- Error Alarm
8	com8	10.20.8.44	MIP-5321_09075	Connected -- Error Alarm
9	com9	10.20.9.86	MIP-5321_08553	Connected -- Error Alarm
10	com10	10.20.10.23	MIP-5621_08531	Connected -- Error Alarm
11	com11	10.20.11.65	MIP-5621_08519	Connected -- Error Alarm
12	com12	10.20.12.51	MIP-5321_08467	Connected -- Error Alarm
13	com13	10.20.13.72	MIP-5301_01204	Connected -- Error Alarm
14	com14	10.20.14.79	MIP-5321_08466	Connected -- Error Alarm
15	com15	10.20.15.16	MIP-5321_09097	Connected -- Error Alarm

Figure 10-4: Private Ethernet Interfaces for MediaDirector 2252 or 2202

The MediaDirector 2252 and 2202 both have 16 private Ethernet ports, the MediaDirector 2251 and 2201 have 8 private Ethernet ports, and the MediaCenter has up to 10.

Ethernet Port Number	The number of the Ethernet interface on the MediaPort Ethernet array, which corresponds to the number indicated on the rear panel of the Spectrum video server.
Ethernet Port Label	Internal private Ethernet interface name.
Ethernet Port IP Address	IP address assigned to the Ethernet port.
Connected MediaPort Name	Name of the MediaPort attached to that Ethernet port.
Connected MediaPort Status	Connection status of the MediaPort.

Fibre Channel Interfaces

Find descriptions of the fibre channel interfaces section of the video server properties page.

This section applies to the MediaDirectors 2100, 2101, 2102, 2102B, 2201, and 2202.

Fibre Channel Interfaces

Current State

Interface	GUID	Status			Speed	Mode
		Loop	Port A	Port B		
0	5000d028-0f000040	Nominal	OK	No Transceiver	4 Gbps	Enabled, Loop
1	5000d028-0f000041	Nominal	OK	No Transceiver	4 Gbps	Enabled, Loop
2	5000d028-0f000042	Not connected	No Transceiver	No Transceiver	Unknown	Enabled, Loop
3	5000d028-0f000043	Not connected	No Transceiver	No Transceiver	Unknown	Enabled, Loop
4	5000d028-0f000044	Not connected	No Transceiver	No Transceiver	Unknown	Enabled, Loop
5	5000d028-0f000045	Not connected	No Transceiver	No Transceiver	Unknown	Enabled, Loop
6	00000000-5000d028	Unknown	Unknown	Unknown	Unknown	Unknown Mode
7	00000000-5000d028	Unknown	Unknown	Unknown	Unknown	Unknown Mode

Statistics

Interface	GUID	Requests Executed	Loop Up	Loop Down	Async Events	LIPs Initiated	LIPs Received	Link error count
0	5000d028-0f000040	2420671	1	0	4	1	1	0
1	5000d028-0f000041	2146801	1	0	4	1	1	0
2	5000d028-0f000042	0	0	0	0	0	0	0
3	5000d028-0f000043	0	0	0	0	0	0	0
4	5000d028-0f000044	0	0	0	0	0	0	0
5	5000d028-0f000045	0	0	0	0	0	0	0
6	00000000-5000d028	0	0	0	0	0	0	0
7	00000000-5000d028	0	0	0	0	0	0	0

Figure 10-5: Fibre channel interfaces

Current State

Interface — Shows the Fibre Channel (FC) interfaces available on the selected MediaDirector.

> **NOTE:** The number of interfaces displayed depends on the MediaDirector model. MediaDirector 2100 shows two interfaces, MediaDirector 2101 shows three interfaces, MediaDirector 2102 and 2102B show six interfaces, and MediaDirector 2202 and 2201 show eight interfaces.

GUID — Lists the GUIDs of the MediaDirector's FC interfaces.

StatusLoop — Shows the connection status for the Fibre Channel loop on the selected interface.

Status — **Port A (and B)** lists the status of Ports A and B on each of the FC interfaces on the MediaDirector.

Speed — Lists the loop speed of the indicated FC loops (1 Gbps, 2 Gbps, or 4 Gbps, or Unknown, depending on MediaDirector model).

Mode — Lists the loop status of the indicated FC loops.

Statistics

Interface — Shows the Fibre Channel interfaces available on the selected MediaDirector.

GUID — Lists the GUIDs of the MediaDirector's FC interfaces.

Requests Executed — Displays the number of read/write requests issued per loop. This may be useful for FC loop troubleshooting purposes.

Loop Up	Displays a number relating to the FC operational state. This may be useful for FC loop troubleshooting purposes.
Loop Down	Displays a number relating to the FC operational state. This may be useful for FC loop troubleshooting purposes.
Async Events	Displays the number of disruptive FC events on the loop. This may be useful for FC loop troubleshooting purposes.
LIPs Initiated	Displays a number relating to Loop Initialization Protocol initiations. This may be useful for FC loop troubleshooting purposes.
LIPs Received	Displays a number relating to Loop Initialization Protocol instances received on the loop. This may be useful for FC loop troubleshooting purposes.
Link error count	Displays the number of transmission errors on the loop. This may be useful for FC loop troubleshooting purposes.
Set FC Loop Speed to (1 Gbps, 2 Gbps or 4 Gbps) button	The loop speed shown on this button will vary according to the MediaDirector and to what is already configured. Click to change the FC loop speed for all loops. Reboot the MediaDirector for the change to take place. **NOTE:** The FC Loop Speed setting must match the physical DIP switch setting on the attached MediaStores. If you need to reset the settings, you must power cycle the MediaStores before the new settings take effect. For information on supported loop speeds, and configuring loop speeds, refer to the Getting Started Guide and Hardware Orientation Guide from the Spectrum 6.4 documentation suite.

Spectrum server: Environment

The Environment section of the Spectrum Server page displays environmental statistics for the Spectrum video server.

The fields will vary depending on the type of Spectrum video server you are viewing.

Power Supplies:

PS 0, PS 1	Describes the state of the indicated power supply. • **NORMAL** = the power supply is OK • **FAILED-Absent/Unpowered** = the power supply is not delivering power, or is not plugged in. • **BAD =** the power supply has a hardware fault and is broken.
RTC Battery	Describes the state of the Clock Battery. • **NORMAL** = the battery is OK. • **BAD-Malfunctioning** = the battery is dead or absent.
RAM Battery	Describes the state of the RAM battery. • **NORMAL** = the battery is OK. • **CHARGING** = the battery is charging • **BAD-Malfunctioning** = the battery is dead or absent.

1394 PHY	Describes the state of the power supply for the 1394 buses • **NORMAL** = the power supply is OK. • **BAD** = there is a supply failure, or the system is unable to read supply status. Voltage Levels: **NOTE:** The values in this section are displayed in volts. The valid ranges are also displayed. Note that these ranges are not user configurable.
1.5V Line through Fan1 Voltage	(For MediaDirectors 2100, 2101, 2102, and 2102B only) Displays the combined voltages present on the outputs of the power supply.
Comm 1.0V through FC1 12V	(For MediaDirector 2202 only) Displays the values of the various voltage rails present on the MediaDirector.
BB +12.0V through BB +2.2V Vbat	(For MediaCenters, MediaDirector 2252B and 2251B, and Spectrum X only) Displays the values of the various voltage rails present on the motherboard.
MB CPU Vcore through MB VBAT	Displays the values of the various voltage rails present on the MediaCenter motherboard.
MRAM 1.2V through MRAM 12V	Displays the values of the various voltage rails present on the Harmonic MRAM expansion card.
Mid 1.0V through Mid 12.0V	(For MediaDeck 7000 only) Displays the values of the various voltage rails present on the MediaDeck 7000. Temperatures: note the actual list will varies according to your Spectrum video server. **NOTE:** The values in this section are always displayed in degrees centigrade. The valid range is also displayed. Note that this range is not user configurable.
Mainboard Int	Displays the incoming or ambient temperature for the mainboard section of the chassis.
Power Supply Int	Displays the incoming or ambient temperature for the power supply section of the chassis.
Mainboard Ext	Displays the outgoing or exhaust temperature for the mainboard section of the chassis.
Power Supply Ext	Displays the outgoing or exhaust temperature for the power supply section of the chassis.
Front Panel	Displays the incoming or ambient temperature for the front panel section of the chassis.
BB P1 VR Temp through BB Rt Rear Temp	display the internal temperatures of the motherboard, including the processors (P1, P2), BMC, and left and right sides.
SSB Temp	Displays the internal temperature near the southbridge chip.
LAN NIC Temp	Displays internal temperature of the onboard NICs.

Riser 1 Temp through Riser 3 Temp	Displays the internal temperature near each of the riser boards.
Exit Air Temp	Displays the outgoing air temperature.
HSBP Temp	Displays the internal temperature of the hot-swap backplane, which connects to the drives.
Comm Out	Displays the outgoing air temperature over the mainboard of the system.
FC0 In	Displays the internal air temperature over the Fibre Channel 0 board of the system.
FC0 Out	Displays the outgoing air temperature over the Fibre Channel 0 board of the system.
FC1 In	Displays the internal air temperature over the Fibre Channel 1 board of the system.
FC1 Out	Displays the outgoing air temperature over the Fibre Channel 1 board of the system.
Env In	Displays the incoming air temperature over the environmental board section temperature over the Fibre Channel 1 section of the chassis.
Server Cores	Displays the aggregate air temperature over the CPU section of the system.
MRAM In, MRAM Out	Display the incoming and outgoing air temperatures over the MRAM board respectively.
MB Temp2, MB In	Display the temperatures of various sensors on the motherboard.
MRAM In, MRAM Out	Display the incoming and outgoing air temperatures over the MRAM board respectively.
Power Supply 0 through Power Supply 1, or PS1 through PS2	Displays the temperature of the sensor for respective power supply.
Mid CPU 0 through Mid CPU 1, or CPU 1 through CPU 2	Displays the temperature of the sensor for the respective CPU.
Mid Board HM	Displays the temperature of the sensor for the midplane.
Mid Enet IC	Displays the temperature of the sensor for Ethernet device.
Mid Slot0 Intake	Displays the incoming air temperature for I/O module slot 0.
Mid Slot1 Intake	Displays the incoming air temperature for I/O module slot 1.
Slot 0	Displays the aggregate air temperature for I/O module slot 0.
Slot 1	Displays the aggregate air temperature for I/O module slot 1.
	Fan Controllers: (for MediaDeck 7000) This section provides the control value to be used to set the fan speed for each I/O module slot.

Fans: This section lists the speed (in RPM) of each of the Spectrum video server fans. The valid range is also displayed. Note that this range is not user configurable.

Viewing Spectrum storage properties

On the **Storage Properties** page you can view properties as well as perform tasks such as labeling the selected storage enclosure and checking the status of the disks and other components in an enclosure

1. On the **System Diagram**, click any Spectrum video server heading (or icon) to reach the **Physical Configuration** page.
2. Click the image of the “MediaStore” to display the **Storage Properties** page.

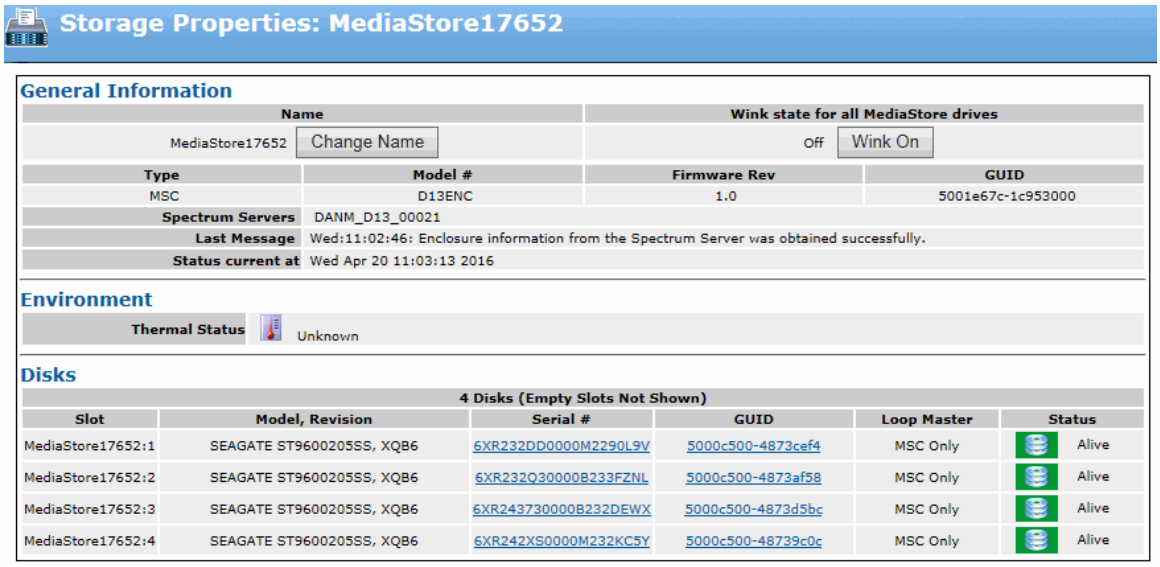


Figure 10-6: Storage properties

Storage properties

You can view the properties for your Spectrum storage.

In the **General Information** section, view the following.

Name	Displays a user-definable name given to a physical enclosure.
Change Name	Click to rename a MediaStore.
Wink state for all MediaStore drives	Click to change the wink state of all drives on the MediaStore. When on, all drive LEDs wink on the front panel of the MediaStore. **NOTE:** Drives that are winked will only wink for 30 seconds.
Type	Indicates the MediaStore model type. Current types are MS, MSC, and MSS models.

NOTE: Spectrum systems do not support the intermixing of MS, MSC, and MSS MediaStore models. All MediaStores on any Spectrum system must be either MS, MSC, or MSS. In addition, Hard Disk drives may not be swapped between these three models of MediaStore. If you have multiple Spectrum systems, with a mixture of MediaStore models, make sure that replacement drives at your facility are all configured for the correct operation. Contact Harmonic technical support for details.

Model # Indicates the MediaStore manufacturer's model number.

Firmware Rev. Lists the firmware level within the MediaStore's controller unit. This information is used primarily for debugging purposes.

GUID Displays the Global Unique Identifier for the MediaStore. This information is primarily used for debugging purposes.

Spectrum Servers Displays a list of Spectrum servers that are physically connected to the MediaStore.

Last Message This line displays the last message received that deals with the selected MediaStore.

Status Current At Indicates when the currently displayed MediaStore enclosure information and status was last obtained.

NOTE: The environment section does not provide details for the MediaStore 5000 series, the MediaCenter, the Spectrum X, or the MediaDeck 7000.

In the **Disks** section, view the following.

Slot Displays the slot ID, which is the numeric identifier that represents the physical position for each disk drive in the enclosure.

Model, Revision Displays the manufacturer's model number and firmware revision level for each disk drive in the enclosure.

Serial # Displays the manufacturer’s serial number for each disk drive in the enclosure. Click the serial number hyperlink to access the **Drive Properties** page for the selected drive.

GUID Displays the Global Unique Identifier for a disk drive in a MediaStore. This information is primarily used for debugging purposes.

Loop Master (not shown for MediaStore 5000 series, MediaCenter, or MediaDeck 7000) Displays whether a drive has been upgraded (converted) to the latest drive technology available from Harmonic. The following text may appear in this field:

- **MSC only**: Indicates the particular drive has not been upgraded. As Spectrum Systems do not support intermixing drives with older drive technology and the latest new technology, drives which are labeled as **MSC only** should undergo the technology conversion process before being mixed with drives which are built on newer technology (MS and MSS-4000 Series MediaStores).
- **MSC/MS/MSS**: Indicates the drive has been upgraded to the newer drive technology.

NOTE: Contact Harmonic technical support for details on upgrading systems with existing MSC-4000 Series MediaStores to newer disk technologies.

- **Status** Displays the current operational status for each disk drive in the enclosure. Click the **Disk Drive** icon to access the **Drive Properties** page for the selected drive.

Related information

Changing the MediaStore name
Winking all drives on a MediaStore

Viewing drive properties

On the **Drive Properties** page you can view general information about a specific drive as well as perform drive-related tasks.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Spectrum Disk Utilities** page.
3. Click the icon for the Spectrum video server for which you want view drive properties. to clear a hot spare. The **Disk Utilities** page for your Spectrum video server appears.
4. In the drive list, locate the desired disk drive and click its **Disk Drive** icon to display the **Drive Properties** page (for the selected drive).

Drive properties

The **Drive Properties** page provides drive details and some administrative operations for each drive.

In the **General Information** section you can view the following settings.

Status	Lists the status of the drive: Alive, Dead, or Missing.
Last Message	This line displays the last error message (generated by SystemManager) that deals with the selected drive.
Model	Lists the model number of the drive.
Manufacturer	Lists the name of the drive's manufacturer.
Serial Number	Lists the serial number of the selected drive.
Firmware Rev. Level	Lists the firmware revision level of the selected drive. Note that drive firmware can be updated from the application.
Disk GUID	Lists the specific GUID (Global Unique Identifier) of the selected drive.
MediaStore	Lists the MediaStore in which the selected drive is physically located. Click the hyperlink to jump to the MediaStore's "Properties" page.

MediaStore Slot Number	Lists the slot number where the drive is located.
Loop Master	Displays whether a drive has been upgraded (converted) to the latest drive technology available from Harmonic. The following text may appear in this field: • **Enabled**: Indicates the drive has been upgraded to the latest drive technology. • **Disabled**: Indicates the particular drive has not been upgraded. As Spectrum Systems do not support intermixing drives with older drive technology and the latest new technology, drives which are labeled as MSC only should undergo the technology conversion process before being mixed with drives which are built on the new technology. **NOTE:** Contact Harmonic technical support for details on upgrading systems to the new disk technologies.

In the **Disk Statistics** section you can view the following.

Disk Size	Shows the disk size (in GB) of the selected drive.
Block Size	Displays the block size of the selected drive.
Blocks	Shows the number of blocks on the selected drive.
SMART Threshold Errors	Shows the number of SMART warnings. This value is not affected by bad block repairs or disk reformatting. If this value is greater than zero, system management displays a Critical level alarm (red) and the drive should be replaced as soon as possible.
Hardware Errors	Shows the number of hardware errors reported. This value is not affected by bad block repairs or disk reformatting. If this value is greater than zero, system management displays a Critical level alarm (red) and the drive should be replaced as soon as possible.
Login Failures	Shows the persistent number of login failures detected. This value is not affected by bad block repairs or disk reformatting. If this value is greater than zero, system management displays a Failure level alarm (orange).
Bad Blocks	Shows the total number of bad blocks. This value increases whenever a new bad block is detected and decreases when bad blocks are repaired. If this value is greater than zero, system management displays a Failure level alarm (orange).
Read Errors	Shows the total number of read errors that have occurred on this drive. This number is not reset by repairing bad blocks, but is reset by reformatting the disk. If this value is greater than zero, system management displays a Failure level alarm (orange).
Write Errors	Shows the total number of write errors that have occurred on this drive. This number is not reset by repairing bad blocks, but is reset by reformatting the disk. If this value is greater than zero, system management displays a Failure level alarm (orange).
Read Timeouts	Shows the total number of read timeouts that have occurred on this drive. This number is not reset by repairing bad blocks, but is reset by reformatting the

	disk. If this value is greater than zero, system management displays a Failure level alarm (Orange).
Write Timeouts	Shows the total number of write timeouts that have occurred on this drive. This number is not reset by repairing bad blocks, but is reset by reformatting the disk. If this value is greater than zero, system management displays a Failure level alarm (orange).
Blocks Repaired	Shows the number of bad blocks that have been repaired. This number increases when bad blocks are repaired, and is reset when the disk is reformatted.
Aggregate Errors	Shows the number of errors represented by the current bad block list. This number decreases if bad blocks are repaired, and is cleared if the disk is reformatted.
SSD life expectancy	(For solid-state drives only) Displays the life expectancy of the solid-state drive as a percentage. When the life expectancy reaches 1%, the drive should be replaced. For replacement instructions, refer to the component replacement guide for your device.

In the **Miscellaneous** section you can view the following.

Fibre Channel Loops	Lists the individual Fibre Channel loops available.
RAID set	Click the **RAID Set** hyperlink to access the **RAID Utilities** page.
Position in RAID set	Lists the location of the selected drive in relation to the RAID set. If there were eight drives in a RAID set, the first drive would be in position 0 (zero). The positions of all drives in the RAID set are shown on the **Disk Utilities** page.

At the bottom of the page you can view the following buttons.

NOTE: Depending on the type of video server, some buttons may not appear.

Fail Drive	Click to fail the selected drive, and change its status to “Dead, Failed.” If you suspect that a drive is faulty, you can fail it, remove it from the enclosure and replace it with a new drive, whereupon “rebuild” begins automatically. When you fail a drive, the Unfail Drive button appears. This allows you to return a failed drive to service without performing a rebuild. The File System does not need be stopped for either procedure. **CAUTION:** Failing a drive is a drastic measure that should only be performed by qualified service personnel. It is important to note that sometimes you cannot unfail a failed drive.
Make Hot Spare	Click to change the status of the selected drive to “Alive, Hot Spare.” Note that when you make a hot spare, a new Clear Hot Spare button appears.
Remove Drive	(not available for SSDs) When a drive is dead and has been removed from the system, the drive’s information still remains on the **Disk Utilities** page and in the database. Click Remove Drive to remove the drive from the associated Spectrum video server and from both the **Disk Utilities** page and the database. Note that this button only appears if the drive is dead. **NOTE:** In an EFS setup, you must remove the “dead” drive from each of the MediaDirectors in the system.

Bypass Drive	Click to bypass a disk drive before attempting to remove the drive. Once a drive is bypassed it should then be removed promptly to maintain correct SES functionality. Refer to the *Spectrum System Component Replacement Guide* for detailed instructions on how to safely replace a disk drive.
Wink On/Off	Click to change the wink state of the selected drive. When on, the LEDs for the selected drive wink on the front panel of the MediaStore.
Done	Click to save any changes and return to the **Disk Utilities** page.

Related information

Failing a drive

Viewing RAID set information

On the **RAID Utilities** page you can view general information about a particular RAID set and also perform a variety of tasks including changing the RAID set's name, adding and removing drives from the RAID set, manually starting a "rebuild" and setting the RAID set's channel.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers appears.
3. Click the icon for the Spectrum video server whose RAID set information you want to view. The Spectrum video server's **Disk Utilities** page appears.
4. Click the **RAID Set** icon (or the **RAID Set Hyperlink**) for the RAID set about which you want information.

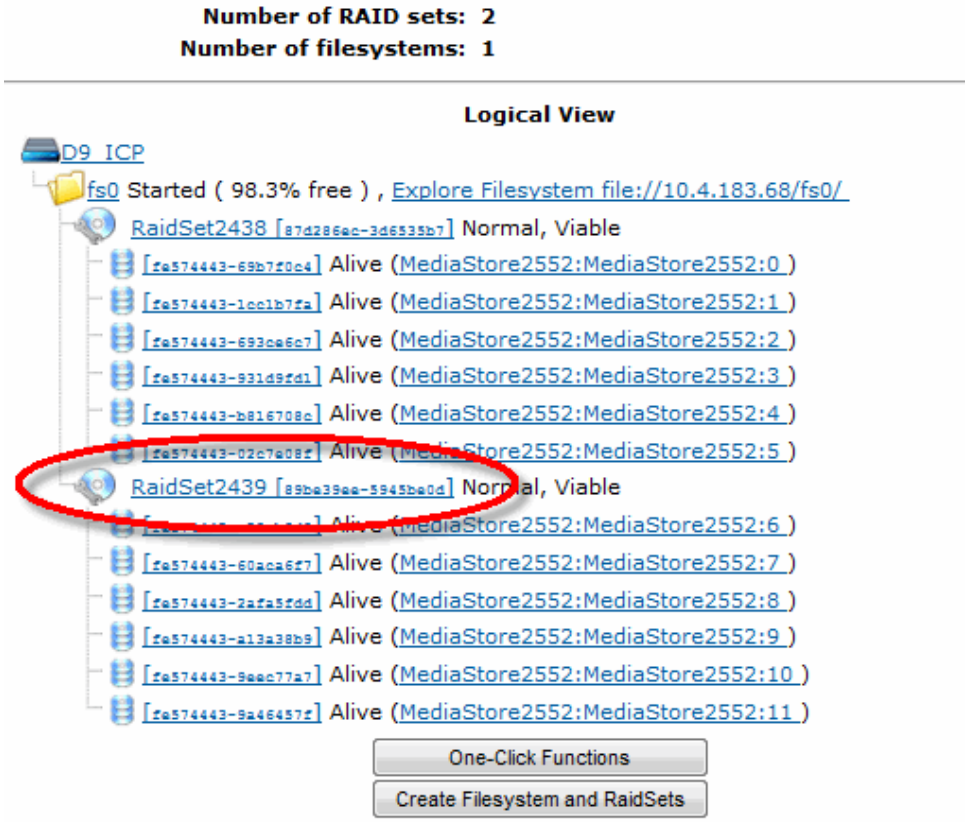


Figure 10-7: RAID Set Icon

5. The **RAID Utilities** page appears.

RAID Utilities fields

The RAID Utilities page provide RAID set details and some administrative operations for each RAID set.

In the **Information** section you can view the following.

Name	Displays the name of the RAID set. Click to **Change** to rename a RAID set.
Status	Displays the current status of the selected RAID set.
Last Message	This line displays the last error message (generated by the SystemManager) that deals with the selected RAID set.
Type	Lists whether or not the RAID set is protected or un-protected.
Channel	Lists the virtual channel that the RAID set is using.
File System	Click the **File System** hyperlink to access the **File System Utilities** page for the selected RAID set.
Total Blocks	Lists the total number of blocks of all drives in the RAID set.

	• **Rebuild Status**: Displays whether or not a “rebuild” has been started. • **Rebuild Blocks Completed**: Lists the number of completed blocks in the rebuild. • **Rebuild Blocks To Do**: Lists the number of blocks left to be rebuilt. • **Rebuild Time Elapsed**: Displays the running time of the rebuild process. • **RAID set drives wink state**: Click to change the wink state of all drives in the RAID set. When on, the LEDs on each drive in the RAID set will wink. • **GUID**: Displays the GUID of the complete RAID set.
Drive ID List	Lists the MediaStore name in which the RAID set lives, and the position of each drive in the MediaStore.
Drive Serial Number	Click to access the **Drive Properties** page for the selected drive. **NOTE:** In the **Actions** section of the page, some of the following buttons may not appear depending on the type of video server.
Add/Remove Drives	Click to add or remove drives from the selected RAID set.
Set Channel	Click to access the **Modify Channel** page, which specifies the channel that you wish to use for the selected RAID set. As detailed above, the channel designation gives the MediaDirector information on how to map RAID sets to Fibre Channel loops.
Start Rebuild	Click to manually start a “rebuild” after a drive failure has occurred, or after a drive has been replaced.
Suspend Rebuild	Click to manually suspend a “rebuild” after the rebuild process has been started.
Continue Rebuild	Click to manually continue a “rebuild” after the rebuild process has been suspended.
Abort Rebuild	Click to manually abort a “rebuild” after the rebuild process has been started.
Done	Click to save any changes on the **RAID Utilities** page and return to the **Disk Utilities** page.

Related information

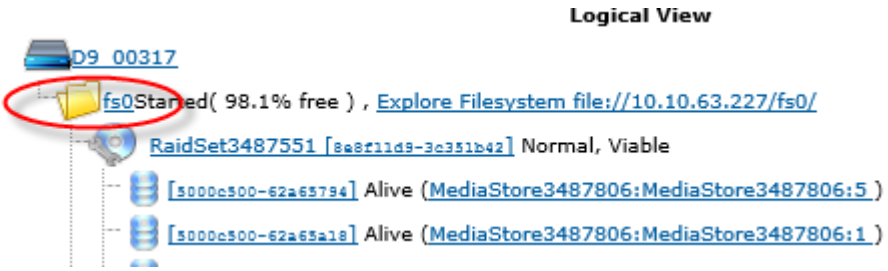
Renaming a RAID set
Creating a file system
About disk subsystem performance factors

Viewing general file system information

On the **File System Utilities** page you can view general information about a Spectrum video server’s File System as well as perform a variety of tasks including starting and stopping the File System.

1. Click the **Configuration** tab to display the **Configuration** page.
2. In the left-hand column, click the **Disk Utilities** icon to display the **Disk Utilities** page. A list of available Spectrum video servers appears.

3. Click the icon for the Spectrum video server for which you want to view a File System. The **Disk Utilities** page for that Spectrum video server is displayed.
4. Click the **File System Hyperlink** to display the **File System Utilities** page.



File system utilities fields

The **File System Utilities** page provide details for your Spectrum file system.

In the **Information** section you can view the following:

Name	Lists the File System's name.
Status	Displays whether the File System is "Started" or "Not Started."
Fibre Channel Loop Allocation Status	Indicates the status of internal Fibre Channel wiring between the video server and the storage. • **Not Started** — The File System has not been started. • **Failed** — The video server attempted to start the File System, but was not able to access all of the File System's RAID sets. At this point, the File System is unusable. Contact Harmonic Technical Assistance Center for assistance. • **Sub-optimal** — The video server was able to access all the File System's RAID sets, however, an internal connection may be unbalanced. Contact Harmonic Technical Assistance Center for assistance. • **Optimal** — The video server was able to access all the File System's RAID sets.
Last Message	This line displays the last error message (generated by the SystemManager) that deals with the selected File System.
Total Space	Lists the total amount of space on your File System.
Free Space	Lists the amount of space remaining to which you can record.
Non-Volatile Journaling	When **On**, indicates that the Spectrum video server is storing information about this File System in non-volatile memory. When a power failure occurs, information will not be lost. When **Off**, the Spectrum video server is not storing information about the system. This option is selected on the **Initialize File System** page or the **Start File System** page. Only one File System may have this property turned on.
Mode	Displays if the File System is read only or read/write.

Sharing with Other MediaDirectors	When **On**, indicates that this File System is shared with other video servers, and that the video server is participating in the EFS (Extended File Sharing) group. When **Off**, indicates that the File System is not shared with any other video servers. The validity of this indicator is based on proper system wiring, and all video servers working properly. **NOTE:** If your system is configured with EFS and the indicator is **Off,** you have a configuration problem. Resolve the problem before continuing.
Mountpoint	Lists the File System's mounting point — the directory name and location where the File System appears. A primary File System is always mounted at "/filesysname", meaning that it appears at the root of the directory name space with its own name.
File System Drives Wink State	Click to change the wink state of all drives in the File System. When on, the LEDs on each drive in the File System will wink.
Character Set DB Loaded	Indicates whether the file necessary for Unicode conversion is loaded on the File System. If the status is Yes, the file needed for Unicode conversion is available to the File System. If the status is No, the file needed for Unicode is missing and no conversion can take place.
GUID	Lists the File System's GUID (Global Unique Identifier).
	You can view the following information in the **RAID Set** section:
RAID Set	Click the RAID Set hyperlink to access the **RAID Utilities** page.
Stop FS / Start FS	Click to start/stop the File System, to make changes to the RAID sets. .
Done	Click to save any changes and return to the **Disk Utilities** page.

Viewing I/O module properties

Open the I/O module properties page for your MediaPort, ChannelPort, or Spectrum X SDI I/O card to view information such as model number, GPIO configuration, and environmental data.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click the heading or icon for your I/O module to open the **Properties** page.

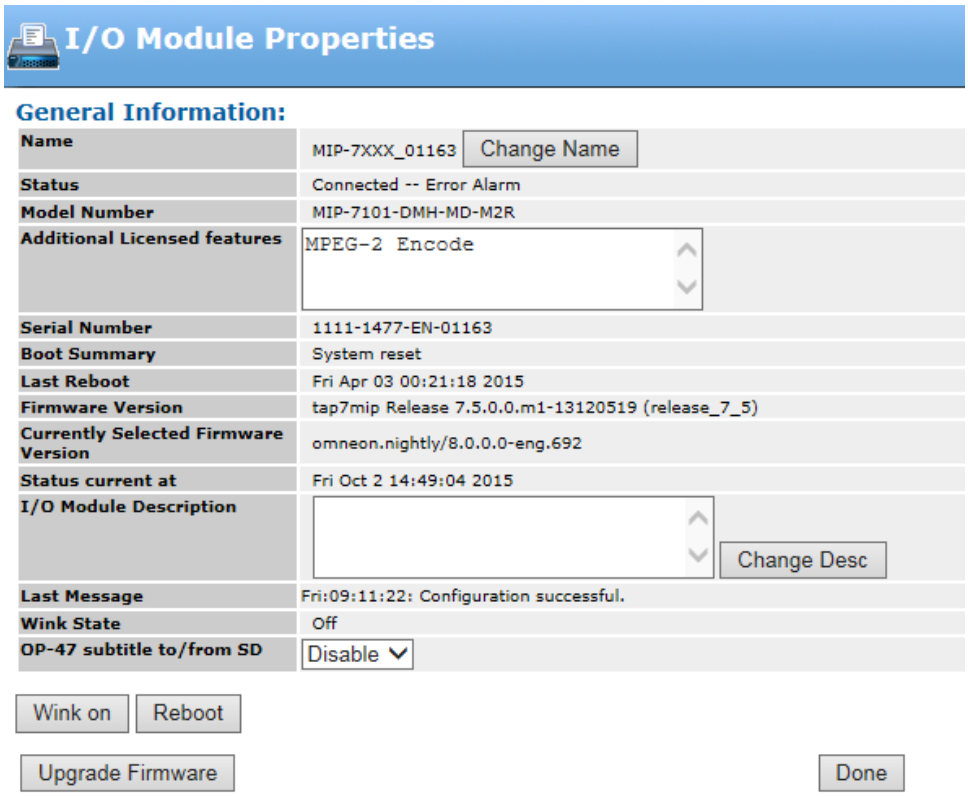


Figure 10-8: Properties—General Information

For a Spectrum X with the 10 Gb I/O module installed, the **Edit NIC Configuration** section will appear on the **I/O Module Properties** page. For details on configuring the 10 Gb interfaces, see "Configuring network settings for the 10 Gb I/O modules.".

Related information

Configuring network settings for the 10 Gb I/O modules

I/O module properties

The I/O Module Properties page provides details for your MediaPort, ChannelPort, or Spectrum X SDI card. Note the fields will vary depending on the device type.

In the **General Information** section you can view the following.

Name	Displays the user-defined name given to this I/O module. By default, this field displays the model number and serial number of the I/O module.
Slot	(for Spectrum X only) Displays the position of the I/O module in the chassis. When facing the rear panel of the Spectrum X, slot 1 is the left-hand module and slot 2 is the right-hand module.
Change Name	Click to rename the selected I/O module.
Status	Displays the current network status for the selected I/O module. This field is used primarily for diagnostic troubleshooting.

Model Number	Lists the I/O module product model number.
Additional Licensed features	Lists additional licensed features for this I/O module. **NOTE:** Spectrum licenses are installed only on the Spectrum video server and not on the Spectrum X if it is running in shared storage mode. For details on I/O module features and licenses, see the *Spectrum System Installation Guide*.
Serial Number	Displays the I/O module serial number as set at the factory.
Boot Summary	Displays the reason why the last reboot of the I/O module occurred.
Last Reboot	Displays the date and time of the last reboot of the I/O module.
Firmware Version	Lists the current version of firmware that resides in the flash memory of the I/O module.
Currently Selected Firmware Version	Lists the firmware version that is selected on the **Firmware Version Selection** page.
Status current at	Lists the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
I/O Module Description	Displays a scroll-able multi-line description of the selected MediaPort. This field is useful for entering data that clarifies the specific MediaPort's role in your system.
Change Desc	Click to change the I/O module description.
Last Message	This line displays the last error message received that deals with File System operation problems, or problems during the periodic File System check.
Wink State	Describes the wink state of the light bar, either On or Off. Refer to the **Wink On/ Off** description that follows for details.
Proxy Record Mode versus Audio Scrub Play Mode	(for the MediaPort and MediaDeck Modules 5320, 5220, and 5600 series only) Displays either **Proxy Record** mode enabled or **Audio Scrub** mode enabled. They cannot both be enabled at the same time. Depending on the current mode, the button will show either **Set Proxy Record Mode** or **Set Audio Scrub Mode**. Click the button to change the status. You must reboot in order for the changes to take affect.
OP-47 subtitle to/ from SD	(for the MediaPort 5400, 5500 and 7000 series only): • For the MediaPort 7000, this field allows you to enable or disable, up-conversion or down-conversion of subtitles to OP-47. • For the MediaPort 5400 and 5500 series, this field provides configuration options for subtitles which use the OP-47 standard.
Simulcast or Non-Simulcast Mode	(for the MediaPort 5500 series only) Displays either **Simulcast** mode or **Non-Simulcast** mode enabled. Click the button to change the status.
Assignable LTC Output	(for the MediaPort 5320 and 5220 series only) Select the channel you wish to use for LTC output, **Channel A**, **Channel B**, or **Loop Through**.
Channel Configuration	(for Spectrum X and ChannelPort) Depending on your I/O module and installed licenses, the following check boxes may be available.

	IMPORTANT: If you change the channel configuration, you must restart the Spectrum X or ChannelPort for the changes to take effect. Note that when switching to UHD mode (Ultra), the restart may take up to 15 minutes due to the system changes. • **Standard**: (default) Select to enable Standard Channel mode. • **Enhanced**: Select to enable Enhanced Channel mode. • **Ultra**: Select to enable UHD mode. **NOTE:** When the Spectrum X is in UHD mode, the **Configure Channel B** button will be disabled. This is because both SDI I/O cards are used for one channel of UHD.
IP Transport Protocol	(For Spectrum X) Select to enable SMPTE-2022-6. **NOTE:** Enabling or disabling SMPTE 2022-6 requires a restart of the Spectrum X. Note that SMPTE 2022-6 options on the Master Control Switcher section of the Channel Properties page are only available when SMPTE 2022-6 is enabled.
Soft Video Filter	(For Spectrum X) Select to apply a soft video filter to all players attached to the I/O module.
Wink On/Off	(button) Click to change the wink state of the light bar.
Reboot	(button) Click to reboot the device. This function is typically performed after loading new firmware. .
Configure Channel A	(button) Click to configure Channel A of the I/O module.
Configure Channel B	(button) Click to configure Channel B of the I/O module.
Upgrade Firmware	(button) click to upgrade the I/O module firmware.
Upgrade License	(button, if available) click to upgrade the I/O module license.

Related information

About recording proxies with the MediaPort 5000 series
Configuring audio scrub
Enabling OP-47 subtitle conversion
Configuring OP-47 subtitle conversion for the MediaPort 5000 series
About Simulcast mode
Changing the I/O module wink state
Rebooting the I/O module
Spectrum I/O channel configuration
Upgrading I/O module firmware
Upgrading the MediaPort or ChannelPort license
Changing the channel mode
Changing the I/O module name
Changing the I/O module description

About GPIO Configuration

The GPIO connector on the Spectrum I/O module can be configured to provide player control as well as control for graphics, or an Emergency Alert System (EAS), depending on the I/O module.

For the ChannelPort or the Spectrum X, GPIO can be configured to provide control for players, graphics, or an Emergency Alert System (EAS). For the MediaPort 7000 series, GPIO can be configured to provide player control.

In order to use GPIO to control players, you must first configure the GPIO settings on the I/O Module Properties page to create GPIO triggers, and then configure the GPIO settings for the attached players on their respective Player Properties pages to map the GPIO triggers to each player.

For ChannelPort or Spectrum X, you can map the triggers to a graphics template or EAS system by using the **Channel Properties** page.

For detailed instructions on configuring GPIO, refer to “Overview of configuring GPIO triggers.”

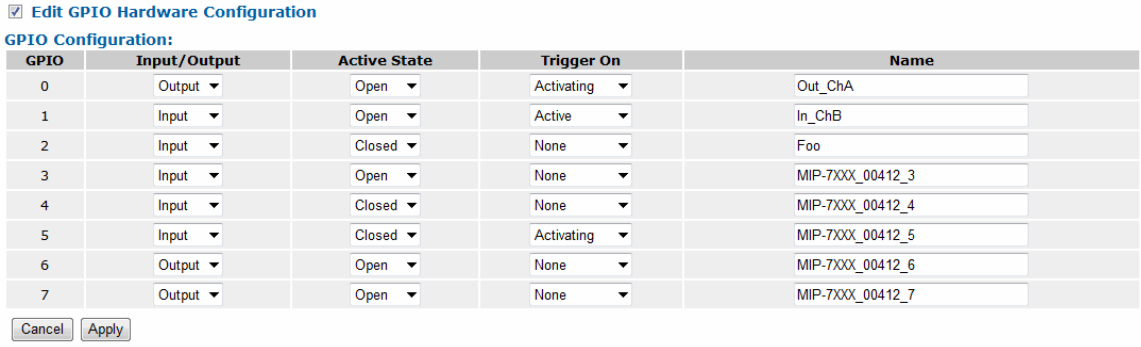


Figure 10-9: GPIO Configuration

Related information

Overview of configuring GPIO triggers
Spectrum I/O channel configuration
Configuring GPIO settings for players

I/O module environment properties

The Environment section of the **Properties** page provides environmental details.

NOTE: The fields in the Environment section will vary depending on the I/O module you are viewing.

Environment:

Power Supplies		
PS 0	NORMAL	
Voltage Levels		
1.90V Line	1.87 Volts	(Range: 1.83 - 1.95)
2.50V Line	2.47 Volts	(Range: 2.42 - 2.58)
3.30V Line	3.25 Volts	(Range: 3.13 - 3.47)
5.00V Line	4.99 Volts	(Range: 4.75 - 5.25)
12.00V Line	10.84 Volts	(Range: 10.00 - 14.25)
Temperatures		
Mainboard In	40 Celsius	(Range: 10 - 48)
Mainboard Out	42 Celsius	(Range: 10 - 55)
Fans		
Fan 0	8437 RPM	(Range: 4000 - 15000)
Fan 1	8231 RPM	(Range: 4000 - 15000)
Fan 2	9121 RPM	(Range: 4000 - 15000)
Fan 3	8231 RPM	(Range: 4000 - 15000)

Figure 10-10: Environment

For MediaPort modules installed on a MediaDeck 7000, refer to the Environment section of the MediaDeck Properties page for information on power supplies and fans.

Power Supplies — Shows the status of the I/O module's power supplies. This information is used primarily for diagnostic troubleshooting. The number of power supplies varies with I/O modules.

Voltage Levels — Lists the current voltages of the power supplies and other components. This information is used primarily for diagnostic troubleshooting. The valid ranges are also displayed. Note that these ranges are not configurable.

Temperatures — Displays the current temperature (in Centigrade) of this I/O module. This information is used primarily for diagnostic troubleshooting. The valid ranges are also displayed. Note that these ranges are not configurable.

Fans — Displays the speed (in RPM) of all fans in this I/O module. This information is used primarily for diagnostic troubleshooting. The valid ranges are also displayed. Note that these ranges are not configurable.

- **Other Counts**
  - **Cache Parity Errors**: (MediaPorts only) This field appears if any cache parity error has occurred on this MediaPort. The value shown in this field indicates the number of cache parity errors that have occurred on this MediaPort.
  - **Reference**: This field indicates whether reference for this I/O module is **Locked**, **Unlocked**, or **Unknown**.
  - **Recording input check (chan A) or (chan B)** (MediaPorts only) This field appears if any black frames are present in the video being recorded by this MediaPort channel, and indicates the number of black frames that are recorded.

Viewing I/O module alarms and events

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click any I/O module heading (or icon) to reach the **I/O Module Properties** page.
3. Scroll down to the bottom of the page to view any alarms or events associated with the selected I/O module as shown in the following figure.

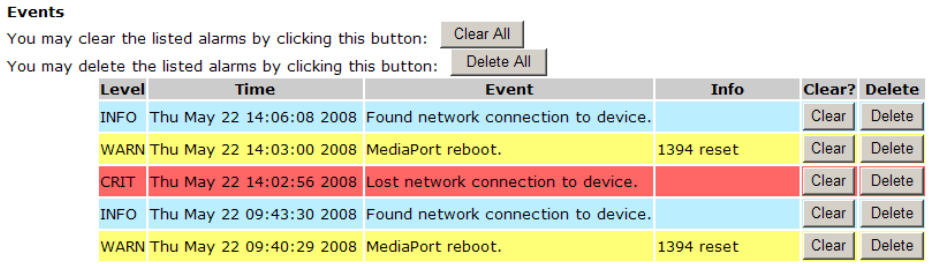


Figure 10-11: Alarms and Events

Viewing a snapshot of the Spectrum video server log

You can view a snapshot of the Spectrum video server's log. The function is used for diagnostic purposes only.

1. Click the **Configuration** tab to display the **Configuration** page and **System Diagram**.
2. Click a Spectrum video server icon to display the **Physical Configuration** page for the selected Spectrum video server.
3. Click the Spectrum video server's picture to display the **Properties** page.
4. Scroll to the bottom of the page and click **Log Snapshot** to display the **View Device Log** page. Contact Harmonic technical support for additional assistance.

Changing logging variable settings

Logging, or "debug," variables determine which information is included in the Spectrum log file and enable Harmonic technical support to troubleshoot issues on a Spectrum system.

IMPORTANT: Do not change the settings on this page unless directed by Harmonic technical support.

The Change Logging Variable Settings page allows you to specify new information to be added to the Spectrum log file. If you encounter problems with your Spectrum system, Harmonic technical support may ask you to configure this page to help them identify the cause of the issue.

1. Navigate to the **Properties** page for your Spectrum video server.
2. From the **Change Settings** section, click **Update Logging variables**. The **Change Logging Variable Settings** page appears.

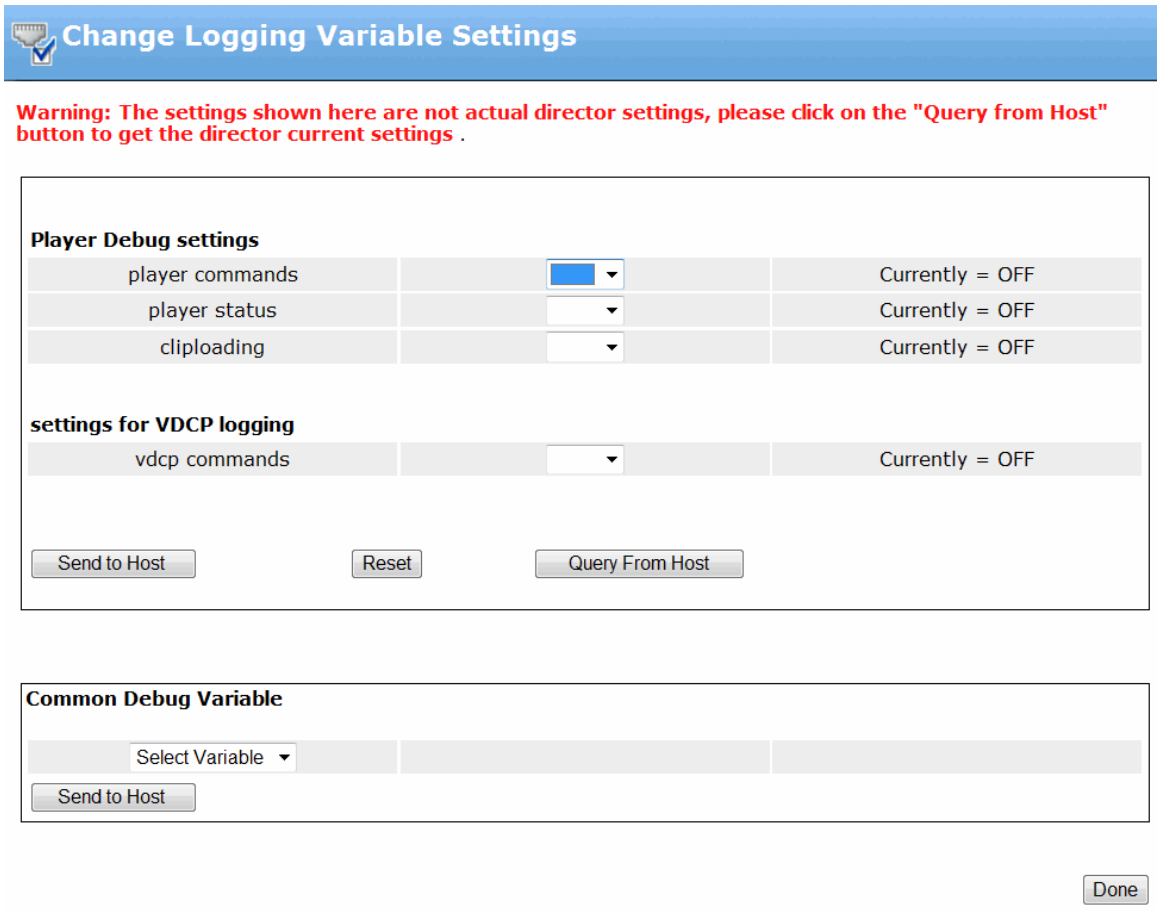


Figure 10-12: Change Logging Variable Settings

3. Click **Query From Host** to query the logging settings from the host. Once the page refreshes, the current host settings will appear.
4. Modify the following logging settings as instructed by Harmonic technical support:

   Under **Player Debug settings**:

   - **player commands**: Select **On** to log all player activity.
   - **player status**: Select **On** to log all queries or responses regarding player status.
   - **cliploading**: Select **On** to log all instances of clips being loaded or ejected.

   Under **settings for VDCP logging**:

   - **vdcp commands**: Select **ON** to log all VDCP commands.
5. Click **Send to Host** to send the new settings to the host.
6. Click **Query From Host** and verify that the new settings appear.

   You may click **Reset** at any time to clear the settings on the SystemManager page and query the settings from the host.
7. If instructed by Harmonic technical support, you may select an option under **Common Debug Variable**. These options may vary. If you are directed to select a variable, Harmonic technical support will provide the value to enter in the corresponding field.

8. Click **Send to Host** to send the new settings to the host.

Part III

Harmonic MediaGrid

- *Harmonic MediaGrid configuration*
- *Harmonic MediaGrid RAID configuration and maintenance*
- *Harmonic MediaGrid monitoring and troubleshooting*

Chapter 11

Harmonic MediaGrid configuration

Find basic configuration procedures for Harmonic MediaGrid.

Refer to the *Harmonic MediaGrid Installation Guide* for detailed instructions on installing a Harmonic MediaGrid.

NOTE: Before commencing Harmonic MediaGrid configuration, ensure that vDHCP is disabled on the SystemManager Platform. Refer to the *SystemManager Installation Guide* for instructions.

- *Gaining secure access to the Harmonic MediaGrid system*
- *About Harmonic MediaGrid licenses*
- *Installing a Harmonic MediaGrid license file on a cluster*
- *About clusters, volumes and groups*
- *About mixing ContentServers and scheduled balancing*
- *About checkpoints and scheduling checkpoints*
- *Configuring Harmonic MediaGrid*
- *Restarting a Harmonic MediaGrid device*
- *Powering down a Harmonic MediaGrid system*
- *Powering on a Harmonic MediaGrid system*
- *Editing the slice size configuration file*
- *Editing the ContentServer configuration file*
- *Editing the ContentBridge configuration file*
- *Enabling and configuring scheduled balancing*
- *Enabling and configuring log forwarding*
- *Balancing the ContentServer controllers*
- *Upgrading Harmonic MediaGrid firmware*
- *Changing the Harmonic MediaGrid wink state*
- *Enabling and configuring checkpoint schedules*
- *Changing the descriptions for Harmonic MediaGrid components*

Gaining secure access to the Harmonic MediaGrid system

Access the Harmonic MediaGrid using one of three types of users: regular user, Harmonic MediaGrid administrator, and SystemManager administrator.

1. From the **Configuration** tab, click the Access Control icon in the Harmonic MediaGrid section of the left-hand column. The **Access Control Settings for Harmonic MediaGrid Devices** page appears.

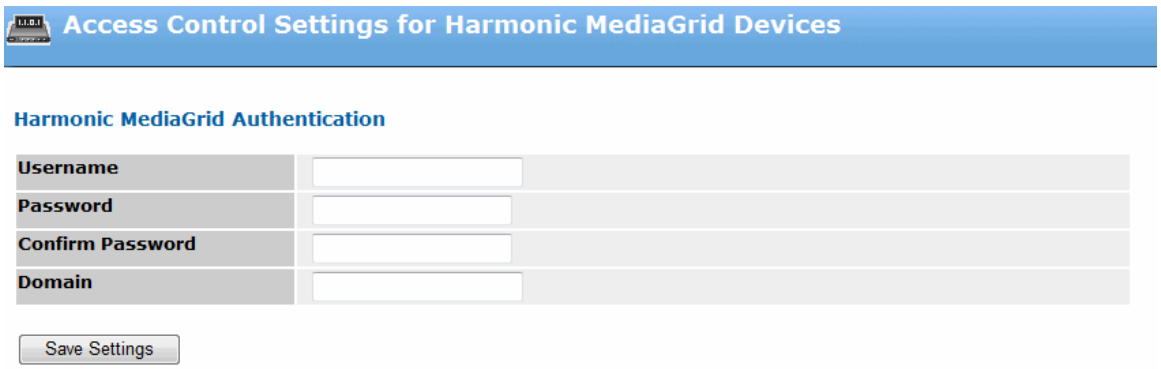


Figure 11-1: Access Control Settings for Harmonic MediaGrid

2. Enter information in the following fields to gain secure access.
   - For Regular user access, contact your IT department for information.
   - For Harmonic MediaGrid Administrator level access use:
     - **Username**: mgadmin
     - **Password**: 1234
     - **Confirm Password** 1234
     - **Domain**: (empty)
   - For SystemManager Administrator level access use:
     - **Username**: omneon
     - **Password**: usm
     - **Confirm Password** usm
     - **Domain**: (empty)
3. Click **Save Settings** to save changes. The SystemManager now provides access to the Harmonic MediaGrid according to the security access level assigned to the user.

About Harmonic MediaGrid authentication

Security on a Harmonic MediaGrid is provided at three levels: regular user, Harmonic MediaGrid administrator, and SystemManager administrator.

Using Windows Domain Controller (WDC)	Connecting to a WDC provides a user's security token and a list of group memberships. Thus, a WDC is a requirement for facilities operating a Harmonic MediaGrid **Regular users** are permitted this level of access. For more information about WDC, a good general starting point is the Windows Server Cookbook: *http://www.oreilly.com/catalog/windowsvrckbk/index.html*

NOTE: Although Harmonic neither recommends nor supports this, customers with expert level skills and knowledge can connect to a Samba-emulated WDC. For more information about a Samba-emulated WDC, go to: *http://www-128.ibm.com/developerworks/linux/library/l-samba-tng.html*

Using the ContentManager application	ContentManager allows you to set user and group level security for various Harmonic MediaGrid files and directories through Access Control Lists (ACLs). Once an ACL is created, you can customize the security preferences for each individual Access Control Entry (ACE). In summary, **Harmonic MediaGrid Administrators** are permitted to configure the Harmonic MediaGrid, whereas regular users are not. Refer to the *ContentManager User's Guide* for additional information.
Using Harmonic MediaGrid with MAS	The Media Application Server (MAS) provides unified content management capabilities across various storage systems, as well as a common view of content stored across multiple file systems. **SystemManager Administrators** are permitted to configure Harmonic MediaGrid directories using a MAS system. Refer to the *Media Application Server User Guide* for additional information.

NOTE: Do not log in as a SystemManager administrator if you plan to configure ContentManager settings.

About Harmonic MediaGrid licenses

Note some points about Harmonic MediaGrid licenses.

At least one compute node license must be installed to enable client grid access. This license restricts grid usage by limiting the maximum number of grids allocated at any time, as well as limiting each grid to a maximum number of nodes. Additional compute node licenses must be installed if the maximum number of nodes in use is exceeded.

The compute node licenses are included in Harmonic MediaGrid license files. After the licenses have been purchased, the license files ending in .omlic, are sent by e-mail to customers. License files should be placed in the D:\Licenses directory of the SystemManager Platform. Refer to "Obtaining and Installing a SystemManager License File" in the *SystemManager Installation Guide* for step by step instructions.

Once Harmonic MediaGrid license files are available in the D:\License directory on the SystemManager Platform, you can install them on a cluster.

Installing a Harmonic MediaGrid license file on a cluster

Install a license file on a Cluster.

NOTE: You must have Administrator privileges to perform this function.

1. Ensure that a license file is available for use in the D:\Licenses directory of the SystemManager Platform that controls the Harmonic MediaGrid. Contact Technical Support if the license file is not in this directory.
2. From the **Configuration** tab, click the **Install License** icon in the left-hand column to access the **Install License** page.

3. Identify the required license and select an installation location from the **Select Cluster** list.
4. Select the appropriate check box.
5. Click **Install**.

   The license file is installed on a ContentDirector in the selected cluster.

About clusters, volumes and groups

When setting up a Harmonic MediaGrid system, generally, there will be one cluster, one volume, and one group, all of which are generated automatically by the Configuration Assistant.

Term	Description
Cluster	Includes a volume and its associated ContentDirector, ContentServer, ContentStore, and ContentBridge nodes within a Harmonic MediaGrid.
Volume	Includes the file system, one Group, and its associated ContentServer and ContentStore nodes in a Harmonic MediaGrid.
Group	A collection of one or more ContentServer units and their attached ContentStore nodes.

About mixing ContentServers and scheduled balancing

Clients can utilize the full bandwidth and storage provided by ContentServer 2000 series in a mixed-server configuration (ContentServers 2122 and 2124 in the same Harmonic MediaGrid system).

NOTE: At this time, the ContentServer 3000 or 4000 and ContentStores 3160, 4240, or 5840/5840A series cannot be mixed with ContentServer 2000 series in the same Harmonic MediaGrid system.

In order for a mixed server configuration to function properly, you must make sure the system is balanced on a regular basis by using the Balancer feature included in this version of SystemManager. Enabling and configuring scheduled balancing for a cluster ensures that all ContentServers have disk space balanced across the cluster.

Related information

Enabling and configuring scheduled balancing

About checkpoints and scheduling checkpoints

Enabling Checkpoints saves a copy of all File System metadata stored in a ContentDirector. Data is saved to a single file, the Checkpoint file, and stored on another ContentDirector.

Each ContentDirector holds a single Checkpoint file; each new Checkpoint goes to a different ContentDirector. If a disaster destroys all File System metadata on all ContentDirectors, the File System metadata can be retrieved from the Checkpoint file and then restored.

Checkpoint scheduling allows you to periodically create Checkpoint files. Checkpoints can be immediate (on demand) or scheduled at intervals. You can set the interval from 1 to 12 hours, 16 or 20 hours, or from 1-15 days. Checkpoint intervals can be configured to occur at any hour of the day, and on any day of the week.

Harmonic makes the following recommendations for Checkpoints and Checkpoint Scheduling:

- All ContentDirectors should have Checkpoints enabled and a schedule configured.
- Schedule Checkpoints to occur at least every 24 hours.
- All ContentDirectors in a cluster should have identical Checkpoint intervals but different starting times. For example, if a Harmonic MediaGrid has three ContentDirectors, then ContentDirector A could have a schedule start time of Monday at midnight, ContentDirector B would have Tuesday at midnight, and ContentDirector C would have Wednesday at midnight. The Checkpoint interval should then be set to 72 hours on each ContentDirector. This would ensure a Checkpoint occurred every 24 hours, rotating among the ContentDirectors.
- Before configuring checkpoints, Harmonic recommends that you set the time zone on each ContentDirector. Refer to “Setting ContentDirector Timezones” in the *Harmonic MediaGrid Installation Guide* for step by step instructions.

  NOTE: Contact Harmonic technical support if you wish to access information in the Checkpoint file.

The **Events** section on a **ContentDirector Properties** page provides information about the success or failure of the last attempted checkpoint operation.

Related information

Enabling and configuring checkpoint schedules

Viewing and clearing alarms and events for Harmonic MediaGrid components

Configuring Harmonic MediaGrid

Once you have configured your Harmonic MediaGrid system by running the configuration assistant, and initialized a cluster, you may perform some additional configuration.

Before you begin

For information on running the configuration assistant, refer to “System Configuration” in the Harmonic MediaGrid Installation Guide.

To configure and maintain Harmonic MediaGrid RAID systems, refer to *Harmonic MediaGrid RAID Configuration and Maintenance*.

NOTE: To perform the required initial configuration tasks for a Harmonic MediaGrid, you will need Admin level access. See *Gaining secure access to the Harmonic MediaGrid system*.

Creating or deleting a volume

You can create or delete a volume from SystemManager.

NOTE: When setting up a Harmonic MediaGrid system with the ContentServer 3000 or 4000, there can only be one cluster, one volume, and one group, all of which are generated automatically by the configuration assistant. You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** section, click the name of the cluster for which you want to create or delete a volume. The **Cluster Properties** page loads.

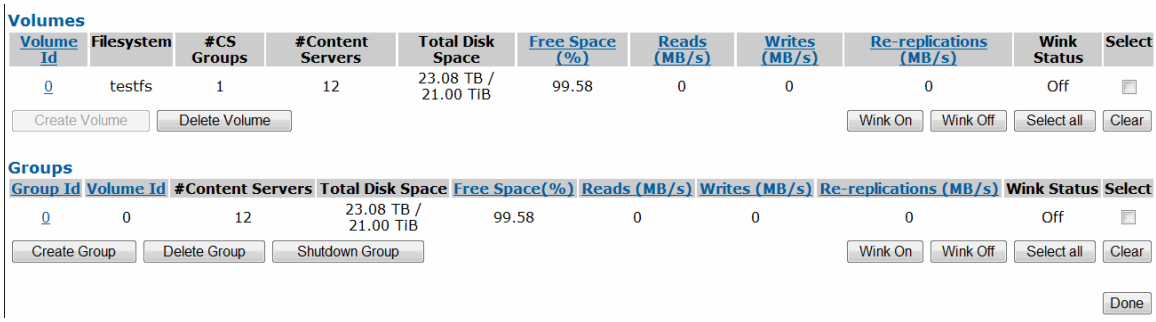


Figure 11-2: Cluster Properties—Volumes Section

3. In the **Volumes** section of the page, proceed as follows:
   - To create a Volume: Click **Create Volume**. A dialog box appears asking you to confirm the creation. Click **OK**. A new volume is added to the list of volumes.
   - To delete a Volume: Select the volume to be deleted and click **Delete Volume**. A dialog box appears asking you to confirm the deletion. Click **OK**. The volume is removed from the list of volumes.

   NOTE: Only one volume is supported on the Harmonic MediaGrid.
4. Click **Done**.

Related information

Creating or deleting a volume

Creating or deleting groups

You can create or delete groups from SystemManager.

NOTE: When setting up a Harmonic MediaGrid system with the ContentServer 3000 or 4000, there can only be one cluster, one volume, and one group, all of which are generated automatically by the configuration assistant.

The number of groups should be equal to or slightly higher than the expected replication factor. Once the desired replication factor is chosen, set up a grouping arrangement that best supports that replication factor.

NOTE: You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the cluster with the required volume. The **Cluster Properties** page appears. Scroll to the **Groups** section as shown in the following figure.

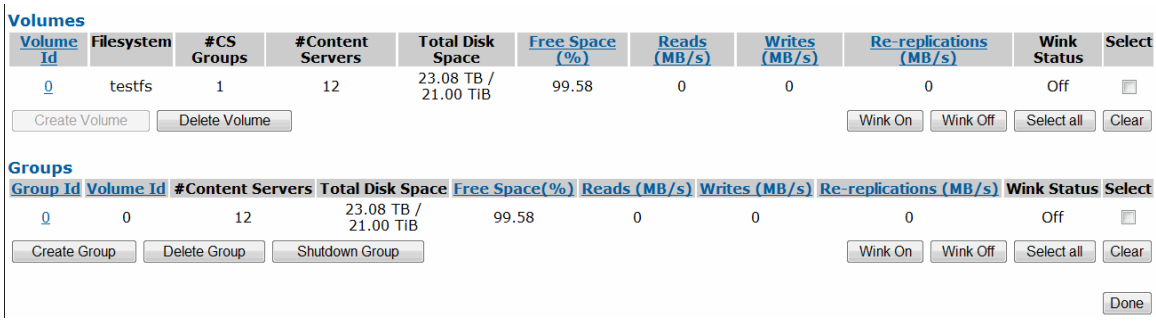


Figure 11-3: Cluster Properties—Groups Section

3. In the **Groups** section of the page, proceed as follows:
   - To create a Group: Click **Create Group**. A dialog box appears asking you to confirm the creation. Click **OK**. A new **Group** is added to the list of **Groups**.
   - To delete a Group: Select the **Group** to be deleted and click **Delete Group**. A dialog box appears asking you to confirm the deletion. Click **OK**. The **Group** is removed from the list of **Groups**.
4. Click **Done**.

Adding or removing ContentServers from a group

You can add or remove ContentServers to or from a Group.

NOTE: When setting up a Harmonic MediaGrid system with the ContentServer 3000 or 4000, there can only be one cluster, one volume, and one group, all of which are generated automatically by the configuration assistant.

Follow these guidelines when adding ContentServers to a group:

ContentServer 2000: The recommended configuration is 12 ContentServers per group. Note that the default replication factor is 3; the replication factor can be changed to best support the number of ContentServers. For maximum performance, do not use less than 10 ContentServers in a group. This provides a sufficient pool of ContentServers for slice storage.

ContentServer 3000: Supports the base pack and up to 5 ContentStore 3160s. The default replication factor is 1.

ContentServer 4000: Supports the base pack and up to 4 ContentStore 4240s and 1 ContentStore 5840 or 1 ContentStore 5840A. The default replication factor is 1.

NOTE: You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the cluster with the required **Group**. The **Cluster Properties** page appears. Scroll down the page to display the **Group** section.
3. Click the required **Group ID** to display the **Group Properties** page as shown in the following figure.

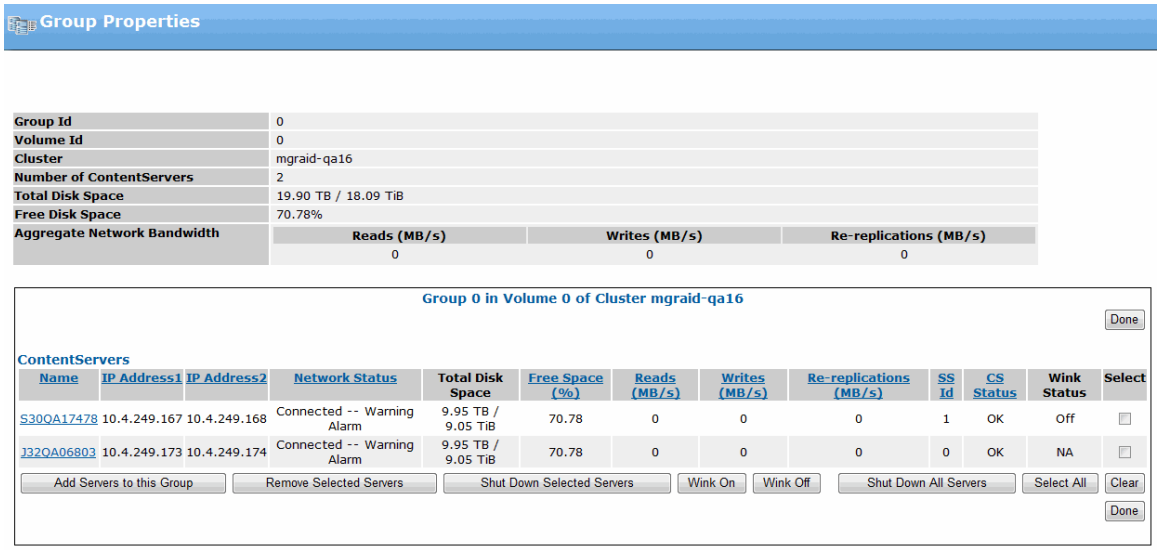


Figure 11-4: Group Properties

4. To add a Server to the **Group**, click **Add Servers to this Group**. The **Unattached ContentServers** page appears where you select which Server to add. Click **Confirm Add**. A dialog box appears which prompts you to confirm the addition. Click **OK**.
5. To remove a Server from the **Group**, select the Server and click **Remove Selected Servers**. A dialog box appears prompting you to confirm the delete. Click **OK**.
6. Click **Done**.

   The Server has been added to or deleted from the group as specified. Deleted Servers can be reused with another group (or the same group) within a Harmonic MediaGrid at a later time.

Related information

Setting replication factors for file systems

About ContentBridge discovery and cluster association

Note how the SystemManager discovers the ContentBridges.

ContentBridges will not be added to SystemManager automatically if they are not in the same IP network as the SystemManager or ContentDirectors being monitored. In most cases, the Connect Device feature must to be used to add such devices.

Note that ContentBridges will not be displayed in a cluster if they are not in the same IP network as one of the cluster's ContentDirectors. Also, their cluster value will be shown as "unknown" in such cases. The ContentBridge cluster association is for convenience only and does not affect operation.

Related information

Connecting a device from a different IP network

Adding or removing groups from a volume

You can add or remove an existing Group to/from a Volume.

You must have Administrator privileges to perform these functions.

NOTE: When setting up a Harmonic MediaGrid system with the ContentServer 3000 or 4000, there can only be one cluster, one volume, and one group, all of which are generated automatically by the configuration assistant.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the cluster with the required volume. The **Cluster Properties** page appears. Scroll down the page to display the **Volume** section.
3. Click the required **Volume** to display the **Volume Properties** page, as shown in the following figure.

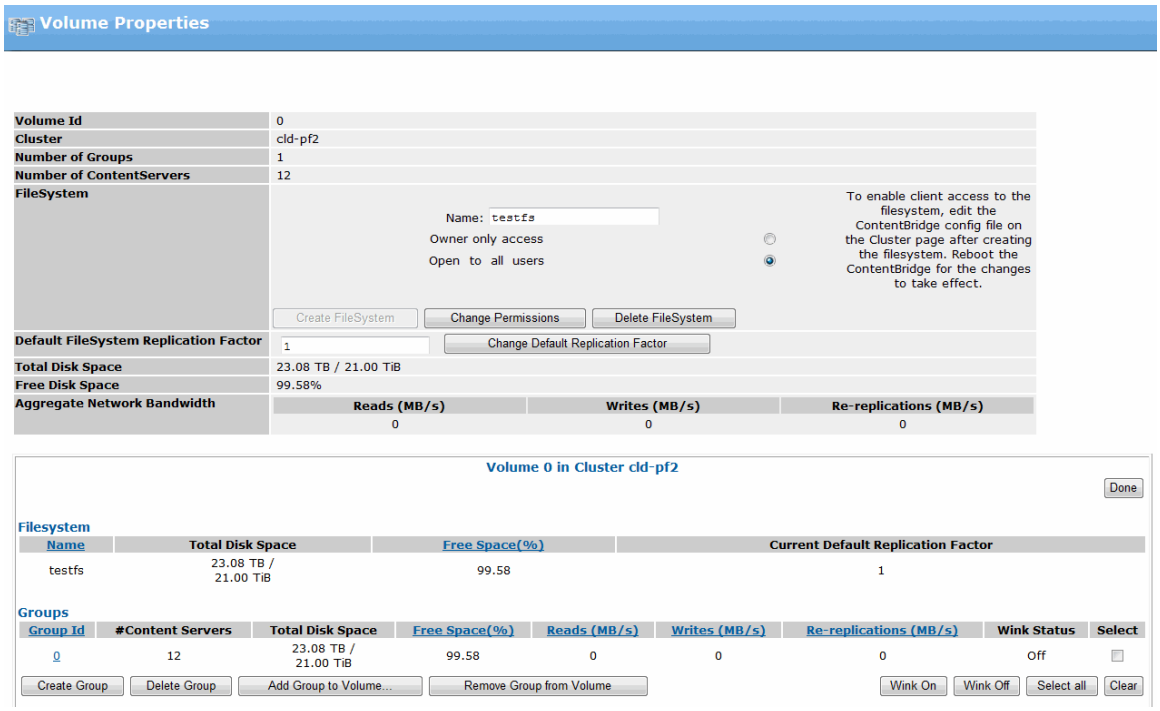


Figure 11-5: Adding or Removing Groups

4. To add a group to the volume, click **Add Group to Volume**. The **Unattached Groups** page appears, which allows you to select which group to add. Click **Confirm Add**. A dialog box appears, which prompts you to confirm the addition. Click **OK**.
5. To remove a group from the volume, select the group and click **Remove Group from Volume**. A dialog box appears, which prompts you to confirm the delete. Click **OK**.
6. Click **Done**.

The **Group** has been added or deleted from the **Volume** as specified. A deleted group can be added to another (or the same) volume at a later time.

Creating or deleting file systems from a volume

You can create or delete a file system.

NOTE: You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the Name hyperlink for the cluster with the required **Volume**. The **Cluster Properties** page appears.
3. Scroll down the page to the **Volume**s section and click the required **Volume** ID to access the **Volume Properties** page.
4. Choose one of the following:
   - To create a File System: In the **File System** field at the top of the page, enter a File System name and click **Create File System**. Refer to “About Naming Files and System Elements” for rules to follow when naming a File System.

     NOTE: Only one File System can be associated with a Volume; if one File System is already created for a volume the Create File System button will be grayed out.
   - To delete a File System: In the **File System** field, click **Delete File System**.
5. A dialog box appears to confirm the deletion. Click **OK**.
6. Click **Done** to complete the task. The **File System** has been created or deleted from the **Volume** as specified.

Related information

About naming files and system elements

Setting or changing file system permissions

You can change permissions for a file system.

NOTE: You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the cluster with the required **Volume**. The **Cluster Properties** page appears.
3. Scroll down the page to the **Volume**s section and click the required **Volume ID** to access the **Volume Properties** page..
4. In the **File System** field, select from:
   - **Owner only access**: Select to limit access to the person who has logged in. This is the default permission.
   - **Open to all users**: Select to provide File System access to all users.

5. Click **Change Permissions** to save the change.

Setting replication factors for file systems

You can set the replication factor for a file system.

NOTE: You must have Administrator privileges to perform these functions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the cluster with the required **Volume** and associated **File System**. The **Cluster Properties** page appears.
3. Scroll down the page to the **Volume**s section and click the appropriate **Volume ID**to access the **Volume Properties** page.
4. In the **Default File System Replication Factor** field, enter a number between 2 and 105. Refer to “About File System Replication Factors” for recommendations about replication factors. The default replication factor is 3.
5. Click **Change Default Replication Factor** to set the change.

About file system replication factors

For Harmonic MediaGrid systems with the ContentServer 2000 series, Harmonic recommends that you keep the replication factor for your system set to 3 (the default setting) or, at minimum, 2.

CAUTION: Note that setting the replication factor to 1 will lead to data loss in the case of system or disk failure.

About ContentServer and Cluster bandwidth measurements

SystemManager provides bandwidth measurement statistics on a drive read, write and re-replication basis for each ContentServer.

Aggregate statistics are also available for each cluster. For ContentServers, the drive read, write and re-replication measurements are summed over all the ContentServers of the cluster and are shown as the **Bandwidth Utilization** on the **Cluster Properties** page.

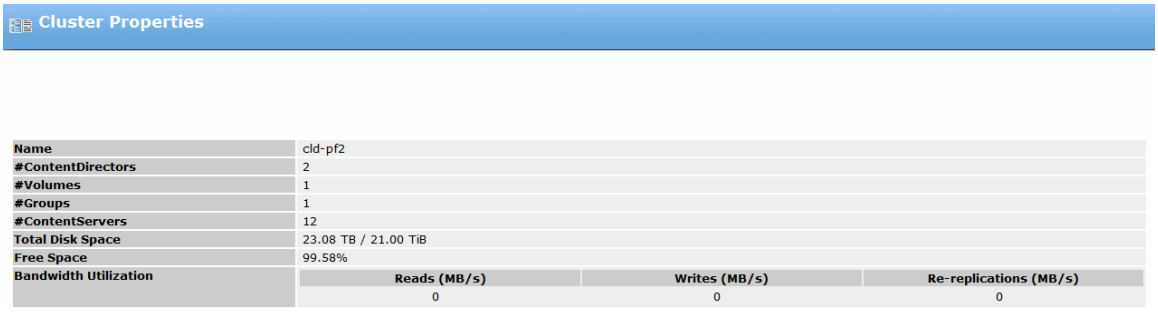


Figure 11-6: Cluster Properties—Bandwidth Utilization

The aggregate total is compared to the potential available bandwidth and calculated as a percentage, which is shown as the **Bandwidth Utilization** (Average per ContentServer) on the **Cluster Properties**

page. This percentage is then checked against the SystemManager alarm levels. The alarm levels can be configured from **Diagnostics** tab, using the **Edit Thresholds** page.

The default alarm levels are presented as follows:

- An ERROR (orange) alarm is raised if the value moves into the (80...90) range.
- A CRITICAL (red) alarm is raised if the value moves into the (90...100) range.
- An INFO (blue) alarm is raised if the value moves into the (0...80) range.

No alarm is raised if the value is in the same range as it was when this measure was last checked.

NOTE: ContentServers unresponsive to SystemManager queries for the read, write and re-replication counters are omitted from the calculation.

Related information

Editing alarm thresholds

Restarting a Harmonic MediaGrid device

Safely restart a device from the **Properties** page in SystemManager.

1. From the **Properties** page for the device you wish to restart, click the **Reboot** button located at the bottom of the **General Properties** section.
2. Click **OK** to confirm.

   Result: The device restarts.
3. Verify that the **Status** field changes to **Not Responding**, and then returns to its previous state.

   NOTE: It might take a few minutes for the status to change, depending on the length of the discovery cycle and the status of other devices in your network.

Powering down a Harmonic MediaGrid system

Power down the entire system only when directed to do so by Harmonic support.

This procedure requires that you shut down all ContentDirector nodes first, then all ContentBridge nodes, and then all ContentServer nodes. Wait for each group of devices to change to **Not Responding** before powering down the next group of devices. It may take a few minutes for the status to change to **Not Responding**, depending on the length of the discovery cycle and the status of other devices in your network.

IMPORTANT: Only perform the following steps if directed to do so by Harmonic technical support.

1. From the **Configuration** tab in SystemManager, click the **Servers & Switches** icon.
2. From the **Servers & Switches** page, click the link for the cluster that you wish to shut down.
3. From the **Cluster Properties** page, in the **Shutdown cluster** section, click **Shutdown all ContentDirectors in a cluster**.
4. Click **OK** to confirm.

5. Scroll to the **ContentDirectors** section of the page and confirm that the **Network Status** indicates **Not Responding**.
6. Disconnect the power cables from each ContentDirector.

   After each ContentDirector has shut down, the **Shutdown all ContentBridges in a cluster** button will be activated.
7. Click **Shutdown all ContentBridges in a cluster**.
8. Click **OK** to confirm.
9. Scroll to the **ContentBridges** section of the page and confirm that the **Network Status** has changed to **Not Responding**.
10. Disconnect the power cables from each ContentBridge.

    After each ContentBridge has shut down, the **Shutdown all ContentServers in a cluster** button will be activated.
11. Click **Shutdown all ContentServers in a cluster**.
12. Click **OK** to confirm.
13. Scroll down to the **ContentServers/ContentStores** section of the page and confirm that the **Network Status** indicates **Not Responding**.
14. Physically power down each ContentServer and ContentStore in the cluster as follows:

Option	Description
ContentServer 4000	Press the power button on the control panel and hold for four seconds. Once the disk drive LEDs are off, disconnect the two power cords from the back of the server.
ContentServer 3000	Press the red power button on the control panel on the front of the server and hold for five seconds. Once the disk drive LEDs are off, disconnect the two power cords from the back of the server.
ContentStore 5840/5840A	Move all power supply switches to the “off” position. Once the front panel LEDs are off, disconnect the power cables from the power supplies.
ContentStore 4240	Press the power button on the control panel and hold for four seconds. Once the disk drive LEDs are off, disconnect the two power cords from the back of the server.
ContentStore 3160	Press the red power button on the control panel on the front of the device and hold for five seconds. Once the disk drive LEDs are off, disconnect the two power cords from the back of the device.

15. Shut down the SystemManager platform:
    a. Click the **Start** button on the task bar, and then click **Shut Down**.
    b. Disconnect the power cable if necessary.
16. Power down each network switch by disconnecting the power cords.

Powering down a single ContentDirector

Safely power down the device from SystemManager.

1. From the **Configuration** tab, click the **Servers & Switches** icon.
2. From the **Servers & Switches** page, in the **ContentDirector** section, click the name of the ContentDirector you wish to power down.
3. From the **Properties** page, click the **Shutdown** button located at the bottom of the **General Properties** section.
4. Click **OK** to confirm.
5. Verify that the **Status** field indicates **Not Responding**.

   NOTE: It might take a few minutes for the status to change, depending on the length of the discovery cycle and the status of other devices in your network.
6. Disconnect the power cables.

Powering down a single ContentBridge

Safely power down the device from SystemManager.

1. From the **Configuration** tab, click the **Servers & Switches** icon.
2. From the **Servers & Switches** page, in the **ContentBridge** section, click the name of the ContentBridge you wish to power down.
3. From the **Properties** page, click the **Shutdown** button located at the bottom of the **General Properties** section.
4. Click **OK** to confirm.
5. Verify that the **Status** field indicates **Not Responding**.

   NOTE: It might take a few minutes for the status to change, depending on the length of the discovery cycle and the status of other devices in your network.
6. Disconnect the power cables.

Powering down a single ContentServer

Use SystemManager to safely power down the device.

1. From the **Configuration** tab, click the **Servers & Switches** icon.
2. From the **Servers & Switches** page, in the **ContentServers/ContentStores** section, click the name of the device you wish to power down.
3. From the **Properties** page, click **Shutdown All Enclosures** to shut down both controllers.

   NOTE: This also shuts down all managed ContentServer and ContentStore nodes.
4. Click **OK** to confirm.
5. Verify that the **Status** field indicates **Not Responding**.

NOTE: It might take a few minutes for the status to change, depending on the length of the discovery cycle and the status of other devices in your network.

6. Physically power down the device as follows:

Option	Description
ContentServer 3000	Press the power button on the control panel and hold for five seconds.
ContentServer 4000	Press and hold the power button on the control panel for four seconds.

7. Once all disk drive LEDs are off, disconnect both power cables from the rear of the chassis.

Powering down a single ContentStore

Safely power down the device from SystemManager.

1. From the **Configuration** tab, click the **Servers & Switches** icon.
2. From the **Servers & Switches** page, in the **ContentServers/ContentStores** section, click the name of the device you wish to power down.
3. From the **Properties** page, click the **Shutdown** button located at the top of the page.
4. Click **OK** to confirm.
5. Verify that the **Status** field indicates **Not Responding**.

NOTE: It might take a few minutes for the status to change, depending on the length of the discovery cycle and the status of other devices in your network.

6. Physically power down the device as follows:

Option	Description
ContentStore 3160	Press the red power button on the control panel on the front of the device and hold for five seconds. Once the disk drive LEDs are off, disconnect the two power cords from the back of the device.
ContentStore 4240	Press and hold the power button on the control panel for four seconds. Once all disk drive LEDs are off, disconnect the power cables from the power supplies.
ContentStore 5840/5840A	Move all power supply switches to the “off” position. Once the front panel LEDs are off, disconnect the power cables from the power supplies.

Powering on a Harmonic MediaGrid system

Make sure all Harmonic MediaGrid devices are connected before continuing.

IMPORTANT: The steps must be followed in the order described below.

1. Apply power to the network switches by plugging the power cords into power sources.
2. Apply power to the SystemManager by connecting the power cord to a power source, and then pressing the power button on the front panel.

NOTE: If you have already configured the SystemManager with an IP address ending in "dot-10," wait until after the Configuration Assistant is complete before powering on this device.

3. Apply power to each ContentDirector by connecting both power cords to separate, isolated power sources, and then press the power button on the front panel.

   Result: The ContentDirector takes approximately five minutes to start. Wait for the power-on indicator to light before continuing.

4. If the ContentBridge with Harmonic MediaGridServer software 4.x or earlier is part of your system, apply power by connecting both power cords to separate, isolated power sources, and then press the power button on the front control panel.
   Wait for the power-on indicator to light before continuing.

5. If the ContentBridge 1000B is part of your system, apply power by connecting the power cord to a power source, and then press the power switch on the rear panel.

6. Apply power to each ContentServer and ContentStore as follows:

Option	Description
ContentServer 4000	Connect the power cords to power sources, and then press the power button on the front panel.
ContentStore 4240	Connect the power cords to power sources, and then press the power button on the control panel.
ContentServer 3000	Connect the power cords to power sources. Press the power button on the control panel on the front of the server.
ContentStore 3160	Connect the power cords to power sources, and then press the power button on the front panel.
ContentStore 5840/5840A	Connect the power cords to the power supplies and to power sources. Move all power supply switches to the "on" position.

Editing the slice size configuration file

If instructed by Harmonic technical support, you can modify the slice size configuration file.

IMPORTANT: As the final step in replacing a ContentDirector, review this configuration file to ensure it contains the latest settings. Click **Save** to save the file on the new ContentDirector. Refer to the *ContentDirector Component Replacement Guide* and the product release notes for complete replacement instructions.

CAUTION: Do not edit the Slice Size configuration file unless instructed by Harmonic technical support. Using a smaller-than-recommended slice size can result in an unexpected loss of disk space.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.

2. In the **Clusters** sections, click the **Name** hyperlink for the required cluster to access the **Properties** page.

3. Click **View/Edit Slice Size Config** to access the **Edit “sliceSizeSpec” File** page. Note that the View/Edit Slice Size button is only enabled if you are logged in as Administrator.

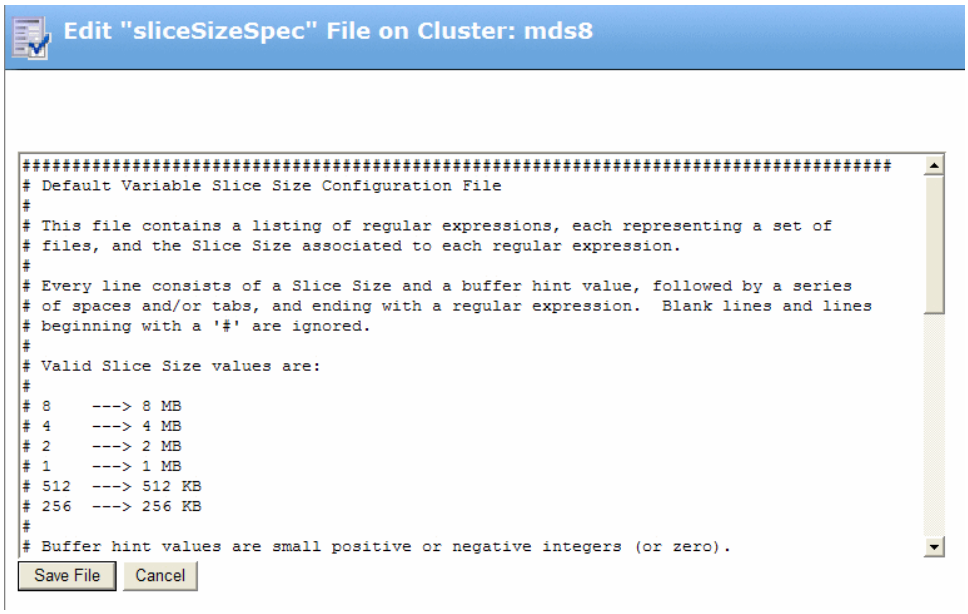


Figure 11-7: Edit “sliceSizeSpec” File

NOTE: If one or more ContentDirectors go offline, the Slice Size configuration file is automatically synchronized for you when the ContentDirectors comes back online. No additional steps are necessary to synchronize the configuration file.

Editing the ContentServer configuration file

The ContentServer configuration file can be edited to set time zones, enable jumbo frames, and change other options.

IMPORTANT: As the final step in replacing a ContentDirector, review this configuration file to ensure it contains the latest settings generated by the Configuration Assistant. Click **Save** to save the file on the new ContentDirector. Refer to the *Harmonic MediaGrid Component Replacement Guide* and the product release notes for complete replacement instructions.

NOTE: If you make manual edits to this configuration file, you must save the file on every ContentDirector in the cluster.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the required cluster to access the **Properties** page.
3. Click **View/Edit ContentServer Config** to access the **Edit ContentServer Config File** page, a sample is displayed in the following figure.

Figure 11-8: Edit ContentServer Config File

4. If the config file does not exist, do the following:
   a. Start an SSH session to the ContentDirector.
   b. Create the directory and file by typing:

      ```
      sudo vi /tftpboot/config/config
      ```

      Set each field as follows:

      ```
      LOGHOST=172.16.1.200
      REBOOT_ON_PANIC=YES
      SLICED_WATCHDOG=YES
      SLICED_LOGLEVEL=err
      ENABLE_JUMBO_SERVER=NO
      ENABLE_JUMBO_BRIDGE=NO
      ```

5. Set the time zone specific to your location, for example:

```
SLICE_TIMEZONE=Etc/GMT+8
```

Refer to the following table for a specific time zone.

Table 11-1: Time Zones

Region	GMT Relative Time Zone	Region	GMT Relative Time Zone
Eniwetok	Etc/GMT+12	Rome	Etc/GMT-1
Samoa	Etc/GMT+11	Israel	Etc/GMT-2
Hawaii	Etc/GMT+10	Moscow	Etc/GMT-3
Alaska	Etc/GMT+9	Baghdad	Etc/GMT-4
Pacific	Etc/GMT+8	New Delhi	Etc/GMT-5
Mountain	Etc/GMT+7	Dhakar	Etc/GMT-6
Central	Etc/GMT+6	Bangkok	Etc/GMT-7
Eastern	Etc/GMT+5	Hong Kong	Etc/GMT-8
Atlantic	Etc/GMT+4	Tokyo	Etc/GMT-9
Brazilia	Etc/GMT+3	Sydney	Etc/GMT-10
Mid-Atlantic	Etc/GMT+2	Magadan	Etc/GMT-11
Azores	Etc/GMT+1	Wellington	Etc/GMT-12
Greenwich	Etc/GMT+0		

6. Make any other edits as necessary. When you are done editing the configuration file, click **Save File**.

IMPORTANT: If one or more ContentDirectors go offline, the ContentServer configuration file is not automatically synchronized for you when the ContentDirectors comes back online. To manually synchronize the configuration file, go back to the **Edit ContentServer Config File** window and save the file again.

ContentServer 2000 series parameters

Refer to the ContentServer 2000 series parameters when editing the ContentServer configuration file.

LOGHOST
The IP address of the log host

REBOOT_ON_PANIC
Will set the ContentServers to reboot 60 seconds after a kernel panic. This should be set to YES.

SLICED_WATCHDOG
Loads a kernel module that reboots the ContentServer if it stops working. This should be set to YES.

SLICED_LOGLEVEL
Determines how verbose logs should be. Acceptable options are: all, info, warn, err.

SLICE_TIMEZONE
Determines the time zone for your location. For reference, refer to the *Table 46: Time Zones* table.

ENABLE_JUMBO_SERVER=NO
Determines the MTU (maximum transmission unit) size used on the ContentServer. This option uses an MTU size of 1500. Set this field to YES to enable jumbo frames. The MTU size for Harmonic MediaGrid with jumbo frames enabled is 9000.

ContentServer 3000 and 4000 series parameters

Refer to the ContentServer 3000 and 4000 series parameters when editing the ContentServer configuration file.

LOGHOST
Is the IP address of the log host

REBOOT_ON_PANIC
Will set the ContentServers to reboot 60 seconds after a kernel panic. This should be set to YES.

SLICE_TIMEZONE
Determines the time zone for your location. For reference, refer to the *Table 46: Time Zones* table.

ENABLE_JUMBO_SERVER=NO
Determines the MTU (maximum transmission unit) size used on the ContentServer. This option uses an MTU size of 1500. Set this field to YES to enable jumbo frames. The MTU size for Harmonic MediaGrid with jumbo frames enabled is 9000.

About Jumbo Frames support

Jumbo frames are a feature that allows for larger transmission sizes of Ethernet frames over a network.

Harmonic MediaGrid supports jumbo frames; however, every device on your network between Harmonic MediaGrid and the client (including the client itself) must also support jumbo frames, with a common packet size, to take advantage of this feature. Network performance is severely impaired otherwise.

Jumbo frames may improve transfer performance between Harmonic MediaGrid and other devices on the network in some cases. However, an improvement will not always be obtained, depending on the devices' ability to process data relative to the maximum network transfer speed available.

The Network Switches are enabled by default. Refer to “Configuring a ContentServer” to enable jumbo frames on the remaining Harmonic MediaGrid devices.

Harmonicstrongly recommends that, before enabling jumbo frames, you initially set up and test the Harmonic MediaGrid with all other parts of the system infrastructure with jumbo frames disabled, to ensure correct functionality.

Editing the ContentBridge configuration file

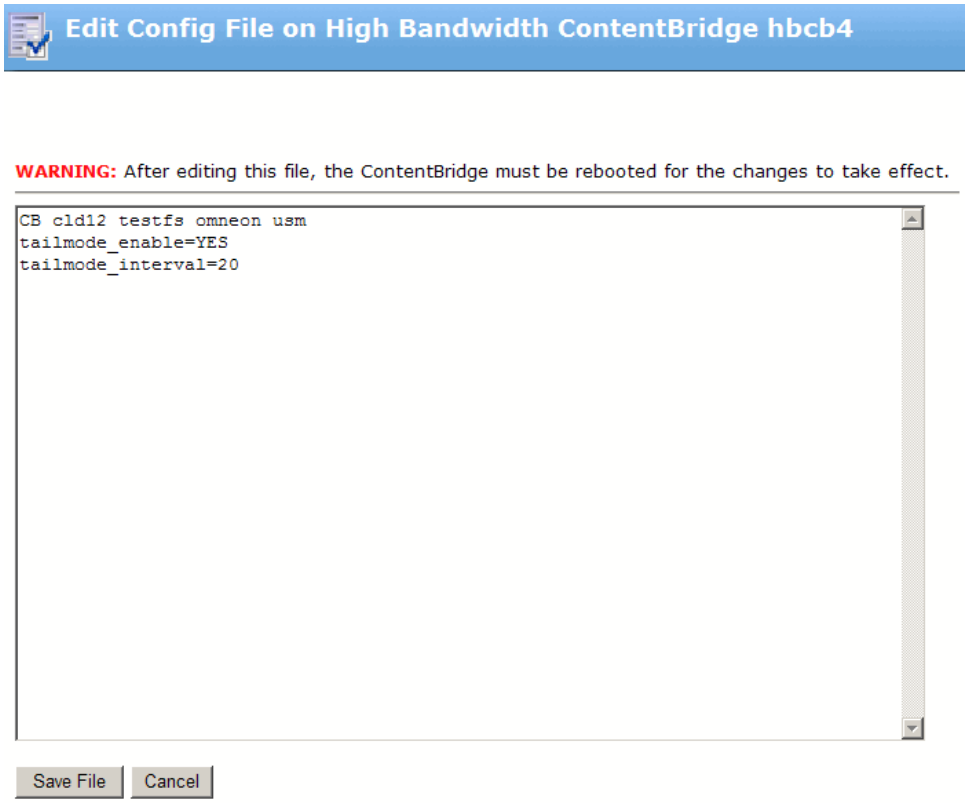
The ContentBridge configuration file can be edited to support authentication and multiple-user access to the Harmonic MediaGrid, as well as various other settings.

When editing the ContentBridge configuration file, refer to the parameter descriptions from both the ContentServer configuration file and the ContentBridge configuration file for reference.

On the ContentBridge with Harmonic MediaGrid, the configuration file is stored locally on the disk at /etc/gateway.conf.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. Scroll down to the **High Bandwidth ContentBridges** section.
3. In the **Config** column, click the **Edit Config** link for the ContentBridge you wish to configure. The **Edit Config File on High Bandwidth ContentBridge** page appears as shown in the following figure.

   Figure 11-9: Edit Config File on High Bandwidth ContentBridge



4. Click **Save File** when you are done editing the configuration file.
5. Perform a service restart or reboot the ContentBridge for the changes to take effect.

Related information

ContentServer 2000 series parameters
ContentServer 3000 and 4000 series parameters
ContentBridge configuration file parameters
ContentBridge configuration file parameters

ContentBridge configuration file parameters

Refer to the descriptions of the parameters when editing the ContentBridge configuration file.

Enabling User Access	Mount the Harmonic MediaGrid to the ContentBridge and enable user access by configuring one of the following settings:

- **NATIVE:** Use this setting to authenticate users via a namespace service like Active Directory, Open Directory, LDAP, or LUA. See the *Harmonic MediaGrid Installation and Configuration Guide* for details.

  When enabled, this setting configures the ContentBridge and creates a single mount to the Harmonic MediaGrid and an associated Samba share. The Samba share is multiplexed for all users that connect to the bridge and are successfully authenticated.

  Add the following line to the configuration file to enable this setting:

  ```
  NATIVE CLD FS_NAME <MOUNTOPTS>
  ```

  If the password for the superuser has been changed on the ContentDirector, be sure to add `password=<password>` for `<MOUNTOPTS>`
- **CB:** Use this setting to configure a 1:1 mapping of users, Samba server shares, and Harmonic MediaGrid mounts. Configure a separate CB record for each user being identified and authorized to use the bridge.

  The name of the user must correspond to a user known by the Content Director through either a user directory service or the built-in Harmonic MediaGrid. Users from the built-in Harmonic MediaGrid can be superusers (default password= `omeneon`) or an administrators (default password=`mgadmin`).

  Add the following line to the configuration file to enable this setting:

  ```
  CB CLD FS_NAME USERNAME PASSWORD <MOUNTOPTS>
  ```

  Some guidelines to follow for NATIVE:

  - If the superuser name has been changed on the ContentDirector, be sure to add `username=<username>` for `<MOUNTOPTS>`.
  - If the superuser password has been changed on the ContentDirector, be sure to add `password=<password>` for `<MOUNTOPTS>`.

  For example:

  ```
  NATIVE mymgrid myfs username=mgsuper,password=5433mgXX
  ```

  NOTE: The **CB** setting does not apply to Harmonic MediaGrid ContentBridge software 5.0 or later.
- **CBSUPER|CBADMIN:** Use this setting to provide access to users with the default Harmonic MediaGrid superuser username (`omneon`) or administrator username (`mgadmin`) authorization. When enabled, this setting configures a 1:1 mapping of users, Samba server shares, and Harmonic MediaGrid mounts.

  Add the following line to the configuration file to enable this setting:

  ```
  CBADMIN|CBSUPER CLD FS_NAME <MOUNTOPTS>
  ```

  Some guidelines to follow for CBADMIN:

  - If the administrator name has been changed on the ContentDirector, be sure to add `username=<username>` for `<MOUNTOPTS>`.

- If the administrator password has been changed on the ContentDirector, be sure to add `password=<password>` for `<MOUNTOPTS>`.

Some guidelines to follow for CBSUPER:

- If the superuser name has been changed on the ContentDirector, be sure to add `username=<username>` for `<MOUNTOPTS>`.
- If the superuser password has been changed on the ContentDirector, be sure to add `password=<password>` for `<MOUNTOPTS>`.

NOTE: The CBSUPER|CBADMIN setting is only available for Harmonic MediaGrid ContentBridge software 5.0 or later.

Edit the line in the configuration file for the setting you added as follows:

- Replace CLD with the DNS name of the ContentDirector.
- Replace FS_NAME with the name of the file system to mount.
- Replace USERNAME with the user name for that particular mount.

  NOTE: The USERNAME only applies to the **CB** setting.
- Replace PASSWORD with the password associated with the USERNAME entry.

  NOTE: The PASSWORD only applies to the **CB** setting.

Enabling CIFS Mounts to other systems

Use the MEDIA_API setting to enable the bridge to mount other systems. With this setting enabled, files can be transferred to or from other systems using the CIFS protocol. Add the following line to the ContentBridge configuration file to enable this setting:

```
MEDIA_API=YES
```

See the *Harmonic MediaGrid Installation Guide*for complete instructions on configuring the remote Media API to initiate transfers.

Enabling/Disabling CIFS Oplocks

Disabling CIFS Oplocks improves data integrity for highly concurrent applications that use file locking.

Add the line to the configuration file to disable CIFS Oplocks:

```
CIFS_OPLOCKS=NO
# Acceptable options are “YES” and “NO”.
```

Setting Case Sensitivity

This setting configures the ContentBridge to enforce or ignore case sensitivity when matching file and directory names.

To have a ContentBridge enforce case sensitivity when matching file and directory names, add this line:

```
CIFS_CASE_SENSITIVE=YES
```

To have the ContentBridge ignore case sensitivity when matching file and directory names, add this line:

```
CIFS_CASE_SENSITIVE=NO
```

CAUTION: Setting this to NO can cause performance issues with large directories. If case insensitivity is desired you can specify `caseinsensitive` in the mount options for NATIVE, CB, or CBADMIN|CBSUPER settings as an alternative. This offloads the case insensitive matching from the CIFS server to the MediaGrid Content Director, which performs this function more efficiently. For example:

```
NATIVE CLD FS_NAME CASEINSENSITIVE
```

To have a ContentBridge allow clients to specify to enforce case sensitivity when matching file and directory names, add this line:

```
CIFS_CASE_SENSITIVE=AUTO
```

If the CIFS_CASE_SENSITIVE setting is not configured, the default is:

- `YES` for ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 and later.
- `AUTO` for ContentBridges with Harmonic MediaGrid Server software 4.x and earlier.

Enabling NFS Support

Enabling NFS support provides the ability to transfer files to using the NFS protocol. Add the following line to the ContentBridge configuration file to enable this setting:

```
NFS=YES
# Acceptable Options are "YES" and "NO".  NO is the default
```

Adding the line above causes all user accessible file systems to be accessible via NFS.

NOTE: NFS is not currently supported for with Harmonic MediaGrid ContentBridge software 5.0 or later.

Enabling FS Permissions

IMPORTANT: Only use this setting for ContentBridges with Harmonic MediaGrid Server software 4.x or earlier.

The feature functionality has been deprecated for ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 or later. The setting will be removed in a future release.

Add the following line to the configuration file on all ContentDirectors in a cluster:

```
PERMISSIONS=YES
# Acceptable Options are "YES" and "NO".  NO is the default
```

Adding Performance Tuning Settings

Add the following (optional) performance tuning settings. When missing, default values are used. The default values vary per operating system. Refer to the Harmonic MediaGrid Installation Guide for guidelines. Do not add these tuning parameters without first checking with your Harmonic representative.

NOTE: The following information applies to the mount options for CB, CBADMIN|CBSUPER, MG, and NATIVE:

Mount Specific Options (add on to specific mount lines):

```
CB CLD FS_NAME USERNAME PASSWORD OPTION=VALUE,OPTION=VALUE,...
```

```
NATIVE CLD FS_NAME OPTION=VALUE,OPTION=VALUE,...
```

Valid OPTIONs:

- **filelimit**: controls the maximum number of simultaneously open files the Linux FSD supports. Replace VALUE with a number greater than 1.
- **readahead**: controls the amount of read-ahead memory used by each open/active file. Units are in slices. Replace VALUE with a number between 1 and 16, inclusive.
- **domain**: Replace VALUE with a character string representing the Windows Active Directory or Domain against which the ContentBridge is authenticated. You do not need to configure the domain option for NATIVE or CBADMIN|CBSUPER.
- **readpri**: Configures the Linux FSD to set the read priority for a ContentBridge. Note that configuring this feature will affect server prioritization with respect to other clients.

  Replace VALUE with one of the following to set the priority:

  - bg = background
  - low = low
  - nr = normal
  - rt = real time
  - rt = system
- **writepri**: Configures the Linux FSD to set the write priority for a ContentBridge. Note that configuring this feature will affect server prioritization with respect to other clients.

  Replace VALUE with one of the following to set the priority:

  - bg = background
  - low = low
  - nr = normal
  - rt = real time
  - rt = system
- **ftphome**: Specifies a path relative to the Harmonic MediaGrid file system directory to use as the home directory for FTP users.

  ```
  ftphome=dir1/dir2/dir3
  ```
- **password**: Specifies the password to use when authenticating the mount to the MediaGrid. If a password is not specified, the default password for the CLD superuser (NATIVE and CBSUPER mount options) or the default password for the CLD administrator (for CBADMIN mount options). This

option must be specified if the associated password has been changed on the CLD. For example:

```
NATIVE mymg mymgfs password=mysuperpassword123
```

- **username**: Specifies the user name to use when authenticating the mount to the MediaGrid. If a username is not specified, the default username of `omneon`for the CLD superuser (NATIVE and CBSUPER mount options) or the default username of `mgadmin` for the CLD administrator (CBADMIN mount option). This option must be specified if the superuser or the administrator username has been changed on the CLD. For example:

```
CBADMIN mymg mymgfs
 username=myadmin,password=myadminpassword567
```

Enabling Transfer of Growing Files (Tail-Mode FTP)

The tail-mode FTP feature provides the ability to transfer growing files to platforms other than Spectrum using the ContentBridge. Add the following line to the ContentBridge configuration file to enable this feature:

```
tailmode_enable=YES
```

The default interval for this setting is 20 seconds. The interval is the amount of the time the ContentBridge waits to check for more data to send before completing a transfer. The interval can be adjusted by adding the following optional line:

```
tailmode_interval=number of seconds
```

The number of seconds can be 0 to any number. However, updates to the file might be missed with anything less than 10 seconds, and anything longer than 30 is likely unnecessary, unless long delays are expected.

About the Media API Version

As of Harmonic MediaGrid version 2.3, the only supported Media API version is 5.5. Regardless of the setting you enter for MEDIA_API_VERSION, it will default to 5.5.

Enabling Jumbo Frames for an Individual ContentBridge

Add this line to increase the size of frames used in Ethernet data transfers:

```
ENABLE_JUMBO_BRIDGE=YES
```

This sets the MTU size to 9000. If NO is entered for the setting, the MTU size is 1500. A larger MTU size can provide increased performance on properly configured networks and endpoints. See *About Jumbo Frames support* for network requirements.

Enabling SMB Signing

SMB signing is a feature that allows SMB communications to be digitally signed at the packet level, enabling the recipient to confirm the point of origination and the authenticity.

NOTE: CIFS performance is affected when SMB signing is enabled.

To configure SMB signing, add the SERVER_SIGNING option followed by one of three values:

- **auto**: (Default setting on ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 and later) Samba server offers SMB signing but does not enforce it for the clients.
- **disabled**: (Default setting on ContentBridges with Harmonic MediaGrid Server software 4.x and earlier) SMB signing on the Samba server is disabled.
- **mandatory**: The Samba server enforces SMB signing for the clients.

  For example:

```
SERVER_SIGNING=mandatory
```

Adjusting the size of the FSD Memory Data Cache

Add this line to specify the bridge kernel memory dedicated to caching Harmonic MediaGrid file data:

```
CACHE_MAX=<nnn>
```

<nnn> represents the desired number of MegaBytes. For ContentBridges with Harmonic MediaGrid Server software 4.x and earlier, the default is 1176 MegaBytes. For ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 and later, the default is 4096 MegaBytes.

Specifying a larger cache can increase throughput of the ContentBridge. However, specifying too large a value for <nnn> may not leave sufficient memory required for the Samba server and FTP server processes.

Controlling File Name Mangling

By default, the Samba server converts the mappings of file names into DOS-compatible names (8.3 format, short file name). This mapping is useful only for old versions of Windows such as Windows 95 or NT 3.5, which are operating system versions no longer supported by the SystemManager. This mapping coupled with very large directories (10k files or more) can cause severe performance degradation for some application versions.

For ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 and later, this feature has been disabled by default. If necessary the feature can be enabled by adding this line:

```
CIFS_MANGLED_NAMES=YES
```

Specifying Min/Max CIFS Protocol

Add the following lines to specify the range of CIFS/SMB protocol versions accepted by the Samba server for ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 and later:

```
CIFS_PROTOCOL_MIN=<ver>
```

```
CIFS_PROTOCOL_MAX=<ver>
```

<vers>represents the protocol version with LANMAN1 as the earliest version and SMB3_11 as the most recent version:

- LANMAN1
- LANMAN2
- NT1
- SMB2 (selects SMB2_10)

- SMB2_02 (default MIN)
- SMB2_10
- SMB2_22
- SMB3 (selects SMB3_00)
- SMB3_00
- SMB3_02 (default MAX)
- SMB3_10 (currently not supported)
- SMB3_11 (currently not supported)

Be aware of the following:

- Some older versions of client operating systems may require CIFS_PROTOCOL_MIN=NT1 in order to connect successfully. In certain cases, the clients can use CIFS mount options such as `vers=2.0,noperm` (for example, on Linux CentOS 6.x).
- Entering a CIFS_PROTOCOL_MIN protocol later than SMB2_10 may be too recent for many clients.
- Entering protocol versions earlier than SMB2_02 may have potential security vulnerabilities, but the earlier versions may be required for some older clients.

Enabling and configuring scheduled balancing

From the **Balancer** page in SystemManager, you can initiate balancing or configure scheduled balancing to ensure that the disk space is balanced across all the ContentServers in a cluster.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** section, click the **Name** hyperlink for the required cluster to access the **Cluster Properties** page.
3. In the ContentServer Balancer Scheduling row, click **View/Edit Balancer Scheduling**. The **Balancer** page appears.

   In the **Balancing Status** section, you can view the following for the selected cluster:

   - **Slices Balanced**: Displays the slice count balanced since the balancing started.
   - **Slices to be Balanced**: Displays the slice count yet to be balanced. This is an approximate number that is calculated at the beginning of the balancer run. This value is static and does not change while the balancer is running.
   - **Elapsed Time in Minutes**: Displays the time in minutes since the last balancer started.
   - **Host**: Displays the ContentDirector which is running the balancer.
   - **Status**: Displays the current status of the balancer. This field will show either **Running**, **Not Running**, or **Suspended** if the balancer has been suspended during slice repair.
   - **Balancing Required?**: Indicates whether or not balancing is recommended. This will show either **No**, **Recommended**, or **Highly Recommended**.

NOTE: If a ContentDirector failover occurs while the balancer is running, the new ContentDirector will recalculate the number of slices to be balanced without taking into account the balancing that already occurred with the failed ContentDirector. The values shown in the Balancing Status will change based on the recalculation by the new ContentDirector.

In the **On-demand Balancing** section, the following buttons are available:

- **Start balancer(normal) now**: Click to start the balancer in normal speed immediately regardless of any other selected settings.
- **Start balancer(high) now**: Click to start the balancer in high speed immediately regardless of any other selected settings.
- **Stop balancer now**: Click to stop the balancer immediately regardless of any other selected settings.

4. In the **Scheduled Balancing** section, you can configure the schedule and other parameters for rebalancing. To enable and configure the schedule, click the **Edit Schedule** check box. This enables the parameters as shown in the following figure.

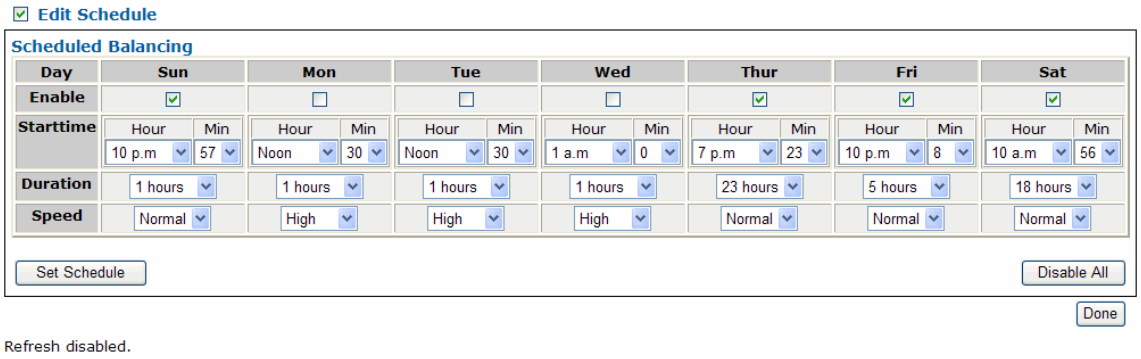


Figure 11-10: Edit Schedule

NOTE: The Balancer uses the system time of the SystemManager server. If the system time for the client you are using to access SystemManager is different than the system time for the SystemManager server, this may create confusion.

- **Enable**: Click to enable balancing for the selected day.
- **Starttime**: Click the drop-down menus to select the hour and minute that balancing will start on the selected day.
- **Duration**: Click the drop-down menu to choose the duration of the scheduled balancing for the selected day.
- **Speed**: Click the drop-down menu to select between **Normal** and **High** speed balancing. Harmonic recommends that you run High speed only at times when there are no clients accessing the cluster (for example, this may be late at night). If clients are connected to the cluster, Normal speed should be used.

  High speed balancing is equivalent to multiple clients accessing the cluster and will reduce the bandwidth of the cluster.
- **Set Schedule (button)**: Click to save any changes made in the **Scheduled Balancing** section of the Balancer page.
- **Disable All (button)**: Click to disable balancing for all days.

5. Click **Done** to return to the **Cluster Properties** page.

Enabling and configuring log forwarding

Log Forwarding allows you to configure your ContentDirector to send log files to a desired e-mail address.

Before you begin

IMPORTANT: Before configuring Log Forwarding, make sure that you have followed the procedures described in “Adding the Harmonic MediaGrid Devices to the Local DNS” and “Setting Up Reverse DNS Lookups” in the *Harmonic MediaGrid Installation Guide*.

Make sure you are logged into the Harmonic MediaGrid system.

1. From the **Configuration** tab in SystemManager, click the **Servers and Switches** icon under the Harmonic MediaGrid heading in the left-hand column.
2. From the **Servers and Switches** page, click the link for the cluster that contains the ContentDirector for which you want to configure log forwarding. The **Cluster Properties** page for that cluster appears.
3. From the **Cluster Properties** page, click the **View/Edit Log Forwarding Options** button.

   The **Edit “Log Forwarding Configuration” File...** page appears.

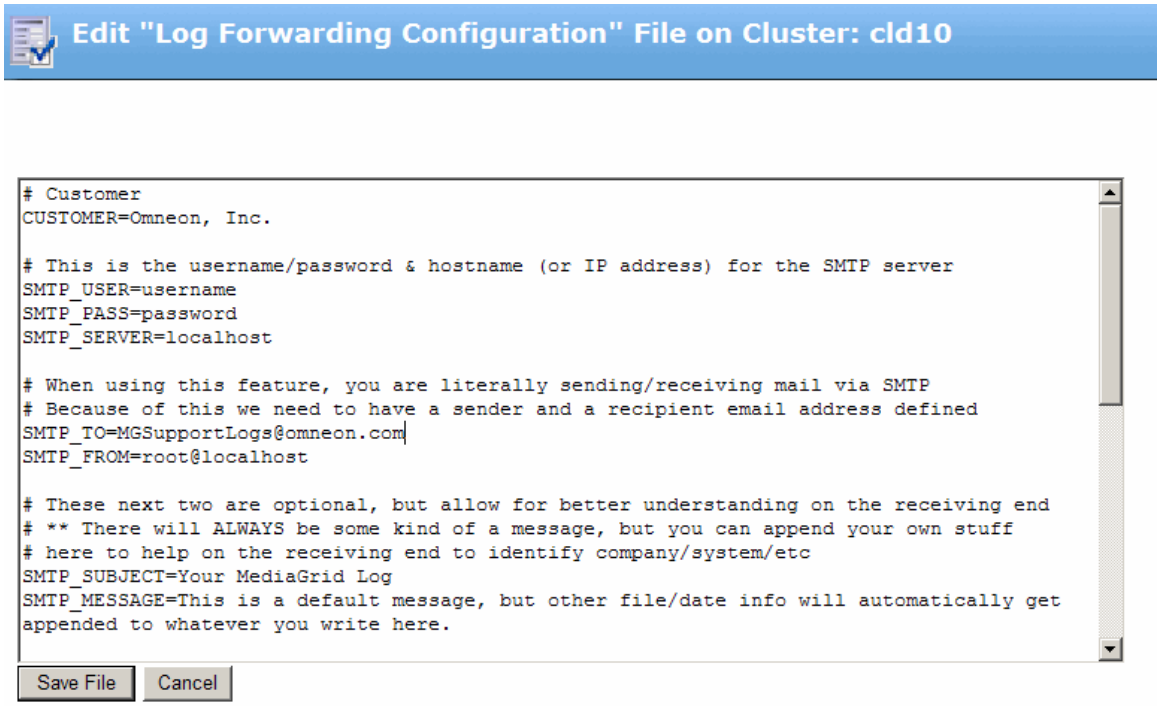


Figure 11-11: Edit “Log Forwarding Configuration” File page

4. Read the descriptions of the values in the configuration file and then modify the values as needed.
5. Once you have modified the values, click Save File. A message appears indicating whether the file was successfully saved.

Log forwarding configuration values

Refer to the log forwarding configuration values for the cluster.

CUSTOMER	(Optional) The name of the customer to be included in the log file.
SMTP_SERVER	(Required) IP address or hostname of the SMTP server.
SMTP_USER	(Required) The user name required for connecting to the SMTP server. If the sever does not require authentication, then leave this value blank.
SMTP_PASS	(Required) The password required for connecting to the SMTP server. If the sever does not require authentication, then leave this value blank.
SMTP_TO	(Required) This is the destination e-mail address to which log e-mails will be sent. To send Harmonic MediaGrid log files to Harmonic technical support, enter MGSupportLogs@omneon.com for this value.
SMTP_FROM	(Required) A valid e-mail address, which will be used for replies to the log e-mail. Any reply to the log e-mail will go to this “from” address.
SMTP_SUBJECT	(Optional) If specified, this value will be used as the subject in the e-mail messages sent out.
SMTP_MESSAGE	(Optional) Any message you wish to include in the log e-mail, which may include information regarding the company, system, and so on.
ATTACHMENT_SIZE	(Optional) The specified size of each log, indicated in bytes (b), kilobytes (k), or megabytes (m). When this size is reached, the log is split into separate e-mails. **NOTE:** Make sure the ATTACHMENT_SIZE value is smaller than the maximum e-mail attachment size allowed by your e-mail server.
SLEEP_TIME	(Optional) When multiple e-mails are being sent, this value specifies the amount of time, in seconds, that SystemManager will wait before sending each e-mail.
SEND_ENABLED	(Required) When set to TRUE, this value enables Log Forwarding, and, when set to FALSE, disables it.

Possible log forwarding errors

If a problem occurs with log forwarding once it has been configured (for example, due to an invalid entry in the configuration file), SystemManager will generate an alarm describing the problem.

The following figure shows an example of the e-mail sent by log forwarding once it has been configured.

```
        ORIGINAL FILE: Omneon__Inc_.Unknown-Cluster-ID.usm-
dev2.vDEBUG.20080526105034.mdscore.1.gz
        TIMESTAMP: May 26 10:50:41
        THIS IS CHUNK 1 OF 1

This is a default message, but other file/date info will automatically
get appended to whatever you write here.
```

Figure 11-12: Example e-mail produced by Log Forwarding

Note that the e-mail contains the following elements:

- Original File name, which includes:
  - Customer Name (underscores replace any unacceptable characters)
  - Cluster ID
  - Hostname
  - Harmonic MediaGrid software version
  - Time and Date stamp
  - Original uncompressed file name
- Timestamp of e-mail
- Identification of which file this is among the total number of files
- A user-definable message

These elements, and the content of the e-mail, will vary depending on your modifications to the Log Forwarding configuration file

Balancing the ContentServer controllers

Harmonic recommends that you balance the Slice Server processes across controllers to improve performance after certain situations.

Any time one controller on a ContentServer goes down, the active Slice Server processes on that controller fail over to the remaining controller. Harmonic recommends that you balance both controllers following any of the events listed below. If you fail to do so, it can negatively affect the performance of the ContentServer.

- Capacity expansion
- ContentServer upgrade
- Controller replacement
- Controller fail-over
- If the **Managed ContentServers and ContentStores** field on the ContentServer Properties page shows all, or a large majority, of ContentStore and ContentServer nodes being managed by one controller (for example, five out of six).

NOTE: Harmonic recommends that you schedule balancing during times when the system is not loaded. For example, this may be late at night. System performance may be affected while balancing is occurring.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer to access the **Properties** page.
3. Click the **Failback** button.

   NOTE: You may also use the **Failback** button on any ContentStore being managed by the ContentServer you wish to balance.
4. Verify that all ContentServer and ContentStore nodes appear in the **Managed ContentServers and ContentStores** field on the ContentServer **Properties** page. If they are not all listed, contact Harmonic technical support for assistance.

After clicking **Failback**, you may observe on the ContentServer **Properties** page that some ContentStore or ContentServer nodes in the **Managed ContentServers and ContentStores** field for one controller now appear under a different controller, in which case, balancing was successful.

Upgrading Harmonic MediaGrid firmware

Upgrade firmware using SystemManager. To ensure a smooth system upgrade, upgrade devices in the given order.

NOTE: To avoid loss of service, upgrade ContentDirector nodes one at a time, as described in the steps that follow.

1. From the left-hand column on the **Home** tab, click the **Firmware Selection** icon to display the **Firmware Version Selection** page, shown below.

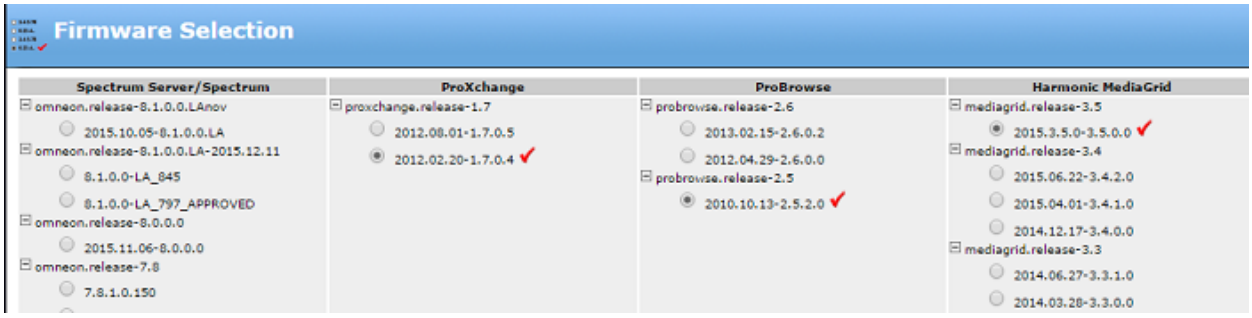


Figure 11-13:

2. In the **Harmonic MediaGrid** column, click the radio button for the desired firmware version. The red check mark indicates the selected version.
3. When the confirmation dialog appears, click **OK** to accept.
4. Click the **Upgrade Firmware** icon in the left-hand column to display the **Upgrade Firmware** page.
5. In the **ContentDirectors** section, click in the **Select** column to specify the ContentDirector you want to upgrade.

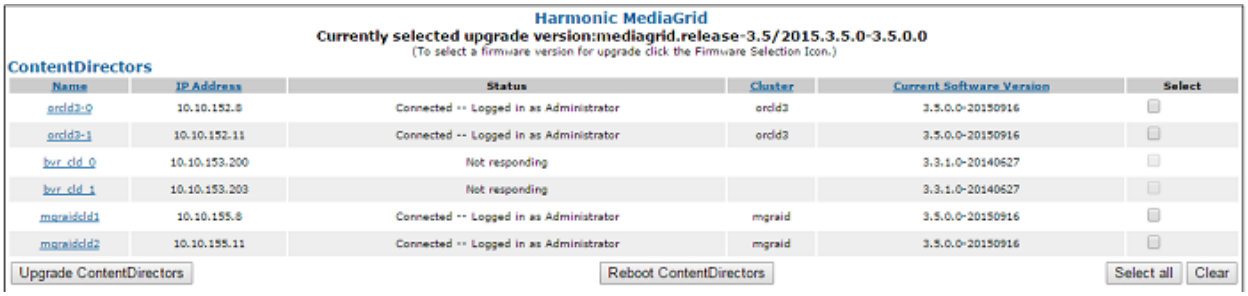


Figure 11-14:

6. Click **Upgrade ContentDirectors** to start upgrading the firmware of the selected ContentDirector.

IMPORTANT: When upgrading or rebooting Harmonic MediaGrid devices, do not upgrade or reboot two different device types at the same time. Consult with your Harmonic representative if you need assistance.

7. Wait for the **Status** column to show `Connected`.
8. Once the status of the first ContentDirector returns to `Connected`, proceed with upgrading the remaining ContentDirector nodes, one a time, by repeating steps 5-7.
9. Clear or delete the alarms and monitor them for a few minutes to ensure that no new alarms are generated after each ContentDirector is upgraded.
10. Restart the ContentDirector nodes in your system, one by one, by clicking **Reboot ContentDirector**.

    IMPORTANT: When upgrading to version 3.4.x or later, restart each ContentDirector node a second time in the same order as used during the first series of restarts except for the last node in your system. This will enable the improved space reporting provided in 3.4.x and later.
11. Return to the **ContentDirectors** section of the **Upgrade Firmware** page to verify the version number for each node that was upgraded.
12. Upgrade the firmware for the ContentServer nodes in your system.

    IMPORTANT: Downgrading the ContentServer 4000 firmware to versions earlier than 4.3.0.0 when more than oneContentStore 5840 is attached to the system is not permitted and is prevented by the SystemManager.

    a. In the **Controllers** section of the page, select one controller per ContentServer to upgrade by clicking in the **Select** column for the corresponding controller and then clicking **Upgrade Controllers**.

       IMPORTANT: Upgrading both controllers on a ContentServer at the same time will cause the system to be unavailable during reboot and is not recommended.

       You can upgrade multiple controllers from different ContentServer enclosures in parallel by selecting one controller from each ContentServer you wish to upgrade.

    b. Once the firmware has been downloaded to the controllers, return to the **Controllers** section of the **Upgrade Firmware** page, select each controller that was upgraded and click **Reboot Controllers**.

       Result: The updated firmware version displays when the reboot is complete.

    c. Select the second controller for each ContentServer you are upgrading by clicking in the **Select** column for the corresponding controller and then clicking **Upgrade Controllers**.

    d. Select each controller that was upgraded and click **Reboot Controllers**.

       Result: The updated firmware version displays when the reboot is complete.

    e. Once you have upgraded both controllers on a ContentServer, Harmonic recommends that you balance the ContentServer.
13. Upgrade the firmware for the ContentBridges in your system. In the **High Bandwidth ContentBridges** section, select one or more units for upgrade, and then click **Upgrade High Bandwidth ContentBridges**.

Changing the Harmonic MediaGrid wink state

You can change the wink state for a component, cluster, volume, or group.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.

2. In the **Cluster**, **ContentServers**, **ContentDirectors**, **ContentBridge** sections, select the cluster or component to wink and click the **Wink** button.
   - If On, click **Wink Off** to stop winking the cluster of blue light bars, located on the front of the units.
   - If Off, click **Wink On** to start winking blue light bars, located on the front of the units
3. To wink a volume or group, select the appropriate cluster and then select which volumes or groups to wink.

   NOTE: If one of the units of a unit is not winking, the top level wink status for that unit is reported as “Mixed”. For instance, a volume and it’s associated cluster will report “mixed” if some groups within the volume are winking (On) and some are not (Off). Thus, the only time the wink status of a cluster is On is when all units within the cluster (volumes, groups, ContentServers, ContentDirectors, and ContentBridges) are set to On.

Enabling and configuring checkpoint schedules

Harmonic strongly recommends that you schedule Checkpoints for your Harmonic MediaGrid system.

Note the following important points:

- You must have Administrator privileges to perform these functions.
- Before configuring checkpoints, Harmonic recommends that you set the timezone on each ContentDirector. Refer to “Setting ContentDirector Timezones” in the *Harmonic MediaGrid Installation Guide* for step by step instructions.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentDirectors** section, click the **Name** hyperlink to access the **Properties** page for the required ContentDirector.

   In the **Current Checkpoint Schedule** section, click **Change Checkpoint Schedule** to access the **Checkpoint Configuration** page.

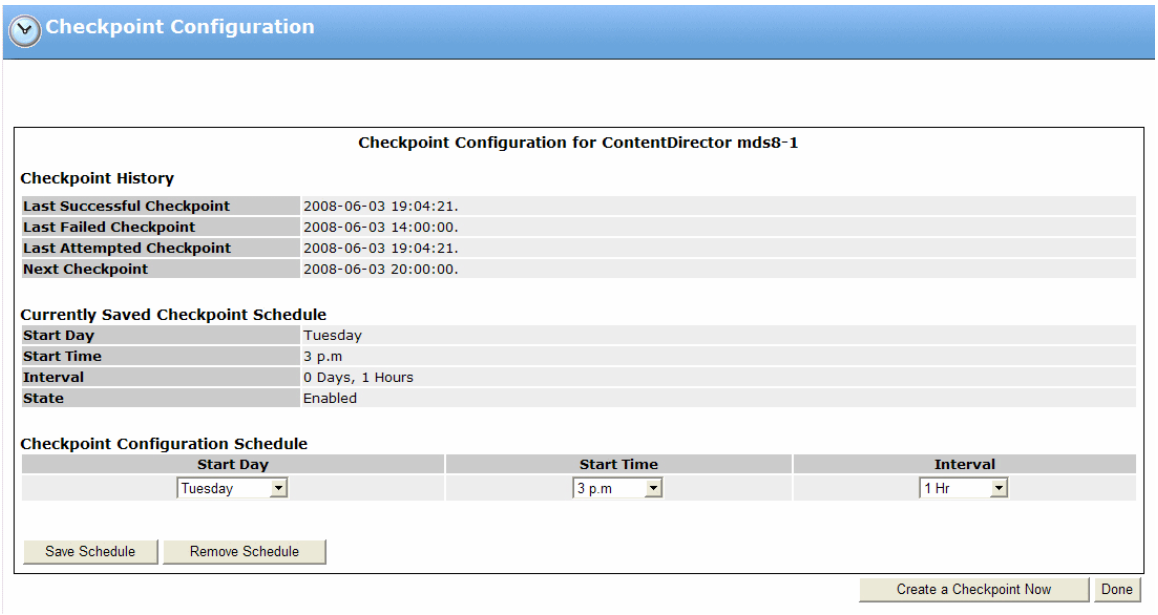


Figure 11-15: Checkpoint Configuration

3. In the **Checkpoint Configuration Schedule** section, configure as follows:
   - **Start Day** Select the day when the next Checkpoint should occur.
   - **Start Time** Select the hour of the day when the next Checkpoint should start.
   - **Interval** Select the interval between Checkpoints; from 1 to 12 hours, 16 or 20 hours, or from 1 -15 days.
4. Click **Create a Checkpoint Now** to perform an immediate Checkpoint or click **Save Schedule** to save the schedule information and perform the Checkpoint at the specified time.

Related information

About checkpoints and scheduling checkpoints

Changing the descriptions for Harmonic MediaGrid components

You can change description that SystemManager displays for each component.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the section for **ContentDirectors**, **ContentServers**, or **ContentBridges**, click the **Name** hyperlink to access the unit's **Properties** page.
3. Click **Change Desc** to display the **Change .... Description** page.
4. Type the new description in the text box.
5. Click **Save** to save the description and return to the **Properties** page.

   The new description appears in the unit's **Description** field.

Chapter 12

Harmonic MediaGrid RAID configuration and maintenance

Configure RAID sets for your ContentServers and ContentStores.

- *Supported RAID configurations*
- *Creating a RAID set*
- *Creating a RAID set with Auto Create*
- *Destroying a RAID set*
- *Failing a drive*
- *Unfailing a drive*
- *Changing RAID set wink state*
- *Stopping a RAID set rebuild in progress*
- *Restarting a RAID set rebuild*
- *Making a hot spare*
- *Clearing a hot spare*
- *Drive capacity expansion in a Harmonic MediaGrid RAID system*

Supported RAID configurations

Note the difference between “capacity optimized” and “performance optimized” RAID configurations, and which configurations are supported in each ContentServer and ContentStore model.

IMPORTANT: Make sure that all ContentServers and ContentStores in a stack are configured with the same RAID geometry.

In the *capacity optimized* RAID configuration, the disk drives are configured in a Dual Parity (DP) RAID array, ensuring that the system can continue to function despite the failure of any two disk drives. This configuration optimizes storage capacity at the cost of bandwidth. A capacity optimized RAID set typically uses a 6+2 configuration.

NOTE: In the ContentStore 5840, capacity optimized RAID sets use a 5+2 configuration.

In the *performance optimized* RAID configuration, each RAID set has a single redundant disk drive, and each enclosure has N total number of hot spares. This configuration optimizes bandwidth at the cost of storage capacity. A performance optimized RAID set typically uses a 2+1 configuration.

RAID configurations for ContentServer 3000 and ContentStore 3160

Find the available disk drive configurations for the ContentServer 3000 and the ContentStore 3160.

Make sure to select the RAID set that works best for your needs.

Table 12-1: RAID configurations for the ContentServer 3000 and ContentStore 3160

# Drives	RAID Sets	Capacity per Drive	Storage Capacity
16	2 x (6+2)	1 TB	12 TB
16	2 x (6+2)	2 TB	24 TB
16	2 x (6+2)	3 TB	36 TB
16	2 x (6+2)	4 TB	48 TB
16	2 x (6+2)	6 TB	72 TB
16	5 x (2+1) +1	1 TB	10 TB
16	5 x (2+1) +1	2 TB	20 TB
16	5 x (2+1) +1	3 TB	30 TB
16	5 x (2+1) +1	4 TB	40 TB
16	5 x (2+1) +1	6 TB	60 TB

NOTE: No other disk drive configurations are supported for the ContentServer 3000 and ContentStore 3160 series.

RAID configurations for ContentServer 4000 and ContentStore 4240

Find the available disk drive configurations for the ContentServer 4000 and the ContentStore 4240.

Make sure to select the RAID set that works best for your needs.

Table 12-2: RAID configurations for the ContentServer 4000 and ContentStore 4240

# Drives	RAID Sets	Capacity per Drive	Storage Capacity
24	3 x (6+2)	2 TB	36 TB
24	3 x (6+2)	4 TB	72 TB
24	3 x (6+2)	6 TB	108 TB
24	3 x (6+2)	8 TB	144 TB
24	7 x (2+1) + 3	2 TB	28 TB
24	7 x (2+1) + 3	4 TB	56 TB
24	7 x (2+1) + 3	6 TB	84 TB
24	7 x (2+1) +3	8 TB	112 TB

NOTE: No other disk drive configurations are supported for the ContentServer 4000 and ContentStore 4240 series.

RAID configurations for ContentStore 5840

Find the available disk drive configurations for the ContentStore 5840.

Make sure to select the RAID set that works best for your needs.

Table 12-3: RAID configurations for the ContentStore 5840

# Drives	RAID Sets	Capacity per Drive	Storage Capacity
84	12 x (5+2)	4 TB	240 TB
84	12 x (5+2)	6 TB	360 TB
84	12 x (5+2)	8 TB	480 TB
84	26 x (2+1) +6	4 TB	208 TB
84	26 x (2+1) +6	6 TB	312 TB
84	26 X (2+1) + 6	8 TB	416 TB

NOTE: No other disk drive configurations are supported for the ContentStore 5840.

Creating a RAID set

Use the Create RAID set utility to manually assign drives to a RAID set.

NOTE: This procedure can be performed automatically when you run the Harmonic MediaGrid configuration assistant. For information about running the configuration assistant, refer to “System Configuration” in the *Harmonic MediaGrid Installation Guide*.

IMPORTANT: Make sure that all ContentServers and ContentStores in a stack are configured with the same RAID geometry.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **Drives** section of the page, click **Create RAID Set** to open the Create RAID Set page, as shown in the following figure.

NOTE: If the Create RAID Set button is grayed out, then all drives are already assigned to a RAID set.

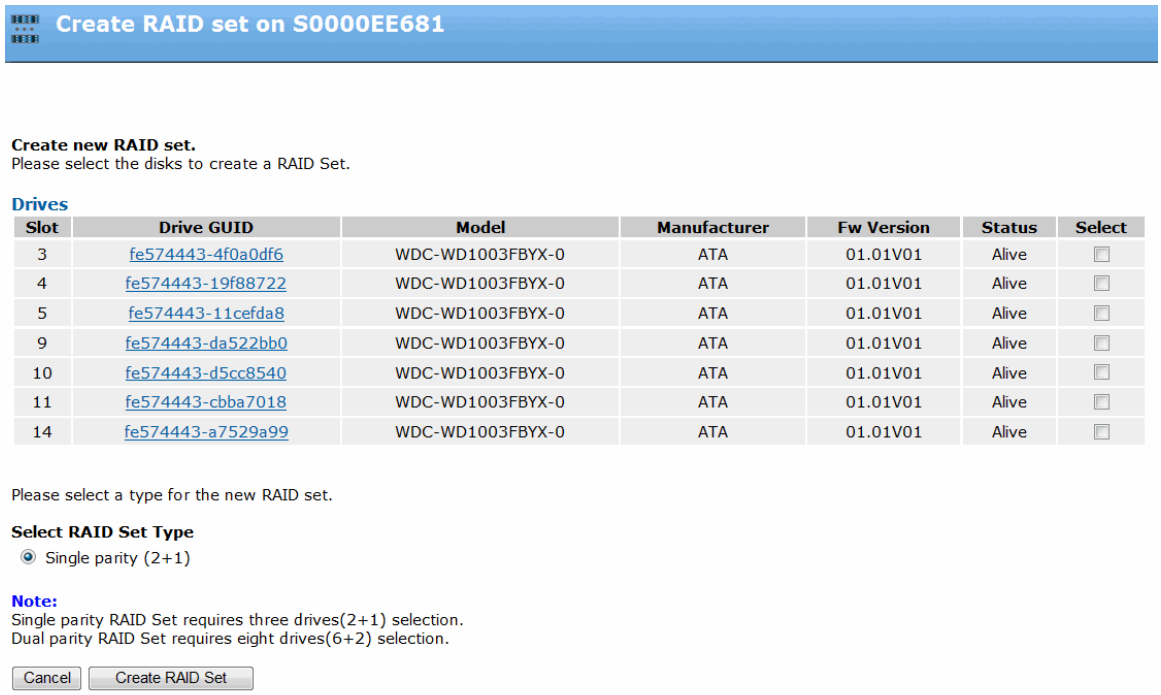


Figure 12-1: Creating a RAID set Manually

4. From the **Create RAID set** page, select the drives you wish to add to a RAID set.
5. In **Selected RAID Set Type**, select the desired RAID set type.

   NOTE: If there are not enough drives available for the dual parity option then SystemManager will only show the single parity option.

6. Click **Create RAID Set**.

   The new RAID set will be visible in the RAID Sets section of the ContentServer or ContentStore Properties page.

Creating a RAID set with Auto Create

Use the Auto Create RAID set utility to automatically assign drives to a RAID set.

NOTE: This procedure can be performed automatically when you run the Harmonic MediaGrid configuration assistant. For information about running the configuration assistant, refer to “System Configuration” in the *Harmonic MediaGrid Installation Guide*.

IMPORTANT: Make sure that all ContentServers and ContentStores in a stack are configured with the same RAID geometry.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.

2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **Drives** section of the page, click **Auto Create RAID Set** to open the Auto Create RAID Set page, as shown in the following figure.

   NOTE: If the Create RAID Set button is grayed out, then all drives are already assigned to a RAID set.

Figure 12-2: Creating a RAID set with Auto Create

4. In **Select RAID Set Type**, select the desired RAID set type.

   NOTE: If there are not enough drives available for the dual parity option then SystemManager will only show the single parity option.

5. Click **Done** to create the RAID set and return to the ContentServer or ContentStore Properties page.

   The new RAID set will be visible in the RAID Sets section of the ContentServer or ContentStore Properties page.

Destroying a RAID set

In some cases, you may need to destroy one or more RAID sets.

CAUTION: Destroying a RAID set will wipe out all data in that RAID set.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. From the **Select** column of the **RAID sets** section of the page, select the RAID sets you wish to destroy, and then click **Set Offline**.
4. Verify the Status for the RAID sets change to “Offline.” At this point, the data on the drives will not be accessible.
5. Select the offline RAID sets, and then click **Destroy**.
6. Verify the destroyed RAID sets no longer appear in the RAID set list.

Failing a drive

Use the Fail drive procedure to remove a drive from a RAID set, when the drive is experiencing a loss of data.

This step is performed as a prerequisite to removing the drive from the chassis and then replacing it with a new drive, at which time the RAID set “rebuild” occurs automatically.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **Drives** section of the page, select the drives you wish to fail and click **Fail Drives**.

   The drive status now appears as “Dead” and “**Unraided**.”

   For instructions on replacing a failed drive, refer to the Component Replacement Guide for your ContentServer or ContentStore.

Unfailing a drive

Use the Unfail drive procedure to make a failed drive available to be used in a RAID set.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **Drives** section of the page, select the drives you wish to unfail and click **Unfail Drives**.

   The drive status changes to **Alive**.

Changing RAID set wink state

You can change the wink state of all drives in a RAID set.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **RAID sets** section of the page, click the link in the GUID column for the RAID set you wish to view. The **RAID Utilities** page appears. .
4. In the **RAID Set drives wink state** section, click **Wink On** to wink all drives in the RAID set. Click **Wink Off** to turn off winking for all drives in the RAID set.

Stopping a RAID set rebuild in progress

You can this stop a RAID set “rebuild” in progress.

Note that when the rebuild stops, the RAID set is left in a compromised state. In this state, the RAID set can still be used, but there is no protection. If another drive is lost, your content will also be lost.

The rebuild might be manually stopped, for example, if you noted that the rebuild was occurring to the wrong Hot Spare. Once stopped, the rebuild can be started again successfully.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **RAID sets** section of the page, click the link in the GUID column for the RAID set you wish to view. The **RAID Utilities** page appears.
4. Scroll to the bottom of the page and click **Abort Rebuild**.
5. Verify that the Rebuild status field reads “**Aborted**.”

   The rebuild has now been stopped, but it can be started again successfully.

   Restarting a RAID set rebuild

Restarting a RAID set rebuild

In some cases, you may need to manually restart at RAID set rebuild.

Normally, the rebuilding of a RAID set occurs automatically when a drive fails and a Hot Spare is available. The rebuild can also occur when a failed drive is replaced.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **RAID sets** section of the page, click the link in the GUID column for the RAID set you wish to view. The **RAID Utilities** page appears.
4. Scroll to the bottom and click **Start Rebuild**. The status field changes to “**Rebuilding**.”
5. Click **Done** to save the changes and return to the ContentServer or ContentStore Properties page.

Making a hot spare

In some cases, you may need to make a hot spare drive.

If a drive failure occurs and a hot spare is available, the system will automatically utilize a hot spare to rebuild a protected RAID set. A hot spare is a drive that will be used by the ContentServer or ContentStore to fulfill hot spare requirements for any RAID set in the ContentServer or ContentStore

where the hot spare resides. If your system is configured with 2+1 RAID sets, Harmonic recommends that you always have at least one hot spare available.

NOTE: If you enable Monitor Hotspares (from the **Options** page on the **Home** tab), the SystemManager will raise an alarm and send a notification by e-mail or trap (depending on the configuration) when a RAID set is no longer protected with an available hot spare.

1. Verify the hot spare drive's condition. From the **ContentServer/ContentStore Properties** page, in the **Drives** section on the page, the drive should appear as "**Alive**" and "**Unraided**." If the drive does not appear this way, contact Harmonic technical support.
2. Verify the drive's firmware. If the firmware revision level does not match the other drives, contact Harmonic technical support for assistance.
3. From the **ContentServer/ContentStore Properties** page, in the **Drives** section on the page, click the GUID for the selected drive to display the **Drive Properties** page.
4. From the **Drive Properties** page, click **Make Hot Spare**. The button changes to **Clear Hot Spare**, the drive's status changes immediately to "**Alive**, **Hot Spare**," and the drive is ready for use as a hot spare.
5. Click **Done** to save the changes and return to the ContentServer or ContentStore Properties page.

Clearing a hot spare

You can clear a **Hot Spare**, for example, if you accidentally created a Hot Spare or if you want to use the selected drive as a normal part of a RAID set.

1. From the **ContentServer/ContentStore Properties** page, in the **Drives** section on the page, click the GUID for the selected drive to display the **Drive Properties** page.
2. From the **Drive Properties** page, click **Clear Hot Spare**. The button changes to **Make Hot Spare**, the drive's status changes immediately to "**Alive**," and the drive is ready for use as normal drive.
3. Click **Done** to save the changes and return to the ContentServer or ContentStore Properties page.

Drive capacity expansion in a Harmonic MediaGrid RAID system

Expanding drive capacity in your Harmonic MediaGrid RAID system requires significant planning. An integral component of this process is shelf evacuation, which can take many hours, or even days, for each ContentServer or ContentStore involved.

Please read the following sections carefully and plan accordingly.

NOTE: Capacity expansion requires Harmonic MediaGrid version 3.5 or later (on all components in your Harmonic MediaGrid system) and SystemManager 6.2.3 or later.

About shelf evacuation

Shelf evacuation involves transferring data, one shelf at a time, to other shelves in the volume or, for stretch cluster configurations, to other shelves in the same group.

This allows you to maintain uninterrupted access to data while expanding capacity, or while reconfiguring, replacing, or retiring a shelf.

In a Harmonic MediaGrid RAID system, a shelf is one ContentServer 3000 or 4000, one ContentStore 3160 or 4240, or one *drawer* in a ContentStore 5840/5840A. The shelf being evacuated is automatically set to read-only mode. It can still service client read requests, however this capability will diminish as data is removed from the shelf after being copied to another shelf.

Note that, if the balancer is enabled when an evacuation begins, it will be suspended throughout the evacuation process and will resume once all shelves return to normal service. After capacity expansion, Harmonic recommends running the balancer on high priority in order to rebalance the system as quickly as possible.

About write bandwidth during shelf evacuation

Although the Harmonic MediaGrid system can still service read and write requests during shelf evacuation, note that write bandwidth will be reduced both by the portion represented by the shelf being evacuated and by the overhead of copying slices to the other shelves.

During evacuation, you can set the priority level to either "normal" or "high", depending on your write bandwidth requirements. When planning for capacity expansion, consider the impact that each priority level will have on the entire time needed for expansion..

Priority Level	Description
Normal	If the Harmonic MediaGrid cluster will be in use during the evacuation process (reads and writes are taking place), you should set the priority level to normal. Note that this setting increases the amount of time required to complete the evacuation.
High	If the Harmonic MediaGrid cluster will be idle during the evacuation process (reads or writes will not be taking place), then you can set the priority level to high. Note that this setting decreases the amount of time required to complete the evacuation.

Reviewing available space

To prepare for capacity expansion, determine the amount of disk space that will be available in the volume or group after a shelf has been evacuated.

Free up as much space as possible! When expanding capacity in multiple shelves, data is repeatedly moved from one shelf to another. The less data there is to move, the faster the process will go.

1. In SystemManager, navigate to the **Cluster Properties** page, and then click **Shelf Evacuation Control/Status** to open the **Shelf Evacuation** page for the cluster.
2. In the **Total Disk Space** column, find the shelf with the least amount of space. If each shelf has the same total disk space, look in the **Free Space (%)** column and find the shelf with the greatest amount of free space.

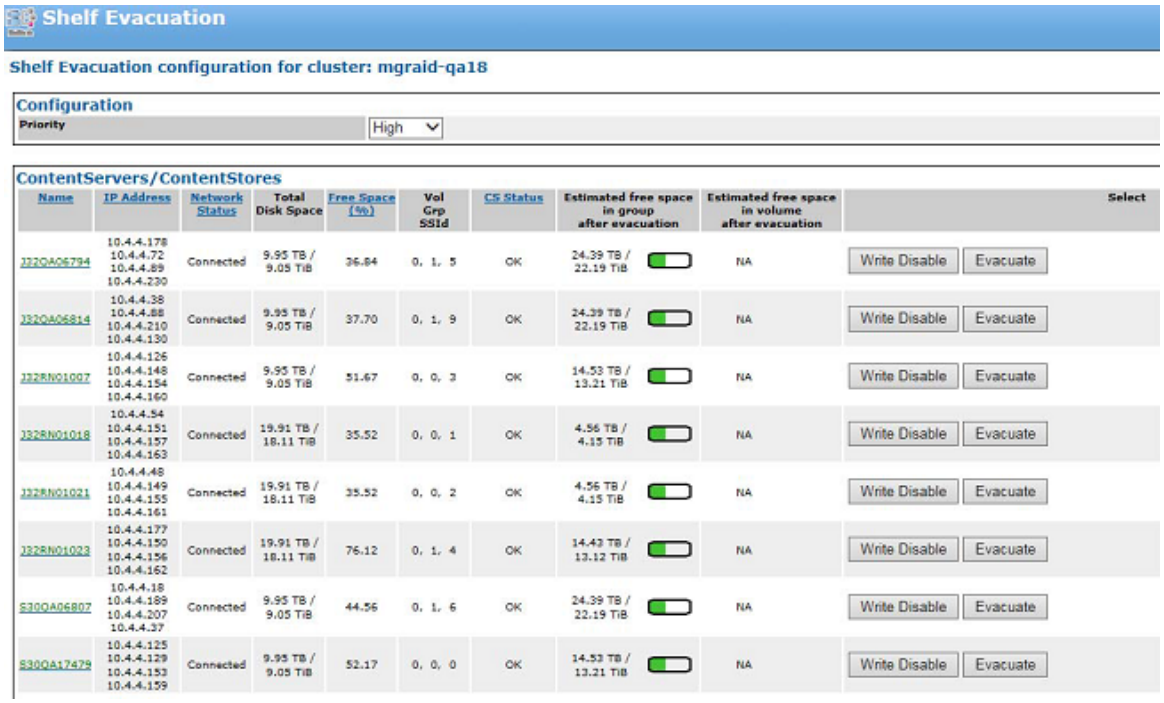


Figure 12-3: Shelf Evacuation page

3. For the same shelf, note the **Estimated free space in group/volume after evacuation**.

   The following table will help you determine if there is enough free space for evacuation:

Color	Status
Green	Sufficient space is available, even if the Harmonic MediaGrid cluster will be in use (reads or writes are taking place) during the evacuation.
Yellow	Sufficient space is available if the Harmonic MediaGrid cluster will have limited use during the evacuation.
Red	Sufficient space is available if the Harmonic MediaGrid cluster will be idle (no reads or writes are taking place) during the evacuation.
Dark Red	Insufficient space available; the **Write Disable** and **Evacuate** buttons are grayed out. You must free up space or add storage in order to proceed.

About setting shelves to read-only mode

To prevent data from migrating to the next shelf to be evacuated in the same volume or group, you can manually set this shelf to read-only.

CAUTION: Manually setting a ContentServer or ContentStore to read-only mode is intended to facilitate capacity expansion ONLY. Do not set a shelf as read-only for any other purpose.

By default, Harmonic MediaGrid distributes content that has been evacuated from one shelf equally across all remaining shelves in the volume or group. This has the advantage of maintaining maximum

possible read bandwidth. However, it increases the total amount of time required for evacuation by moving data to the shelf that will be evacuated next.

If any of the following is true, DO NOT configure the additional shelf as read-only:

- The volume, or each group in the stretch cluster, has fewer than 10 shelves.
- The system has less than 20% available disk space.
- You cannot tolerate further reduction in write bandwidth.

IMPORTANT: Harmonic recommends that you set no more than 2 shelves to read-only, which includes the shelf being evacuated, in a volume or group of 10 shelves.

If you find during the evacuation process that your users require more writable space than anticipated, you can return a shelf to read-write duty at any time.

After you have expanded drive capacity in the first or second shelf, the volume or group should have enough free space to support setting all of the unexpanded shelves to read-only during subsequent evacuations. Note that doing so concentrates the migrated content on the few remaining writable servers. This, in turn, reduces the effective read bandwidth for files that contain these slices. If the system is not in use, this will speed up the expansion process. However, it will take longer to balance the cluster after all shelves have been expanded.

Expanding drive capacity

Begin this procedure only after you have determined that your system has sufficient free space and you have planned accordingly.

1. In SystemManager, navigate to the **Cluster Properties** page, and then click **Shelf Evacuation Control/Status** to open the **Shelf Evacuation** page for the cluster.
2. From the **Priority** drop-down menu, select the priority level for evacuation:
   - **Normal**: Select if the Harmonic MediaGrid cluster will be in use (reads or writes are taking place) during shelf evacuation.
   - **High**: Select if the Harmonic MediaGrid cluster will be idle (no reads or writes are taking place) during shelf evacuation.

   NOTE: You may change the priority level at any time during the evacuation.
3. If your system meets the criteria specified in *About setting shelves to read-only mode*, you may set the first two shelves to be evacuated in the volume or group as read-only. If your system does not meet the criteria, skip this step.
   a. Select **Write Disable** for the shelf that will be evacuated first, and then click **OK** to confirm.

      Result: The **CS Status** changes to `ReadOnly`.
   b. Select **Write Disable** for the shelf that will be evacuated next, and then click **OK** to confirm.

      NOTE: For a stretch cluster configuration, select the next shelf that will be evacuated *in the same group*.

      Result: The **CS Status** field changes to `ReadOnly` and SystemManager updates the **Estimated free space in group/volume after evacuation**.
   c. Note the updated estimated free space after evacuation and consider the anticipated load during the evacuation process.
   d. If there is limited or insufficient free space, or you anticipate heavy load during the evacuation process, return the shelf to normal service by clicking **Write Enable**.

4. For the shelf you intend to evacuate first, select **Evacuate**, and then click **OK** to confirm.

   Result: Within a short while, the **Write Disable** and **Evacuate** buttons change to **Write Enable** and **Cancel Evacuation**. The **CS Status** field changes to `Evacuating`, which also appears on the **Properties** page and the **Servers & Switches** page.

   Lastly, after a short delay, SystemManager shows an estimated time of completion. This estimate is based on the rate at which the Harmonic MediaGrid has copied slices so far, and the number of slices remaining, without regard to slice sizes. This estimate will change with increased/decreased load on the system or network, or with significant variation in the size of slices to be moved.

5. Monitor the progress of the evacuation.

   - If the evacuation appears to be stuck at 99% or 100%, this may mean the shelf has not yet reported that it is done deleting the last few slices that were copied to other shelves. Wait a few minutes for the **CS Status** to update.
   - If an error occurs, refer to "Possible errors during shelf evacuation," and follow the instructions for troubleshooting the particular error that occurred.
   - If necessary, you may cancel the evacuation by clicking **Cancel Evacuation**. Note that canceling an evacuation does not return the data, which has already been transferred, back to the original shelf.

     Following a cancellation, you must return the shelf to normal service (see *step 10*) and rebalance the ContentServer and ContentStore nodes in the cluster (see *step 12*).

   Result: When evacuation is complete, the **CS Status** changes to `Evacuated` and the following message appears:

   ```
   Data migration for [component name] has completed. The component may be
    retired.
   ```

   NOTE: After a shelf is evacuated, the value for **Free Space (%)** may be slightly less than 100. This is expected following a successful evacuation.

   Proceed to the next step only after the evacuation has successfully completed.

6. Navigate to the **Properties** page and click **Wink On** to identify the physical ContentServer or ContentStore that was evacuated.

   NOTE: The ContentStore 5840 appears as two devices in SystemManager. Be sure to navigate to the correct **Properties** page.

7. From the **RAID Sets** section of the **Properties** page, destroy all of the RAID sets for the shelf that was evacuated.
   For instructions, refer to "Destroying a RAID Set" in the *Harmonic SystemManager User Guide*.

8. For the shelf that was evacuated, replace the original drives with higher capacity drives.
   For instructions, refer to the *ContentServer Component Replacement Guide* or *ContentStore Component Replacement Guide*.

9. Using SystemManager, create new RAID sets for the shelf that was expanded.
   For instructions, refer to "Creating a RAID Set with Auto Create" or "Creating a RAID Set" in the *Harmonic SystemManager User Guide*.

10. From the **Shelf Evacuation Control/Status** page in SystemManager, click **Write Enable** for the shelf that was evacuated to return the shelf to normal service.

11. Repeat *step 3* through *step 10* to expand capacity in the remaining shelves, one at a time.

NOTE: For a stretch cluster configuration, alternate between groups with each shelf expansion. If you have write-disabled an additional shelf, leave this shelf in read-only mode (if possible) while expanding a shelf in the other group.

12. Once all the shelves have been returned to normal service, navigate to the **View/Edit Balancer Scheduling** page for the cluster, and balance the ContentServer and ContentStore nodes. Harmonic recommends that you select **Start balancer(high) now** to start the balancer immediately. If that is not possible, configure your balancing shedule to complete as quickly as possible. Refer to "Enabling and Configuring Scheduled Balancing" in the *Harmonic SystemManager User Guide*.

Related information

Destroying a RAID set
Creating a RAID set
Creating a RAID set with Auto Create
Enabling and configuring scheduled balancing

Possible errors during shelf evacuation

Some errors, such as network outages and shelf failover, may interfere with the shelf evacuation process. Check the View Alarms page for any errors that were generated during the evacuation.

If you see any of the following errors, check for network connectivity, shelf status (online/offline), and free space on the shelf:

- `SSID=[SSID] Evacuation canceled due to excessive errors.`

  NOTE: This message refers to errors in retrieving status from the shelf being evacuated.
- `SSID=[SSID] Evacuation canceled due to inaccessible server.`
- `Unable to migrate slice: [SID]. Evacuation canceled.`
- `Unable to migrate slice: [SID]. Evacuation of SSID=[SSID] canceled.`

Once the Harmonic MediaGrid is stable, confirm that there is still sufficient space to evacuate the shelf and then resume the procedure for expanding drive capacity.

If the error persists for the same slice ID, wait 10 minutes and try again.

In some cases, particularly on live systems, you may see the following error:

```
Data migration for ContentServer=[SSID] was not able to complete after [X]
 retries.
```

If this occurs, contact Harmonic technical support for assistance.

Chapter 13

Harmonic MediaGrid monitoring and troubleshooting

SystemManager provides detailed monitoring of your Harmonic MediaGrid system.

- *Viewing Harmonic MediaGrid clusters and components*
- *Viewing properties for individual Harmonic MediaGrid components*
- *Viewing drive properties*
- *Viewing RAID set information*
- *Viewing Harmonic MediaGrid performance statistics*
- *Viewing and clearing alarms and events for Harmonic MediaGrid components*
- *Performing management and troubleshooting on a Harmonic MediaGrid*

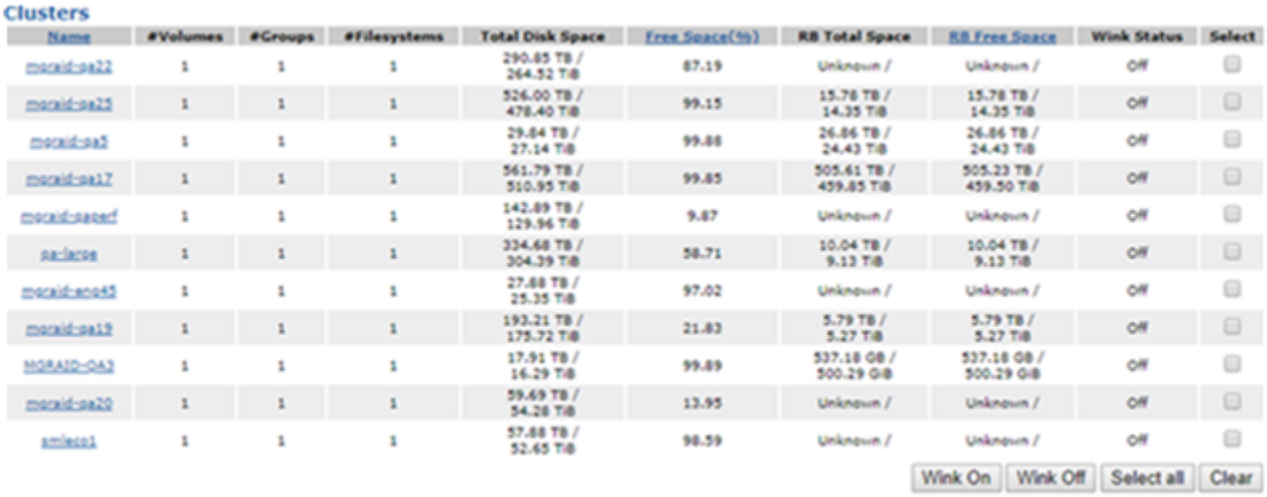
Viewing Harmonic MediaGrid clusters and components

You can view properties for all Harmonic MediaGrid clusters and components.

1. Click the **Configuration Tab** at the top of the SystemManager page.
2. Click the **Servers & Switches** icon in the left-hand column to access the **Servers & Switches** page.

Properties for all clusters

In the **Clusters** section of the **Servers & Switches** page, you can view properties for each cluster created in the system.


Clusters

Name	#Volumes	#Groups	#Filesystems	Total Disk Space	Free Space(%)	RB Total Space	RB Free Space	Wink Status	Select
mgraid-pa22	1	1	1	290.85 TB / 264.52 TiB	87.19	Unknown /	Unknown /	Off	
mgraid-pa25	1	1	1	526.00 TB / 478.40 TiB	99.15	15.78 TB / 14.35 TiB	15.78 TB / 14.35 TiB	Off	
mgraid-pa5	1	1	1	29.84 TB / 27.14 TiB	99.88	26.86 TB / 24.43 TiB	26.86 TB / 24.43 TiB	Off	
mgraid-pa17	1	1	1	561.79 TB / 510.95 TiB	99.85	505.61 TB / 459.85 TiB	505.23 TB / 459.50 TiB	Off	
mgraid-paperf	1	1	1	142.89 TB / 129.96 TiB	9.87	Unknown /	Unknown /	Off	
pa-large	1	1	1	334.68 TB / 304.39 TiB	58.71	10.04 TB / 9.13 TiB	10.04 TB / 9.13 TiB	Off	
mgraid-eng45	1	1	1	27.88 TB / 25.35 TiB	97.02	Unknown /	Unknown /	Off	
mgraid-pa19	1	1	1	193.21 TB / 175.72 TiB	21.83	5.79 TB / 5.27 TiB	5.79 TB / 5.27 TiB	Off	
MGRAID-QA3	1	1	1	17.91 TB / 16.29 TiB	99.89	537.18 GB / 500.29 GiB	537.18 GB / 500.29 GiB	Off	
mgraid-pa20	1	1	1	59.69 TB / 54.28 TiB	13.95	Unknown /	Unknown /	Off	
smleqa1	1	1	1	57.88 TB / 52.65 TiB	98.59	Unknown /	Unknown /	Off	

Wink On | Wink Off | Select all | Clear

Figure 13-1: Harmonic MediaGrid All Clusters view

A cluster includes a volume and its associated its associated ContentDirector, ContentServer, ContentStore, and ContentBridge nodes within a Harmonic MediaGrid.

Name (hyperlink)	Displays the name assigned to the cluster. Click on the hyperlink to access the **Cluster Properties** page.
#Volumes	Displays the number of volumes which make up the cluster.
#Groups	Displays the number of groups which make up the cluster.
#File Systems	Displays the number of File Systems in the cluster.
Total Disk Space	Displays the total disk space available across all the units in a cluster.
Free Space(%)	Displays the percentage of free disk space across all ContentServers in a cluster.
RB Total Space	Displays the total disk space allocated for the Recycle Bin across the nodes in all cluster.
RB Free Space	Displays the percentage of free disk space available for the Recycle Bin across the nodes in all clusters.
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a cluster in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select the cluster.
Wink on/off (button)	Click to change the wink status of all the selected clusters.
Select all (button)	Click to select all the clusters.
Clear (button)	Click to deselect all the clusters.

Properties for all ContentDirectors

In the **ContentDirectors** section of the **Servers & Switches** page, you can view properties for each ContentDirector found in the system.

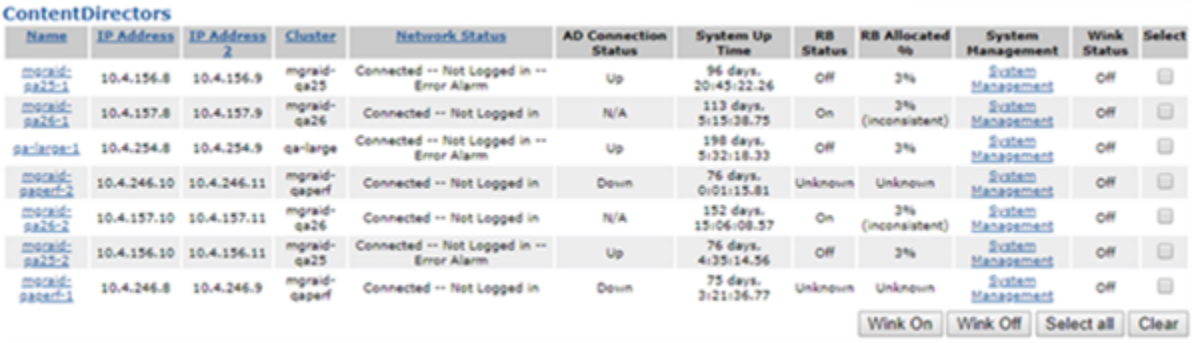


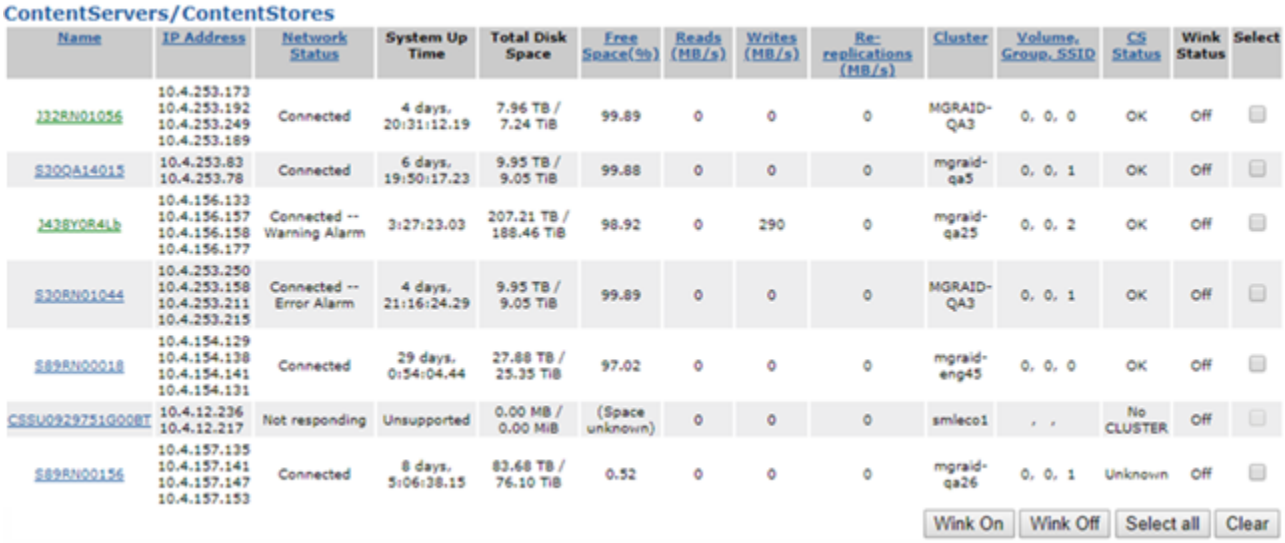
Figure 13-2: Harmonic MediaGrid All ContentDirectors view

Name (hyperlink)	Displays the name assigned to the Server. Click on the hyperlink to access the unit's Properties page.
IP Address	Displays one of the Server's IP addresses.
IP Address 2	Displays one of the Server's IP addresses.
Cluster	Displays the cluster name to which the ContentDirector is assigned.
Network Status	Displays the unit's current network status, authentication status, and security access level, including "Connected," "Not Responding," "Error," "Deleted," "Starting Upgrade," "Authenticated," "Not Authenticated," and "Administrator."
AD Connection Status	Displays the status of the Active Directory connection, which may be "Up," "Down," or "N/A." Note that "N/A" means that either the cluster is not reporting the AD connection status or that the cluster is not using AD for authentication.
System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds. Thus, 20:16:21:52:10 means 20 days, 16 hours, 21 minutes, and 52.10 seconds.
RB Status	Displays the current status of the Recycle Bin on the ContentDirector. The possible values for **RB Status** are on, off, or unknown.
RB Allocated %	Displays the percentage of disk space allocated to the Recycle Bin on the ContentDirector.
System Management	Provides a link to the System Management (Dell OpenManage) page for the ContentDirector.
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a cluster in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select the ContentDirector.
Wink on/off (button)	Click to change the wink status of all the selected ContentDirectors.

Select all (button)	Click to select all the ContentDirectors.
Clear (button)	Click to deselect all the ContentDirectors.

Properties for all ContentServers and ContentStores

In the **ContentServers/ContentStores** section of the **Servers & Switches** page, you can view properties for each ContentServer or ContentStore found in the system.



ContentServers/ContentStores

Name	IP Address	Network Status	System Up Time	Total Disk Space	Free Space(%)	Reads (MB/s)	Writes (MB/s)	Re-replications (MB/s)	Cluster	Volume, Group, SSID	CS Status	Wink Status	Select
J328N01056	10.4.253.173 10.4.253.192 10.4.253.249 10.4.253.189	Connected	4 days, 20:31:12.19	7.96 TB / 7.24 TiB	99.89	0	0	0	MGRAID-QA3	0, 0, 0	OK	Off	
S30QA14015	10.4.253.83 10.4.253.78	Connected	6 days, 19:50:17.23	9.95 TB / 9.05 TiB	99.88	0	0	0	mgraid-qa5	0, 0, 1	OK	Off	
J438Y0R4Lb	10.4.156.133 10.4.156.157 10.4.156.158 10.4.156.177	Connected -- Warning Alarm	3:27:23.03	207.21 TB / 188.46 TiB	98.92	0	290	0	mgraid-qa25	0, 0, 2	OK	Off	
S30RN01044	10.4.253.250 10.4.253.158 10.4.253.211 10.4.253.215	Connected -- Error Alarm	4 days, 21:16:24.29	9.95 TB / 9.05 TiB	99.89	0	0	0	MGRAID-QA3	0, 0, 1	OK	Off	
S89RN00018	10.4.154.129 10.4.154.138 10.4.154.141 10.4.154.131	Connected	29 days, 0:54:04.44	27.88 TB / 25.35 TiB	97.02	0	0	0	mgraid-eng45	0, 0, 0	OK	Off	
CSSU0929751G00BT	10.4.12.236 10.4.12.217	Not responding	Unsupported	0.00 MB / 0.00 MiB	(Space unknown)	0	0	0	smleco1	, ,	No CLUSTER	Off	
S89RN00156	10.4.157.135 10.4.157.141 10.4.157.147 10.4.157.153	Connected	8 days, 5:06:38.15	83.68 TB / 76.10 TiB	0.52	0	0	0	mgraid-qa26	0, 0, 1	Unknown	Off	

Wink On | Wink Off | Select all | Clear

Figure 13-3: Harmonic MediaGrid All ContentServers/ContentStores view

Name (hyperlink)	Displays the name assigned to the device. Note that for the ContentServer 3000 or 4000 series, ContentServer names begin with S and ContentStore names begin with J. Click on the hyperlink to access the Properties page for each device.
IP Address	Displays one of the Server's IP address.
IP Address 2	Displays one of the Server's IP address.
Network Status	Displays the Server's current network status, such as "Connected," "Not Responding," "Error," "Deleted," or "Starting Upgrade."
System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds.
Total Disk Space	Displays the total raw storage capacity of each server.
Free Space(%)	Displays the percentage of free disk space on the ContentServer.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.

	For ContentServer 2000 Series units, a value of zero is normal (no re-replication occurred). Any value other than zero means one of the following occurred: • The replication factor was changed to a higher number by a user (a lower number does not change what is shown on the page) • Drive failure • ContentServer failure
Cluster	Displays the cluster name to which the ContentServer is assigned.
Volume, Group, SSID	Displays the volume name, to which the ContentServer is assigned; the group name to which the ContentServer is assigned; and a numeric identifier for the ContentServer within the cluster.
CS Status	Displays the Server's current status within the cluster, including "No Cluster," "Initializing," "OK," "Degraded," "Storage Failure," "ReadOnly," "Evacuating," or "Evacuated."
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select the ContentServer.
Wink on/off (button)	Click to change the wink status of all the selected ContentServers.
Select all (button)	Click to select all the ContentServers.
Clear (button)	Click to deselect all the ContentServers.

Properties for all ContentBridges with Harmonic MediaGrid ContentBridge software 5.0 or later

In the **ContentBridges** section of the **Servers & Switches** page, you can view properties for each ContentBridge found in the system.

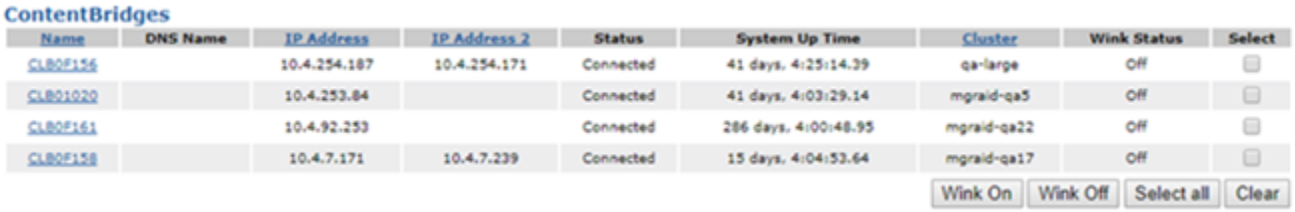


Figure 13-4: Harmonic MediaGrid All ContentBridges view

Name (hyperlink)	Displays the name assigned to the unit. Click on the hyperlink to access the Content Bridge's Properties page.
DNS Name	The DNS name of the ContentBridge.
IP Address	Displays one of the Server's IP addresses.
IP Address 2	Displays one of the Server's IP addresses.
Status	Displays the unit's current network status, such as "Connected," "Not Responding," "Error," "Deleted," or "Starting Upgrade."

System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds. Thus, 20:16:21:52:10 means 20 days, 16 hours, 21 minutes, and 52.10 seconds.
Cluster	Displays the cluster name to which the ContentBridge is assigned.
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select the ContentBridge.
Wink on/off (button)	Click to change the wink status of all the selected ContentBridges.
Select all (button)	Click to select all the ContentBridges.
Clear (button)	Click to deselect all the ContentBridges.

Properties for all ContentBridges with Harmonic MediaGrid Server software 4.x or earlier

In the **High Bandwidth ContentBridges** section of the **Servers & Switches** page, you can view properties for each ContentBridge with Harmonic MediaGrid Server software 4.x or earlier found in the system.

Note that Harmonic provides an HA Pair utility that you may run to configure two ContentBridges with Harmonic MediaGrid Server software 4.x or earlier in a High Availability (HA) pair. If you have configured an HA pair, the details of that pair will appear under **High Bandwidth ContentBridges (in HA mode)**, and some HA-specific fields will appear, as shown in the following figure. For details on configuring an HA pair, see the *Harmonic MediaGrid Installation and Configuration Guide*.

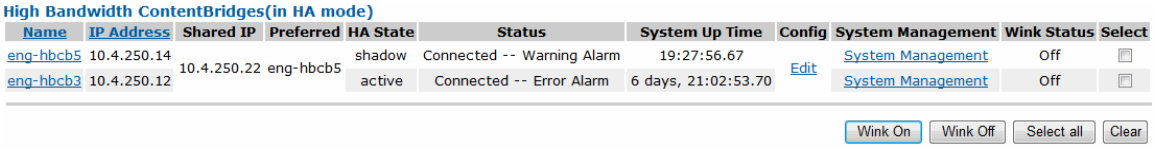


Figure 13-5: High Bandwidth ContentBridges (in HA mode)

Name (hyperlink)	Displays the name assigned to the unit. Click on the hyperlink to access the Properties page.
IP Address	Displays the IP address for the ContentBridge.
Shared IP	(for HA only) Displays the IP address shared by the two HA-paired ContentBridges.
Preferred	(for HA only) Displays the HA-paired ContentBridge configured as the Preferred node. If both nodes in an HA pair fail, in the event of recovery, the preferred node becomes the "active" node first in order to avoid conflicts resulting from two active nodes.
HA State	(for HA only) Displays either **active** or **shadow**. If network connectivity, power, or an essential process fails on the "active" node, the "shadow" node then becomes "active" and takes over operations.
Status	Displays the unit's current network status, such as "Connected," "Not Responding," "Error," "Deleted," and "Starting Upgrade."

System Up Time	Displays the time the unit has been “up and running” in days, hours, minutes, seconds, and fractions of seconds. Thus, 20:16:21:52:10 means 20 days, 16 hours, 21 minutes, and 52.10 seconds.
Config	Access the ContentBridge Configuration File.
System Management	Provides a link to the Dell OpenManage utility. See *Accessing the Dell OpenManage utility* for more information.
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select the ContentBridge.
Wink on/off (button)	Click to change the wink status of all the selected ContentBridge.
Select all (button)	Click to select all the ContentBridges.

Related information

Editing the ContentBridge configuration file

Properties for all network switches

In the **Network Switches** section of the **Servers & Switches** page, you can view properties for each network switch found in the system.

IP Address	Displays a unique identifier, typically the IP address of the switch.
Network Status	Displays the unit's current network status, such as "Connected."
System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds.
Model	Displays the switch type.
Switch Management (hyperlink)	Provides a link to the Switch Management (HP ProCurve Switch) page for the particular unit.

Viewing properties for individual Harmonic MediaGrid components

SystemManager provides details on all Harmonic MediaGrid components.

Viewing properties for a single cluster

You can view properties for a single cluster.

1. Click the **Servers & Switches** icon on the Configuration tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the required cluster to access the **Properties** page. The following figure shows a sample **Cluster Properties** page.

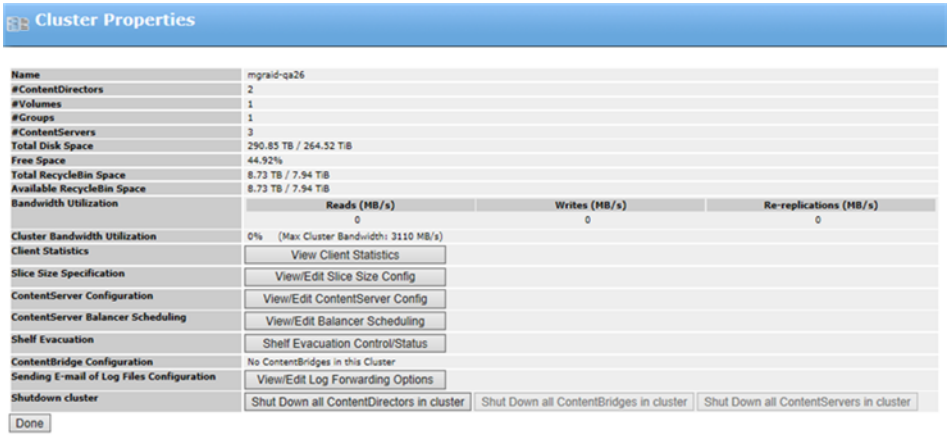


Figure 13-6: Harmonic MediaGrid Cluster Properties

Properties for a single cluster

You can view cluster properties in the general information section at the top of the **Properties** page.

Name	Displays the assigned name for the cluster. Refer to the *Harmonic MediaGrid Installation Guide* for a discussion about naming conventions to follow.
#ContentDirectors	Displays the number of ContentDirectors assigned to the cluster.
#Volumes	Displays the number of volumes present in the cluster.
#Groups	Displays the number of groups present in the cluster.
#ContentServers	Displays the number if the ContentServers present in the cluster.
Total Disk Space	Displays the Total Disk Space across the cluster.
Free Space	Displays the free disk space available across the cluster and as a percentage of Total Disk Space.
RecycleBin Total Space	Displays the total disk space allocated for the Recycle Bin across the nodes in a single cluster.
RecycleBin Free Space	Displays the percentage of free disk space available for the Recycle Bin across the nodes in a single cluster.
Bandwidth Utilization	Displays the bandwidth usage for read, write, and re-replication processes measured by all the ContentServers in the cluster. • **Reads (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for network [deleted disk] "read" requests sent to the ContentServers in the cluster. • **Writes (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for network [deleted disk] "write" requests received by the ContentServers in the cluster. • **Re-replications (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for re-replication requests received by the ContentServers in the cluster.

Cluster Bandwidth Utilization	Displays the percentage of average bandwidth usage per ContentServers in the cluster. This is calculated by combining the total read, write, and re-replication network traffic seen by all the ContentServers in the cluster, then divided by the total number of ContentServers in the cluster. **NOTE:** The following buttons are enabled if at least one ContentDirector in the cluster is up.
Client Statistics	Click **View Client Statistics** to display a list of clients connected to the cluster and the read and write transfer rates per client.
Grid Applications	Click **View Grid Applications** to view a Grid Application system view summary and detailed information on an application by application basis.
Slice Size Specification	Click **View/Edit Slice Size Config** to access the “sliceSizeSpec” file associated with the cluster.
ContentServer Configuration	Click **View/Edit ContentServer Config** to access the ContentServer configuration file associated with the cluster.
ContentServer Balancer Scheduling	Click **View/Edit Balancer Scheduling** to access the Balancer Scheduling page, which allows you to enable and configure scheduled balancing for a cluster.
ContentBridge Configuration	Displays each **ContentBridge** and its corresponding **DNS Name**, and **IP Addresses**. Click **View/Edit ContentBridge Config** to access the configuration file for the selected ContentBridge.
Sending E-mail of Log files Configuration	Click **View/Edit Log Forwarding Options** to open the **Edit "Log Forwarding Configuration" file...** page which allows you to enable and configure log forwarding for a selected ContentDirector.
Shutdown cluster	Click **Shutdown all ContentDirectors** to begin shutting down all the ContentDirectors in the cluster. Once all ContentDirectors in the cluster are shut down, the **Shutdown all ContentBridges** in cluster button, will be activated. Once all ContentBridges are shut down, the **Shutdown all ContentServers** button will be activated.

In the **Devices in Cluster** section you can view information pertaining to elements within the cluster.

For **ContentDirectors**, you can view the following.

Name (hyperlink)	Displays the assigned name for each ContentDirector in the cluster. Click the hyperlink to access the ContentDirector Properties for the particular unit.
IP Address1	Displays one of the Director's IP addresses.
IP Address2	Displays one of the Director's IP addresses.
Network Status	Displays the unit's current network status, authentication status, and security access level, including "Connected," "Not Responding," "Error," "Deleted," "Starting Upgrade," "Authenticated," "Not Authenticated," or "Administrator."
Total Disk Space	Displays the total disk space in each ContentDirector.
Free Space(%)	Displays the free disk space available for each ContentDirector and as a percentage of Total Disk Space.

Interface Out (MB/s)	Displays the rate at which data is transmitted and aggregated over all the network interface cards on the device.
Interface In (MB/s)	Displays the rate at which data is received and aggregated over all the network interface cards on the device.
CPU Load (over 5 mins)	Displays the system load average for the past 5 minutes for the unit.
Mem Free(%)	Displays the percentage of total free memory for the unit.
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select a ContentDirector.
Wink on/off (buttons)	Click to change the wink status of all the selected units.
Select all (button)	Click to select all the ContentDirectors.
Clear (button)	Click to deselect all ContentDirectors.

For **ContentServers/ContentStores** section, you can view the following.

Name	Displays the name assigned to the device. Note that for the ContentServer 3000 or 4000 series, ContentServer names begin with S and ContentStore names begin with J. Click on the hyperlink to access the Properties page for each device
IP Address1	Displays one of the Director's IP addresses.
IP Address2	Displays one of the Director's IP addresses.
Network Status	Displays the unit's current network status, such as **"Connected," "Not Responding," "Error," "Deleted," "Starting Upgrade."**
Total Disk Space	Displays the Total Disk Space for each ContentServer.
Free Space(%)	Displays the free disk space available in the ContentServer and as a percentage of Total Disk Space in each ContentServer.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.
Interface Out (MB/s)	Displays the rate at which data is transmitted and aggregated over all the network interface cards on the device.
Interface In (MB/s)	Displays the rate at which data is received and aggregated over all the network interface cards on the device.
CPU Load (over 5 mins)	Displays the system load average for the past 5 minutes for the unit.
Mem Free(%)	Displays the percentage of total free memory for the unit.

Vol/Grp/CS ID	Displays the volume number to which the ContentServer is assigned, the group number to which the ContentServer is assigned and the ID number assigned to the ContentServer.
CS Status	Displays the ContentServer's current status, such a**s** "Connected," "Not Responding," "Error," "Deleted," "Starting Upgrade," "ReadOnly," "Evacuating," or "Evacuated."
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select a ContentServer.
Shut down (button)	Click to shut down a selected ContentServer or group of ContentServers. Note that this does not completely power down the ContentServer.
Wink on/off (buttons)	Click to change the wink status of all the selected units.
Select all (button)	Click to select all the ContentServers.
Clear (button)	Click to deselect all ContentServers.

For **ContentBridges**, you can view the following.

Name (hyperlink)	Displays the name assigned to the unit. Click on the hyperlink to access the ContentBridge Properties page.
DNS Name	The DNS name of the ContentBridge.
IP Address1	Displays one of the Server’s IP address.
IP Address2	Displays one of the Server’s IP address.
Interface Out (MB/s)	Displays the rate at which data is received and aggregated over all the network interface cards on the device.
Interface In (MB/s)	Displays the rate at which data is received and aggregated over all the network interface cards on the device.
CPU Load (over 5 mins)	Displays the system load average for the past 5 minutes for the unit.
Mem Free(%)	Displays the percentage of total free memory for the unit.
Network Status	Displays the unit's current network status, such as "Connected," "Not Responding," "Error," "Deleted," or "Starting Upgrade."
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select a ContentBridge.
Wink on (button)	Click to change the wink status of all the selected units to On.
Wink off (button)	Click to change the wink status of all the selected units to Off.
Select all (button)	Click to select all the ContentBridges.
Clear (button)	Click to deselect all ContentBridges.

For **Volumes**, you can view the following.

Volume ID	Displays a numeric identifier for the volume in the cluster.
Filesystem	Displays the File System associated with the volume
#CS Groups	Displays the number of ContentServer groups in the volume.
#ContentServers	Displays the number of ContentServers across the volume.
Total Disk Space	Displays the total disk space in TB across the volume.
Free Space(%)	Displays the percentage of disk storage available across the volume.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.
Wink Status	Shows whether the Wink function is enabled on the volume. When Wink is On, front and back panel LEDs flash on all units within the volume allowing you to quickly identify a volume in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select a volume.
Create Volume (button)	Click to create a volume. If a volume already exists, this button will be disabled.
Delete Volume (button)	Click to delete a volume.
Wink on (button)	Click to change the wink status of all the units in the selected volume to On.
Wink off (button)	Click to change the wink status of all the units in the selected unit to Off.
Select All (button)	Click to select the volume.
Clear (button)	Click to deselect the volume.

For Groups, you can view the following.

Group ID	Displays a numeric identifier for the group within the cluster.
Volume ID	Displays a numeric identifier for the volume associated with the group.
#ContentServers	Displays the number of ContentServers across the group.
Total Disk Space	Displays the total disk space across the group.
Free Space(%)	Displays the free disk space available across the group.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.

Wink Status	Shows whether the Wink function is enabled for the group. When Wink is On, front and back panel LEDs flash on all units within the group allowing you to quickly identify a group in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Select	Click the **Select** check box to select a group.
Create Group (button)	Click to create a group. If a volume already exists, this button will be disabled.
Delete Group (button)	Click to delete a group.
Shut Down Group (button)	Click to shut down the selected group of ContentServers. Note that this does not completely power down the ContentServers.
Wink on/off (buttons)	Click to change the wink status of all the units in the selected group.
Select All (button)	Click to select all groups.
Clear (button)	Click to deselect all groups.

Related information

Viewing statistics for clients in Clusters
Editing the slice size configuration file
Editing the ContentServer configuration file
Enabling and configuring scheduled balancing
Editing the configuration file for a ContentBridge with Harmonic MediaGrid ContentBridge software 5.0 or later
Enabling and configuring log forwarding
Creating or deleting a volume
Creating or deleting groups
Powering down a Harmonic MediaGrid system

Viewing properties for a single volume

You can view properties for a single volume

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** section, click the **Name** hyperlink of the cluster which contains the required volume.
3. Scroll down the page to the **Volumes** section and click the name hyperlink for the required volume ID to access the Properties page. The following figure shows a sample **Volume Properties** page.

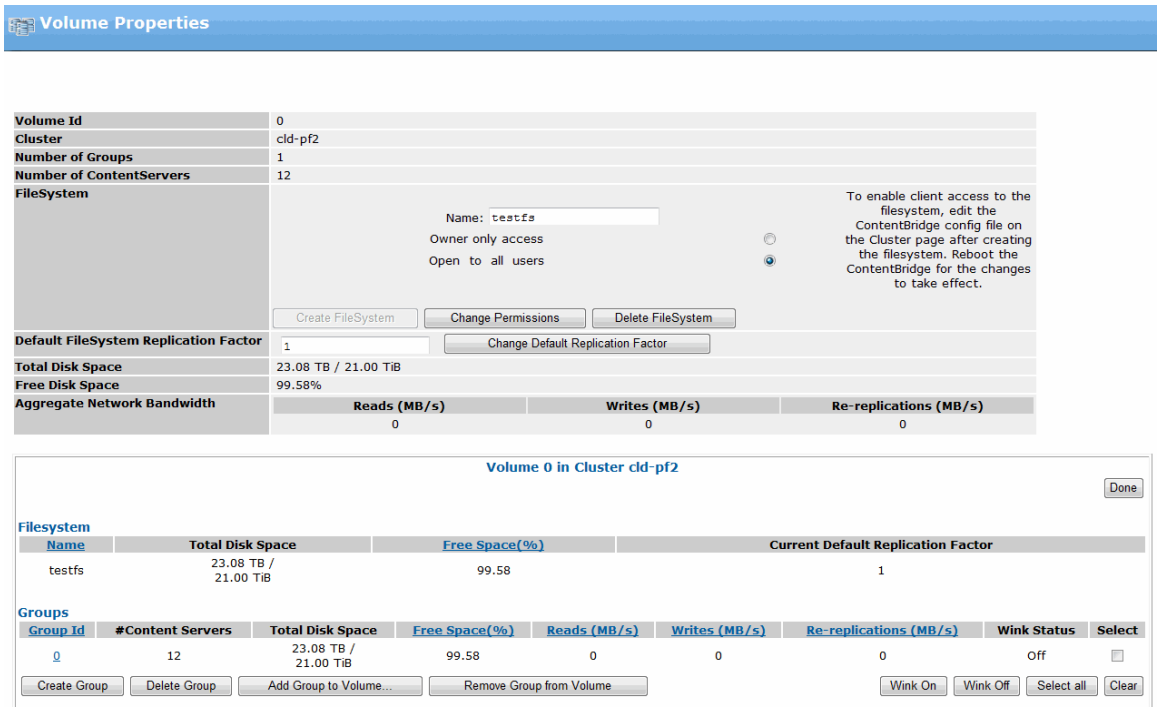


Figure 13-7: Volume Properties

Properties for a single volume

The **Volume Properties** page includes detailed information about a volume.

Volume ID	Displays a numeric identifier for the volume within the cluster.
Cluster	Displays the cluster to which the volume is assigned.
Number of Groups	Displays the number of groups assigned to the volume.
Number of ContentServers	Displays the number of ContentServers associated with the volume.
FileSystem	Displays the File System associated with the volume. In this section, you can create a file system, change permissions to an existing file system, or delete a file system.
Default FileSystem Replication Factor	Displays the default replication factor for all File Systems within the volume. The default replication factor is three.
Total Disk Space	Displays the total disk space in TB across the volume.
Free Space	Displays the percentage of free disk space available across the volume.

- **Aggregate Network Bandwidth**
  - **Reads (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive requests sent to the ContentServers in the volume.
  - **Writes (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive requests received by the ContentServers in the volume.

- **Re-replications (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for re-replication requests received by the ContentServers in the volume.

Volumes

In the **Volume** section you can view information pertaining to elements associated with the volume.

For **File Systems**, you can view the following properties.

Name	Displays the name of the File System.
Total Disk Space	Displays the total disk space available for the File System.
Free Space(%)	Displays the free disk space available for the File System.
Current Default Replication Factor	Displays the currently configured default File System replication factor.

Groups

For Groups, you can view the following properties.

Group ID	Displays a numeric identifier for the group within the volume.
#ContentServers	Displays the number of ContentServers across the group.
Total Disk Space	Displays the total disk space across the group.
Free Space(%)	Displays the free disk space available across the group.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the group.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the group.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the group.
Wink Status	Shows whether the Wink function is enabled for the group. When Wink is On, front and back panel LEDs flash on all units within the group allowing you to quickly identify a group in a rack. Click the **Wink** buttons at the end of the section to turn Wink On/Off.
Select	Check the **Select** check box to select a group.
Create Group (button)	Click to create a new group in this volume.
Delete Group (button)	Click to delete the selected group(s).
Add Group to Volume... (button)	Click to attach the selected groups to this volume. If the selected group is already attached to a volume, a message will appear indicating that you must either create a new group, or free the selected group from its volume.
Remove Group from Volume (button)	Click to remove the selected groups from the volume.

Delete Group (button)	Click to delete the selected groups.
Wink on/off (buttons)	Click to change the wink status of all the units in the group.
Select all (button)	Click to select all the groups in the volume.
Clear (button)	Click to deselect all groups.

ContentServer

For ContentServers you can view the following properties.

Name	Displays the assigned name for each device. Note that for the ContentServer 3000 or 4000 series, ContentServer names begin with S and ContentStore names begin with J. Click on the hyperlink to access the Properties page for the unit.
IP Address 1	Displays one of the Server's IP addresses.
IP Address 2	Displays one of the Server's IP addresses.
Network Status	Displays the unit's current network status, such as "Connected," "Not Responding," "Error," "Deleted," or "Starting Upgrade."
Total Disk Space	Displays the Total Disk Space for each ContentServer.
Free Space(%)	Displays the free disk space available in the ContentServer and as a percentage of Total Disk Space in each ContentServer.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer.
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.
Group	Displays the group number to which the ContentServer is assigned.
CS ID	Displays the ID number assigned to the ContentServer.
CS Status	Displays the ContentServer's current status, such as "No Cluster," "Initializing," "OK," "Degraded," "Storage Failure," "ReadOnly," "Evacuating," or "Evacuated."
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a unit in a rack. Click the Wink buttons at the end of the section to turn Wink On/Off.
Wink on/off (buttons)	Click to change the wink status of all the ContentServers in the group.
Select all (button)	Click to select all the ContentServers in the volume.
Clear (button)	Click to deselect all ContentServers.

Related information

Creating or deleting file systems from a volume
Setting or changing file system permissions
Setting replication factors for file systems

About ContentServer and Cluster bandwidth measurements

Viewing properties for a single group

You can view properties for a single Harmonic MediaGrid group.

1. Click the **Servers & Switches** icon on the Configuration tab to access the **Servers & Switches** page.
2. In the **Clusters** section, click the **Name** hyperlink of the cluster which contains the required group.
3. Scroll down the page to the **Groups** section and click the name hyperlink for the required Group ID to access the **Properties** page. The following figure shows a sample **Group Properties** page.

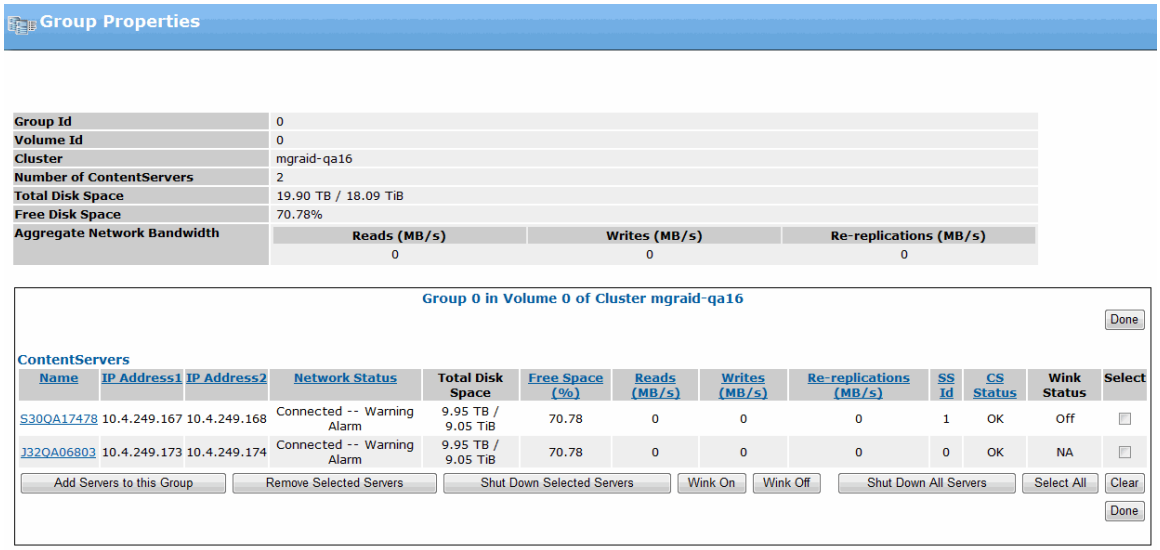


Figure 13-8: Group Properties

Properties for a single group

The Group Properties page includes detailed information about a group.

Group ID — Displays a numeric identifier for the group within the volume.

Volume ID — Displays a numeric identifier for the Volume associated with the group.

Cluster — Displays the cluster to which this group belongs.

Number of ContentServers — Displays the number of ContentServers across the group.

Total Disk Space — Displays the total disk space across the group.

Free Disk Space — Displays the percentage of free disk space available across the group.

- **Aggregate Network Bandwidth:**
  - **Reads (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive requests sent to the ContentServers in the group.
  - **Writes (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive requests received by the ContentServers in the group.

- **Re-replications (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for re-replication requests received by the ContentServers in the group.

ContentServers

In the **ContentServers** section you can view information pertaining to ContentServers within the group as follows.

Name	Displays the assigned name for each device. Note that for the ContentServer 3000 or 4000 series, ContentServer names begin with S and ContentStore names begin with J. Click on the hyperlink to access the Properties page for the unit.
IP Address 1	Displays one of the Server's IP addresses.
IP Address 2	Displays one of the Server's IP addresses.
Network Status	Displays the unit's current network status, such as "Connected," "Not Responding," "Error," "Deleted," or "Starting Upgrade."
Total Disk Space	Displays the Total Disk Space for each ContentServer.
Free Space(%)	Displays the free disk space available in the ContentServer and as a percentage of Total Disk Space in each ContentServer.
Reads (MB/s)	Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer. .
Writes (MB/s)	Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Re-replications (MB/s)	Displays bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.
CS ID	Displays the ID number assigned to the ContentServer.
CS Status	Displays the ContentServer's current status, such as "No Cluster," "Initializing," "OK," "Degraded," "Storage Failure," "ReadOnly," "Evacuating," or "Evacuated."
Wink Status	Shows whether the Wink function is enabled on the unit. When Wink is On, front and back panel LEDs flash allowing you to quickly identify a ContentServer in a group. Click the Wink buttons at the end of the section to turn Wink On/Off.
Add Servers to this Group (button)	click to add a ContentServer to this Group.
Remove Selected Servers (button)	click to remove a ContentServer from this Group.
Shut Down Selected Servers (button)	click to shut down one or more selected ContentServers from this Group. Note that this does not completely power down the ContentServer.
Wink on/off (buttons)	Click to change the wink status of all the ContentServers in the group.
Shut Down All Servers (button)	click to shut down all ContentServers in this Group. Note that this does not completely power down the ContentServer.

Select All (button)	Click to select all the ContentServers in the group.
Clear (button)	Click to deselect all ContentServers in the group.

Related information

About ContentServer and Cluster bandwidth measurements
Adding or removing ContentServers from a group
Powering down a Harmonic MediaGrid system

Viewing properties for a single ContentServer 2000 series

You can view properties for an individual ContentServer 2000 series.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required server to access the **Properties** page. The following figure shows a portion of a **ContentServer Properties** page.

Properties for ContentServer 2000 series

The properties for a single ContentServer 2000 series are defined here.

In the **General Information** section, you can view the following.

Name	Displays the assigned name for the unit. Refer to the *Harmonic MediaGrid Installation Guide* for a discussion about naming conventions to follow.
System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds.
ContentServer ID	Displays the ID number assigned to the ContentServer.
Serial Number	Displays the manufacturer's serial number assigned to the unit.
Cluster	Displays the Cluster name to which the unit is assigned.
Volume	Displays the volume to which the unit is assigned.
Group	Displays the group to which the ContentServer is assigned.
Interface Information displays the following	• **Interface**: Displays the available interfaces for the unit. • **IP Address**: Displays the IP address assigned to each unit's interface. • **MAC Address**: Displays the unique hardware number for each unit's interface. • **MTU**: Shows the maximum size of Ethernet packets. An MTU greater than 1500 bytes indicates that Jumbo Frames are enabled.
Interface Statistics, Transfer Rate	Shows the receive and transmit rate for each interface.
Interface Counters (since agent boot)	Shows the raw interface counters since the SNMP agent was last booted.

Aggregate Network Bandwidth displays the following	• **Reads (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive "read" requests received by the ContentServer. • **Writes (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer. • **Re-replications (MB/s)**: Displays aggregate bandwidth usage in megabytes per second for re-replication requests received by the ContentServer.
Process Monitoring	Displays the name and state of the process running on the ContentServer.
Hardware Model	Displays the unit's model number.
Firmware Version	Displays the version of firmware that resides in the unit's memory.
Status	Displays the current network status for the selected unit. This field is used primarily for diagnostic troubleshooting.
Status Current At	Displays the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
Total Disk Space	Displays the Total Disk Space available on the unit.
Free Disk Space	Displays the amount of free disk space available on the unit.
Number of Disks	Displays the total number of disk drives available in the ContentServer.
Number of Slots	Displays the total number of disk drive slots available in the ContentServer.
CPU Load Average	Displays the system load averages for the past 1, 5, and 15 minutes on the unit.
Memory Utilization	Displays the total real memory, the available real memory, and the percentage of total free memory for the unit.
ContentServer Description	Displays a scrollable multi-line description of the unit. This field is useful for entering data that clarifies the specific unit's role in the Harmonic MediaGrid. Click **Change Desc** to edit the description.
Last Message	Displays the last message (of any type) associated with the unit.
Wink State	Displays the wink state of the unit's light bar, either On or Off. To change the Wink state, click the **Wink** button on this page.
	In the **Environment** section, you can view the following.
Power Supply	Describes the state of the indicated power supply. • **NORMAL** = the power supply is OK • **ABSENT** = the power supply is not delivering power, or is not plugged in. • **FAILED** = the power supply has a hardware fault and is broken.
3.3V Line through 12.0V Line	Displays the combined voltages present on the power supply's outputs. The values are displayed in volts. The valid range is also displayed. Note that this range is not user configurable.
CPU Temperature	Displays the ambient temperature of air entering the ContentServer. The value is always displayed in degrees centigrade. The valid range is also displayed. Note that this range is not user configurable.

Motherboard Temperature	Displays the temperature of the air above the ContentServer's motherboard. The value is always displayed in degrees centigrade. The valid range is also displayed. Note that this range is not user configurable.
Fan 1 through Fan 8	Displays the speed (in RPM) of each of the ContentServer's fans. The valid range is also displayed. Note that this range is not user configurable.
Wink on/off (button)	Click the Wink button to change the wink state of the ContentServer light bar.
Reboot (button)	Click to restart the ContentServer without removing the power supply. .
Shutdown (button)	Click to shut down the ContentServer. Note that this does not completely power down the ContentServer.
	In the **Drive Information** section, you can view the following.
Slot	Displays the slot ID, which is the numeric identifier that represents the physical position for each disk drive in the ContentServer.
Drive Inserted	Displays whether a drive is present in a slot, either Yes, or No.
Serial #	Displays the manufacturer’s serial number for each disk drive in the ContentServer.
Model	Displays the manufacturer’s model number for each disk drive.
FwRev	Displays the firmware level within this drive of a ContentServer. This information is used primarily for debugging purposes.
Total Space	Displays the total space available for each drive in the ContentServer.
Total Used	Displays the total disk space in use for each disk drive in the ContentServer
Drive Status	Displays the current operational status for each disk drive in the ContentServer.
SMART Errors	Displays the number of SMART errors associated with each disk drive.
Total Slice	Displays the total number of slices in each disk drive.
Bad Slices	Displays the number of bad slices for each drive in a ContentServer. **NOTE:** When the data integrity of a slice is compromised, it is considered a "bad slice." This could be due to corruption in data content, missing data, or if the slice size is different from expected value.In the unlikely event that the number of bad slices is greater than 15 per SystemManager polling loop, or greater than 128 per disk drive, an alarm will be generated.
Select all (button)	Click to select that disk drive.
Clear (button)	Click to clear all selections.
	The Events section for ContentDirectors, ContentServers, and ContentBridges displays the following information when an alarm event occurs:
Level	Displays the assigned severity level for an alarm event associated with a unit.
Time	Displays the date and time when the alarm event occurred.
Event	Displays the event which triggered the alarm on the unit.
Info	Provides information on each event.

Clear? (button)	Displays when the unit has an alarm condition. Resolve the cause of the alarm condition and then click Clear to clear the alarm within the unit.
Delete (button)	Displays when the unit has an alarm condition. Click Delete to delete the event from the list and clear that event's Alarm icon.

Related information

Powering down a Harmonic MediaGrid system

About ContentServer and Cluster bandwidth measurements

Viewing properties for a single ContentServer 3000 or 4000 series unit

You can view properties for a ContentServer 3000 or 4000 unit.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer to access the **Properties** page. The following figure shows a portion of a **ContentServer Properties** page.

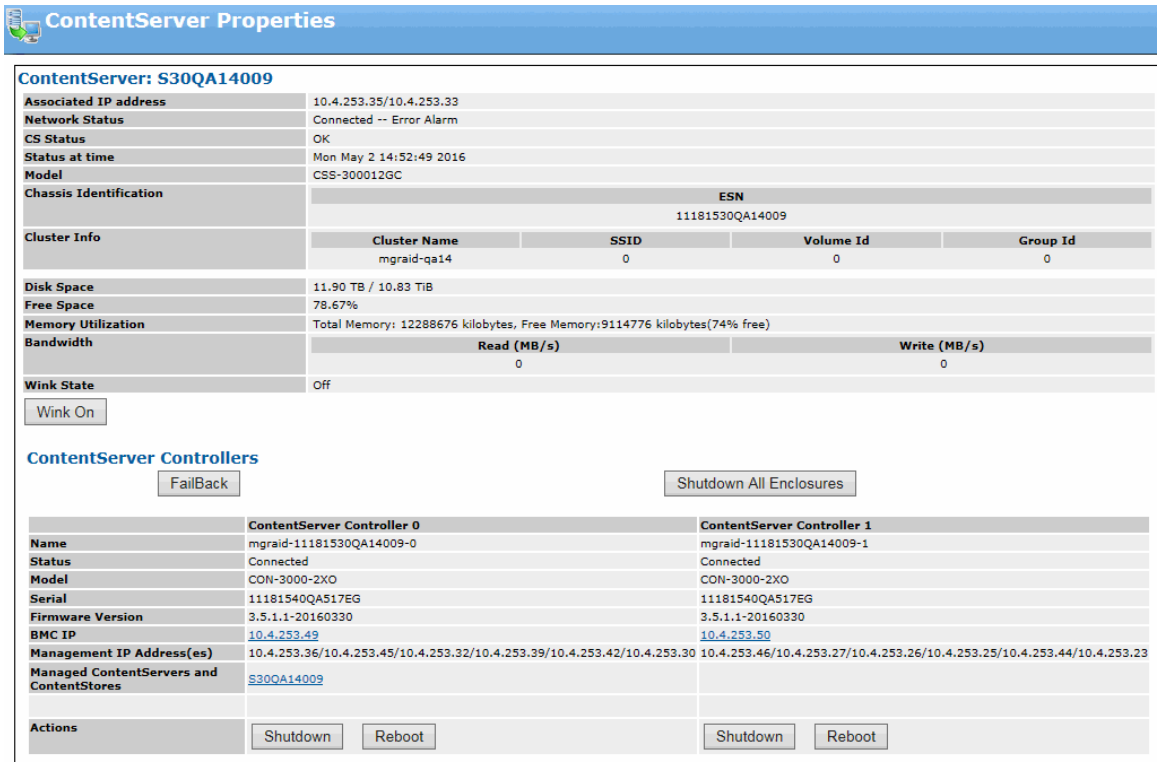


Figure 13-9: ContentServer 3000 Properties

Properties for a ContentServer 3000 and 4000 series unit

The properties for a single ContentServer 3000 or 4000 series unit are defined here.

Associated IP address	Displays the IP addresses of the slice server process in an active state for this ContentServer.
Network Status	Shows the connection status of the ContentServer. Possible states include: Connected and Not Connected.
CS Status	Displays the Server's current status within the cluster, including "No Cluster," "Initializing," "OK," "Degraded," "Storage Failure," "ReadOnly," "Evacuating," or "Evacuated."
Status current at	Shows the day/time that applies to the status.
Model	Displays the manufacturer's model number for this unit.
Chassis Identification	**ESN**: The ESN (Enclosure Serial Number) applies to the ContentServer chassis and can be found on the rear panel of the chassis.
Cluster Info	Displays information about the cluster, including: • **Cluster Name**: Displays the Cluster name to which the unit is assigned. • **SSID**: Displays the numeric identifier for this ContentServer • **Volume Id**: Displays a numeric identifier for the group within the volume • **Group Id**: Displays a numeric identifier for the group within the volume
Disk Space	Displays total disk space on the ContentServer.
Free Space	Displays percentage of free space on the ContentServer.
Memory Utilization	Displays the memory use for the unit.
Bandwidth	Displays information about the bandwidth, including: • **Reads (MB/s):** Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentServer. • **Writes (MB/s):** Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentServer.
Wink State	Displays the Wink state of the unit.
Shelf Evacuation	If the ContentServer is in the process of shelf evacuation or if writes have been disabled on the ContentServer, this section appears. • **Write Enable:** Click to enable writes on the ContentServer. • **Cancel Evacuation:** Click to cancel the shelf evacuation process.
Wink On/Off (button)	Click to change the wink state of the unit's light bar. In the **ContentServer Controllers** section, the following are shown for each controller: **NOTE:** When facing the rear panel of the ContentServer, Controller 0 is on the left-hand side and Controller 1 is on the right.
Failback (button)	Click to balance slice server processes across controllers.

Shutdown All Enclosures (button)	Click to shutdown both controllers on the ContentServer. Note that this also shuts down all managed ContentStores or ContentServers.
Name	Displays the factory default name for the controller.
Status	Displays the connection status for the controller.
Model	Displays the model number for the controller.
Serial	Displays the serial number for the controller
Firmware Version	Displays the version of firmware installed on the controller.
BMC IP	IP address of the BMC for this controller. The BMC is used by Harmonic technical support for troubleshooting purposes only. **NOTE:** The BMC IP address uses the NIC 0 connector.
Management IP Addresses	Displays the IP addresses that correspond to the indicated controller.
Managed ContentServers and ContentStores	Displays a link to the ContentServer and ContentStores being managed by this controller. **NOTE:** If this field shows many more ContentStores or ContentServers being managed by one controller than the other, it may indicate that the system needs to be balanced. Refer to *Balancing the ContentServer controllers*.
Actions	Click the appropriate button for the controller: • **Shutdown** (button): Click to power down the controller. • **Reboot** (button): Click to reboot the controller.

In the **RAID Sets** section:

RAID Sets

Name	GUID	Type	Status	Select
RaidSet147352	813ca3aa-3571a206	(2+1)	Normal , Online	
RaidSet147353	88d8e93c-8ee74e81	(2+1)	Normal , Online	
RaidSet147357	89f8bb73-88946869	(2+1)	Normal , Online	
RaidSet147358	8e219c9c-88077619	(2+1)	Normal , Online	
RaidSet147360	8e2f3366-c2b2ec67	(2+1)	Normal , Online	

Set Offline | Set Online | Destroy | Select All | Clear

Figure 13-10: ContentServer 3000 Properties—RAID Sets

Name	Displays the name of the RAID set.
GUID	Displays the numeric identifier for the RAID set. Click this link to open the RAID Utilities page this RAID set.
Type	Displays the RAID configuration for the corresponding RAID set.
Status	Displays the status of the RAID set. The status may include the following: • **Normal**: The RAID set is usable and all drives are available. • **Compromised**: The RAID set is usable but one or two of the parity drives may be missing or not responding.

	• **Not Viable**: The RAID set is not usable due to missing drives or drives not responding. • **Online**: The RAID set is online and you may access the drives. • **Offline**. The RAID set is offline and you cannot access the drives.
Select	Click to select a RAID set.
Set Offline (button)	Click to take the selected RAID set offline, in which case the data on the drives will not be accessible.
Set Online (button)	Click to move the selected RAID set online, in which case the data on the drives will be accessible.
Destroy (button)	Click to delete a selected RAID set. Before destroying a RAID set, you must first take the RAID set offline by clicking **Set Offline**. **NOTE:** Clicking **Destroy** will destroy all data in a RAID set.
Select All	Click to select all RAID sets.
Clear	Click to clear the selections.

In the **Drives** section, you can view the following.

Slot	Displays the ContentServer slot number for each drive.
GUID	Displays the numeric identifier for the disk drive. Click this link to open the **Drive Properties** page for this drive.
Model	Displays the drive model number.
Fw Version	Displays the drive firmware.
Status	Displays the drive status. The status may indicate one of the following: • **Alive**: The drive is available. • **Dead**: The drive is not responding. • **Missing**: The drive is not part of the system. • **Unavailable**: The drive is not currently available. • **Formatting**: The drive is being formatted. • **Repairing**: The drive is being repaired. • **Unknown**: SystemManager cannot identify the drive state. • **Alive, Hot Spare**: The drive is available and assigned as a Hot Spare.
RAID set	Displays the GUID for the associated RAID set. Click this link to open the RAID Utilities page for the associated RAID set. If the drive is not assigned to a RAID set, this column will display, “Unraided.”
Select	Click to select a drive.
Create RAID Set	Click to open the Create RAID Set page where you can manually create a RAID set.
Auto Create RAID Set	Click to open the Auto Create RAID set page and use the Auto Create utility to create a RAID set.
Wink On	Click to wink the selected drives.
Wink Off	Click to stop winking the selected drives.

Fail Drives	Click to remove the selected drives from the RAID set.
Unfail Drives	Click to make the selected drives available to be used in a RAID set.
Select All	Click to select all drives.
Clear	Click to clear the selections.

In the **Environment** section, you can view environmental details for each controller.

Back Fan 1-3 and Front Fan 1-3	Displays the speed (in RPM) of each of the controller's fans.
Back Temp - UmemTemp2	Display the temperature of the air at different locations above the controller motherboard.
Temperature Status	**CPU1-2**: Displays the temperature status of the two CPUs: • **NORMAL**: Normal temperature • **ABOVE_NORM**: Above normal temperature. • **HOT**: Temperature is critically hot • **OVERHEATED**: CPU is overheated.
Power Supply Status	PS Status 1-2: Displays the status of the of the two power supplies. **NOTE:** The status may include any combination of the following states other than OK. • **OK**: Power status is OK. • **FAILED**: Power has failed. • **OVERVOLT**: Over-voltage. • **UNDERVOLT**: Under-voltage. • **OVERCURR**: Over-current. • **INPUTERR**: Under-current. • **CONFIGERR**: Configuration error.
Battery ChargeUmemCharge 0-2	: Displays the percentage of available charge for each of the batteries on the NVRAM card.
VoltagesCPU1Vcore through UmemVolt 2:	Displays the voltages of the various components on the controller. The values are displayed in volts.

Related information

About ContentServer and Cluster bandwidth measurements
Shelf evacuation for a Harmonic MediaGrid RAID system
Balancing the ContentServer 3000 or 4000 controllers
Viewing RAID set information
Supported RAID configurations
Creating a RAID set
Creating a RAID set with Auto Create
Viewing drive properties

Viewing properties for a single ContentStore 3160 or 4240

You can view properties for a ContentStore 3160 or a 4240.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentStore to access the **Properties** page. The following figure shows a portion of a **ContentStore Properties** page.

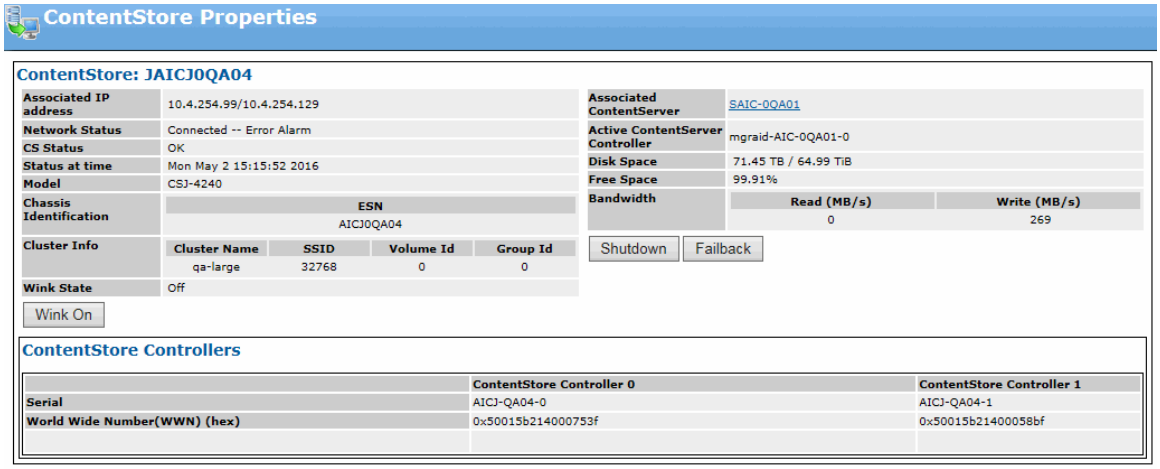


Figure 13-11: ContentStore Properties

Properties for ContentStore 3160 and 4240 series

The properties for a single ContentStore 3160 or 4240 series unit are defined here.

Associated IP address	Displays the IP addresses of the slice server process in an active state for the ContentServer controlling this ContentStore.
Network Status	Shows the connection status of the ContentStore.
CS Status	Displays the Server's current status within the cluster, including "No Cluster," "Initializing," "OK," "Degraded," "Storage Failure," "ReadOnly," "Evacuating," or "Evacuated."
Status at time	Shows the day/time that applies to the status.
Model	Displays the manufacturer's model number for this unit.
Chassis Identification	**ESN**: The ESN (Enclosure Serial Number) applies to the ContentStore chassis and can be found on the rear panel of the chassis.
Cluster Info	Displays information about the cluster, including: • **Cluster Name**: Displays the Cluster name to which the unit is assigned. • **SSID**: Displays the numeric identifier for this ContentStore • **Volume Id**: Displays a numeric identifier for the group within the volume • **Group Id**: Displays a numeric identifier for the group within the volume
Wink State	Displays the Wink state of the unit.

Wink On/Off (button)	Click to change the wink state of the unit's light bar.
Associated ContentServer	Displays the name of the ContentServer controlling this ContentStore. Click the link to open the Properties page for the associated ContentServer.
Active ContentServer Controller	Displays the name of the active ContentServer controller for this ContentStore.
Disk Space	Displays total disk space on the ContentStore in Terabytes.
Free Space	Displays percentage of free space on the ContentStore.
Memory Utilization	Displays the memory use for the unit.
Bandwidth	Displays information about the bandwidth, including: • **Reads (MB/s):** Displays bandwidth usage in megabytes per second for drive "read" requests sent to the ContentStore. • **Writes (MB/s):** Displays bandwidth usage in megabytes per second for drive "write" requests received by the ContentStore.
Shelf Evacuation	If the ContentStore is in the process of shelf evacuation or if writes have been disabled on the ContentStore, this section appears. • **Write Enable:** Click to enable writes on the ContentStore. • **Cancel Evacuation:** Click to cancel the shelf evacuation process.
Shutdown (button)	Click to shut down the ContentStore.
Failback (button)	Click to balance slice server processes across controllers.

In the **ContentStore Controllers** section, you can view the following:

Serial	The serial number for each ContentStore controller.
World Wide Number (WWN) (hex)	The world wide identification number for each ContentStore controller.

In the **RAID Sets** section, you can view the following:

Figure 13-12: RAID Sets section

Name	Displays the name of the RAID set.
GUID	Displays the numeric identifier for the RAID set. Click this link to open the RAID Utilities page this RAID set.
Type	Displays the RAID configuration for the corresponding RAID set.
Status	Displays the status of the RAID set. The status may include the following: • **Normal**: The RAID set is usable and all drives are available. • **Compromised**: The RAID set is usable but one or two of the parity drives may be missing or not responding.

	• **Not Viable**: The RAID set is not usable due to missing drives or drives not responding. • **Online**: The RAID set is online and you may access the drives. • **Offline**. The RAID set is offline and you cannot access the drives.
Select	Click to select a RAID set.
Set Offline (button)	Click to take the selected RAID set offline, in which case the data on the drives will not be accessible.
Set Online (button)	Click to move the selected RAID set online, in which case the data on the drives will be accessible.
Destroy (button)	Click to delete a selected RAID set. Before destroying a RAID set, you must first take the RAID set offline by clicking **Set Offline**. **CAUTION:** Clicking **Destroy** will destroy all data in a RAID set.
Select All	Click to select all RAID sets.
Clear	Click to clear the selections.

In the **Drives** section, you can view the following.

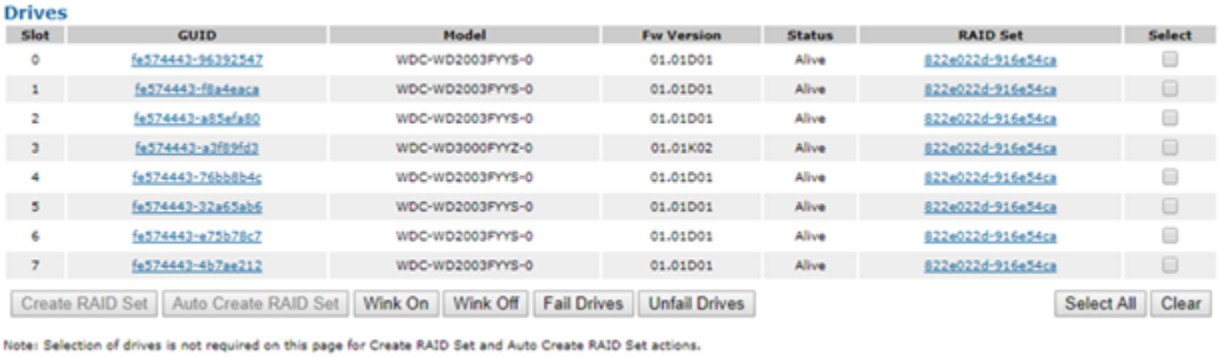


Figure 13-13: Drives section

Slot	Displays the ContentStore slot number for each drive.
GUID	Displays the numeric identifier for the disk drive. Click this link to open the Drive Properties page for this drive.
Model	Displays the drive model number.
Fw Version	Displays the drive firmware.
Status	Displays the drive status. The status may indicate one of the following: • **Alive**: The drive is available. • **Dead**: The drive is not responding. • **Missing**: The drive is not part of the system. • **Unavailable**: The drive is not currently available. • **Formatting**: The drive is being formatted. • **Repairing**: The drive is being repaired. • **Unknown**: SystemManager cannot identify the drive state.

	• **Alive, Hot Spare**: The drive is available and assigned as a Hot Spare.
RAID set	Displays the GUID for the associated RAID set. Click this link to open the RAID Utilities page for the associated RAID set.
Select	Click to select a drive.
Create RAID Set	Click to open the Create RAID Set page where you can manually create a RAID set.
Auto Create RAID Set	Click to open the Auto Create RAID set page and use the Auto Create utility to create a RAID set.
Wink On	Click to wink the selected drives.
Wink Off	Click to stop winking the selected drives.
Fail Drives	Click to remove the selected drives from the RAID set.
Unfail Drives	Click to make the selected drives available to be used in a RAID set.
Select All	Click to select all drives.
Clear	Click to clear the selections.

In the **Environment** section, you can view the following:

Figure 13-14: ContentStore Environment Data

Fans	Displays the speed (in RPM) of each of the ContentStore controller's fans.
Temperatures	Display the temperature of the air above the ContentStore controller motherboard.
Voltages	Displays the voltages of the various components on the controller. The values are displayed in volts.

Related information

About ContentServer and Cluster bandwidth measurements
Shelf evacuation for a Harmonic MediaGrid RAID system
Powering down a single ContentStore
Balancing the ContentServer 3000 or 4000 controllers
Viewing RAID set information
Supported RAID configurations

Viewing drive properties
Creating a RAID set with Auto Create
Creating a RAID set

Viewing properties for ContentStores 5840 and 5840A

The ContentStore 5840/5840A appears as two virtual devices in SystemManager. Each physical drawer is represented by a separate entry on the Servers & Switches page, and has its own Properties page.

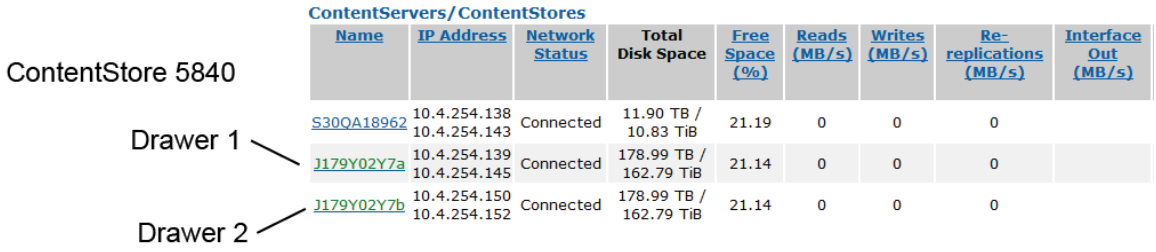


Figure 13-15: ContentStore 5840

1. From the **Configuration** tab, click the **Servers & Switches** icon in the left-hand column to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section:
   - Click the **Name** hyperlink for the *first* entry of the ContentStore 5840/5840A to access the **Properties** page for Drawer 1.
   - Click the **Name** hyperlink for the *second* entry of the ContentStore 5840/5840A to access the **Properties** page for Drawer 2.

   For each drawer, the Properties page displays the same details as described in “Viewing Properties for ContentStores 3160 or 4240.”

   NOTE: The **Shutdown** and **Failback** buttons on the Properties page apply only to the virtual device rather than the entire physical device.

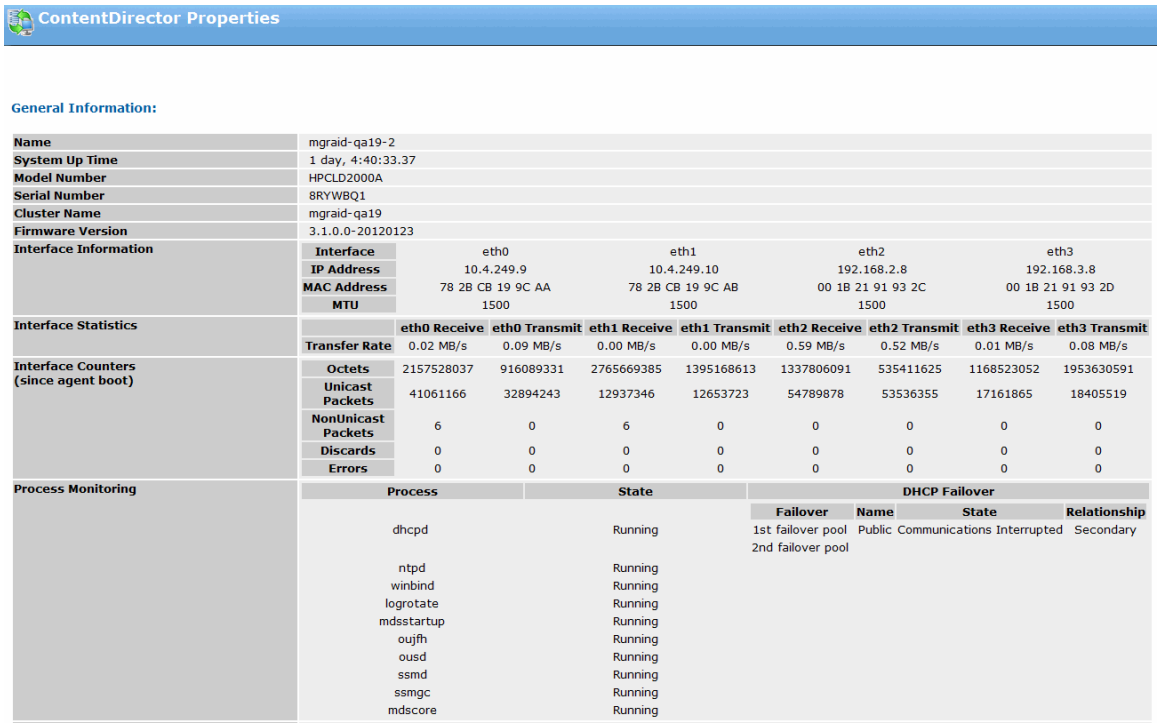
Related information

Viewing properties for a single ContentStore 3160 or 4240
Powering down a single ContentStore
Balancing the ContentServer 3000 or 4000 controllers

Viewing properties for a ContentDirector

You can view properties for a single ContentDirector:

1. From the **Configuration** tab, click the **Servers & Switches** icon in the left-hand column to access the **Servers & Switches** page.
2. In the **ContentDirectors** section, click the **Name** hyperlink for the required unit to access the **Properties** page as shown in the following figure.



ContentDirector Properties

General Information:

Name	mgraid-qa19-2
System Up Time	1 day, 4:40:33.37
Model Number	HPCLD2000A
Serial Number	8RYWBQ1
Cluster Name	mgraid-qa19
Firmware Version	3.1.0.0-20120123

Interface Information

Interface	eth0	eth1	eth2	eth3
IP Address	10.4.249.9	10.4.249.10	192.168.2.8	192.168.3.8
MAC Address	78 2B CB 19 9C AA	78 2B CB 19 9C AB	00 1B 21 91 93 2C	00 1B 21 91 93 2D
MTU	1500	1500	1500	1500

Interface Statistics

	eth0 Receive	eth0 Transmit	eth1 Receive	eth1 Transmit	eth2 Receive	eth2 Transmit	eth3 Receive	eth3 Transmit
Transfer Rate	0.02 MB/s	0.09 MB/s	0.00 MB/s	0.00 MB/s	0.59 MB/s	0.52 MB/s	0.01 MB/s	0.08 MB/s

Interface Counters (since agent boot)

Octets	2157528037	916089331	2765669385	1395168613	1337806091	535411625	1168523052	1953630591
Unicast Packets	41061166	32894243	12937346	12653723	54789878	53536355	17161865	18405519
NonUnicast Packets	6	0	6	0	0	0	0	0
Discards	0	0	0	0	0	0	0	0
Errors	0	0	0	0	0	0	0	0

Process Monitoring

Process	State
dhcpd	Running
ntpd	Running
winbind	Running
logrotate	Running
mdsstartup	Running
oujfh	Running
ousd	Running
ssmd	Running
ssmgc	Running
mdscore	Running

DHCP Failover

Failover	Name	State	Relationship
1st failover pool	Public	Communications Interrupted	Secondary
2nd failover pool			

Figure 13-16: ContentDirector Properties (Upper Section)

Properties for a ContentDirector

You can view properties for a single ContentDirector.

Name Displays the assigned name for the unit. Refer to the *Harmonic MediaGrid Installation Guide* for a discussion about naming conventions to follow.

System Up Time Displays the time the unit has been “up and running” in days, hours, minutes, seconds, and fractions of seconds.

Model Number Displays the Harmonic model number for the unit.

Serial Number Displays the manufacturer’s serial number assigned to the unit.

Cluster Name Displays the cluster name to which the unit is assigned.

Firmware Version Displays the version of firmware that resides in the unit’s memory.

- **Interface Information**
  - **Interface** Displays the available interfaces for the unit.

    NOTE: If a VLAN port is disconnected, the associated IP address will transfer to the remaining interface, which will be displayed in the following format: **eth 0:0**.
  - **IP Address**: Displays the IP address assigned to each unit’s interface.
  - **MAC Address**: Displays the unique hardware number for each unit’s interface.
  - **MTU**: Shows the maximum size of Ethernet packets. An MTU greater than 1500 bytes indicates that Jumbo Frames are enabled.

Interface Statistics, Transfer Rate

Shows the receive and transmit rate for each interface.

Interface Counters (since agent boot)

Shows the raw interface counters for each interface since the SNMP agent was last booted.

- **Process Monitoring**
  - **Process**: Displays the name of the process running on the ContentDirector.
  - **State**: Displays the current state of the process running on the ContentDirector. The states are: Running, Stopped, or N.A (Not Applicable).
  - **DHCP Failover** Identifies the failover pool.
  - **DHCP Name** Displays the name of the failover pool.
  - **DHCP State** Displays the state of the DHCP server in the first or second pool of addresses. The states are:
    - Partner Down
    - Normal
    - Communications Interrupted
    - Resolution Interrupted
    - Potential Conflict
    - Recover
    - Recover Done
    - Shutdown
    - Paused
    - Startup
    - Recover Wait
  - **DHCP Relationship** Displays the relationship of the server to the first or second pool of addresses. **Primary** indicates that the DHCP server is configured to provide primary service to the set of DHCP clients for a particular set of subnet address pools. **Secondary** indicates that the DHCP server is configured to act as backup to the primary server for a particular set of subnet address pools.
- **Local Disk Storage**
  - **FS (Partition) Name**: The name of the local file system.
  - **Total Space (KB)**: The total local storage space.
  - **Used Space (KB)**: The amount of local storage space used.
  - **Available Space (KB)**: The amount of local space available.
  - **Used %**: The percentage of local storage space used.

Status

Displays the current network status for the selected unit. This field is used primarily for diagnostic troubleshooting.

Status Current At

Displays the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.

Checkpoint History (ContentDirectors only)	Displays previous Checkpoint information and details for the next scheduled Checkpoint.
Current Checkpoint Schedule (ContentDirectors only)	Displays the configured Checkpoint schedule, if Checkpoint is enabled. Click **Change Checkpoint Schedule** to configure a new schedule. **NOTE:** The Checkpoint schedule feature is OFF by default.
Total Disk Space	Displays the Total Disk Space available on the unit.
Free Disk Space	Displays the amount of free disk space available on the unit.
RecycleBin Status	Displays the current status of the Recycle Bin on the ContentDirector. The possible values for **RB Status** are on, off, or unknown.
RecyclBin Allocated %	Displays the percentage of disk space allocated to the Recycle Bin on the ContentDirector.
CPU Load Average	Displays the system load averages for the past 1, 5, and 15 minutes on the unit.
Memory Utilization	Displays the total real memory, the available real memory, and the percentage of total free memory for the unit.
ContentDirector Description	Displays a scrollable multi-line description of the unit. This field is useful for entering data that clarifies the specific unit's role in the Harmonic MediaGrid. To change the description, click **Change Desc**.
Last Message	Displays the last message (of any type) associated with the unit.
Wink State	Displays the wink state of the unit's light bar, either On or Off. To change the Wink state, click the **Wink** button.
Wink on/off (button)	Click the Wink button to change the wink state of the ContentDirector light bar.
Reboot (button)	Click to restart the ContentDirector without removing the power supply.
Shutdown (button)	Click to shut down the ContentDirector.

The **Environment Data** section appears only for the High Performance ContentDirector and displays the following:

SSD Lifetime	Displays the percentage of wear of the solid-state drive (SSD). For a new SSD, this will be 0% and, over time, as the SSD wears out this value will increase. When the value reaches 95%, the SSD should be replaced.

The **Events** section displays the following information when an alarm event occurs:

Level	Displays the assigned severity level for an alarm event associated with a unit.
Time	Displays the date and time when the alarm event occurred.
Event	Displays the event which triggered the alarm on the unit.
Info	Provides information on each event.
Clear? (button)	Displays when the unit has an alarm condition. Resolve the cause of the alarm condition and then click **Clear** to clear the alarm within the unit.
Delete (button)	Display when the unit has an alarm condition. Click to delete the event from the list and clear that event's Alarm icon.

Related information

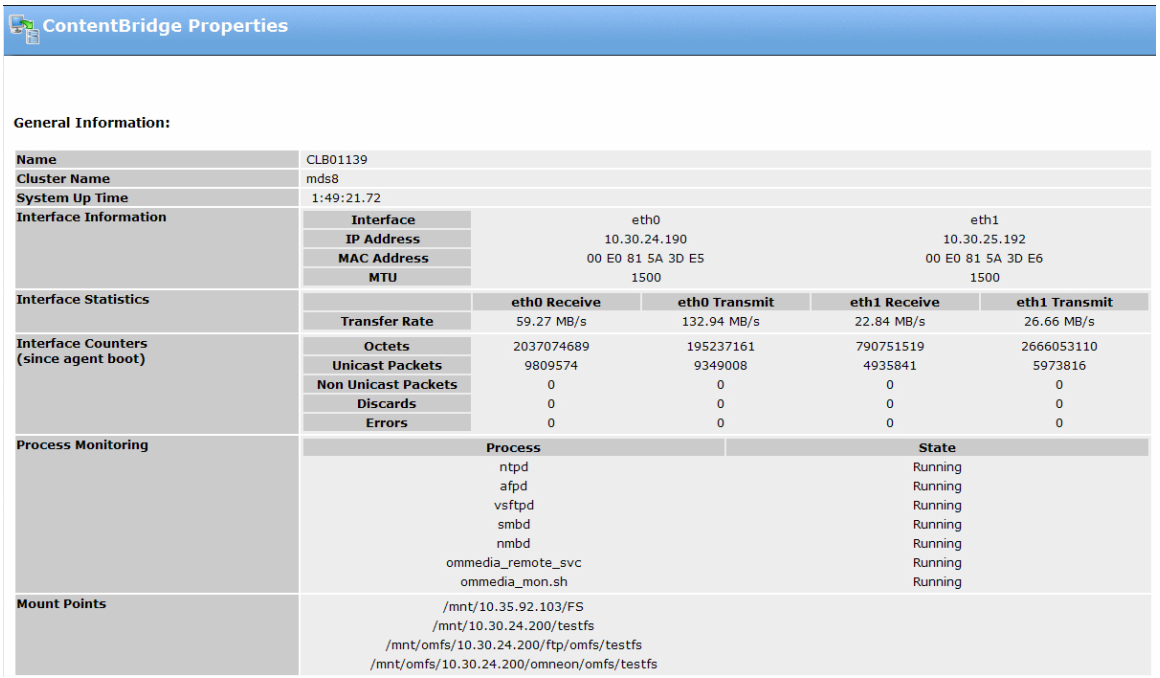
Enabling and configuring scheduled balancing

Powering down a single ContentDirector

Viewing properties for a ContentBridge

You can view properties for a single ContentBridge.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentBridges** section, click the **Name** hyperlink for the required unit to access the **Properties** page.



ContentBridge Properties

General Information:

Name	CLB01139				
Cluster Name	mds8				
System Up Time	1:49:21.72				
Interface Information	**Interface**	eth0		eth1	
	IP Address	10.30.24.190		10.30.25.192	
	MAC Address	00 E0 81 5A 3D E5		00 E0 81 5A 3D E6	
	MTU	1500		1500	
Interface Statistics		**eth0 Receive**	**eth0 Transmit**	**eth1 Receive**	**eth1 Transmit**
	Transfer Rate	59.27 MB/s	132.94 MB/s	22.84 MB/s	26.66 MB/s
Interface Counters (since agent boot)	**Octets**	2037074689	195237161	790751519	2666053110
	Unicast Packets	9809574	9349008	4935841	5973816
	Non Unicast Packets	0	0	0	0
	Discards	0	0	0	0
	Errors	0	0	0	0

Process Monitoring	**Process**	**State**
	ntpd	Running
	afpd	Running
	vsftpd	Running
	smbd	Running
	nmbd	Running
	ommedia_remote_svc	Running
	ommedia_mon.sh	Running

Mount Points
/mnt/10.35.92.103/FS
/mnt/10.30.24.200/testfs
/mnt/omfs/10.30.24.200/ftp/omfs/testfs
/mnt/omfs/10.30.24.200/omneon/omfs/testfs

Figure 13-17: ContentBridge Properties

Properties for a ContentBridge

In the **General Information** section, you can view the following information about a ContentBridge.

Name	Displays the assigned name for the unit. Refer to the *Harmonic MediaGrid Installation Guide* for a discussion about naming conventions to follow.
Cluster Name	Displays the name assigned to this cluster.
System Up Time	Displays the time the unit has been "up and running" in days, hours, minutes, seconds, and fractions of seconds. • For a ContentBridge with Harmonic MediaGrid Server software 4.x or earlier in an HA Pair only: ◦ **Shared IP**: Displays the IP address shared by the two HA-paired ContentBridges.

	◦ **Peer IP**: Displays the IP address of the second ContentBridge in the HA pair. ◦ **HA State**: Displays either **active** or **shadow**. If network connectivity, power, or an essential process fails on the "active" node, the "shadow" node then becomes "active" and takes over operations. ◦ **Preferred**: Displays the name of the HA-paired ContentBridge configured as the Preferred node. If both nodes in an HA pair fail, in the event of recovery, the preferred node becomes the "active" node first in order to avoid conflicts resulting from two active nodes. • **Interface Information** ◦ **Interface** Displays the available interfaces for the unit. ◦ **IP Address** Displays the IP address assigned to each unit's interface. ◦ **MAC Address** Displays the unique hardware number for each unit's interface. ◦ **MTU** Shows the maximum size of Ethernet packets. An MTU greater than 1500 bytes indicates that Jumbo Frames are enabled.
Interface Statistics, Transfer Rate	Shows the receive and transmit rate for each interface.
Interface Counters (since agent boot)	Shows the raw interface counters for each interface since the SNMP agent was last booted.
	• **Process Monitoring** ◦ **Process**: Displays the name of the process running on the ContentBridge. ◦ **State**: Displays the current state of the process. The states are: Running, Stopped, or N.A (Not Applicable).
Mount Points	Displays the physical location in the directory structure where a computer puts the files in a File System.
Status	Displays the current status of the process. States include Connected, Connected -- Error Alarm, Connected -- Warning Alarm, or Not Responding.
Model Number	Displays the Harmonic model number for the unit.
Serial Number	Displays the manufacturer’s serial number assigned to the unit.
CPU Load Average	Displays the system load averages for the past 1, 5, and 15 minutes on the unit.
Memory Utilization	Displays the total real memory, the available real memory, and the percentage of total free memory for the unit.
Firmware Version	Displays the version of firmware that resides in the unit's memory.
Status Current At	Displays the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
ContentBridge Description	Displays a scrollable multi-line description of the unit. This field is useful for entering data that identifies the specific unit's role in the Harmonic MediaGrid. Click **Change Desc** to edit the description.
Last Message	Displays the last message (of any type) associated with the unit.

Wink State	Displays the wink state of the unit's light bar, either On or Off.
	In the **Environment** section of the page, you can view the following.
3.3V Line through 5.0V Line	Displays the combined voltages present on the power supply's outputs. The values are displayed in volts. The valid range is also displayed. Note that this range is not user configurable and voltage lines vary according across ContentBridge models.
CPU Temperature	Displays the ambient temperature of air entering the ContentBridge. The value is always displayed in degrees centigrade. The valid range is also displayed. Note that this range is not user configurable.
Motherboard Temperature	Displays the temperature of the air above the ContentBridge's motherboard. The value is always displayed in degrees centigrade. The valid range is also displayed. Note that this range is not user configurable.
Fan 1 through Fan 6	Displays the speed (in RPM) of each of the ContentBridge’s fans. The valid range is also displayed. Note that this range is not user configurable.
SMART Errors	Displays the number of SMART Errors associated with each disk drive.
Wink on/off (button)	Click the **Wink** button to change the wink state of the ContentBridge light bar.
Reboot (button)	Click to restart the ContentBridge without removing the power supply.
Shutdown (button)	Click to shut down the ContentBridge.
	The **Events** section displays the following information when an alarm event occurs:
Level	Displays the assigned severity level for an alarm event associated with a unit.
Time	Displays the date and time when the alarm event occurred.
Event	Displays the event which triggered the alarm on the unit.
Info	Provides information on each event.
Clear? (button)	Displays when the unit has an alarm condition. Resolve the cause of the alarm condition and then click Clear to clear the alarm within the unit.
Delete (button)	Display when the unit has an alarm condition. Click to delete the event from the list and clear that event's Alarm icon.

Viewing properties for a network switch

You can view properties for a single network switch.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Network Switches** sections, click the **IP Address** hyperlink for the required unit to access the **Properties** page.

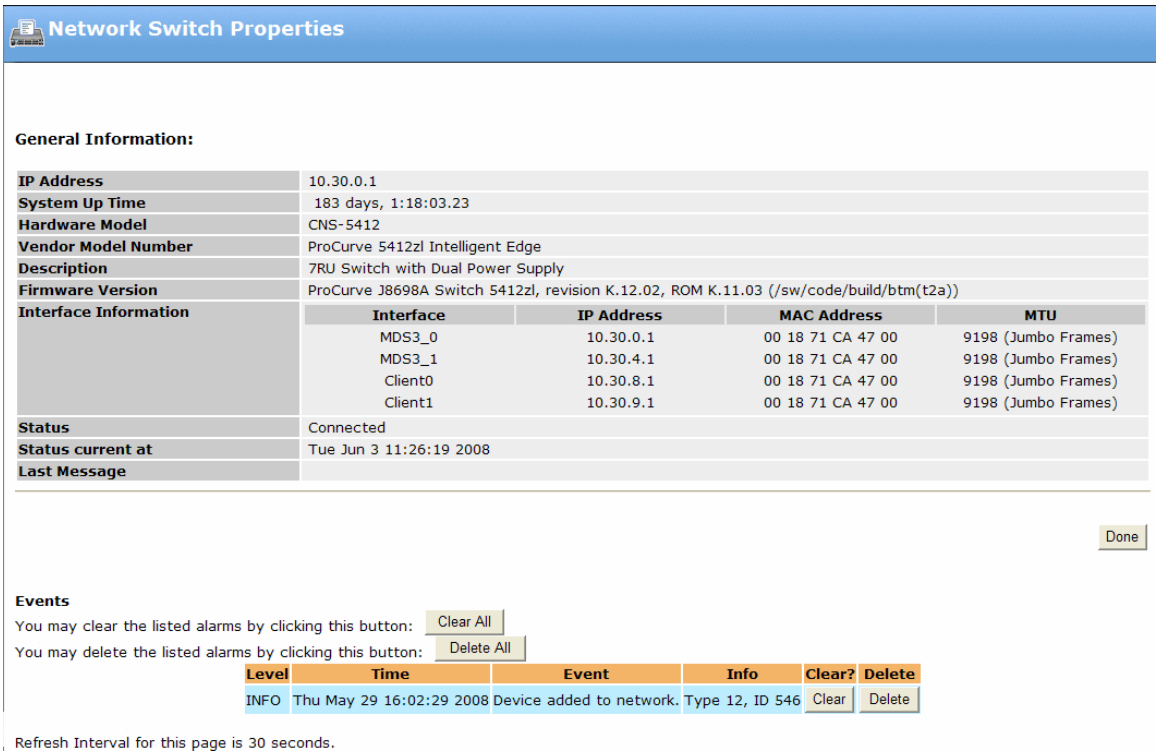


Figure 13-18: Network Switch Properties

Properties for a network switch

You can view properties for a single network switch.

In the **General Information** section, you can view the following.

Name — Displays the assigned name for the unit. Refer to the *Harmonic MediaGrid Installation Guide* for a discussion about naming conventions to follow.

IP Address — Shows the assigned IP address for the unit.

System Up Time — Displays the time the unit has been “up and running” in days, hours, minutes, seconds, and fractions of seconds.

Hardware Model — Displays the unit’s model number.

Vendor Model Number — Displays the vendor name and model number.

Description — Displays a scrollable multi-line description of the unit. This field is useful for entering data that clarifies the specific unit’s role in the Harmonic MediaGrid.

Firmware Version — Displays the version of firmware that resides in the unit’s memory.

- **Interface Information**
  - **Interface**: Displays the available interfaces for the unit.
  - **IP Address**: Displays the IP address assigned to each unit’s interface.
  - **MAC Address**: Displays the unique hardware number for each unit’s interface.

	◦ **MTU** Shows the maximum size of Ethernet packets. An MTU greater than 1500 bytes indicates that Jumbo Frames are enabled.
Status	Displays the current network status for the selected unit. This field is used primarily for diagnostic troubleshooting.
Status Current At	Displays the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
Last Message	Displays the last message (of any type) associated with the unit.
	The Events section displays the following information when an alarm event occurs.
Level	Displays the assigned severity level for an alarm event associated with a unit.
Time	Displays the date and time when the alarm event occurred.
Event	Displays the event which triggered the alarm on the unit.
Info	Provides information on each event.
Clear? (button)	Displays when the unit has an alarm condition. Resolve the cause of the alarm condition and then click Clear to clear the alarm within the unit.
Delete (button)	Display when the unit has an alarm condition. Click to delete the event from the list and clear that event's Alarm icon.

Viewing statistics for clients in Clusters

You can view statistics for all clients in a cluster.

The **Client Statistics** page enables the SystemManager to list all clients connected to a Harmonic MediaGrid, and provides a snapshot of the current bandwidth usage on a per-client basis.

NOTE: Client Statistics shows metrics over a variable time interval. The default time interval is two minutes, and the metrics show the rates over that period only. In some situations, the general monitoring loop may be longer, which could make Client Statistics cover four minutes or longer. This can occur in large Harmonic MediaGrid systems with many down devices.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **Clusters** sections, click the **Name** hyperlink for the required cluster to access the **Properties** page.
3. Click **View Client Statistics** to access the **Client Statistics** page, a sample is displayed in the following figure.

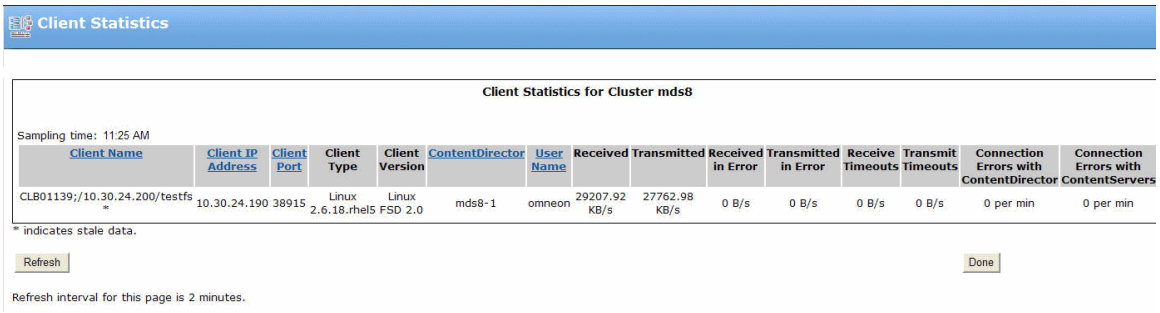


Figure 13-19: Client Statistics

Client statistics

You can view data for all clients connected to all ContentServers in a cluster.

Client Name	Shows the name assigned to the client.
Client IP Address	Shows the IP address of the client communicating with the ContentDirector.
Client Port	Shows the client's source port. This field is filled in by the ContentDirector (by querying the RPC transport for the client's source port).
Client Type	Shows the OS type running on the client.
Client Version	Shows the OS version running on the client.
ContentDirector	Shows the name of the ContentDirector.
User Name	Shows the name of the user authenticated with this session.
	The remaining fields show the delta values for the last five minutes of sampling.
Received	Shows the data received from the client.
Transmitted	Shows the data transmitted to the client.
Received in Error	Shows the number of bytes received which contained an error.
Transmitted in Error	Shows the number of bytes transmitted which contained an error.
Transmit Timeouts	Shows the number of timeouts which occurred.
Connection Errors with ContentDirector	Shows the number of connection errors during the connection process.
Connection Errors with ContentServer	Shows the number of connection errors during the connection process.

Viewing drive properties

On the **Drive Properties** page for a ContentServer or ContentStore drive, you can view general information about a specific drive as well as perform drive-related tasks.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.

2. In the **ContentServers/ContentStores** section, click the **Name** hyperlink for the required ContentServer or ContentStore to access the **Properties** page.
3. In the **Drives** section of the page, identify the drive you wish to view and then click the link in the **GUID** column. This opens the **Drive Properties** page, shown in the following figure.

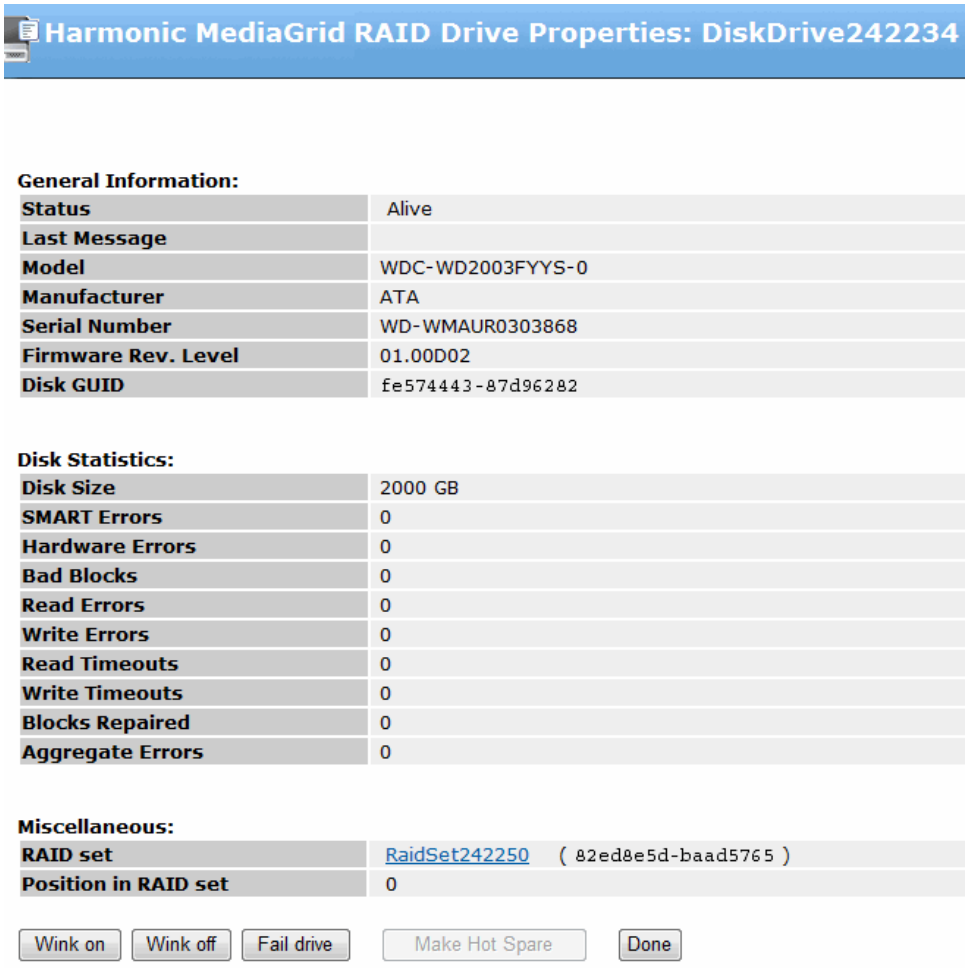


Figure 13-20: Viewing Drive Properties

Properties for a drive

The Drive Properties page provides detailed information for a drive.

Status Lists the status of the drive:

- **Alive**: The drive is available.
- **Dead**: The drive is not responding.
- **Missing**: The drive is not part of the system.
- **Unavailable**: The drive is not currently available.
- **Formatting**: The drive is being formatted.
- **Repairing**: The drive is being repaired.
- **Rebuilding**: The RAID set is being rebuilt.

	• **Unknown**: SystemManager cannot identify the drive state. • **Alive, Hot Spare**: The drive is available and assigned as a Hot Spare.
Last Message	This line displays the last error message (generated by the SystemManager) relating to the drive.
Model	Lists the model number of the drive.
Manufacturer	Lists the name of the drive's manufacturer.
Serial Number	Lists the serial number of the selected drive.
Firmware Rev. Level	Lists the firmware revision level of the selected drive.
Disk GUID	Lists the specific GUID (Global Unique Identifier) of the selected drive.
	In the **Disk Statistics** section you can view:
Disk Size	Shows the disk size (in GB) of the selected drive.
Block Size	Displays the block size of the selected drive.
Blocks	Shows the number of blocks on the selected drive.
SMART Errors	Shows the number of SMART warnings. This value is not affected by bad block repairs. If this value is greater than zero, the SystemManager displays a Critical level alarm (red) and the drive should be replaced as soon as possible.
Hardware Errors	Shows the number of hardware errors reported. This value is not affected by bad block repairs. If this value is greater than zero, the SystemManager displays a Critical level alarm (red) and the drive should be replaced as soon as possible. .
Login Failures	Shows the persistent number of login failures detected. This value is not affected by bad block repairs. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).
Bad Blocks	Shows the total number of bad blocks. This value increases whenever a new bad block is detected and decreases when bad blocks are repaired. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).
Read Errors	Shows the total number of read errors that have occurred on this drive. This number is not reset by repairing bad blocks, but is reset by reformatting the disk. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).
Write Errors	Shows the total number of write errors that have occurred on this drive. This number is not reset by repairing bad blocks. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).
Read Timeouts	Shows the total number of read timeouts that have occurred on this drive. This number is not reset by repairing bad blocks. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).
Write Timeouts	Shows the total number of write timeouts that have occurred on this drive. This number is not reset by repairing bad blocks. If this value is greater than zero, the SystemManager displays a Failure level alarm (orange).

Blocks Repaired	Shows the number of bad blocks that have been repaired. This number increases when bad blocks are repaired.
Aggregate Errors	Shows the number of errors represented by the current bad block list. This number decreases if bad blocks are repaired.
	In the **Miscellaneous** section you can view:
RAID set	Click the **RAID Set** hyperlink to access the **RAID Utilities** page.
Position in RAID set	Displays the location of the selected drive in relation to the RAID set. For example, if there are eight drives in a RAID set, the first drive would be in position 0 (zero).
Wink On (button)	Click to wink the drive.
Wink Off (button)	Click to turn off winking.
Fail Drive (button)	Click to remove the drive from the RAID set.
Make Hot Spare/ Clear Hot Spare (button)	Click **Make Hot Spare** to assign the drive to be a Hot Spare. This changes the status of the drive to “Alive, Hot Spare.” Note that when you make a hot spare, a new **Clear Hot Spare** button appears. Click **Clear Hot Spare** to clear the Hot Spare designation (for example, if you wish to use the selected drive as a normal part of a RAID set).
Done (button)	Click to save any changes and return to the ContentServer/ContentStore Properties page.

NOTE: Drives which report SMART warnings, hardware errors, and some persistent login failures will be removed from the RAID set provided that:

1. The RAID set has a hot spare.
2. No other drives in the RAID set have bad blocks.
3. The RAID set is not already compromised or in the process of rebuilding.

Related information

Making a hot spare
Clearing a hot spare

Viewing RAID set information

On the **RAID Utilities** page you can view general information about a particular RAID set and also perform a variety of tasks including changing the RAID set’s name, adding and removing drives from the RAID set, manually starting a “rebuild.”

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the **ContentServers/ContentStores** section, click the Name hyperlink for the required ContentServer or ContentStore to access the **Properties** page.

3. In the **RAID sets** section of the page, click the link in the GUID column for the RAID set you wish to view. The **RAID Utilities** page appears, as shown in the following figure.

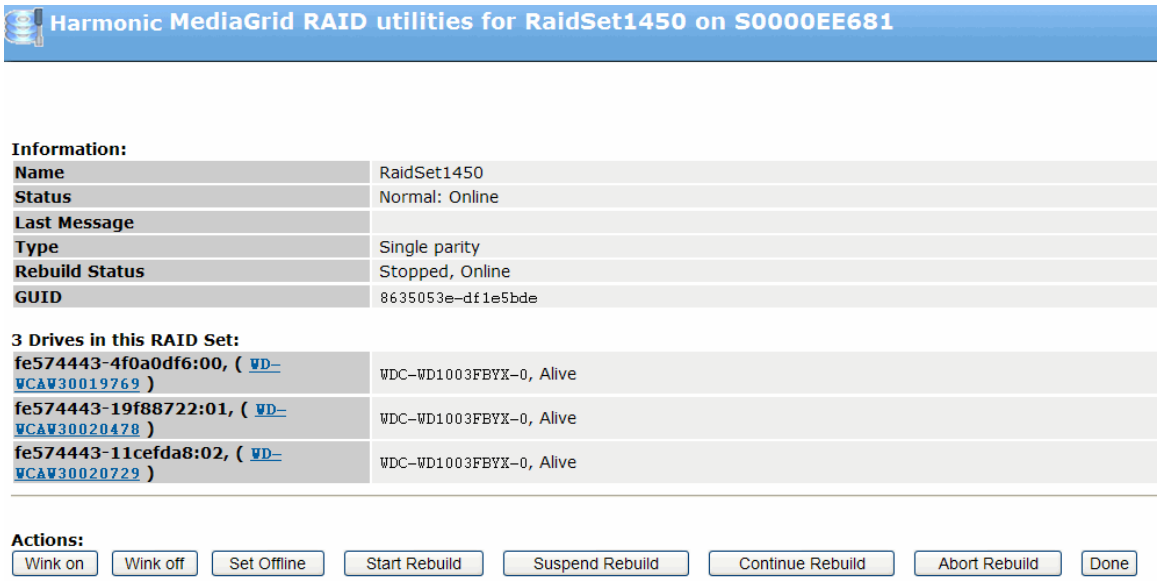


Figure 13-21: RAID Utilities Page

RAID Utilities fields

The RAID Utilities page provides detailed information about a RAID set.

Name	Displays the name of the RAID set.
Status	Displays the current status of the selected RAID set.
Last Message	This line displays the last error message (generated by the SystemManager) that deals with the selected RAID set.
Type	Displays the RAID set type.
Rebuild Status	Displays the status of the RAID set rebuild.
GUID	Displays the GUID of the complete RAID set.
<X> Drives in this RAID Set	Displays information on each drive in the RAID set. The left-hand column displays the GUID for each drive, and a link to the Drive Properties page for each
Wink On (button)	Click to wink all drives in the RAID set.
Wink Off (button)	Click to turn off winking for all drives in the RAID set.
Set Online/Offline (button)	Click to set the RAID set either online or offline. When the RAID set is offline, the drives cannot be accessed.
Start Rebuild (button)	Click to manually start a “rebuild” after a drive failure has occurred, or after a drive has been replaced.
Suspend Rebuild (button)	Click to manually suspend a “rebuild” after the rebuild process has been started.

Continue Rebuild (button)	Click to manually continue a “rebuild” after the rebuild process has been suspended.
Abort Rebuild (button)	Click to manually abort a “rebuild” after the rebuild process has been started..
Done	Click to save any changes on the **RAID Utilities** page and return to the ContentServer or ContentStore Properties page.

Related information

Restarting a RAID set rebuild

Stopping a RAID set rebuild in progress

Viewing Harmonic MediaGrid performance statistics

You can view performance statistics for your Harmonic MediaGrid system from the **MediaGrid Dashboard**.

1. From the **Configuration** tab in SystemManager, click the **MediaGrid Dashboard** icon under the **Harmonic MediaGrid** heading in the left-hand column.

Figure 13-22: Select MediaGrid Dashboard from Configuration tab

The Harmonic MediaGrid Dashboard appears in a separate browser window.

Figure 13-23: Harmonic MediaGrid Dashboard browser window

2. View statistics for a component or group of components as follows.

   - **Clusters**: Click the **All Clusters** folder in the left-hand column, to view performance data for all the clusters in your Harmonic MediaGrid System. For a statistics on a single cluster, click the cluster that you wish to view.
   - **ContentDirector**s: Click the individual cluster in the left-hand column, and then click the **ContentDirectors** folder. To view statistics for a specific ContentDirector, click the name of the ContentDirector you want to view.
   - **ContentServer**s: Click the individual cluster in the left-hand column, and then click the **ContentServers** folder.
   - **Disk drives**: To view statistics for all disk drives in a cluster, click the individual cluster in the left-hand column, and then click the **ContentServer**s folder. Click the name of a specific ContentServer to view the disk drives associated with all the enclosures (ContentServers and ContentStores) in the cluster.

Harmonic MediaGrid dashboard user interface

The user interface for the Harmonic MediaGrid dashboard consists of a number of standard elements to aid in navigating the different performance statistic views.

Figure 13-24: Navigating the Harmonic MediaGrid Dashboard

IP address	Displays the IP address of the SystemManager.
Expandable directory	Click on the directory folders on the left side of the page to view performance statistics for all clusters or specific clusters, and specific ContentDirectors, ContentServers, or disk drives.
Title bar	Shows the details for the selected item from the directory in the left-hand column.
Auto refresh	Click the toggle button to the **On** setting to have the dashboard refresh every 60 seconds. If Auto refresh is set to **Off**, the dashboard only updates when loading the All Cluster view.
Content pane	Displays statistical and performance information for the component selected from the expandable directory on the left-side of the page.
Data point	Appears when you move your cursor over an element in a graph and shows certain details about the performance of a component or a process.

Performance statistics for all clusters

The **All Clusters** view displays performance data for all of the clusters in the Harmonic MediaGrid system.

Title bar	Identifies the current dashboard view as the Clusters Overview.

Auto refresh

Click the toggle button to the **On** setting to have the dashboard refresh every 60 seconds. If Auto refresh is set to **Off**, the dashboard only updates when loading the All Cluster view.

System Health and Connected Client Statistics

Lists the clusters configured for the Harmonic MediaGrid system. The list also includes information on the system health and how many clients are connected to each cluster. You can click on each cluster name to view the details specific to that cluster.

The system health states are:

- **Green**: Indicates the cluster is running as expected and no error conditions have been detected.
- **Yellow**: Indicates a warning condition that requires an action to avert a critical error.
- **Red**: Indicates a critical error condition or a failed component that requires immediate attention.

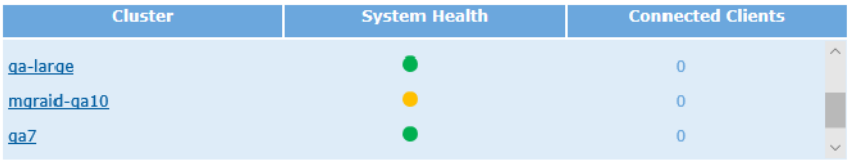


Figure 13-25: System Health and Connected Client Statistics

Bandwidth Utilization graph

Displays the bandwidth consumption in MB/s for every cluster computed as an average of all nodes in the cluster. Each cluster is represented by a different color in the graph, which is indicated in the key above the graph.

The graph is interactive:

- To hide the data for a specific cluster from view in the graph, click on the cluster name.
- Hover the cursor over a value in the graph to show the time the information was collected, which clusters are included in the graph data, and the bandwidth consumption of each cluster in MB/s.

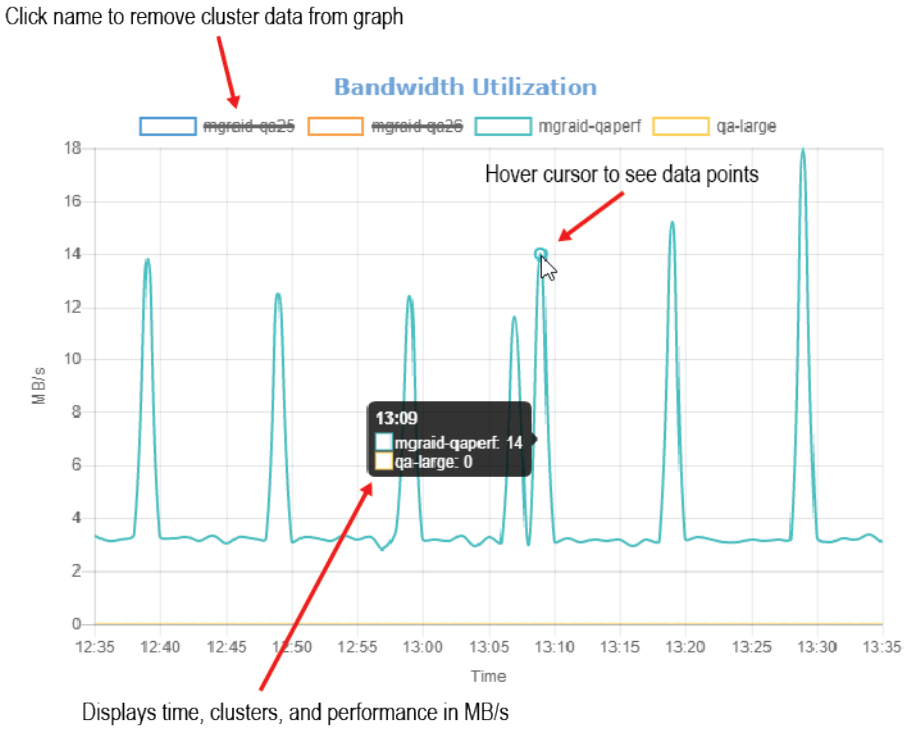


Figure 13-26: Bandwidth Utilization graph

Consumed Storage Capacity graph

Displays the total disk space in TBs used for each cluster computed as an average of all nodes in the cluster. Each cluster is represented by a different color in the graph, which is indicated in the key above the graph.

The graph is interactive:

- To hide the data for a specific cluster from view in the graph, click on the cluster name.
- Hover the cursor over a value in the graph to show the time the information was collected, which clusters are included in the graph data, and the storage consumption of each cluster in TBs.

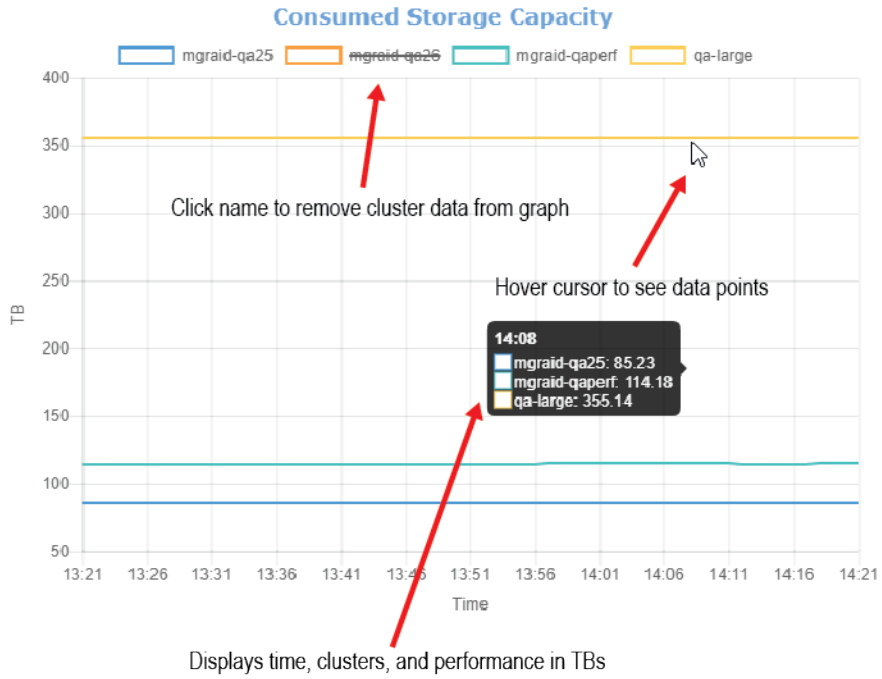


Figure 13-27: Consumed Storage Capacity graph

Performance statistics for a single cluster

The **Single Cluster** view displays performance data for a specific cluster in the Harmonic MediaGrid system.

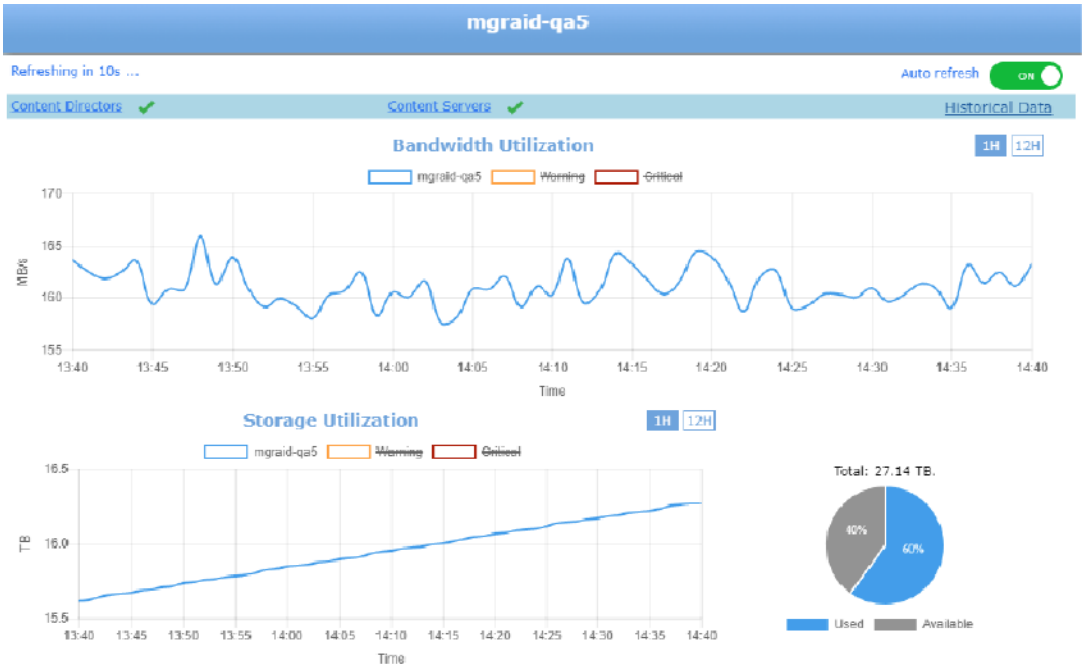


Figure 13-28: Single Cluster view

Title bar	Identifies the name of the cluster for which you are viewing the current bandwidth and storage consumption data.
Auto refresh	Click the toggle button to the **On** setting to have the dashboard refresh every 60 seconds. If Auto refresh is set to **Off**, the dashboard only updates when loading the Single Cluster view.
Content Directors	Click the link to view information about the ContentDirectors in the cluster. A symbol indicating the system health of the ContentDirectors also appears next to the link. • A green check mark indicates the ContentDirectors and all services are operating in a normal state. • A warning label (exclamation mark in a triangle) indicates that services are not running on one of ContentDirectors or one of the ContentDirectors is not responding. • A red cross indicates services are not running on any of the ContentDirectors.
Content Servers	Click the link to view information about the ContentServers in the cluster. A symbol indicating the system health of the ContentServers also appears next to the link.

- A green check mark indicates a normal state for the controllers and the slice server processes.
- A warning label indicates either Controller0 or Controller1 is not responding.
- A red cross indicates a slice server process is not running.

Historical Data Click the link to view the historical data for the cluster.

Bandwidth Utilization graph Displays the bandwidth consumption in MB/s of the specific cluster computed as an average of all nodes in the cluster.

Each cluster is represented by a different color in the graph, which is indicated in the key above the graph:

- The **blue** line represents the bandwidth consumed by the cluster.
- The **orange** line indicates the Warning level of bandwidth usage for the cluster. If this Warning level is reached, a corresponding Warning alarm will be generated by the SystemManager.
- The **red** line indicates the Critical level of bandwidth usage for the cluster. If this Critical level is reached, a corresponding Critical alarm will be generated by the SystemManager.

The graph is interactive:

- Click the **1H** button to view the bandwidth consumption for a one hour period.
- Click the **12H** button to view the bandwidth consumption for a twelve hour period.
- To filter the data that appears in the graph, click on the different labels in the key. For example, you can hide the lines for the warning and the critical levels if you only want to see the bandwidth consumption of the cluster.
- Hover the cursor over a value in the graph to show the time the information was collected, which clusters are included in the graph data, and the bandwidth consumption of each cluster in MB/s.

Storage Utilization graph Displays the total disk space in TBs used by each cluster computed as an average of all nodes in the cluster.

Each cluster is represented by a different color in the graph, which is indicated in the key above the graph.

- The **blue** line represents the storage consumed by the cluster.
- The **orange** line indicates the Warning level of storage usage for this cluster. If this Warning level is reached, a corresponding Warning alarm will be generated by the SystemManager. If that occurs, Harmonic recommends that you add more storage to your system.
- The **red** line indicates the Critical level of storage usage for this cluster. If this Critical level is reached, a corresponding Critical alarm will be generated by the SystemManager. If that occurs, Harmonic recommends that you add more storage to your system.

The graph is interactive:

- Click the **1H** button to view the storage consumed over a one hour period.

- Click the **12H** button to view the storage consumed over a twelve hour period.
- To filter the data that appears in the graph, click on the different labels in the key. For example, you can hide the line representing the storage consumption of the cluster if you only want to see the warning and the critical levels.
- Hover the cursor over a value in the graph to show the time the information was collected, which clusters are included in the graph data, and the storage consumption of each cluster in TBs.

Storage Utilization pie chart	Displays the current storage status. The pie chart refreshes every 5 minutes or upon the loading the view. The total storage usage is displayed as percentages in the pie chart. You can also hover over the different parts of the pie to see storage consumption or availability in terabytes.

Historical performance statistics for a single cluster

The **Historical Data** view displays the bandwidth and the storage consumption data for a specific cluster in the Harmonic MediaGrid system over a period of one day, one week, or one month.

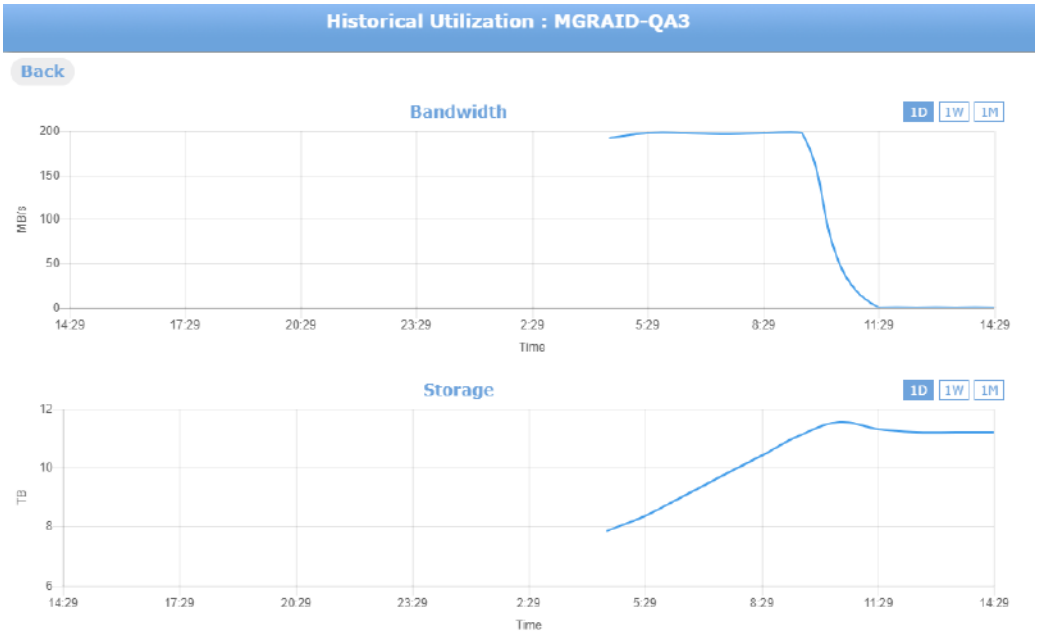


Figure 13-29: Historical Data view

The **Title bar** identifies the name of the cluster for which you are viewing the historical bandwidth and storage consumption data.

The two graphs appearing in the dashboard are interactive:

- Click the **1D** button to view the bandwidth or the storage consumption of the cluster for one day.
- Click the **1W** button to view the bandwidth or the storage consumption of the cluster for one week.
- Click the **1M** button to view the bandwidth or the storage consumption of the cluster for one month.

- Click the **Back** button to return to the view displaying the current status of the bandwidth and the storage consumption for the cluster.

NOTE: If you see a gap in the graph (disconnected lines), this indicates the data is not available to SystemManager for that period. A number of issues can cause this gap in data, including the SystemManager, the Harmonic MediaGrid, or both systems being down for that period.

Performance statistics for ContentDirectors

The **All ContentDirectors** view provides statistics on all of the ContentDirectors in a cluster.

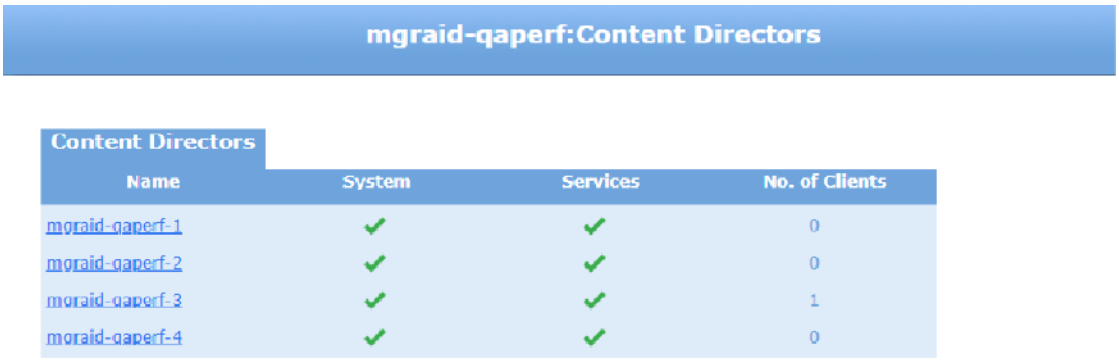


Figure 13-30: All ContentDirectors view

The following summary information is displayed for each ContentDirector:

Title bar	Identifies the name of the cluster and specifies you are viewing the information on the ContentDirectors for that cluster.
Name	Displays the assigned names of the ContentDirector. You can click on each ContentDirector name to view the details specific to thatContentDirector.
System status	Displays the hardware health status of each ContentDirector: • A green check mark indicates a normal state for the ContentDirector's hardware. • A warning label (exclamation mark in a triangle) indicates an issue with the ContentDirector's hardware, such as a power supply failure or a loose network cable. • A red cross symbol indicates the ContentDirector is not responding.
Services status	Displays the health of the required processes running on a ContentDirector: • A green check mark indicates a normal state for the required processes running on the ContentDirector. • A warning label (exclamation mark in a triangle) indicates one or more of the required processes is not running on the ContentDirector. • A red cross symbol indicates the ContentDirector is not responding.
No. of clients	Displays the number of clients currently connected to the ContentDirector.

Performance statistics for a single ContentDirector

The **Single ContentDirector** view displays performance data for a specific ContentDirector in the Harmonic MediaGrid system.

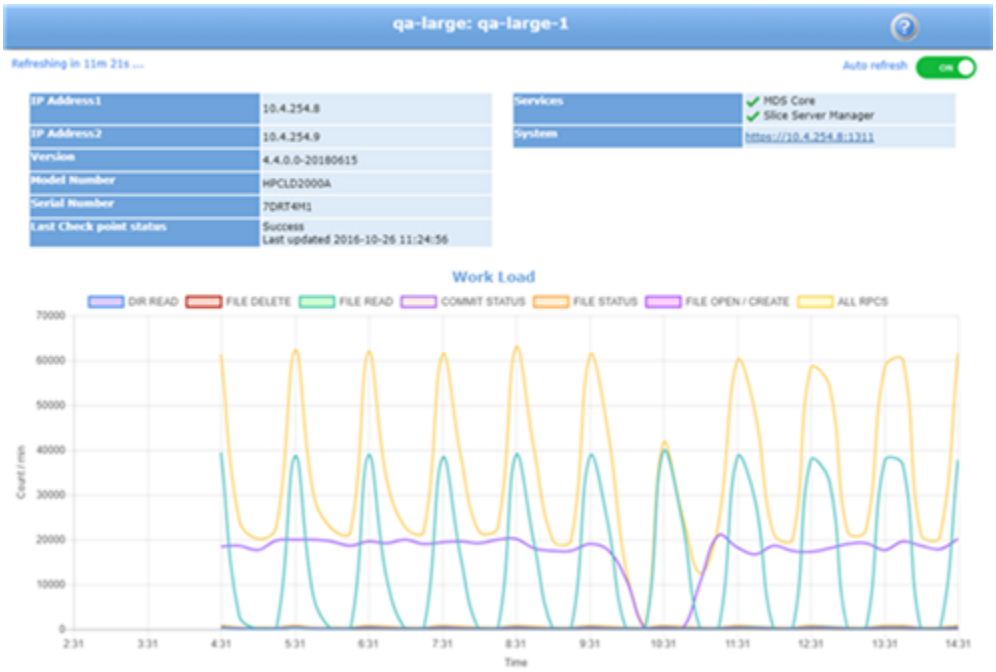


Figure 13-31: Single ContentDirector view

The following summary information is displayed for the ContentDirector:

Title bar	Identifies the name of the cluster and the specific ContentDirector for which you are viewing address, manufacturer, check point, services,and work load information.
Auto refresh	Click the toggle button to the **On** setting to have the dashboard refresh every 15 seconds. If Auto refresh is set to **Off**, the dashboard only updates when loading the **Single ContentDirector** view.
IP Address1/IP Address 2	Displays the IP addresses assigned to the ContentDirector.
Version	Displays the version of firmware installed on the ContentDirector.
Model Number	Displays the model number assigned to the ContentDirector by the manufacturer.
Serial Number	Displays the serial number assigned to the ContentDirector by the manufacturer.
Last Check point status	Displays the state of the check point when it was evaluated, and the date and time when the evaluation was performed. A status of None displays if a check has not been performed.

Services	Displays which required services are configured on the ContentDirector.
System	Click the IP address link to load the BMC interface page for the ContentDirector. The BMC interface page is typically only used by Harmonic technical support for troubleshooting purposes.
Work Load graph	Displays the work load of the critical remote procedure calls (RPCs) used by the Harmonic MediaGrid system in counts per minute once per hour during a twenty-four hour period. If no data has been collected for the required RPCs, a message will appear in place of the graph stating **No "Work Load" Data**. Each RPC is represented by a different color in the graph, which is indicated in the key above the graph. • To filter the data that appears in the graph, click on the different labels in the key. For example, you can hide the line representing the DIR READ activity on the ContentDirector if you only want to see the activity for the other RPCs. • Hover the cursor over any part of the graph to show the reading time in the graph history, which RPCs are included in the graph data, the counts per minute registered for the RPC, and the time the specific counts per minute reading was collected for the RPC.

Performance statistics for ContentServers

The **All ContentServers** view provides statistics for all of the ContentServers in a cluster.

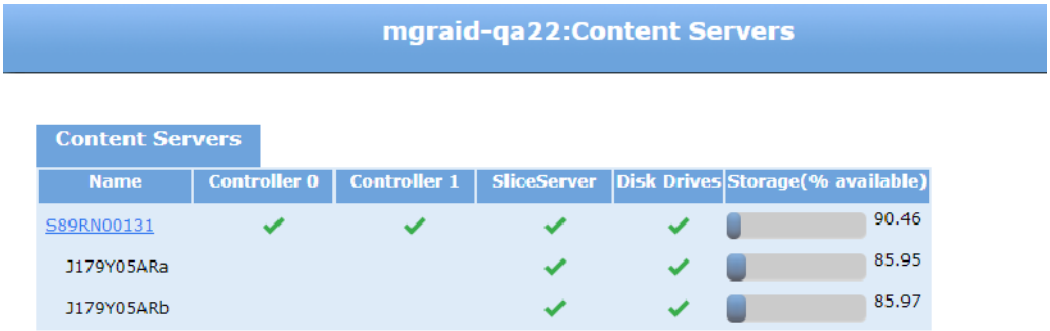


Figure 13-32: All ContentServers view

The following summary information is displayed for each ContentServer:

Title bar	Displays the name of the cluster and specifies you are viewing the information on the ContentServers for that cluster.
Name	Displays the name of each ContentServer and its associated ContentStores for that cluster. You can click the name of the ContentServer to view information about the disk drives associated with the ContentServers.
Controller 0/ Controller 1	Displays the current status of the two ContentServer controllers. • A green check mark indicates the controller is running. • A red cross symbol indicates the controller is not running or responding.

SliceServer	Displays the current status of the SliceServer (master) running in the controllers to manage the disks from the ContentServer and the associated ContentStores. • A green check mark indicates the SliceServer is running. • A red cross symbol indicates the SliceServer is not running or responding.
Disk Drives	Displays the current status of all the drives associated with the ContentServer or the ContentStore. • A green check mark indicates a normal state for the drives. • A warning label (exclamation mark in a triangle) indicates updating, rebuilding, formatting, or repairing states for the drives. • A red cross symbol indicates dead, missing, unavailable, or unknown states for the drives.
Storage (% available)	Displays the percentage of available storage on the drives for the ContentServers and the ContentStores. The percentage bar will change from blue to red when the used disk space exceeds the "Error Limit %" defined for the ContentServer Storage Utilization in the **Edit Thresholds** page, which can be accessed from the Diagnostics tab.

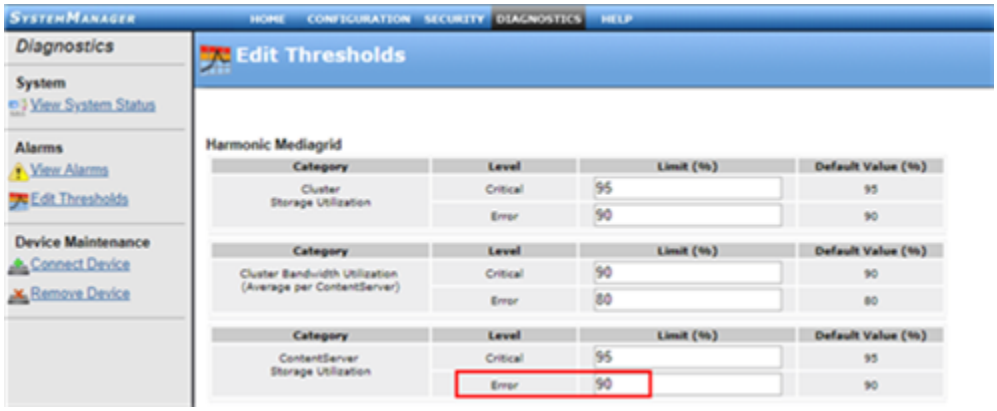


Figure 13-33: Edit Thresholds page

Performance statistics for disk drives

The **Disk Drives** view provides statistics for all disk drives associated with a ContentServer.

The **Disk Drives** view is divided into two tables. The first table displays the RAID set drives and the second table displays the unraided drives (hot spares). In the RAID set drives table, you can click the button on the right-side of each row to view details on the drives.

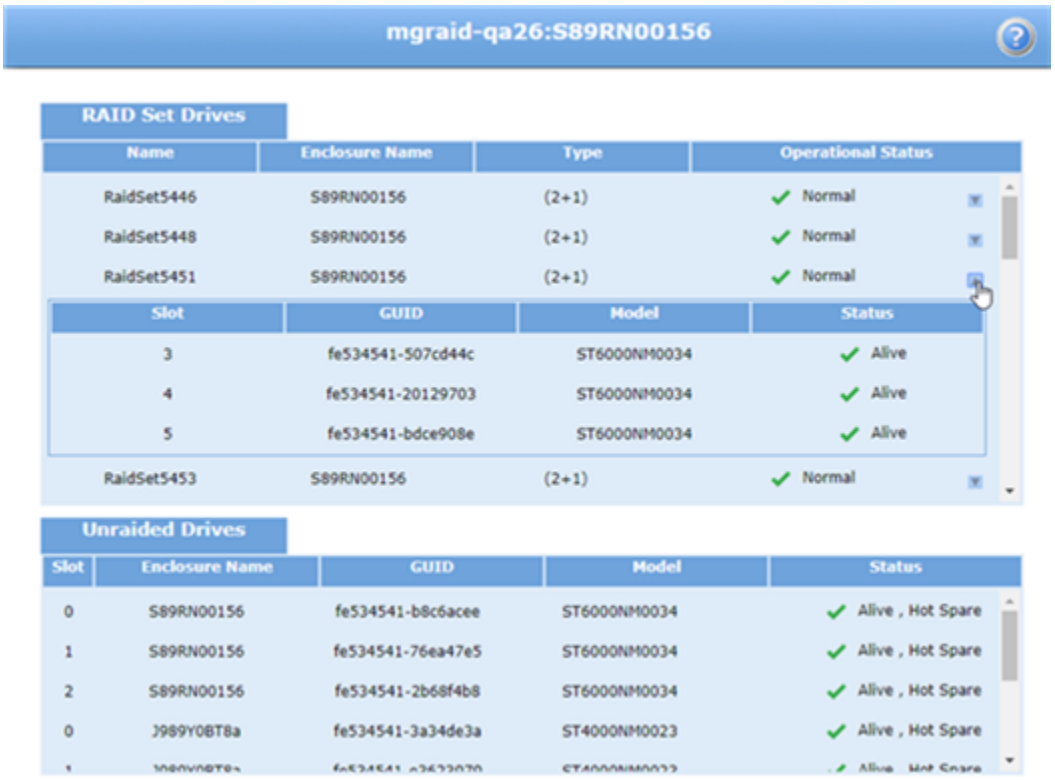


Figure 13-34: Disk drives view

You can also click the name of each RAID set to view the shelf information.

Figure 13-35: Raid Set drive–shelf information

The following information is displayed for the disk drives:

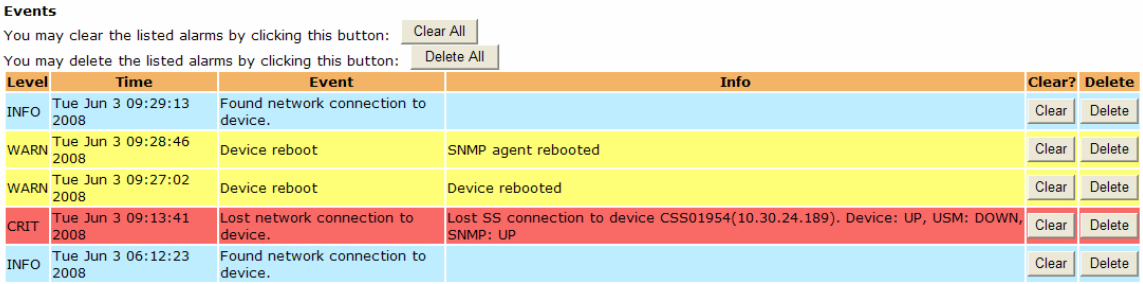
Title bar	Identifies the name of the cluster and the specific ContentServer for which you are viewing the disk drives information.
Name	Displays the name of the RAID set.
Enclosure Name	Displays the name of the ContentServer or ContentStore that houses the RAID set drives or the unraided drives (hot spares).

Type	Displays the type of redundancy model configured for the RAID set drives. For example, 2+1 or 3+1 redundancy.
Operational Status	Displays the current operational status for each RAID set: • A green check mark indicates a normal state for the RAID set. • A warning label (exclamation mark in a triangle) indicates updating, rebuilding, formatting, or repairing states for the RAID set. • A red cross symbol indicates dead, missing, unavailable, or unknown states for the RAID set.
Status	Displays the current status for each drive: • A green check mark indicates a normal state for the drive. • A red cross symbol indicates dead, missing, unavailable, or unknown states for the drive. • A blue light symbol indicates updating, rebuilding, formatting, or repairing states for the drive.
Slot	Displays the slot number in the chassis (ContentServer or ContentStore) in which the drive is installed.
GUID	Displays the global unique identifier (GUID) of the drive.
Model	Displays the model number of the drive.
Shelf Type	Displays the type of shelf in which the RAID set is installed. In this case, the RAID set is installed in a ContentServer.
Shelf ID	Displays the ID of the shelf (ContentServer).
Serial #	Displays the serial number assigned to the shelf (ContentServer).

Viewing and clearing alarms and events for Harmonic MediaGrid components

You can view and clear alarms for Harmonic MediaGrid components.

1. Click the **Servers & Switches** icon on the **Configuration** tab to access the **Servers & Switches** page.
2. In the section for **ContentDirectors**, ContentServers, or ContentBridges, click the Name hyperlink to access the unit's Properties page.
3. Scroll to the bottom of the page to view any alarms or events associated with the selected unit as shown in the following figure.


Events

You may clear the listed alarms by clicking this button: Clear All

You may delete the listed alarms by clicking this button: Delete All

Level	Time	Event	Info	Clear?	Delete
INFO	Tue Jun 3 09:29:13 2008	Found network connection to device.		Clear	Delete
WARN	Tue Jun 3 09:28:46 2008	Device reboot	SNMP agent rebooted	Clear	Delete
WARN	Tue Jun 3 09:27:02 2008	Device reboot	Device rebooted	Clear	Delete
CRIT	Tue Jun 3 09:13:41 2008	Lost network connection to device.	Lost SS connection to device CSS01954(10.30.24.189). Device: UP, USM: DOWN, SNMP: UP	Clear	Delete
INFO	Tue Jun 3 06:12:23 2008	Found network connection to device.		Clear	Delete

Figure 13-36: Alarm or Event Properties

4. If desired, perform the following actions:
   - Click **Clear All** to clear all alarms in the list, but retain the individual events. This action also clears the Alarm icon from the upper right corner of the user interface.
   - Click **Delete All** to remove all alarms from the list and clear the Alarm icon.
   - Click **Clear** to clear an individual event's alarm and retain the event in the list. This action clears the Alarm icon for that event, but the icon may continue to blink if other alarms are active.
   - Click **Delete** to delete the event from the list and clear that event's Alarm icon. The icon may continue to blink if other alarms are active.

     To receive e-mailed logs displaying the status of a selected ContentDirector, enable and configure log forwarding.

Related information

Enabling and configuring log forwarding

Performing management and troubleshooting on a Harmonic MediaGrid

SystemManager provides various ways to perform system management, troubleshooting, and monitoring tasks on a Harmonic MediaGrid.

Before you begin

- Use the Dell™ OpenManage™ utility (installed with SystemManager Release 5.1 and later) to perform RAID and Disk maintenance.
- Use the SystemManager to discover Harmonic MediaGrid units and to send alarms if communication is lost between the units.
- Use the HP ProCurve Switch utility for switch management.

Accessing the Dell OpenManage utility

You can access and use the Dell OpenManage for some maintenance tasks.

1. Click the **Servers & Switches** icon on the Configuration tab to access the **Servers & Switches** page.
2. In the **ContentDirector** section, click the **System Management** hyperlink.

NOTE: On some SystemManager Platforms, a warning dialog appears when attempting to access the Dell™ OpenManage™ interface for Harmonic MediaGrid via the System Management links. Ignore the warning and proceed to the OpenManage GUI by clicking Continue.

The Dell OpenManage Log in page opens.

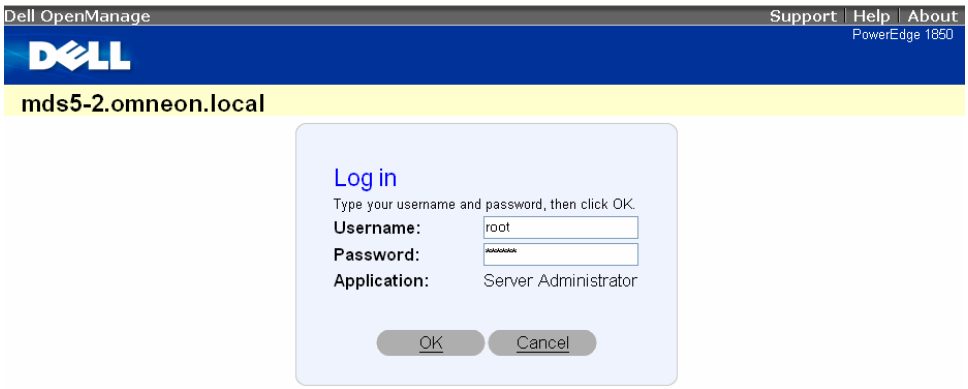


Figure 13-37: OpenManage Login

3. Log in with the following user name and password:
   - User name: ovnuser
   - Password: OVN@SvCaUsa

   The Dell OpenManage window is displayed.

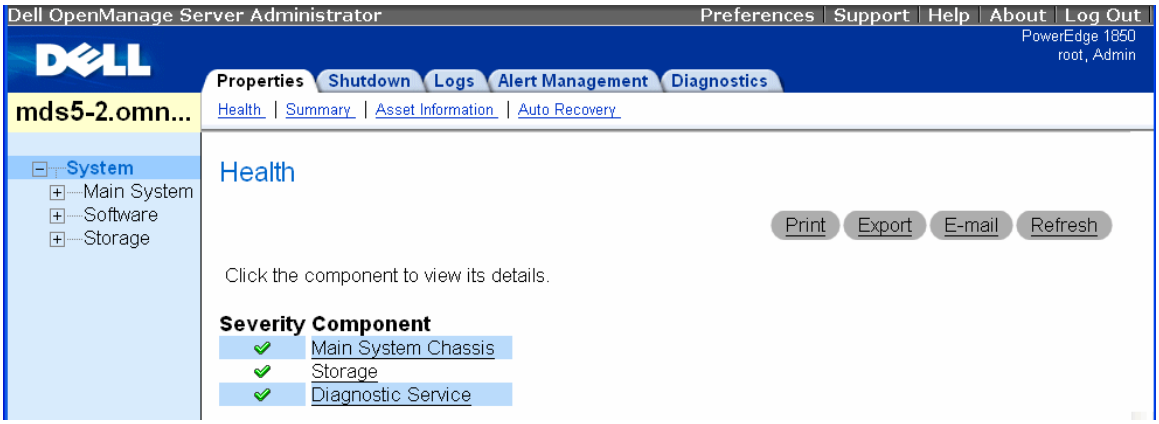


Figure 13-38: Open Manage Health Window

4. On the left hand navigation column, navigate to the RAID Controller at:

```
System > Storage > PERC 4e/Di (Embedded) > Channel 0 (RAID) > Backplane > Array
 Disks
```

or:

```
System > Storage > PERC 4e/Di (Embedded) > Channel 0 (RAID) > Virtual Disks
```

5. Click the Help tab at the top of each page to view information about the page and execute disk related tasks.

Accessing the network switch utility

You can use the network switch utility to manage your network switch.

1. Click the **Servers & Switches** icon on the Configuration tab to access the **Servers & Switches** page.
2. In the Network Switches section, click the Switch Management hyperlink.

   For certain switches the Log in page may open. If it does, enter the following information in the Log in fields:

   - User name: ovnuser
   - Password: OVN@SvCaUsa

   The Switch Management window is displayed.

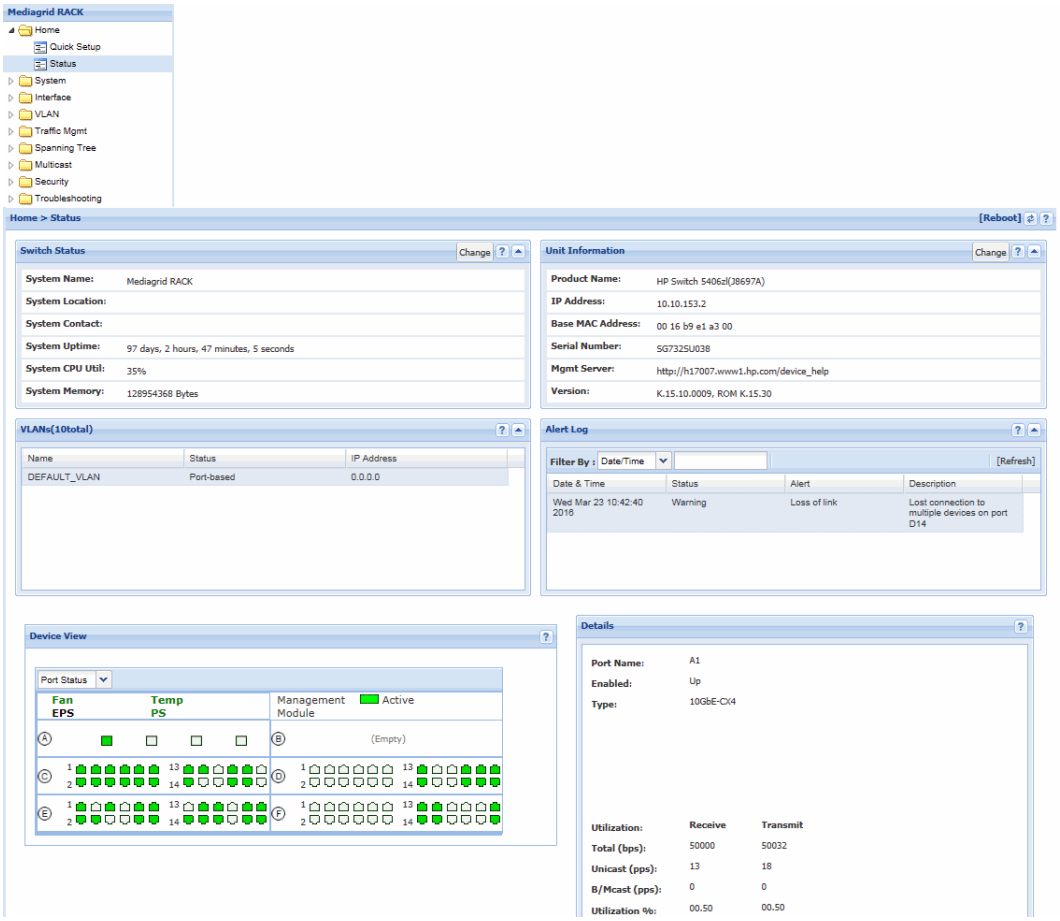


Figure 13-39: HP ProCurve Switch Window

The switch management window provides information such as system status details, basic network details, alarms, and a device view showing active ports.

NOTE: The names and descriptions of alerts in the **Alert Log** section of the **Status** tab may differ from the same alarms listed by SystemManager. To identify alerts that may correspond to network switch alarms reported by SystemManager, search the Alert Log for events occurring in the same time frame as the SystemManager alarms.

Refer to the documentation that ships with the your network switch for additional information on the functionality of this utility.

Part IV

Media Application Server

- *Media Application Server configuration*

Chapter 14

Media Application Server configuration

Find procedures for managing, monitoring, and troubleshooting a Media Application Server (MAS) system using the SystemManager application.

NOTE: Refer to the *Media Application Server Installation and Configuration Guide* for detailed instructions on installing or upgrading an MAS System. For information on using your MAS system, refer to the Media Application Server User Guide.

- *Viewing all MAS clusters and servers in a system*
- *Viewing properties for a single MAS cluster*
- *Viewing properties for a single MAS server*
- *Opening the MAS portal*
- *Viewing MAS log files*
- *About management and troubleshooting on MAS systems*
- *Accessing Dell OpenManage*

Viewing all MAS clusters and servers in a system

View all MAS clusters in your system.

- Click the **Configuration Tab** at the top of the SystemManager page, and then click the **Servers** icon in the **MAS** section of the left-hand column to display the **MAS Clusters** page.

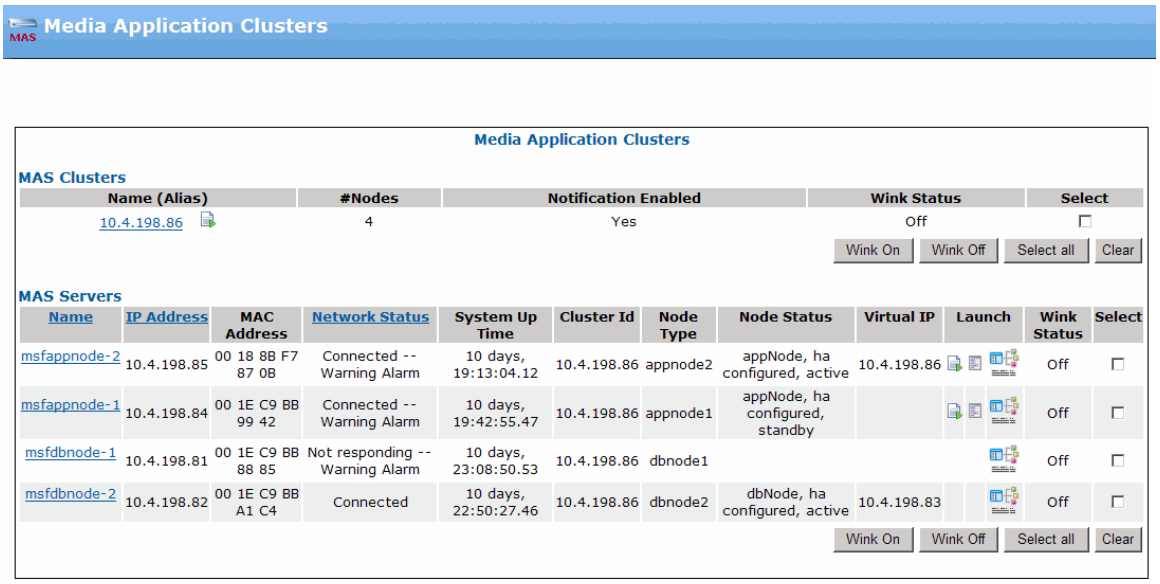


Figure 14-1: Viewing MAS Clusters

Properties for all MAS clusters and servers

In the **MAS Clusters** section of the page, you can view details for all MAS clusters in your system.

Name (Alias)	Name assigned to the cluster.
#Nodes	Number MAS nodes in each cluster.
Notification Enabled	Indicates whether notifications regarding changes to devices or file systems in your network are being sent from SystemManager to the MAS server.
Wink Status	Shows whether or not wink mode is on or off. Note that changing the wink status for a cluster changes the wink status of all the nodes in that cluster.
Select	Click to select a cluster.
Wink On (button)	Click to change the wink status of all the selected clusters to On.
Wink Off (button)	Click to change the wink status of all the selected clusters to Off.
Select All (button)	Click to select all the clusters.
Clear (button)	Click to deselect all the clusters.
	In the **MAS Servers** section, you can view the following Server information.
Name	Displays the name of the MAS Server. Click the hyperlink to access the **MAS Server Properties** page.
IP Address	Displays the IP address for the eth0 Ethernet interface.
MAC Address	Displays the MAC address of the Server.
Network Status	Displays the MAS Server's current network status, authentication status and security access level, including "Connected," and "Not Responding."

System Up Time	Displays the time the MAS Server has been “up and running” in days, hours, minutes, seconds and fractions of seconds.
Node Type	Displays the type of MAS node that applies to each server, including “appnode” (application node) or “dbnode” (database node).
Node Status	Displays the status of the MAS node, including whether a node is configured in standalone or HA (high availability) mode, and whether a node is configured as an active or standby server.
Virtual IP	Displays the virtual IP address for each server.
Launch	For application nodes, you can click one of the following three icons (from left to right). Note that for database nodes, only the System Management icon is available. • **MAS Portal**: Click to launch the MAS Portal for your MAS system. • **View Logs**: Click to open the MAS log files. • **System Management**: Click to open the Dell™ OpenManage™ utility to perform system management, troubleshooting, and monitoring tasks.
Wink Status	shows whether the Wink function is enabled on the MAS Server. When Wink is On, front and back panel LEDs flash to identify an MAS Server. Click the Wink buttons at the bottom of the section to turn Wink On/Off.
Select	Click to select the server.
Wink On/Off (buttons)	Click to change the wink status of all the selected servers.
Select All (button)	Click to select all the servers.
Clear (button)	Click to deselect all the servers.

Viewing properties for a single MAS cluster

You can view properties of a single MAS cluster.

1. Click the **Configuration** tab at the top of the SystemManager page, and then click the **MAS Servers** icon in the left-hand column to access the **MAS Clusters** page.
2. Click the name of the MAS Cluster that you wish to view. The **MAS Cluster Properties** page appears, as shown in the following figure.

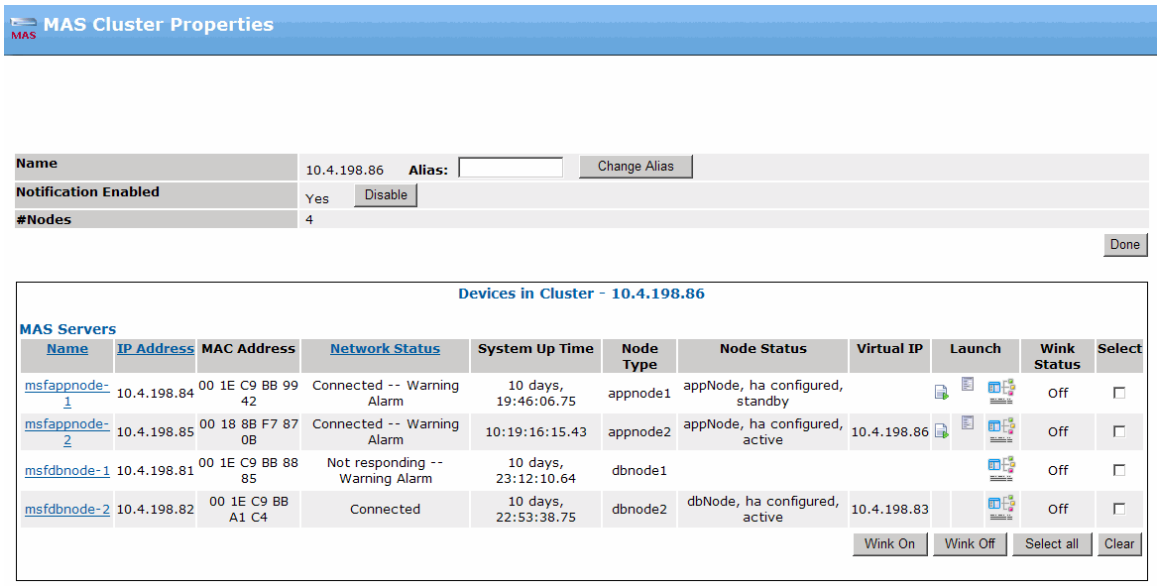


Figure 14-2: Viewing MAS Cluster Properties

The following cluster information is displayed.

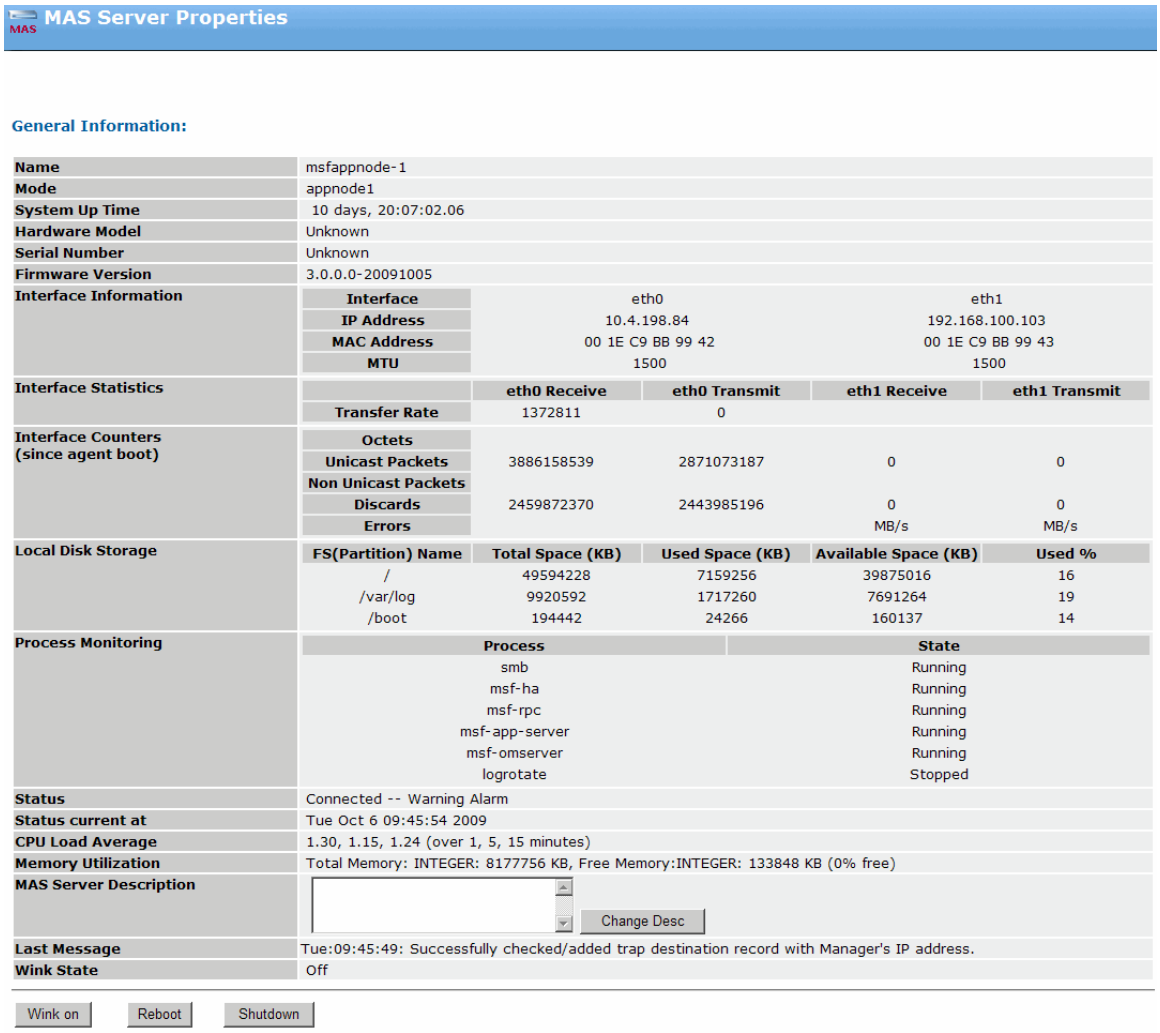
- **Name**: shows the name assigned to the cluster. To change the name, type the new name in the **Alias** field and click **Change Alias**.
- **Notification Enabled**: Indicates whether notifications regarding changes to devices or file systems in your network are being sent from SystemManager to the MAS server. To enable or disable notification, click the **Enable** or **Disable** button.

  NOTE: Harmonic recommends that you keep Notification enabled for your MAS clusters.
- **#Nodes**: Shows the number of MAS nodes in this cluster.

Viewing properties for a single MAS server

You can view the properties of a single MAS server.

1. Click the **Configuration** tab at the top of the SystemManager page, and then click the **MAS Servers** icon in the left-hand column to access the **MAS Servers** page.
2. Click the name of the MAS Server that you wish to view. The **MAS Server Properties** page appears, as shown in the following figure.



MAS Server Properties

General Information:

Name	msfappnode-1				
Mode	appnode1				
System Up Time	10 days, 20:07:02.06				
Hardware Model	Unknown				
Serial Number	Unknown				
Firmware Version	3.0.0.0-20091005				
Interface Information	Interface	eth0		eth1	
	IP Address	10.4.198.84		192.168.100.103	
	MAC Address	00 1E C9 BB 99 42		00 1E C9 BB 99 43	
	MTU	1500		1500	
Interface Statistics		eth0 Receive	eth0 Transmit	eth1 Receive	eth1 Transmit
	Transfer Rate	1372811	0		
Interface Counters (since agent boot)	Octets				
	Unicast Packets	3886158539	2871073187	0	0
	Non Unicast Packets				
	Discards	2459872370	2443985196	0	0
	Errors			MB/s	MB/s

Local Disk Storage	FS(Partition) Name	Total Space (KB)	Used Space (KB)	Available Space (KB)	Used %
	/	49594228	7159256	39875016	16
	/var/log	9920592	1717260	7691264	19
	/boot	194442	24266	160137	14

Process Monitoring	Process	State
	smb	Running
	msf-ha	Running
	msf-rpc	Running
	msf-app-server	Running
	msf-omserver	Running
	logrotate	Stopped

Status	Connected -- Warning Alarm
Status current at	Tue Oct 6 09:45:54 2009
CPU Load Average	1.30, 1.15, 1.24 (over 1, 5, 15 minutes)
Memory Utilization	Total Memory: INTEGER: 8177756 KB, Free Memory:INTEGER: 133848 KB (0% free)
MAS Server Description	Change Desc
Last Message	Tue:09:45:49: Successfully checked/added trap destination record with Manager's IP address.
Wink State	Off

Wink on Reboot Shutdown

Figure 14-3: MAS Server Properties

Properties for a MAS server

The **MAS Server Properties** page displays details for a single MAS server.

Name	Displays the assigned name for the component.
Mode	Displays whether the server is configured in standalone or HA (high availability) mode.
System Up Time	Displays the time the component has been “up and running” in days, hours, minutes, seconds, and fractions of seconds.
Hardware Model	Displays the Harmonic model number for the component.
Serial Number	Displays the manufacturer’s serial number assigned to the component.
Firmware Version	Displays the version of firmware that resides in the component’s memory.
Interface Information	• **Interface** Displays the available interfaces for the unit.

	• **IP Address:** Displays the IP address assigned to each unit's interface. • **MAC Address:** Displays the unique hardware number for each unit's interface. • **MTU** Shows the maximum size of Ethernet packets. An MTU greater than 1500 bytes indicates that Jumbo Frames are enabled.
Interface Statistics	Shows the receive and transmit rate for each interface
Interface Counters	Shows the raw interface counters since the SNMP agent was last booted.
Local Disk Storage	Shows the name of each file system (partition), as well as the Total Space, Used Space, Available Space, and percentage of available space used, for each file system.
Process Monitoring	Shows the state of each of the MAS services.
Status	Displays the current network status for the selected component. This field is used primarily for diagnostic troubleshooting.
Status current at	Displays the most recent date and time that the page was refreshed. Note that the page is automatically refreshed every 30 seconds, unless configured otherwise.
CPU Load Average	Displays the system load averages for the past 1, 5, and 15 minutes on the component.
Memory Utilization	Displays the total real memory, the available real memory, and the percentage of total free memory for the component.
MAS Server Description	Displays a scrollable multi-line description of the component. This field is useful for entering data that clarifies the specific component's role in a MAS System. Click **Change Desc** to enter or revise data.
Last Message	Displays the last message (of any type) associated with the component.
Wink State	Displays the wink state of the component's light bar, either **On** or **Off**.
Wink On/Off (button)	Click to change the wink state of the MAS Server.
Reboot (button)	Click to reboot the MAS Server without removing power from the unit.
Shutdown (button)	Click to shut down the MAS server. When the status of the MAS server changes to **Not Responding**, you can power down the server. Refer to "Shutting down the Server" in the *Media Application Server User Guide*.
	The Events section displays the following information when an alarm event occurs.
Level	Displays the assigned severity level for an alarm event associated with a unit.
Time	Displays the date and time when the alarm event occurred.
Event	Displays the event which triggered the alarm on the unit.
Info	Provides information on each event.
Clear? (button)	Displays when the unit has an alarm condition. Resolve the cause of the alarm condition and then click Clear to clear the alarm within the unit.
Delete (button)	Display when the unit has an alarm condition. Click to delete the event from the list and clear that event's Alarm icon.

Opening the MAS portal

You can open the MAS portal from the clusters page.

1. From the **MAS Clusters** page, in the **MAS Servers** section of the page, in the **Launch** column, click the **MAS Portal** icon, as shown in the following figure.

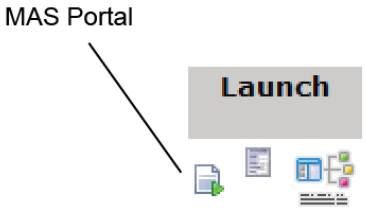


Figure 14-4: Launch the MAS Portal

A new browser window appears and prompts for a user name and password.

2. Enter the MAS user name and password in the dialog box.
3. Click **OK** to log in.

NOTE: If you are logging in for the first time, you will be required to enter the license key. Enter the license key provided by Harmonic and click **OK**.

Viewing MAS log files

You can view the MAS log files from the clusters page.

- From the **MAS Clusters** page, in the **MAS Servers** section of the page, in the **Launch** column, click the **View Logs** icon, as shown in the following figure.

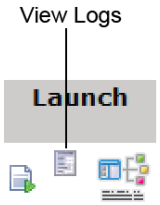


Figure 14-5: Viewing the MAS log files

A new browser window appears, which contains links to each of the log files, as shown in the following figure.

Directory Listing For /log/ - Up To /

Filename	Size	Last Modified
.msf-app-server.log.swp	280.0 kb	Sat, 26 Sep 2009 02:25:41 GMT
boot.log	73.4 kb	Tue, 29 Sep 2009 19:47:14 GMT
createSchema.log	0.1 kb	Tue, 29 Sep 2009 19:47:11 GMT
dbUpgrade.log	0.1 kb	Mon, 28 Sep 2009 20:44:20 GMT
msf-app-server.log	99946.2 kb	Tue, 29 Sep 2009 23:26:22 GMT
msf-app-server.log.1	102400.1 kb	Thu, 24 Sep 2009 09:55:01 GMT
msf-app-server.log.10	102400.1 kb	Sat, 19 Sep 2009 23:44:44 GMT
msf-app-server.log.2	102400.1 kb	Wed, 23 Sep 2009 00:35:53 GMT
msf-app-server.log.3	102400.0 kb	Wed, 23 Sep 2009 00:34:57 GMT
msf-app-server.log.4	102400.0 kb	Wed, 23 Sep 2009 00:33:56 GMT
msf-app-server.log.5	102400.2 kb	Wed, 23 Sep 2009 00:32:54 GMT
msf-app-server.log.6	102400.6 kb	Tue, 22 Sep 2009 04:56:00 GMT
msf-app-server.log.7	102400.0 kb	Sat, 19 Sep 2009 23:52:40 GMT
msf-app-server.log.8	102400.0 kb	Sat, 19 Sep 2009 23:51:43 GMT
msf-app-server.log.9	102400.2 kb	Sat, 19 Sep 2009 23:48:40 GMT

Figure 14-6: MAS log files

About management and troubleshooting on MAS systems

SystemManager provides system management, troubleshooting, and monitoring for your MAS system.

- Use the Dell™ OpenManage™ utility for RAID and Disk maintenance on MAS Systems. See “Accessing Dell OpenManage” for additional information.
- Use the SystemManager alarm function to get notification when environmental parameters, such as temperature or fan speeds on MAS Servers reach threshold levels.

Accessing Dell OpenManage

You can use Dell™ OpenManage™ to monitor the MAS platform components and view diagnostic information.

1. Click the **Configuration Tab** at the top of the SystemManager page, and then click the **MAS Servers** icon in the left-hand column to open the **MAS Clusters** page.

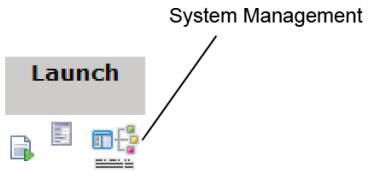


Figure 14-7: Accessing Dell OpenManage

The first time you attempt to access the Log in page, you will see a security certificate warning. Click **Continue to this website (not recommended)** to access the **Log in** page. You will not be presented with this warning in future sessions

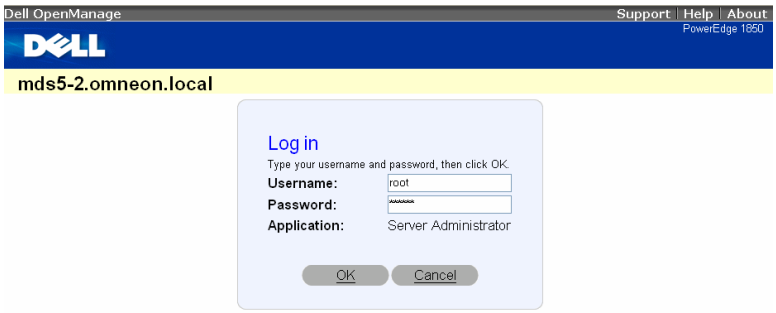


Figure 14-8: OpenManage Log in

NOTE: On some SystemManager Platforms, a warning dialog appears when attempting to access the Dell OpenManage interface via the System Management links. Ignore the warning and proceed to the OpenManage GUI by clicking **Continue**.

2. Log in with the user name and default password for the root account.

   The Dell OpenManage window appears as shown in the following figure.

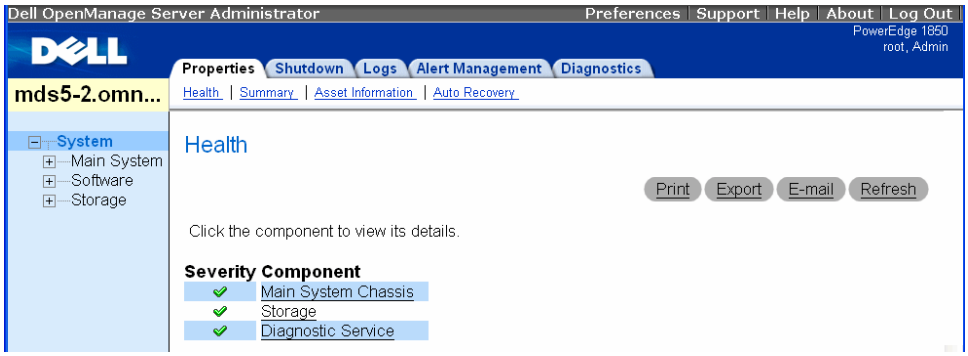


Figure 14-9: OpenManage Window

3. Click the **Help** tab at the top of each page to view information about the page and execute disk related tasks.

Related information

Opening the MAS portal

Appendix A

Contacting Harmonic technical support

- *Harmonic Technical Assistance Center contact information*
- *Harmonic corporate contact information*

Harmonic Technical Assistance Center contact information

A list of phone numbers, e-mail addresses, and important links for the Harmonic Technical Assistance Center (TAC).

Table A-1: Harmonic Technical Assistance Center phone numbers and email addresses

Region	Telephone Technical Support	Email
Americas	888.673.4896 (888.MPEG.TWO) 408.490.6477	*support@harmonicinc.com*
Europe, the Middle East and Africa (EMEA)	+44.1252.555.450	*emeasupport@harmonicinc.com*
India	+91.120.498.3199	*apacsupport@harmonicinc.com*
Russia	+7.495.926.4608	*rusupport@harmonicinc.com*
China	+86.10.6569.5580	*chinasupport@harmonicinc.com*
Japan	+81.3.5614.0524	*japansupport@harmonicinc.com*
Asia Pacific (APAC) – Other Territories	+852.3184.0045 +65.6542.0050	*apacsupport@harmonicinc.com*

Report an issue online

https://www.harmonicinc.com/service-support/support/

Harmonic support website

http://www.harmonicinc.com/content/technical-support

Software download location for Cable Edge products

ftp://ftp.harmonicinc.com

Contact Harmonic Technical Publications

techdocs@harmonicinc.com

Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

4300 North First Street
San Jose, CA 95134
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Harmonic corporate telephone numbers

Tel. 1.800.788.1330 (from the U.S. and Canada)
Tel. +1.408.542.2500 (outside the U.S. and Canada)
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