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<th>部件名称 (Part name)</th>
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O: 表示在该部件的所有均质材料中，此类有害物质的含量均小于 SJ/T11363-2006 标准所规定的限量。
O: Indicates the content of the toxic and hazardous substances at the homogeneous material level of the parts is below the limit defined in SJ/T11363 2006 standard.

X: 表示至少在该部件的某一均质材料中，此类有害物质的含量超出 SJ/T11363-2006 标准规定的限量。
X: Indicates that the content of the toxic and hazardous substances in at least one of the homogeneous materials of the parts is above the limit defined in SJ/T11363 2006 standard.
Standards and Agency Approval

The following tables list regulatory standards and agency approvals:

**North America**

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**Australia and New Zealand**

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<tr>
<th>Standards</th>
<th>Agency Approval</th>
</tr>
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</table>
Documentation Conventions

This manual uses some special symbols and fonts to call your attention to important information. The following symbols appear throughout this manual:

- **DANGER:** The Danger symbol calls your attention to information that, if ignored, can cause physical harm to you.

- **CAUTION:** The Caution symbol calls your attention to information that, if ignored, can adversely affect the performance of your Harmonic product, or that can make a procedure needlessly difficult.

- **LASER DANGER:** The Laser symbol and the Danger alert call your attention to information about the lasers in this product that, if ignored, can cause physical harm to you.

- **NOTE:** The Note symbol calls your attention to additional information that you will benefit from heeding. It may be used to call attention to an especially important piece of information you need, or it may provide additional information that applies in only some carefully delineated circumstances.

- **TIP:** The Tip symbol calls your attention to parenthetical information that is not necessary for performing a given procedure, but which, if followed, might make the procedure or its subsequent steps easier, smoother, or more efficient.

In addition to these symbols, this manual uses the following text conventions:

- **Data Entry:** indicates text you enter at the keyboard.

- **User Interface:** indicates a button to click, a menu item to select, or a key or key sequence to press.

- **Screen Output:** shows console output or other text that is displayed to you on a computer screen.

- **Bold:** indicates the definition of a new term.

- **Italic:** used for emphasis, cross-references, and hyperlinked cross-references in online documents.

**NOTE:** You require Adobe Reader or Adobe Acrobat version 6.0 or later to open the PDF files. You can download Adobe Reader free of charge from www.adobe.com.
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This chapter provides an overview of the system and operating environment required to operate the ProStream 8000 Digital Mosaic (PS8K).

The sections are:

- System Overview
- Operating Environment

1.1 System Overview

The Harmonic ProStream 8000 provides a complete solution for mosaic channel generation. It receives standard-definition (SD) or high-definition (HD) MPEG-2 or H.264 streams, either multiprogram transport streams (MPTS) or single-program transport streams (SPTS), delivered via a UDP/IP interface. The ProStream 8000 demultiplexes the stream and decodes the video to create the desired mosaic from these decoded streams. The ProStream 8000 encodes the resulting mosaic of videos as a single video stream and multiplexes it with the associated audio streams and metadata to produce an output SPTS.

The hardware platform is a Dell® PowerEdge R610/1950 server. The ProStream 8000 platform is controlled by HDM Manager, which provides controls for selecting video streams from the input streams, sizing and cropping the video to create the desired thumbnails, adding a background from a bitmap image or an input video or audio stream, setting the output video resolution, and adding descriptive text in an output metadata stream. The output is a new SPTS that is delivered over a UDP/IP interface.

The ProStream 8000 is a 19" RU platform that supports up to 20 SD MPEG-2/H.264, 8 HD MPEG-2 streams or 5 HD H.264 streams embedded as video thumbnails in the video composite. See Appendix H, Dell® PowerEdge PS8K Platform Capabilities.

To increase the H.264 capacity, you have the option of a distributed architecture, in which you can configure two ProStream 8000 platforms. The total number of streams are: SD streams up to 20, HD streams up to 16 and PiP streams up to 20, see Appendix H, Dell® PowerEdge PS8K Platform Capabilities. Under both architectures, up to 20 audio streams can be embedded in the program stream, alongside the video and metadata packet identifiers (PIDs).

1.1.1 ProStream 8000 System Components

The ProStream 8000 consists of the following components (Windows services):

- **HDM Source** – Performs the following functions:
  - Demultiplexes the MPTS or SPTS streams
  - Decodes the video
  - Buffers the audio
  - Creates and sizes the basic thumbnail video stream
- **HDM Builder** – Performs the following functions:
  - Positions each thumbnail
  - Composes a single PS8K video from thumbnails and background
  - Encodes this stream
- **HDM Stream Server (B2StreamServer)** – Remultiplexes the encoded digital mosaic video stream with PSI, audio streams, and metadata, then streams it out over the IP interface.
- **HDM HTTP Server** – Provides the message and control handler for the HDM Source and HDM Builder functions.

See Figure 1–1 to see their interconnection.

![Figure 1–1: ProStream 8000 system diagram](image)

### 1.1.2 ProStream 8000 Management Applications

- **HDM Manager** – The HDM Manager is the supplied PS8K management software.
- **HDM Cycler** – HDM Cycler is used for automated cycling through different templates.
- **VRN** – Video Rich Navigation produces metadata to enable interactivity.
1.1.3 Single-Platform Architecture

In the single-platform architecture, the HDM Source, HDM Builder, and HDM HTTP Server applications run on the ProStream 8000 and communicate through the local loopback (127.0.0.1). In this configuration, there can be a total of 4 NICs. One connects to the management network which includes a computer running the HDM Manager application. Up to three can be designated as the portal for media receiving and transmitting. Figure 1–2 shows the ProStream 8000 single-platform architecture.

1.1.4 Distributed-Platform Architecture

The distributed architecture includes two ProStream 8000 platforms, both running the HDM Source application. The base platform also runs HDM Builder and HDM HTTP Server. Three NICs are required: one for media receiving and transmitting, another to connect the source platforms to the base platform, and the third for the management network.

Figure 1–3 shows the PS8K distributed architecture with two platforms.
1.2 Operating Environment

As shown in the previous figures, the ProStream 8000 sends and receives MPEG streams via a GbE IP interface.

Inputs are unencrypted programs and include the video and audio streams to be included in the mosaic. Video is in the format of SD or HD programs encoded at a constant or variable bit rate (CBR or VBR). The video and audio streams you select to insert in the output mosaic are demultiplexed and de-encapsulated to elementary streams. The HDM Builder service performs the positioning and sizing of each thumbnail and constructs the final mosaic rendering. The HDM Builder may also apply a background to the mosaic image.

The output from the HDM Builder is transmitted to an internal encoder (MPEG-2 or H.264), and then input to a final multiplexer. The multiplexer encapsulates and multiplexes several audio and video PIDs based on a common clock (PCR/PTS). The multiplexer also inserts DVB service information (SI). Metadata describing the position and size of each thumbnail can be inserted in the output transport stream to be used by a downstream interactive application.

The resulting output from the ProStream 8000 is an SD SPTS, which includes:

- Mosaic video
- Audio stream for each thumbnail and the background
- DVB SI data
- Metadata
- Auxiliary audio streams
Chapter 2
How to Set Up and Configure the ProStream 8000

PS8K software comes installed on a Dell® PowerEdge Server computer. You can begin using the PS8K after you connect it to your network, provide IP settings, and install the HDM Manager software on a remote computer.

The sections are:

- Package Contents
- Setting Up the ProStream 8000 Hardware
- Installing the ProStream 8000 Software
- Configuring the Broadcom Settings
- Starting the ProStream 8000
- Configuring the HDM HTTP Server
- Notification Icons
- Enabling the FTP Server

2.1 Package Contents

The complete PS8K package includes:

- One PS8K hardware platform, based on the Dell® PowerEdge R610 server
- One USB dongle, which includes a license key
- The PS8K software package, loaded and configured on the hardware platform
- Adobe Reader 6.0 or later
- Dell recovery CDs:
  - DELL Build and Update Utility (Bootable CD)
  - DELL Systems Service and Diagnostics Tools
- Operating System – Microsoft® Windows Server 2003 R2 Standard Edition SP2 (disk 1 and disk 2)
- A ProStream 8000 application CD, which includes product documentation in PDF format.

⚠️ CAUTION: Do not install or run any software on the ProStream 8000 computer that does not come with your Harmonic package. Consult your Harmonic representative for further information.

For instructions for how to recover the system after a failure, see 7.4 Restoring or Upgrading a PS8K System on page 67.
2.2 Setting Up the ProStream 8000 Hardware

You can begin using the PS8K software after you connect one NIC to the data media network, the other to your local management network as described in this section and configure the Broadcom settings. See 2.4 Configuring the Broadcom Settings on page 8. The remote manager should be able to connect to the PS8K through this local management network. For more information about using a remote manager, see 3.1 Installing HDM Manager on a Client PC on page 16.

NOTE: Make sure you know the multicast addresses for existing traffic on your Windows network.

To set up the PS8K, perform the following:
1. Unpack the PS8K unit and install it in a 19" rack in a cool room.
2. Using standard Ethernet cables, connect the computer directly to a media network and management network, as shown in Figure 2–1.

![Figure 2–1: Connecting to LANs](image)

* IP addresses are provided only as a guide. Use addresses most appropriate for your environment.

If you are installing a distributed architecture, one acts as a source-only server, and the other acts as a source/builder server. The two servers are cross-connected as shown in Figure 2–2 on page 6.

![Figure 2–2: Cross-connecting servers in a dual-server configuration](image)

See 1.1.4 Distributed-Platform Architecture on page 3 for information about dual servers.
3. Insert the provided USB dongle into the USB port at the back of the unit. (ProStream 8000 does not operate without the dongle.) In a distributed architecture, there are two dongles: a Builder dongle and a Source dongle. Insert the Builder dongle in the ProStream 8000 builder platform. Insert the Source dongle in the ProStream 8000 source platform.

4. Switch the unit on.

5. When the unit has started up, log in to Windows with the default username of *Administrator*; no password is required.

**NOTE:** Harmonic recommends setting a password for the administrator user. You can add other users, if necessary. You must log in to Windows as a user with administrator permissions to run ProStream 8000 software.

---

### 2.3 Installing the ProStream 8000 Software

The ProStream 8000 server is supplied with the ProStream 8000 software pre-installed.

#### 2.3.1 Installing the Server Software

This procedure is given in case you need to re-install the ProStream 8000 software.

To install the ProStream 8000 server software, perform the following:

1. Navigate to the System folder on the CD.
2. Double-click the **Setup** icon.
   
   The HDM Setup dialog displays.
3. Click **Install**.
4. Select whether to install:
   
   - Complete (Source, Builder and HttpServer)
   - Builder Only
   - Source Only
5. Select **QuickSetup**.
6. Click **Install** to proceed with the installation.
7. Click Finish.
   The HDM Quick Setup dialog displays.

![Figure 2–3: HDM Quick Setup dialog](image)

8. Perform 2.5.1 Configuring with HDM Quick Setup on page 10.

### 2.4 Configuring the Broadcom Settings

The Broadcom interface must be configured in the PS8K to work properly.

To configure the PS8K Broadcom interface, perform the following:

1. Right-click Broadcom Interface and select Properties.
2. Click Configure.
   The Broadcom Properties dialog displays.
3. Select the Advanced tab.
4. Select Receive Side Scaling and select Disable from the Value list.
5. Select Speed & Duplex and select AUTO from the Value list.
2.5 Starting the ProStream 8000

The ProStream 8000 system components start automatically when Windows starts. Four icons appear on the bottom taskbar, one for each service, as shown in Figure 2–4.

![Figure 2–4: Taskbar service icons](image)

If you do not see these service icons, use the Windows Services in Administrative Tools to start the services. By default the Administrative Tools for Windows are hidden and should be made visible.

**NOTE:** In a distributed architecture, the PS8K source platforms run only the HDM Source service. If the other three services are running on a source-only platform, uninstall the applications.

The PS8K services are started and operated by another computer running Windows that has internet access.

To start the PS8K services, perform the following:

1. Double-click the HDM QuickSetup icon on your Windows Desktop.
2. Click Start Services.
2.5.1 Configuring with HDM Quick Setup

With HDM Quick Setup, you can configure the:

- Input transport interfaces
- Output transport interfaces
- Remote management

You can also stop services with HDM Quick Setup.

**NOTE:** Use Quick Setup only for single platform configurations, not for distributed platforms.

To configure HDM Quick Setup perform the following:

- Click the **HDM_QuickSetup** icon on the bottom of the Windows taskbar.
  
The HDM_QuickSetup dialog displays. See Figure 2–5.

2.5.1.1 Configuring the Transport Interfaces

To configure the Transport Interfaces perform the following:

1. In the Input Transport drop-down menus, select the interfaces that are used as inputs on the video network. See Figure 2–5.
2. In the Output Transport drop-down menus, select the interfaces that are used as outputs on the video network.
2.5.1.2 Configuring the Remote Management Parameters

If you are using another client other than HDM Manager then you must configure the Remote Management Parameters.

To configure the Remote Management Parameters perform the following:
1. Enter the HTTP Listen Port number. This is the port you want to use for remote connection from the HDM manager. See Figure 2–5.
2. If you are using a multicast server, mark the Multicast Server check box and enter the IP address of the server and the port number.
3. Select the Primary NIC from the drop-down menu in the Interface box.
4. If you are setting up port redundancy, mark the Secondary check box in the Interface box and select the interface that you want to use from the drop-down menu.

2.5.1.3 Starting the Services

Click Start services when you have finished configuring to start the services.

2.5.2 Configuring the HDM Source

There is rarely a need to change the default settings for the HDM Source parameters.

To configure the HDM Source, perform the following:
1. Click the HDM Source icon on the bottom taskbar. The HDM source window opens. See Figure 2–6.

   Figure 2–6: HDM Source configuration window

2. Select the interface that connects the media network from the Primary drop-down menu in the Input Transport Interface box.
3. Select the Output to Builder Interface from the drop-down menu. The selection is different between single and distributed platform architectures.
   For a single-platform architecture, select Local NIC [127.0.0.1] to loop back, as shown.
   For each platform in a distributed architecture, select the IP address of the interface that connects the sources to the Builder network.
4. Click Start.
2.5.3 Configuring the HDM Builder

There is rarely a need to change the default settings for the HDM builder properties.

**NOTE:** In a distributed architecture, configure HDM Builder only on the base platform. Do not install HDM Builder on source-only platforms.

To configure the current HDM Builder parameters perform the following:

1. Click the **HDM Builder** icon in the Windows Notification area.
   
   The HDM Builder Window displays with the current configuration. See Figure 2–7.

   ![Figure 2–7: HDM Builder configuration window](image)

2. Select the Builder Input Interface from the drop-down menu.
   
   For a single-platform architecture, select **Local NIC [127.0.0.1]**.
   
   In the base platform of a distributed architecture, this is the IP address of the interface that is connected to the sources to builder network. (This is the same as the Output to Builder Interface in the HDM Source window).

3. Select the Builder Output Interface. It is the IP address of the Primary Output NIC.

4. To select a secondary Builder Output Interface, mark the check box and select the address of the secondary NIC.

5. Click **Start**.

**NOTE:** If you shut down the HDM Builder and remove the license key, the HDM Builder processes continue to work for approximately 1 minute.
2.6 Configuring the HDM HTTP Server

To change the default configuration of the HDM HTTP Server service on the base platform, perform the following:

1. Click the HDM Management Server icon in the Windows Notification area.
   The HDM HTTP Server window displays. See Figure 2–8.

   ![Figure 2–8: HDM HTTP Server configuration window](image)

2. Enter the HTTP Server Listen Port number.

3. If you are using a Multicast Server, perform the following:
   i Mark the Multicast Server check box
   ii Enter the IP address and Port number.
   iii Select the primary interface from the drop-down menu.
   iv If you are using a secondary interface, mark the Secondary Interface check box and select the secondary interface from the drop-down menu.

4. Enter 6500 for the Transport Decoder Port.
   Enter the Transport Decoder Address. The selection is different between single and distributed platform architectures.
   For a single-platform architecture, set both IP addresses to loop back as shown above.
   In a distributed-platform system perform the following:
   i Select more check boxes to enable the additional source platform addresses.
   ii Enter 7000 for all of your HDM Source Ports.
   iii Enter a Ratio value if you are using distributed architecture. With this parameter you can allocate more thumbnails to a platform. A platform with a ratio value of 2 is allocated twice as many thumbnails as a platform with a ratio value of 1. We recommend using a higher ratio number for a source only platform as it does not use processing power to encode or mux.

5. Click Enable Remote Management.
Chapter 2 How to Set Up and Configure the ProStream 8000

2.7 Notification Icons

When you close an HDM service in the Taskbar Notification area, you only close the UI while the service keeps running.

2.8 Enabling the FTP Server

To receive background files via FTP, enable the FTP server on the PS8K base platform. FTP depends on Microsoft Internet Information Services (IIS). IIS and the FTP Service must be installed on the computer. In Windows Server 2003, the FTP Service is not installed by default when you install IIS.

2.8.1 Installing IIS and the FTP Service

To install IIS and the FTP Service, perform the following:

1. Select Start > Settings > Control Panel.
2. Double-click Add or Remove Programs.
3. Click Add/Remove Windows Components.
4. In the Components list, select Application Server then click Details.
5. Click Internet Information Services (IIS) (but do not select or clear the check box).
6. Click Details.
7. Click FTP.
8. In the FTP panel, mark the following check boxes (if they are not already marked):
   - Common Files
   - File Transfer Protocol (FTP) Service
   - Internet Information Services Manager
9. Mark the check boxes next to any other IIS-related service or subcomponent that you want to install.
10. Click OK.
11. Click Next.
12. When you are prompted, insert the Windows Server 2003 CD-ROM into the computer's CD-ROM or DVD-ROM drive or provide a path to the location of the files, and then click OK.
13. Click Finish.

2.8.2 Configuring the FTP Service

IIS and the FTP service are now installed. You must configure the FTP Service before you can use it.

To configure the FTP Service to allow only anonymous connections, perform the following:

1. From Select Administrative Tools, select Internet Information Services Manager – or open the IIS snap-in.
2. Expand Server_name, where Server_name is the name of the server.
3. Expand FTP Sites.
4. Right-click **Default FTP Site**, and then click **Properties**.

5. Select the **Security Accounts** tab.

6. Select the **Allow Anonymous Connections** check box if it is not already selected.
   
   When you click to select the **Allow only anonymous connections** check box, you configure the FTP Service to allow only anonymous connections. Users cannot log on by using user names and passwords.

7. Select the **Home Directory** tab.

8. Select the radio button named **a directory located on this computer**.

9. For the FTP site directory, enter or browse to:  
   
   `C:\Program Files\HARMONIC\HDM\backgrounds`

10. Select **Read**, **Write**, and **Log Visits**.

11. Select **MS-DOS** as the directory listing style.

12. Click **Apply**.

13. Click **OK**.

14. Quit **Internet Information Services Manager** – or close the IIS snap-in.

The FTP server is now configured to accept incoming FTP requests.

---

Copy or move any files that you want to make available to the FTP publishing folder for access. The default folder is drive:\IIS\Ftproot, where drive is the drive on which IIS is installed.
Chapter 3
How to Setup and Configure a Client PC

The sections are:
- Installing HDM Manager on a Client PC
- Starting the HDM Manager
- Connecting HDM Manager to the PS8K
- Installing Cycler
- Preliminary configuration in the HDM manager to support VRN
- Installing VRN

3.1 Installing HDM Manager on a Client PC

Use HDM Manager to manage the PS8K from a client PC. Harmonic does not recommend using HDM Manager directly on the PS8K platform. Operating HDM Manager on the PS8K platform severely degrades system performance.

To install the HDM Manager application, perform the following:
1. Navigate to the Manager folder on the CD.
2. Double-click the Setup icon.
   The HDM Manager Setup dialog displays.
3. Click Next.
4. Select the destination folder and click Next.
5. Click Install.
6. Click **Finish**.

   The HDM Manager window displays. See Figure 3–1.

   ![HDM Manager window](image)

   **Figure 3–1: HDM Manager window**

### 3.2 Starting the HDM Manager

Before running the HDM Manager all four PS8K services must be running. See Chapter 2, *How to Set Up and Configure the ProStream 8000* for information about the PS8K services.

To start the HDM Manager, double-click the **HDM Manager** icon on the desktop. See Figure 3–2.

![HDM Manager icon](image)

**Figure 3–2: HDM Manager icon**
3.3 Connecting HDM Manager to the PS8K

Use the HDM Manager to connect to the PS8K HTTP server and to operate the PS8K.
To connect to the PS8K HTTP server, perform the following:
1. Enter the management IP address in the HDM Address box.
2. Enter the port number of the PS8K platform in the Port box.
3. Click **Connect**. See Figure 3–3.

Figure 3–3 shows the HDM Address box, Port box and Connect button.

The connection dialog displays and asks if you want to get the existing configuration or overwrite the existing configuration. See Figure 3–4.

**NOTE:** When Cycler is running, choose only **Get the existing online configuration**. If you choose **Overwrite the existing online configuration** then you can mismatch the thumbnail layout.

4. Click either **Get the existing online configuration** or **Overwrite the existing online configuration**.
   - Click **Get the existing online configuration** to retrieve the thumbnail configuration that was last saved on the server that you are connecting to. The existing configuration is the active configuration being used to produce the current PS8K mosaic output.

**NOTE:** If the system is live and the configuration has not been saved, it is recommended that you get the existing online configuration first. Then save that configuration before making any changes.

- Click **Overwrite the existing online configuration** to overwrite the saved configuration with the configuration currently displayed in HDM Manager. You can create thumbnails while you are not connected to a server, and then transfer them to a PS8K system when you connect to the HTTP server.

To transfer a configuration that you created while the manager was not connected to a server, you must save it first. Click the **Save** button and enter a name for the configuration file. This is the only choice available when you connect to a server for the first time and there is no existing configuration.
Chapter 3 How to Setup and Configure a Client PC

3.4 Installing Cycler

You can install Cycler on any PC on the management network including the PS8K server. It is compatible with 32-bit Windows operating systems only. Cycler is an additional application, which requires an additional dongle license.

To Install Cycler, perform the following:
1. Navigate to the Cycler folder on the CD.
2. Double-click the Setup icon.
   The HDM Cycler Setup dialog displays.
3. Click Next.
4. Select the destination folder and click Next.
5. Click Install.
6. Click Finish.

If your dongle does not contain the Cycler license then perform the following:
1. Copy the rtu file to the desktop.
2. Double-click the rtu icon to run it.

3.5 Preliminary configuration in the HDM manager to support VRN

To configure the HDM manager for the VRN System, perform the following:
1. Select the Background tab.
2. Place the correct Alpha mask as the background and the correct background as a remote file.
3. Select the Output config tab.
4. Configure the following:
   - the required video Bitrate in the Video box
   - the resolution in the Video box
   - the mux bitrate in the Multicast Output box
5. Configure the VRN System metadata.
6. Select VRN from the Type drop-down menu in the Metadata box.
   - Enter the PID
Multicast Output address should be configured to be the multicast address of the VRN server and the same as the VRN sender configuration in the VRN GUI

7. Select the **PostProcess** tab to enable scrolling. See Figure 4–12 on page 41.

8. Set the Id parameter to 1.

9. Select **scroll text** from the Type drop-down menu.

10. Enter a space into the **Text box**.

11. Click **Add**.

12. Select the **Channel Mapping** tab.

13. Define all the channel names with IP sources and channel Id for the VRN application to choose from.

14. Select the **Thumbnails** tab.

15. Create the thumbnails to fit each template according to the required thumbnail positions by Rovi and the Alpha mask.

---

### 3.6 Installing VRN

The STB should support VRN system clients – TVGuide version A24 and up. A JAVA runtime must first be installed on the server.

To install VRN copy the following folders to the platform that you use to run VRN:

- **templates** – contains XML VRN template files
- **config** – contains an XML file that describes links between the Object Id templates and the thumbnail number on the Mosaic manager. See Appendix E, XML Configuration.
- **engine** – contains Java tools to compile the XML templates
- **scheduler** – contains schedule files with date, time and repeat information for starting each template
Chapter 4
Operating the ProStream 8000

Before you use the HDM Manager to operate the PS8K, make sure you have started and set up the PS8K and remotely installed HDM Manager, as described in Chapter 2, How to Set Up and Configure the ProStream 8000.

HDM Manager provides tools to select input sources, configure all thumbnails, add a background, adjust output properties and video quality and preview the output mosaic of the PS8K.

The sections are:
- Undoing a Change
- Creating Thumbnails
- Copying a Thumbnail
- Moving or Resizing a Thumbnail
- Changing Thumbnail Properties
- Viewing the Thumbnail Status
- Backgrounds
- Configuring Auxiliary Audio Streams
- Configuring the Output
- Configuring Postprocessing
- Mapping Channels
- Mapping Channels
- Alarms tab
- Previewing the Output
- Logs Tab
- Saving Thumbnail Configuration Files
- Loading Thumbnail Configuration Files
- Renaming the Thumbnail Configuration

4.1 Undoing a Change

As you work in HDM Manager, if Undo Managed is selected, you can undo your last change by clicking the Undo button. Only your last action can be undone. Click Undo again to redo the same action.
4.2 Creating Thumbnails

The PS8K 1 RU platform supports the following stream maximums to be embedded as thumbnails in the video composite:

- In MPEG-2: up to 20 SD or 8 HD
- In H.264: up to 20 SD or 5 HD, with up to 20 audio streams embedded into the program stream alongside the video and metadata packet identifiers (PIDs)

See Appendix H for specific capabilities.

The PS8K also creates one metadata stream, which contains the current configuration data sent in XML format for decoding by the set-top box. For information about how to include additional audio streams, see 4.8 Configuring Auxiliary Audio Streams on page 37.

After you create a thumbnail, you can copy and paste it to create more thumbnails. See 4.3 Copying a Thumbnail on page 29 for more information.

To create a thumbnail, perform the following:

1. On the Thumbnails tab of the HDM Manager screen, click the New button.

   The Add Thumbnail dialog box displays. See Figure 4–1.

   **NOTE:** The Metadata tab shows in Thumbnails only if you configured metadata in the HDM Manager's Output Config tab.

   ![Figure 4–1: Add Thumbnail dialog box](image)
2. Configure the following parameters:
   - **Number** – The thumbnail number. This value automatically increments by one every time you add a thumbnail.
   - **Name** – A name for the thumbnail, typically the service name.
   - **Predefined channels** – You can select a channel that you have defined in the Channel Mapping tab. For information about how to predefine channels, see 4.11 Mapping Channels on page 42.
   - **High Timing Tolerance** – Select if your input has high network jitter. This feature can stabilize video when using VBR video input. It is useful for non standard streams.
   - **Forced Occulted** – Remove the thumbnail image from the output stream as soon as you click the OK button. If a logo is configured the logo displays or else the thumbnail display is black.
   - **Occulted** – Remove the thumbnail image from the output stream if service is lost. If a logo is configured the logo displays or else the thumbnail display is black.

3. Select the **Transport Source** tab. See [Figure 4–1](#) on page 22.

4. Configure the following parameters on the Transport Source tab:
   - **Multicast** – Mark the check box if you are using multicast transport source, and enter the multicast IP.
   - **Port** – The multicast UDP port number where the source is received.
   - **IP Source** – Enter the address of the source interface (used for IGMPv3 network using SSM, Source-Specific Multicast).
   - **File** – To use a file source for your thumbnail, mark the check box and select the file from the drop-down menu. Source files must be placed in advance in the following path: c:\Program Files\Harmonic\HDM\Transports. Supported file types are: MPEG-2 TS and H.264 in MPEG-2 TS.
   - **PIDs**:
     - Video stream PID – HDM Manager automatically fills in the video PID when you select the program.
     - AudioPID – If you want audio, click here and enter the PID.
   - **Scan** – Click Scan to view the programs available in the SPTS or MPTS source and select the program for which you want to create a thumbnail. Select the MPEG program number in the drop-down menu. HDM Manager automatically enters the video and audio PIDs in the appropriate fields when you select the program.
5. Select the **Video** tab.
   See Figure 4–2.

![Figure 4–2: Add Thumbnail, Video tab](image)

6. Configure the following parameters:

   - **Layer** – Specifies the display layer. Layers with larger numbers are on top of layers with smaller numbers. Thumbnails in different layers can overlap in the display, while thumbnails in the same layer cannot. This value automatically increments by one as you add thumbnails.

   - **Logo** – To display a logo for the thumbnail, select the name of the graphic file from the drop-down menu. The graphic file should be designed according to the thumbnail size. These files are saved on the PS8K server at: `C:\Program Files\HARMONIC\HDM\Logos`

   - **Position: X and Y** – Specify, in pixels, the thumbnail’s X and Y position on the display. The area of the output depends on the output resolution. If you set the output resolution to 704x480, there are 704 units on the X axis, and 480 units on the Y axis. If you know the specific X and Y coordinates, enter them here.

     Because you can easily move thumbnails in the thumbnail window, you might want to accept the default values, and then position the thumbnail later. See **4.4 Moving or Resizing a Thumbnail** on page 30.

   - **Size – W and H**. Specify, in pixels, the width and height of the thumbnail. To change the width based on the aspect ratio, in the Aspect Ratio box, and height, click the **W <- from AR** button. To change the height based on the aspect ratio, in the Aspect Ratio box, and width, click the **H <- from AR** button.

   - **Round – W and H**. If you want the thumbnail to have rounded corners, enter a width and height for the rounding.
Aspect Ratio – Select an aspect ratio from the drop-down list. The ratio is presented as the width divided by the height, or X-to-Y. You can select one of the following from the Adaptation drop-down menu:

- Add black (letterbox)
- Crop (Pan & Scan)
- None (fullscreen)

☐ Overscan – Drag the slider to adjust the overscan percentage up to 10%. This parameter determines the percentage that will not be displayed on the viewers’ screen. Use this feature to remove black borders and improve visual quality.

☐ Resize Quality – Drag the slider to adjust. The filtering is preset, based on the slider position. Rightmost results in sharper output, while leftmost results in a softer output. Typically, smaller thumbnails require higher quality.

See Appendix A, Adjusting Thumbnail Quality, for detailed information about adjusting video quality with the resizing option.

☐ Crop Top/Bottom/Left/Right – Crop the video. This feature functions as a zoom-in. For example, if the original thumbnail is 704x480 pixels, and you want to remove the upper half of the thumbnail, enter 240 in the Top field.

☐ Decoding resolution – Select to decode the video in 1/4 or 1/2 vertical resolution. When selecting the decoding resolution, consider the size of the original source and the size of the thumbnail. If the source is 704x480, and you create a small thumbnail, for example 100x80, set the resolution to 1/4 because the thumbnail is less than one-quarter the size of the original. If the thumbnail is larger, for example 352x240, you should select 1/2 because the thumbnail is about half the size of the original.

See Appendix A, Adjusting Thumbnail Quality, for detailed information and examples of using decoding resolution to adjust video quality.
7. Select the **Audio** tab

See Figure 4–3.

![Figure 4–3: Add Thumbnail, Audio tab](image)

8. Configure the following parameters:

   - **Language desc.** – Enter the 3-character ISO 639 language descriptor for the thumbnail
   - **Output PID** – HDM Manager automatically selects the audio output PID, or you can manually enter it. The auto value (if used) is based on the Audio PID (base) set on the Output config tab.
   - **Delay** – The delay in milliseconds (positive values only). Use to adjust lip synchronization.
   - **Customized** – You can choose a different format for each thumbnail. If you don’t customize the thumbnail then it uses the configuration in the Audio box of the Output config tab. There are four customized formats to choose from:
     - **passthrough** – There are no parameter options for passthrough.
     - **mpeg2** – You can configure the following three parameters for mpeg2: Bitrate, Samplerate and Mode. The audio input format is transcoded to MPEG-2.
     - **ac3** – You can configure the following four parameters for ac3: Dial Norm, Bitrate, Samplerate and Mode. The audio input format is transcoded to AC-3.
     - **aac** – You can configure the following three parameters for aac: Bitrate, Samplerate and Mode. The audio input format is transcoded to AAC.

9. Select the **Metadata** tab.

See Figure 4–4.
NOTE: The Metadata tab appears only when Metadata is configured on the Output Configuration Tab of HDM Manager.

![Add thumbnail, Metadata tab](image)

**Figure 4–4: Add Thumbnail, Metadata tab**

10. Configure the following parameters:
   - **MetaData channel** – Enter the channel number. (Metadata is only visible here if you have selected Native for the type of Metadata on the Output Configuration tab.)
   - **Text** – Enter the text that you want to be included in the metadata output.
11. Select the **Plugins** tab.

See Figure 4–5.

![Figure 4–5: Add Thumbnail, Plugins tab](image)

12. Configure the following parameters:

- **Audio Meter** – Mark the check box if you want an audio meter to display beside the thumbnail.
  - **RMS** – Select to have the meter show the average audio.
  - **Peak** – Select to have the meter show the peak audio.
  - **Opacity** – Drag the slider to set the amount of opacity of the text. Values to the left are more transparent, values to the right are more solid.

- **Text** – If you want text to display below the picture in your thumbnail, mark the check box, and enter the text below.
  - **Color** – Twice, enter values for the Red, Green, and Blue of the text banner: once for the Text itself, and again for the banner **Background**.
  - **Opacity** – Drag the slider bar to set the amount of opacity of the text. Values to the left are more transparent, values to the right are more solid.
  - **Scroll** – If you want the text to scroll, mark the check box. To have fixed-position text, click again to clear the check box.
  - **Speed** – Drag the slider to change the text scroll speed.
  - **height** – Enter a height, in pixels for the text banner.

- **Font** – Enter a font name and size (in picas) for the text. You can also select **Bold** or **Italic**.
  If you install additional fonts then you must install them in the HDM Server.

13. Click **OK**.
The main Thumbnail screen displays with all the thumbnails. The color of a thumbnail indicates its connection status, the colors are:

- **Green** – Indicates a good connection to a valid MPEG stream with valid data.
- **Blue** – Indicates that the designated MPEG multicast stream is present and HDM Manager is connected to a PS8K, but there is little or no data in the program stream.
- **Pink** – If all positioned thumbnails are pink, it indicates that HDM Manager is not connected to a PS8K.

Figure 4–6 shows HDM Manager with a green thumbnail, indicating that HDM Manager has a good connection to the PS8K.

### 4.3 Copying a Thumbnail

After creating a thumbnail, you can copy it and then use it as a template to create more thumbnails. Then, you can modify their properties if necessary. When you copy a thumbnail, HDM Manager copies all thumbnail properties to the new thumbnail, except the thumbnail number and layer.

To copy a thumbnail, perform the following:

1. Right-click on a thumbnail that you want to copy, and select **Copy** from the drop-down menu.
2. Right-click in a blank area of the window, and select **Paste** from the shortcut menu. You can paste the same selection to several places.
4.4 **Moving or Resizing a Thumbnail**

You can drag a thumbnail to any position in the window. If you enable snap to grid, the thumbnail automatically jumps to the nearest grid position when you drag it.

If thumbnails are on different layers, you can overlap them to create different effects. Thumbnails on the same layer cannot overlap.

4.4.1 **Enabling Snap to Grid**

To enable snap to grid, perform the following:

❖ Mark the **Snap to grid** check box, and enter the X and Y resolution.

4.4.2 **Moving a Thumbnail**

To move a thumbnail, perform the following:

1. Position the mouse pointer over the thumbnail you want to move.
   
   The pointer turns into a hand.

2. Hold down the left mouse button and drag the thumbnail to a new location. If the thumbnail won’t move or resize, make sure **Lock thumbnails positions** is not selected.

4.4.3 **Resizing a Thumbnail**

To resize a thumbnail, perform the following:

1. Position the mouse pointer over the border of the thumbnail you want to adjust.
   
   The pointer turns into a double-ended arrow.

2. Hold down the left mouse button while you drag the border to the new size. Drag the corner of a thumbnail to adjust the thumbnail height and width at the same time. To maintain the same aspect ratio when resizing one or more thumbnails, mark the **Maintain Aspect Ratio** check box.

4.4.4 **Locking the Thumbnails**

After creating all of the thumbnails, you can lock their position and size to prevent unintended repositioning.

To lock the position and size of all thumbnails, perform the following:

❖ Mark the **Lock thumbnails positions** check box. (You can still change any other thumbnail properties.)
4.5 Changing Thumbnail Properties

After creating a thumbnail, you can change thumbnail properties using the Properties dialog box.

To modify thumbnail properties, perform the following:

1. Right-click the thumbnail, and select Properties from the shortcut menu.
   The Thumbnail Properties dialog box displays. See Figure 4–7.

2. Modify the properties as desired. For descriptions of the thumbnail properties, see 4.2 Creating Thumbnails on page 22.

3. Click OK.
4.6 Viewing the Thumbnail Status

You can view the current status of a thumbnail.

To view the status of a thumbnail, perform the following:
❖ Right-click the thumbnail, and select Status from the shortcut menu. The Thumbnail status dialog displays. See Figure 4–8.

The Source box shows the present HDM video source output frame rate and resolution.

**Framerate** is the average frame rate (fps). If **expected** is 0 then it means a problematic source to decode or a CPU problem.

The Builder box shows the HDM builder input video properties.

The **FillRate** is the rate that the HDM Builder receives data from the HDM source.

4.7 Backgrounds

PS8K can display a background behind the thumbnails.

4.7.1 Background Sources

The background feature supports the following three types of background sources:
- IP Transport Stream
- MPEG-2 Video Elementary Stream File
- Bitmap Files

4.7.1.1 IP Transport Stream

You select a service to use as the background. The source transport stream (TS) can be either a multiprogram transport stream (MPTS) or a single-program transport stream (SPTS) encoded in VBR or CBR.
4.7.1.2 MPEG-2 Video Elementary Stream File

A video elementary stream (VBR or CBR) contains only compressed video and decoding-related data. These video elementary stream files are commonly identified with the extension .mpv, .m2v, or occasionally .mpg (usually used to identify multiplexed MPEG files). The extension used generally depends on the application that generates the video elementary stream.

Harmonic recommends using MPEG-2 video files 50 MB or smaller if you embed the file, or 150 MB or smaller if you FTP the file.

You can generate a video elementary stream from a storage encoder or encoder card, or extract the stream from a multiplexed program or transport. Content stored on tape or DVD is typically encoded using a storage encoder or encoder card.

For video file types other than MPEG, use a transcoding application to convert it to an MPEG program or transport before de-multiplexing the file to obtain the video elementary stream. Some applications may have both de-multiplexing and transcoding functions.

MPEG-2 Video Elementary Stream files should be placed under C:\Program Files\HARMONIC\HDM\Backgounds\mpeg2video.

4.7.1.3 Bitmap Files

The PS8K supports 24-bit bitmap (.bmp) files. The bitmap resolution should match the video encoding resolution of the PS8K output. Using a bitmap resolution that matches the encoding resolution retains the aspect ratio of the bitmap and creates a higher-quality background. Distorted backgrounds may result from mismatched bitmap and video resolution. Bitmap files should be placed under C:\Program Files\HARMONIC\HDM\Backgounds\pictures.

4.7.2 Uploading a Background File

When you use a video or bitmap background file, the file must be transferred to the PS8K platform.

There are two options:

- Embedded File
- Remote file

4.7.2.1 Embedded File

HDM Manager embeds and transfers the file to the PS8K platform via HTTP. You do not need to upload the file via FTP. The maximum file size is 60 MB. The bitmap is extracted into the PS8K XML template, this increases its size.

If you select an input video or other MPEG file for the background, it appears only in the actual output. The HDM Manager background turns gray.

Larger files have an impact on system performance, and background changes create a longer delay. When you operate HDM Manager in the standard remote configuration, .mpv background files larger than 40 MB can take up to a minute to appear in the output.
4.7.2.2 Remote file

The maximum file size is 150 MB. Harmonic recommends using this method, especially if Harmonic NMX is providing redundancy. This is a two-step process. First, use Internet Explorer to transfer the background file to the PS8K platform via FTP. Then, use HDM Manager to select the file.

Uploading a File Via FTP

To upload a video or bitmap background file from the HDM Manager computer to the PS8K, perform the following:

1. Start Internet Explorer.
2. Enter `ftp://` followed by the IP address of the PS8K platform in the Address box.
3. Press the Enter key.
   The FTP directory of the PS8K displays.
4. Change to the appropriate folder. If you are uploading a video file, double-click the `mpeg2video` folder. If you are uploading a bitmap image file, double-click the `pictures` folder.
   In the folder, a list of previously transferred files appears (or the folder may be empty).
5. Locate the video or bitmap file in Windows, then drag the file icon into the Internet Explorer window to upload the file.
   When the upload is complete, the background file appears in the file list.
4.7.3 Setting the Background

Use the Background tab in HDM Manager to select the background that you want to appear behind the thumbnails.

**CAUTION:** Installing HDM Manager directly on the PS8K platform is not recommended. If you run HDM Manager from the PS8K platform, loading .mpv background files larger than 60 MB may significantly degrade performance to the point of system failure.

To create a background, perform the following:

1. Select the **Background** tab.
   
   See Figure 4–9.

![Figure 4–9: Background tab](image)

2. To select the source for your background, mark one of the following check boxes:
   - Transport (multicast file)
   - Embedded file
   - Remote file
   - None (no background)

   If you chose Transport, configure the following parameters:
   - **Multicast** – To use a video stream as the background, mark the **Multicast** check box, and enter the source port and IP address.
   - **File** – Mark the check box then select from the drop-down list. Files are stored on the Mosaic Prostream 8000 server at: \(C:\Program Files\HARMONIC\HDM\transports\)
❑ **Predefined channel** – To use a predefined channel, select one from the drop-down list. For information about how to predefine channels, see 4.11 Mapping Channels on page 42.

❑ **Scan** – Using the appropriate PID, click **Scan** to select the video you want to use.

If you chose Embedded file, perform the following:

i. Click **Browse**.

ii. Browse to the file and select it.

iii. Click **Save**.

The file is embedded, then transferred to the PS8K platform via HTTP. For further information, see 4.7.2 Uploading a Background File on page 33.

If you chose Remote file, configure the following parameters:

- Select the file from the drop-down list. The file must already be located on the PS8K platform. For further information and instructions, see 4.7.2 Uploading a Background File on page 33.

- From the Deinterlace list, you can select one of the following:
  - **Weave (none)** – for progressive interlaced input
  - **Vertical Filter** – for interlaced input that is filtered vertically (an unusual progressive input with artifacts).
  - **Field Interpolation** – for most interlaced sources

**NOTE:** If the service within the TS does not contain an MPEG-2-compliant video type (stream type 02), the scan function does not display the service within the list.

To use Alpha Mask, mark the Alpha Mask check box and select an item from the drop-down menu.

**NOTE:** Alpha mask is a special bitmap to improve the borders between the thumbnails and the background. Black areas are transparent to video and white areas are opaque. This file should be prepared in advance according to the target size and location of the desired thumbnail. The alpha mask should be placed under C:\Program Files\HARMONIC\HDM\Backgrounds\Alpha.

3. Click **Apply**.

**NOTE:** If you use a file as the background, HDM Manager verifies that the file is within the size limit. If the file is too large, a warning displays.
4.8 Configuring Auxiliary Audio Streams

Use the Auxiliary audios tab to add up to 20 additional audio streams to the output transport. For example, you might include audio-only channels or a background audio stream. You can select an audio stream from the input source or from a file.

To configure auxiliary audio streams, perform the following:

1. Select the Auxiliary audios tab. See Figure 4–10.

2. Enter the following for the audio stream:
   - Id
   - Name
   - Audio Language Descriptor
   - Output PID

   HDM Manager automatically selects the audio output PID, or you can manually enter it. The auto value (if used) is based on the Audio PID (base) set on the Output config tab.

3. If you are using Transport mark either the Multicast or File check box in the Transport box or select a predefined channel from the Predefined Channels drop-down menu. For information about how to redefine channels, see 4.11 Mapping Channels on page 42.
   - If you selected Multicast then perform the following:
     i. Enter the Multicast address.
     ii. Enter the Port number.
     iii. If you are using IGMPv3, enter the IP source.
If you selected file, choose the file name from the drop-down list. Transport files are stored in the Mosaic Prostream 8000 server at:

C:\Program Files\HARMONIC\HDM\Transports

Click Scan to select the audio source from the drop-down list, or enter the audio PID. Enter the delay in seconds.

4. If you selected File then click Browse and browse for a file.

5. Click the Add button under the auxiliary list above.

Your information appears in the list.

4.9 Configuring the Output

Use the Output config tab to set video properties and information about the program.

To configure the output, perform the following:

1. Select the Output config tab.

2. Configure the following parameters:
   - Configure the following Program Information parameters:
     - Name (Service Name / SDT)
     - Transport Stream Id
     - Program Id
Enter the following PIDs:
・ Video
・ Audio (base)
・ PMT

**NOTE:** We recommend using the default PIDs to avoid accidental duplication of PIDs. Note that HDM increases the PID number and saves it for each thumbnail.

- Configure the following Video parameters:
  ・ NTSC or PAL
  ・ H.264
  ・ Interlaced – no need to check this box for most STBs
  ・ Bitrate (bps) – add 5% to the target bitrate
  ・ **Low Variation** – This parameter stabilizers the rate when there is not enough stuffing. It is not suitable for MPEG-2.
  ・ **Size** (video resolution)

**NOTE:** After you save the configuration, you cannot change the size.

- **Aspect Ratio** (4:3 or 16:9)
- **Encoding quality** – This field sets the strength of the motion estimation filter. The range is 20, and the default is 10. Harmonic recommends using 20 for MPEG-2 output and between 10 and 20 for H.264 output. Note that H.264 uses more processing power than MPEG-2. Drag the slider to set the value.

- **Fade in/out** – A checkmark in this check box means your thumbnail videos will fade in when they appear, and fade out when they are replaced. Mark the check box to change.

- **Adapt layout to video size changes** – This parameter maintains the thumbnail composition when the video size changes.

- **Audio** – Configure the following parameters:
  ・ audio format
  ・ bit rate
  ・ sample rate
  ・ mode (stereo or mono)

**NOTE:** The parameters in the Audio box are used for all thumbnails except those with individual customization via the Thumbnails tab.

- **Multicast Output** – Configure the following parameters:
  ・ Multicast IP address
  ・ **Port** – Enter the UDP port number for multicast output.
  ・ **TTL** – Time-to-live (TTL) is a value in an IP packet that tells a network router whether the packet has been in the network too long and should be discarded. In some networks, packets may take longer than usual to reach their destination. In this case, increase the TTL value to account for network characteristics. The default value of 1 should work in most PS8K cases.
· **IP source** – Enter the address of the source for all NICs. This parameter causes the PS8K to send the data with the same IP sender address through all ports.

· **Mux bit rate** – Enter the value of the total bit rate of the SPTS output of PS8K. It must be larger than the encoding bit rate and account for the bit rate required to support the audio streams, PSI/SI, and metadata accompanying the video in the SPTS. Add at least an extra 300 to 500 KB for stuffing.

❑ **VChip** – (Parental Control) Select the system and rating for the program from the drop-down boxes. Supported rating systems are: MPA (MPAA) and TPG, or you can disable ratings. Available options may include violence (V), sex (S), language (L), and dialogue (D).

❑ **Metadata** – Select the type of metadata from the **Type** drop-down menu.

· **Native** – In band

· **Aptive** – XML by http added to mux directly to STB

· **VRN** – special engine to create the metadata

If you enable Native metadata, enter the following:

· Metadata PID

· Bit rate

You can add text to help you recognize the setting later.

If you enable Aptive metadata, enter the following:

· Metadata PID

· Bit rate

· Stream Id

If you enable VRN metadata, perform the following:

· Enter the output VRN metadata PID

· Mark either or both VRN1 and VRN2 check boxes.

· Enter the input multicast address of the metadata server, the UDP port, and the stream Id type.

· If you are using source-specific multicast, enter the source interface IP address.

3. Click **Apply**.
4.10 Configuring Postprocessing

Use the PostProcess tab to configure postprocessing of the entire output stream. You can configure up to eight Ids and add them to the list.

To configure the PostProcess tab, perform the following:

1. Select the **PostProcess** tab.

   See Figure 4–12.

2. Select an Id from the drop-down menu.

3. Select a Type and configure its parameters, the types are:

   - **Linear Filter** – To sharpen the edges of the video, mark the **Linear Filter** check box. You can choose to sharpen or soften the intensity. Either enter a number, or drag the slider to change. The total range is 0 to 20, and the default is 10. This parameter consumes more processing power. Mark the **Only Y** check box to process only the Y component, this uses less processing power than when using all components.

   - **Bitmap Alpha Comp** – To overlay a bitmap pattern, copy the .bmp file to `c:\Program Files\Harmonic\HDM\Plugins\PluginPostProcessAlphaComp\` on the HDM Manager computer, mark the **Bitmap Alpha Comp** check box, and select the graphic file. You may need to create the `PluginPostProcessAlphaComp` folder.

   - **Vertical Offset** – To shift the output on the screen, mark the **Vertical Offset** check box, and enter the offset (positive or negative) in pixels. No need to check this box for most STBs.

   - **Scroll text** – Enter the text in the Text box and configure the following parameters:

     - Color
     - Font
     - X
     - Y
     - Width
     - Height
4. Click **Add** to add the process to the list.

4.11 **Mapping Channels**

Use the Channel Mapping tab to predefine input sources. After you have created channel mappings, you can select a predefined channel in Thumbnail Properties dialog boxes and on the Background and Auxiliary audios tabs.

To modify a predefined channel, or to define a new one, select the **Channel Mapping** tab. See Figure 4–13.
4.11.1 Modifying a Predefined Channel

To modify a predefined channel:

1. Select the channel listing in the table.
2. In the fields below, make any desired changes to the Address, Port, or PID fields. (To change a channel's name, you must delete the channel, then add it as a new channel.)
3. Click the Modify button. (When you click on a channel in the list, the Modify button replaces the Add button.)

![Figure 4–13: Channel Mapping tab](image)

4.11.2 Predefining a Channel

At the top of the tab is the current list. You can perform the following functions on channels:

- Add
- Modify
- Remove
- Load – this loads from the client
- Save – this saves to the client
To predefine a channel:

1. Configure the following parameters:
   - Name
   - Channel Id
   - **Logo** – If you want to display a logo for the thumbnail, select the path and name of the graphic from the drop-down menu. Logo files are stored on the Mosaic Prostream server at C:\Program Files\HARMONIC\HDM\logos.
   - **Multicast Address** – The multicast IP address of the source, either MPTS or SPTS.
   - **Port** – The multicast UDP port number that the source is received from.
   - **IP Source** – The IP address of the source.
   - **PIDs** – Set the video and audio PIDs.
   - **File** – A file source for your thumbnail. Supported file types are: MPEG2 TS and h.264 in MPEG2 TS. Transport files are stored on the Mosaic Prostream server at C:\Program Files\HARMONIC\HDM\transports.
   - **Scan** – Click **Scan** to view the programs available in the SPTS or MPTS source, and select the program you want to create the thumbnail for. Select the MPEG program number in the drop-down menu. HDM Manager automatically enters the video and audio PIDs in the appropriate fields when you select the program.

2. Click **Add**.

### 4.12 Viewing the Transport Stream Tree

Use the TS Tree tab for a tree view of the output transport stream. To see a tree view of the output, select the **TS Tree** tab.

The TS tree shows the stream type, bit rate, and PID of each output stream.

See Figure 4–14.

![Figure 4–14: TS Tree tab](image)
4.13 Alarms tab

This tab displays the current alarms. For information about the Alarms tab, see 7.2 Viewing Alarms on page 65.

4.14 Previewing the Output

After configuring all the options, preview the output. The Preview tab shows still photos of the thumbnails, which refresh every 2 seconds. See Figure 4–15.

![Figure 4–15: Preview tab](image)

You can also use an MPEG/IP decoder of any type to monitor the digital video composite and audio channels. Some test tools include IP set-top boxes and free software decoders found on the Internet.

The MPEG program is now ready to be injected into the channel lineup and decoded by the end receiver.

4.15 Logs Tab

For information about the Logs tab, see 7.1 Viewing Logs on page 64.
4.16 Saving Thumbnail Configuration Files

After configuring the thumbnails, save all configuration data in a configuration file. You can use this file as a template for other thumbnail configurations and as a backup file. Harmonic recommends creating a new configuration file every time you change any settings. To fully protect your backup configuration files, save a copy on a remote server, on removable media or include the files in nightly backups.

**NOTE:** HDM Manager creates configuration files in XML file format. Do not change the default setting in the Save as Type field when you save the file.

To save a thumbnail configuration, perform the following:
1. Click **Save** in the upper right corner of HDM Manager. The **Save As** dialog displays. The current configuration name displays in the **File name** box.
2. Navigate to the location where you want to save the file.
3. Enter a name for the file.
4. Click **Save**.

**NOTE:** If you choose a different name for the file other than the current thumbnail configuration name, the name for the thumbnail configuration in use does not change. You must use the Rename feature to rename the current configuration. The name of the current thumbnail configuration displays in the HDM Manager window title bar.

4.17 Loading Thumbnail Configuration Files

If you have saved thumbnail configuration files, you can load one of them into HDM Manager to restore a previous thumbnail layout and settings.

To load a thumbnail configuration file, perform the following:
1. Click **Load** in the upper right corner of HDM Manager. The **Select an XML mosaic file** dialog displays.
2. Find and select the configuration file you want to load.
3. Click **Open**.

**NOTE:** Loading a large configuration file may take several minutes.
4.18 Renaming the Thumbnail Configuration

When you rename the thumbnail configuration, you only rename the running configuration, the manager does not rename a file. The name of the current thumbnail configuration displays in the HDM Manager window title bar.

To rename the thumbnail configuration, perform the following:

1. Click **Rename**.
   
   The **Configuration name** dialog displays.

2. Enter the new name.

3. Click **OK**.
Cycler is used for automated cycling through different templates that are created with HDM Manager or with other applications in XML format. You can run multiple templates on Cycler. The maximum number of thumbnails on each SD template is 10 and each HD template is 3 or 4. You don’t need a dongle license to configure HDM Cycler and save configuration files but you do need a dongle license to start the cycle process.

**NOTE:** VRN and Cycler should not be used at the same time.

The sections are:

- **Starting HDM Cycler**
- **Configuring and Operating Cycler**
5.1 Starting HDM Cycler

To start HDM Cycler, perform the following:

1. Double-click the HDM Cycler icon or if it is minimized double-click the HDM Cycler icon in the taskbar notifications area.

   The HDM Cycler dialog displays.

2. Enter the IP address of the PS8K server in the Mosaic server box. If Cycler is running on the PS8K server then enter the loopback address of 127.0.0.1 and the port number in use.

5.2 Configuring and Operating Cycler

5.2.1 Adding Templates

To add a template, perform the following:

1. Click an empty space in the XML Template List Box. See Figure 5–1.

2. Click the browse button in the Page box.

   The Select an XML mosaic cfg file dialog displays.

3. Browse to the template filename.

4. Click the template filename.

5. Click Open.

6. Enter the display duration in seconds in the Duration (sec) box.
7. Click Add.
   The template file name displays in the XML Template List Box.

5.2.2 Changing a Template Display Duration

To change a template display duration, perform the following:
1. Click the template row in the XML Template List Box. See Figure 5–1 on page 49.
2. Enter the display duration in seconds in the Duration (sec) box.
3. Click Modify.

5.2.3 Changing the Position of a Template in the Sequence

To change the position of a template in the sequence, perform the following:
1. Click the template row in the XML Template List Box. See Figure 5–1 on page 49.
2. Click the up and down buttons to change the position of the template in the sequence.

5.2.4 Removing a Template from the List

To remove a template from the list, perform the following:
1. Click the template row in the XML Template List Box. See Figure 5–1 on page 49.
2. Click Remove to remove the template.

5.2.5 Removing all the Templates

To remove all the templates, perform the following:
❖ Click the Remove all button. See Figure 5–1 on page 49.

5.2.6 Saving the Configuration

You can save as many configuration files as you need. The configuration files contain the paths and filenames of the template files as well as their sequence and display duration.

To save the Cycler configuration, perform the following:
1. Click Save in the Config box. See Figure 5–1 on page 49.
   The Save As dialog displays.
2. Browse to the PS8K XML files folder.
3. Enter a name for the new configuration file.
4. Click Save.
5.2.7 Loading the Configuration

To load the Cycler configuration, perform the following:
1. Click Load in the Config box. See Figure 5–1 on page 49.
   The Select an XML mosa cycling cfg file dialog displays.
2. Browse to the PS8K XML files folder.
3. Click the filename.
4. Click Open.

5.2.8 Starting the Cycle Process

To start cycling the templates, perform the following:
❖ Click Start. See Figure 5–1 on page 49.
The VRN (Video Rich Navigation) System enables generation of VRN metadata by the Mosaic. This metadata is sent to the STB as a data PID and is multiplexed in the Mosaic video output. The STB client recognizes this metadata and displays the Mosaic screen with the VRN info and menus which come from the ROVI server.

**NOTE:** VRN and Cycler should not be used at the same time.

The sections are:

- Starting the VRN System
- Setting up Communication between VRN and PS8K.
- VRN System Configuration
6.1 Starting the VRN System

Before running the VRN System check the icon notification area in the Windows Taskbar for any running instances of the VRN System.

CAUTION: It is possible to run multiple instances of the VRN System but it is not recommended.

To start VRN System, perform the following:

❖ Double-click the **VRN System** icon.

The VRN System dialog displays.

![Figure 6–1: The VRN System dialog](image)
6.2 Setting up Communication between VRN and PS8K.

You must first configure the Remote Management Parameters in HDM Quick Setup before you run VRN.

To set up communication between the VRN System and PS8K, perform the following:

1. In VRN System select File > Configuration.

The Communication configuration dialog displays.

![Figure 6–2: Configuration dialog](image)

2. Configure the IP address and port number. The Mosaic HTTP server address is the physical IP address of the HTTP Mosaic server (you can trace the IP address in the Quick SET-UP). If you are installing VRN on the server then enter the loop back address (127.0.0.1) for the Mosaic HTTP server.

PS8K automatically connects to the new server, and updates the channels map.

3. Configure the VRN System sender configuration address and port. VRN System sender configuration is the Multicast Output address of the VRN server. This address must be configured in the Output config tab in the Metadata box for VRN of the HDM Manager.

4. Select the physical address of the NIC from the drop down list.

5. Configure TTL (time-to-live) and Cycle time in milliseconds.

6. Click OK.

VRN System automatically starts sending VRN metadata to this new multicast host.

See Figure F–1 on page 99.
6.3 VRN System Configuration

The PS8K creates the VRN metadata stream which contains the current VRN System configuration sent as a data PID for decoding by the STB. The VRN System configuration can be created by different VRN templates and consists of different object IDs that can be configured.

6.3.1 VRN System Template Configuration GUI

VRN template tabs consist of objects. Each object has an ID number. You can configure the object ID numbers through the GUI. The channels in the drop-down menus are the channels defined on the Channel Mapping tab of the HDM manager.

The finger menus are pre-defined and are presented on the left side of the STB screen as VRN info. You can show/hide these finger menus as well as change the template colors.

6.3.2 General Configuration

Two kinds of fields are present, channel field (as combo box) and information field (as edit box). In all channel fields, there is a list of programs retrieved from the mosaic server. This combo is useful to set which program is associated with the selected object ID (specified on the top left of all frames). Information fields allow user to set some text description in ASCII1 format. Two font tables are available to print special characters such as small icons. See Figure G–1 on page 100 and Figure G–2 on page 100.

6.3.3 Templates

The template layouts with their keys follow:

- Template 1
- Template 2
- Template 3
- Template 4
6.3.3.1 Template 1

See Figure 6–3 for the Template 1 layout.

![Figure 6–3: Template 1 tab]

Configurable object IDs for Template 1 are objects 9-13. See Figure 6–4.

![Figure 6–4: Template 1 key]

The list of configurable object IDs and descriptions follow:

- Object Id 9 – you can choose a channel from the drop down list
- Object Id 10 – text for object Id 9
- Object Ids 11, 12, 13 – you can choose a channel from the drop down list
- Object Ids 11a, 12a, 13a – text label for the thumbnails
- Object Id 8 – info data that is retrieved from EPG
6.3.3.2 Template 2

See Figure 6–5 for the Template 2 layout.

![Figure 6–5: Template 2 tab](image)

Configurable object Ids for Template 2 are objects 9-12. See Figure 6–6.

![Figure 6–6: Template 2 key](image)

The list of configurable object Ids and descriptions follow:

- Object Ids 9, 10, 11, 12 – you can choose a channel out of the drop down list
- Object Ids 9a, 10a, 11a, 12a – text label for the thumbnails
- Object Id 8 – info data that is retrieved from EPG
6.3.3.3 Template 3

See Figure 6–7 for the Template 3 layout.

Figure 6–7: Template 3 tab

Configurable object Ids for Template 3 are objects 9-14. See Figure 6–8.

Figure 6–8: Template 3 key

The list of configurable object Ids and descriptions follow:

- Object Ids 9, 10, 11, 12, 13, 14 – you can choose a channel out of the drop down list
- Object Id 9a, 10a, 11a, 12a, 13a, 14a – text label for the thumbnails
- Object Id 8 – info data that is retrieved from EPG
6.3.3.4 Template 4

See Figure 6–9 for the Template 4 layout.

Object Ids 8-19 are poster art pictures that represent VOD assets. See Figure 6–10.
This template is a poster art template. No thumbnails are necessary on the manager. The template should be prepared graphically on the following base template:

![Base Template Image]

You can use any paint box to place your pictures on the blocks and save the file as background according to the following example:

![Example Image]

Place this background in the C:\Program Files\HARMONIC\HDM\Backgounds folder.

For each object you should specify the Asset Id. This is the reference for VRN to which asset info from the VOD server it should refer to.

### 6.3.4 Other Template Configurational Settings

See Figure 6–11 for the following template configurational settings:

- **Palette Color**
- **Configuring the Background**
- **Configuring the Ticker**
Palette Color
You can select from a list of colors.

Configuring the Background
To configure the background, perform the following:
1. Mark the **Use background** check box.
2. Select a file from the drop-down menu.
Configuring the Ticker

The HDM Manager must be configured before you can use the Ticker. See 3.5 Preliminary configuration in the HDM manager to support VRN on page 19.

To configure the Ticker, perform the following:
1. Mark the Use ticker check box.
2. Enter the ticker text into the edit box.

![Figure 6–12: Template tab parameters](image)

Load

You can load a template file in XML format.

Save

You can save a template file in XML format.

6.3.5 Actions:

After configuration is done you have 2 options:
- Apply Now
- Add to Sched

6.3.5.1 Apply Now

Click the Apply now button to apply the current template, background and ticker configurations.

6.3.5.2 Add to Sched

You can choose to schedule different background and ticker definitions with the Scheduler. The same template can be used in multiple schedules.

To add a new schedule action, perform the following:
1. Configure a template.
2. Click Add to sched.
3. The Action scheduling dialog displays.
4. Configure the General and Repeat parameters for activating the template on specific days and at a specific time.
5. Click OK.
   - The Save As dialog displays.
6. Enter a filename or click an existing filename and click Save.
   - The new schedule displays in the Actions Scheduler list.
6.3.6 **Actions Scheduler**

With the Actions scheduler you can perform the following schedule operations:

- Modify
- Remove
- Load
- Save

### 6.3.6.1 Modify

To modify a schedule, perform the following:

1. Select a schedule in the Actions scheduling box.
2. Click **Modify**.
   The Actions scheduling dialog displays.
3. Configure the General and Repeat parameters for activating the template on specific days and at a specific time.
4. Click **OK**.

### 6.3.6.2 Remove

To remove a schedule, perform the following:

- Click **Remove**.

### 6.3.6.3 Load

You can load a schedule list in XML format.

### 6.3.6.4 Save

You can save the schedule list in XML format.
Chapter 7
Maintenance and Troubleshooting

The sections are:

- Viewing Logs
- Viewing Alarms
- Solving Problems
- Restoring or Upgrading a PS8K System
- Contacting Harmonic Support

7.1 Viewing Logs

Logs are displayed in the Logs tab of the HDM interface. See Figure 7–1.

![Example of display in Logs tab](image)

Figure 7–1: Example of display in Logs tab
There are several ways to view the information in the log tab, namely:

- **Type** – Mark either or both check boxes: **Actions** and **Alarms**.

- **Date**:
  - **From To** – To display a range of dates, mark this check box then enter the starting and ending dates. Enter the dates with year, month, and day in the form of YYYY/MM/DD.
  - **Most recent** – To see the most recent items, mark this check box then specify how many you want to see.

- **Disable updates** – Mark this check box to stop new messages from being shown. Click again to enable the display of new messages.

- **Sort order** – You can set the sort criteria to see your logs displayed. Click a column to re-sort the entries by date, time, type, origin, content, and info (log message). A triangle appears in the selected columns. Click that column again to reverse the order.

Select an item in the upper list to see the XML data relevant to the log item selected in the upper box.

### 7.2 Viewing Alarms

Alarms are displayed on the Alarm tab of the HDM interface. See **Figure 7–2** on page 65.

![Example of display in Alarms tab](image)
## 7.3 Solving Problems

Table 7–1 provides a list of common problems and their resolutions.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cannot connect to the HTTP servers.</td>
<td>■ If you were previously able to connect to the server from the remote client PC, verify that the connection still exists by sending a ping to the target PS8K.</td>
</tr>
<tr>
<td></td>
<td>■ If a ping response occurs, check the PS8K and verify that the HTTP Server application is started on the platform. See 2.5 Starting the ProStream 8000 on page 9 for instructions.</td>
</tr>
<tr>
<td>I connected to the HTTP server but received the message “Cannot Connect to Mosaic Source” or “Cannot Connect to Mosaic Builder.”</td>
<td>This error occurs when the HTTP server is operational, but the interconnections between the HDM Source and HDM Builder are incorrect.</td>
</tr>
<tr>
<td></td>
<td>■ On the PS8K platform, verify that the HDM Source is sending information to the loopback address (127.0.0.1).</td>
</tr>
<tr>
<td></td>
<td>■ Verify that the HDM Builder is receiving at the loopback address (127.0.0.1).</td>
</tr>
<tr>
<td></td>
<td>■ See 2.5.1 Configuring with HDM Quick Setup on page 10 and 2.5.3 Configuring the HDM Builder on page 12 for instructions.</td>
</tr>
<tr>
<td>There is no output from the PS8K.</td>
<td>■ On the PS8K platform, verify that there are four icons in the lower right corner of the window.</td>
</tr>
<tr>
<td></td>
<td>■ If the B2 Stream Server icon is missing, verify that the dongle with the software license key is inserted correctly into the USB port of the unit.</td>
</tr>
<tr>
<td>The output video thumbnails look “jerky.”</td>
<td>■ Load a moving video background (if one is available) and observe the entire output.</td>
</tr>
<tr>
<td></td>
<td>■ If the thumbnails are jerky but the moving background is displayed correctly, check the video sources or the IP switch delivering the content, and confirm that no packet overloading is occurring.</td>
</tr>
<tr>
<td>The entire output video macroblocks or looks “jerky.”</td>
<td>This problem may occur if the output program stream is oversubscribed.</td>
</tr>
<tr>
<td></td>
<td>■ The first step is to reduce the video bit rate dramatically so that the overall bit rate of the video, audio, and metadata streams use less bandwidth than the bit rate set for the transport.</td>
</tr>
<tr>
<td></td>
<td>■ The lower right graphical indicator will reveal whether the PIDs all fit within the envelope by changing color from red (oversubscribed) to green (sufficient).</td>
</tr>
<tr>
<td></td>
<td>■ If reducing the bit rates does not fix the problem, reload the configuration by first removing all components or connecting to the platform and clicking “Overwrite the existing configuration.”</td>
</tr>
</tbody>
</table>

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This section describes how to restore the operating system, and how to install and upgrade the PS8K applications.

Version 6.0 of the ProStream 8000/PS8K is supported on Dell PowerEdge R610 computers with Microsoft Windows 2003, Service Pack 2 installed.

### 7.4.1 PS8K CDs

Harmonic provides two types of CDs to restore the PS8K platform computer in the event of a disk crash or other failure. They are:

- **Four Disks from Dell:**
  - DELL Build and Update Utility (Bootable CD)
  - DELL Systems Service and Diagnostics Tools
  - Two disks for the Operating System – Microsoft® Windows 2003 Server 2003 R2, Standard Edition SP2 (disk 1 and disk 2)

- **One disk for ProStream 8000, Version 6.0**

The Dell platform recovery CDs configure the following:

- Windows 2003 Server
- Service Pack 2, hardware drivers
- Dell documentation

The PS8K application CD provides:

- The PS8K applications
- PDF files of the product documentation

### Problem

<table>
<thead>
<tr>
<th>Problem</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple service icons appear in the lower right corner of the taskbar.</td>
<td>This problem results in a disruption of the output and requires resetting the system files.</td>
</tr>
<tr>
<td></td>
<td>- Uninstall the PS8K software.</td>
</tr>
<tr>
<td></td>
<td>- Open this folder: C:\Program Files\Harmonic</td>
</tr>
<tr>
<td></td>
<td>- Delete these two files: HDM_Source.xml</td>
</tr>
<tr>
<td></td>
<td>- Install the PS8K software as described in 7.4.3 Installing the PS8K Applications on page 68.</td>
</tr>
<tr>
<td></td>
<td>- Reboot the system when the installation finishes.</td>
</tr>
</tbody>
</table>
7.4.2 Restoring the Operating System from the Recovery CD

Restore the operating system on the computer before installing the PS8K applications.

NOTE: Restoring the operating system formats the hardware and overwrites any PS8K configuration files saved on the computer. If you do not already have configuration files saved in another location, you might want to try to retrieve them from the computer before restoring the operating system.

To install Windows 2003 Server on the failed computer:

1. Insert the first operating system recovery CD (Build and Update Utility, Disk 1 of 2) into the CD-ROM drive.
2. Restart the computer.
5. Follow the onscreen instructions to set up Windows 2003 Server. The interface will collect information, and will tell you which CD to insert next. Generally, accept the defaults when they are offered.
   - For RAID, choose Yes, configure RAID. In the next window, select RAID 1 (mirroring), and accept the default for size.
   - For the Network Adapter Configuration enter the IP address and subnet mask for both NICs.
   - For File System Boot environment, select NTFS and accept its defaults.
   - When you see the option for SNMP, choose yes to install SNMP.
   - Choose yes for Install Server Administrator.

NOTE: When the Install disks are working, there is no need to interrupt and configure anything during the automatic processes.

6. After following the onscreen instructions and installing Windows, you have an opportunity to download the latest security files. It is recommended that you do this. You will need an internet connection.

When the Windows 2003 installation finishes, the computer automatically restarts and the Windows updates that you chose are installed.

7.4.3 Installing the PS8K Applications

After the computer restarts, log in to Windows with an administrator account.

NOTE: Be sure to log in to the computer with the Administrator account or as a user with administrator privileges. You must have administrator privileges to install PS8K software.

7.4.3.1 Installing the ProStream Applications

The ProStream 8000 CD includes:
- Several programs necessary for ProStream, including:
  - Wibukey software for the dongle
  - XML parser software
  - DirectX
Intel Integrated Performance Primitives RTI 5.2 (for the PC CPUs)

- Two Prostream 8000 applications:
  - HDM
  - HDM_Manager

To install the ProStream applications, perform the following:

1. Insert the ProStream CD into the CD-ROM drive.
2. Navigate to the System folder on the CD and double-click the ProStream 8000 setup icon.
3. Follow the onscreen instructions, and click Next after completing each screen.
4. On the Options screen, select the components to install, and click Next.
   - For the ProStream 8000 single platform or the base platform in a distributed architecture, select Builder, Source, and HTTPServer.
   - For a source platform in a distributed architecture, select only the Source application.
5. On the Select Installation Folder screen, click Next. Harmonic recommends setting this to the default location.
6. On the Start Installed Services screen, select No, and click Next. Harmonic recommends starting the services automatically.
7. Click Next to confirm the installation.
8. When the installation is complete, eject the ProStream 8000 CD.
9. Plug the dongle into the USB port at the back of the platform.
10. Restart the computer.
11. Set up the applications as described in Chapter 2, How to Set Up and Configure the ProStream 8000.

### 7.4.4 Installing the HDM Manager Application

Because Harmonic recommends installing HDM Manager on a different computer, you do not need to restore the HDM Manager application if there is a failure on the PS8K platform. However, if you do need to install HDM Manager on another computer, follow the instructions in 3.1 Installing HDM Manager on a Client PC on page 16.

### 7.4.5 Upgrading the PS8K Applications

Harmonic provides software upgrades to the PS8K applications.

To upgrade an existing installation of PS8K applications, perform the following:

1. Navigate to Control Panel > Add or Remove Programs and uninstall the HDM and HDM Manager applications.
2. Restart the computer.
3. Install the PS8K applications, as described in 7.4.3 Installing the PS8K Applications on page 68.
7.5 Contacting Harmonic Support

The Harmonic Customer and Technical Support groups are available to help you with any questions or problems you may have regarding Harmonic products.

For assistance from within the U.S. and Canada, call toll free:
1.888.MPEGTWO (673.4896)

For assistance from outside the U.S. and Canada, call:
1.408.490.6477

The fax number is 408.490.6770

The email address is techhelp@harmonicinc.com.

The corporate address for Harmonic Inc. is:
Harmonic Inc.
549 Baltic Way
Sunnyvale, CA 94089, U.S.A.
Attn: Customer Support

The corporate telephone numbers for Harmonic Inc. are:
Tel. 1.800.788.1330 (from the U.S. and Canada)
Tel. +1.408.542.2500 (outside the U.S. and Canada)
Fax.+1.408.490.6708

The web address for Harmonic Inc. is www.harmonicinc.com.
Appendix A
Adjusting Thumbnail Quality

When you use a large number of thumbnails in your PS8K system, Harmonic recommends adjusting the thumbnail video quality to conserve system resources. You can adjust the video quality through either decoding resolution or the resize quality option. This appendix describes both.

You set the parameters for decoding resolution and resizing quality in the Add Thumbnail dialog box, as described in 4.2 Creating Thumbnails on page 22.

The sections are:
- Decoding Resolution
- Resizing Quality Modes
- Recommendations for Thumbnail Adjustments

A.1 Decoding Resolution

There are three types of decoding resolution:
- Full Decoding Resolution
- Half Decoding Resolution
- Quarter Decoding Resolution

A.1.1 Full Decoding Resolution

Full decoding resolution decodes the source video with full horizontal and vertical resolution. Harmonic recommends this option for large thumbnails.

A.1.2 Half Decoding Resolution

Half decoding resolution provides the best video quality for thumbnails. It decodes the source video with full horizontal and half vertical resolution. Harmonic recommends this option for thumbnails with a horizontal resolution greater than half of the source video resolution.

A.1.3 Quarter Decoding Resolution

Thumbnails with a resolution of less than half the size of their source may achieve equivalent video quality by using either half or quarter decoding resolution. The main advantage of quarter decoding is that it helps conserve system resources.

When there are nine or more thumbnails within a mosaic, thumbnail sizes decrease and will fall within the resolution range for quarter decoding. Quarter decoding resolution decodes the source video with half horizontal and half vertical resolution. Harmonic recommends this option for thumbnails with a horizontal resolution of less than half of the source video resolution.

With quarter decoding resolution, some MPEG source streams may contain long groups of pictures (GOPs) that could cause excessive blurring in the video. In this case, Harmonic recommends using half decoding resolution.
A.1.4 Example of Half and Quarter Decoding Resolution

Figure A–1 shows an example of thumbnail resolution ranges for decoding resolution.

![Image](image_url)

Figure A–1: Quarter and half resolution decoding

A.2 Resizing Quality Modes

Image interpolation (or image resizing) is a mathematical process of averaging pixel information to create or discard pixels to enlarge or reduce the size of an image. The resizing option offers three modes (or algorithms) of image interpolation: high, med, and low. Each mode provides a different level of interpolation accuracy (or quality) and computational efficiency.

As the accuracy of the interpolation increases, more system resources are required to support the computational process. With three modes of interpolation, the performance of the PS8K is scalable. You can adjust video quality and system resource allocations to increase the number of thumbnails available for the creation of a mosaic.

NOTE: The further the thumbnail size deviates from the output resolution, the more accurate the interpolation needs to be.

A.2.1 High

The high mode uses super sampling interpolation. It provides the most accurate and high-quality interpolation, but has the most impact on system performance. This mode has the smoothest effect on the picture. In situations where system resources are low, use this mode only with thumbnails that have a horizontal resolution less than one-fifth of the targeted horizontal encoding resolution (mosaic video output).
A.2.2 Mid

The mid mode uses cubic interpolation. It is less accurate than the high mode, but it has less of an impact on system performance. This mode has a smoothing effect on the picture. In situations where system resources are low, use the mid mode with thumbnails that have a horizontal resolution less than one-third of the target horizontal encoding resolution (mosaic video output).

A.2.3 Low

The low mode uses linear interpolation. It is the least accurate of the three interpolations, but has the lowest impact on system performance. This mode has a sharpening effect on the picture. In situations where system resources are low, use the low mode with thumbnails that have a horizontal resolution larger than one-third of the target horizontal resolution encoding (mosaic video output).

A.2.4 Example of Resize Quality

Figure A–2 shows an example of thumbnail resolution ranges for resize quality.

Figure A–2: High, mid, and low interpolation
A.3 Recommendations for Thumbnail Adjustments

When making thumbnail adjustments, use HDM Manager from a remote system to avoid using additional system resources. See Chapter 4, *Operating the ProStream 8000*, for information about how to use and operate HDM Manager.

NOTE: Thumbnail changes are real-time. For this reason, Harmonic does not recommend setting adjustments with on-air systems. Any changes or adjustments needed should be tested with an off-air system. You could then apply the optimal settings from the testing to an on-air system by using a configuration file or manual entry.

The following are suggested practices for adjusting mosaic thumbnails:

- For up to eight thumbnails, create thumbnails with half decoding resolution and high interpolation. For nine or more thumbnails, use quarter decoding resolution and mid interpolation.
- Before attempting any thumbnail adjustments, you must:
  - Determine the number, size, and position of thumbnails within a mosaic.
  - Finalize the mosaic composition, including background, auxiliary audio, and output configurations.

NOTE: Adjusting the decoding resolution and resizing quality prior to finalizing the mosaic composition can cause varying results.

- Monitor the mosaic video output for any artifacts, freezing, or breakup.
- If the video output starts to show signs of artifacts, freezing, or breakup, make adjustments to thumbnails to stabilize the output video (usually by lowering the decoding resolution and resizing quality).
- Make adjustments in small intervals, checking results after each change.
Appendix B
PS8K XML Interface

This appendix describes the XML interface to the PS8K system, which enables an external manager or editor to control the PS8K.

The sections are:

- Introduction
- Checking Communication with the Server
- Monitoring Alarms
- Configuring Thumbnails
- Configuring the Background
- Configuring Auxiliary Audio
- Configuring the Output
- Getting the Whole Configuration
- Setting the Whole Configuration
- Examples

B.1 Introduction

The PS8K system runs an HTTP server, through which it can receive configuration settings from an external manager.

The interface is based on XML format over HTTP (that is, the XML body of the request is encapsulated in an HTTP POST method message).

The PS8K system replies to each message with an ACK or NACK XML message.

Failure to get settings will result in a NACK XML message with an optional error description:

```xml
<nack error="optional error desc"/>
```

The PS8K replies to successful operations with an ACK XML response with optional content depending on the request:

```xml
<ack thumbnails_version="TH_VER" auxaudios_version="AUX_VER" background_version="BACK_VER" param_version="PAR_VER" software_version="SOFT_VER" alarms_version="AL_VER">
  <content>Information you requested</content>
</ack>
```

Every acknowledged response includes version information for four parts of the mosaic, system software, and alarms:

- **TH_VER.** An integer incremented by 1 each time thumbnails are modified
- **AUX_VER.** An integer incremented by 1 each time auxiliary audios are modified
- **BACK_VER.** An integer incremented by 1 each time the background is modified
- **PAR_VER.** An integer incremented by 1 each time any other (mostly output) parameters are modified
• **SOFT_VER.** The software version of the PS8K system
• **AL_VER.** An integer incremented by 1 each time the alarms list is modified (an alarm was removed or added)

If one of the first four parameters changes, the configuration has changed.

### B.2 Checking Communication with the Server

```xml
<ping/>
```

### B.3 Monitoring Alarms

```xml
<get>
    <alarms/>
</get>
```

Response (when successful):

```xml
<ack>
    <alarms>
        <alarm id="ALARM_ID" type="ALARM_TYPE"
            ServiceAffecting="SERVICE_AFFECTING">alarm
description</alarm>
        <alarm id=... >
        <alarm id=... >
    </alarms>
</ack>
```

**ALARM_ID.** A predefined number that represents an alarm of a specific type. See Table B–1.

**ALARM_TYPE.** warning or error

**SERVICE_AFFECTING.** true or false

Table B–1: Alarms

<table>
<thead>
<tr>
<th>Alarm Id</th>
<th>Description</th>
<th>Alarm Type</th>
<th>Service Affecting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Builder is not responding.</td>
<td>Error</td>
<td>True</td>
</tr>
<tr>
<td>2</td>
<td>A source is not responding.</td>
<td>Error</td>
<td>True</td>
</tr>
<tr>
<td>3</td>
<td>CPU usage on base platform is too high ( &gt;90% ).</td>
<td>Warning</td>
<td>False</td>
</tr>
<tr>
<td>4</td>
<td>A thumbnail is missing or starving ( &lt;20 fps ).</td>
<td>Warning</td>
<td>False</td>
</tr>
<tr>
<td>5</td>
<td>Overflow condition; output bandwidth is oversubscribed.</td>
<td>Warning</td>
<td>True</td>
</tr>
</tbody>
</table>
B.4 Configuring Thumbnails

This section includes the following sub-sections:

- Getting All the Thumbnails
- Adding a Thumbnail
- Removing a Thumbnail
- Changing the Size of a Thumbnail
- Changing the Position of a Thumbnail
- Changing the Cropping of a Thumbnail
- Changing the Rounded Size of a Thumbnail
- Changing the Source (Localization) of a Thumbnail
- Changing the Source PID\s of a Thumbnail
- Changing the Layer of a Thumbnail
- Changing the Name of a Thumbnail
- Changing the Metadata Channel of a Thumbnail
- Changing the Metadata Text of a Thumbnail
- Changing the Language Descriptors of a Thumbnail

B.4.1 Getting All the Thumbnails

```
<get>
  <thumbnails/>
</get>
```

Response (when successful):

```
<ack>
  <thumbnails>
    <thumbnail name="THUMBNAIL_NAME1"
      layer="LAYER1" number="1">
      <PosX>X1</PosX>
      <PosY>Y1</PosY>
      <size>
        <width>WIDTH1</width>
        <height>HEIGHT1</height>
      </size>
      <RoundWidth>ROUNDWIDTH1</RoundWidth>
      <RoundHeight>ROUNDHEIGHT1</RoundHeight>
      <PIDVideo>VIDEONAME</PIDVideo>
      <PIDAudio>AUDIONAME</PIDAudio>
      <SourceAddress>MCAST_ADDRESS1</SourceAddress>
      <SourcePort>MCAST_PORT1</SourcePort>
      <audio_delay>AUDIO_DELAY1</audio_delay>
      <ResizeQuality>RQ1</ResizeQuality>
      <QuarterResolutionDecoding>QRD1</QuarterResolutionDecoding>
      <crop>
        <left>LEFT_CROP1</left>
    </crop>
  </thumbnail>
</thumbnails>
```
<add>
  <thumbnail name="thumbnail name" number="thumbnail number" layer="thumbnail layer">
    <PosX>X position</PosX>
    <PosY>Y position</PosY>
  </thumbnail>
...</add>

B.4.2 Adding a Thumbnail
<size>
  <width>thumbnail width</width>
  <height>thumbnail height</height>
</size>

<RoundWidth>width of optional rounded corner</RoundWidth>
<RoundHeight>height of optional rounded corner</RoundHeight>
<PIDVideo>PID of the video</PIDVideo>
<PIDAUDIO>PID of the audio (8191 if no PID)</PIDAUDIO>
<SourceAddress>multicast address of source TS</SourceAddress>
<SourcePort>multicast port</SourcePort>
<audio_delay>audio delay (ms) (positive value)</audio_delay>
<ResizeQuality>from 1(lowest) to 3(highest)</ResizeQuality>
<QuarterResolutionDecoding>QRD</QuarterResolutionDecoding>

With QRD in { quarter, half, full }
<crop>
  <left>left crop</left>
  <top>top crop</top>
  <right>right crop</right>
  <bottom>bottom crop</bottom>
</crop>
<Channel>Metadata channel number</Channel>
<Text>Metadata text</Text>
<AudioLang>Audio language descriptor (3 char.)</AudioLang>
</thumbnail>
</add>

B.4.3 Removing a Thumbnail
<remove>
  <thumbnail number="thumbnail number"/>
</remove>

B.4.4 Changing the Size of a Thumbnail
<set>
  <thumbnail_size number="thumbnail number">
    <width>NEW_WIDTH</width>
    <height>NEW_HEIGHT</height>
  </thumbnail_size>
</set>
B.4.5  Changing the Position of a Thumbnail

```xml
<set>
  <thumbnail_pos number="thumbnail number">
    <PosX>NEWPOSX</PosX>
    <PosY>NEWPOSY</PosY>
  </thumbnail_pos>
</set>
```

B.4.6  Changing the Cropping of a Thumbnail

```xml
<set>
  <thumbnail_crop number="thumbnail number">
    <left>NEWLEFTCROP</left>
    <top>NEWTOPCROP</top>
    <right>NEWRIGHTCROP</right>
    <bottom>NEWBOTTOMCROP</bottom>
  </thumbnail_crop>
</set>
```

B.4.7  Changing the Rounded Size of a Thumbnail

```xml
<set>
  <thumbnail_round_size number="thumbnail number">
    <RoundWidth>NEWROUNDWIDTH</RoundWidth>
    <RoundHeight>NEWROUNDHEIGHT</RoundHeight>
  </thumbnail_round_size>
</set>
```

B.4.8  Changing the Source (Localization) of a Thumbnail

```xml
<set>
  <thumbnail_source number="thumbnail number">
    <SourceAddress>NEW_MCAST_ADDRESS</SourceAddress>
    <SourcePort>NEW_MCAST_PORT</SourcePort>
  </thumbnail_source>
</set>
```

B.4.9  Changing the Source PIDs of a Thumbnail

```xml
<set>
  <thumbnail_pids number="thumbnail number">
    <PIDVideo>NEWPIDVIDEO</PIDVideo>
    <PIDAudio>NEWPIDAUDIO</PIDAudio>
  </thumbnail_pids>
</set>
```

B.4.10 Changing the Layer of a Thumbnail

```xml
<set>
  <thumbnail_layer number="thumbnail number">NEWLAYER</thumbnail_layer>
</set>
```
B.4.11 Changing the Name of a Thumbnail

<set>
  <thumbnail_name number="thumbnail number">
    NEWNAME
  </thumbnail_name>
</set>

B.4.12 Changing the Metadata Channel of a Thumbnail

<set>
  <thumbnail_channel number="thumbnail number">
    NEWCHANNEL
  </thumbnail_channel>
</set>

B.4.13 Changing the Metadata Text of a Thumbnail

<set>
  <thumbnail_text number="thumbnail number">
    NEWTEXT
  </thumbnail_text>
</set>

B.4.14 Changing the Language Descriptor of a Thumbnail

<set>
  <thumbnail_language_desc
    number="thumbnail number">
    NEWTEXT
  </thumbnail_language_desc>
</set>

B.5 Configuring the Background

This section includes the following sub-sections:

- Getting the Background
- Adding a Multicast MPEG Background
- Adding an Embedded MPEG or BMP Background File
- Adding an MPEG or BMP Background File Located on Server
- Setting No Background

B.5.1 Getting the Background

<get>
  <background/>
</get>

Possible responses (when successful):

Multicast MPEG Background

<ack>
  <background>
    <SourceAddress>multicast address</SourceAddress>
    <SourcePort>multicast port</SourcePort>
    <PIDVideo>PID of the video</PIDVideo>
  </background>
</ack>
Embedded MPEG or BMP Background File

<ack>
  <background>Base64Encoded Bytes of the background</background>
</ack>

MPEG or BMP Background File Located on Server

<ack>
  <background>
    <Path>relative path of the file on the server</Path>
  </background>
</ack>

B.5.2 Adding a Multicast MPEG Background

<set>
  <background>
    <SourceAddress>multicast address</SourceAddress>
    <SourcePort>multicast port</SourcePort>
    <PIDVideo>PID of the video</PIDVideo>
  </background>
</set>

B.5.3 Adding an Embedded MPEG or BMP Background File

<set>
  <background>Base64Encoded Bytes of the background</background>
</set>

B.5.4 Adding an MPEG or BMP Background File Located on Server

<set>
  <background>
    <Path>relative path of the file on the server</Path>
  </background>
</set>

For a video file, the path should be /mpeg2video/mybackground.ext
For a bitmap file, the path should be /bmp/mybackground.ext

B.5.5 Setting No Background

<set>
  <background/>
</set>
B.6 Configuring Auxiliary Audio

This section includes the following sub-sections:

- Adding a Multicast Auxiliary Audio Stream
- Adding an Embedded Auxiliary Audio File
- Removing an Auxiliary Audio Stream or File

B.6.1 Adding a Multicast Auxiliary Audio Stream

```xml
<add>
  <auxiliary_audio name="auxaudio name" number="auxaudio number">
    <PIDAudio>PID of the audio</PIDAudio>
    <SourceAddress>multicast address of source TS</SourceAddress>
    <SourcePort>multicast port</SourcePort>
    <audio_delay>audio delay (ms) (positive value)</audio_delay>
    <AudioLang>Audio language descriptor (3 char.)</AudioLang>
  </auxiliary_audio>
</add>
```

B.6.2 Adding an Embedded Auxiliary Audio File

```xml
<add>
  <auxiliary_audio name="auxaudio name" number="auxaudio number">
    <data>Base64Encoded Bytes of the Elem. Stream</data>
    <AudioLang>Audio language descriptor (3 char.)</AudioLang>
  </auxiliary_audio>
</add>
```

B.6.3 Removing an Auxiliary Audio Stream or File

```xml
<remove>
  <auxiliary_audio number="auxaudio number"/>
</remove>
```
B.7 Configuring the Output

This section includes the following sub-sections:

- Getting the Video Format
- Setting the Video Format
- Getting the Video Bit Rate
- Setting the Video Bit Rate
- Getting the Video Quality
- Setting the Video Quality
- Getting the Video Aspect Ratio
- Setting the Video Aspect Ratio
- Getting the SPTS SI
- Setting the SPTS SI
- Getting the SPTS Multicast Output
- Setting the SPTS Multicast Output

B.7.1 Getting the Video Format

```xml
<get>
  <video_format/>
</get>
```

Response (when successful):

```xml
<ack>
  <video_format>
    <size>
      <width>Width</width>
      <height>Height</height>
    </size>
    <framerate>Frame rate (floating value)</framerate>
  </video_format>
</ack>
```

B.7.2 Setting the Video Format

```xml
<set>
  <video_format>
    <size>
      <width>Width</width>
      <height>Height</height>
    </size>
    <framerate>Frame rate (floating value)</framerate>
  </video_format>
</set>
```
B.7.3 Getting the Video Bit Rate
<get>
   <bitrate/>
</get>

B.7.4 Setting the Video Bit Rate
<set>
   <bitrate>Bit rate value in bits/sec</bitrate>
</set>

B.7.5 Getting the Video Quality
<get>
   <motion_estimation/>
</get>

Response (when successful):
<ack>
   <motion_estimation>Value from 1 (lowest) to 32 (highest)</motion_estimation>
</ack>

B.7.6 Setting the Video Quality
<set>
   <motion_estimation>Value from 1 (lowest) to 32 (highest)</motion_estimation>
</set>

B.7.7 Getting the Video Aspect Ratio
<get>
   <aspect_ratio/>
</get>

Response (when successful):
<ack>
   <aspect_ratio>AR Value</aspect_ratio>
</ack>

B.7.8 Setting the Video Aspect Ratio
<set>
   <aspect_ratio>AR Value</aspect_ratio>
</set>

With AR Value in \{ 1:1, 3:4, 9:16 \}

B.7.9 Getting the SPTS SI
<get>
   <SI/>
</get>

Response (when successful):
<ack>
<SI>
  <service_id>ID (number) of the service</service_id>
  <name>Service Name</name>
  <PMT_PID>PMT PID</PMT_PID>
  <AUDIO_START_PID>Audio Start PID</AUDIO_START_PID>
  <METADATA_PID>metadata PID</METADATA_PID>
  <Text>Metadata text</Text>
  <metadata_bitrate>Metadata bitrate</metadata_bitrate>
</SI>
</ack>

B.7.10 Setting the SPTS SI

<set>
  <SI>
    <service_id>ID (number) of the service</service_id>
    <name>Service Name</name>
    <PMT_PID>PID where to place PMT table</PMT_PID>
    <AUDIO_START_PID>Audio tracks are on this PID + track number</AUDIO_START_PID>
    <METADATA_PID>PID to place metadata (0x1FFF if not interested)</METADATA_PID>
    <Text>Text placed in metadata</Text>
    <metadata_bitrate>Metadata bitrate in bits/sec</metadata_bitrate>
  </SI>
</set>

B.7.11 Getting the SPTS Multicast Output

<get>
  <multicast/>
</get>

Response (when successful):

<ack>
  <multicast>
    <address>multicast address</address>
    <port>multicast port</port>
    <ttl>TTL</ttl>
    <MTU>MTU (in bytes)</MTU>
  </multicast>
</ack>
B.7.12 Setting the SPTS Multicast Output

```xml
<set>
  <multicast>
    <address>multicast address</address>
    <port>multicast port</port>
    <ttl>TTL</ttl>
    <MTU>MTU (in bytes)</MTU>
  </multicast>
</set>
```

B.8 Getting the Whole Configuration

```xml
<get>
  <root>
</get>
```

Response (when successful):

```xml
<ack>
  <root>
    <NMS_IPAddress>NMS_IP_ADDRESS</NMS_IPAddress>
    <background>BACKGROUND</background>
    <width>Width</width>
    <height>Height</height>
    <framerate>Framerate (floating value)</framerate>
    <aspect_ratio>AR Value</aspect_ratio>
    <bitrate>Bitrate value in bits/sec</bitrate>
    <mux_bitrate>12160000</mux_bitrate>
    <multicast>
      <address>multicast address</address>
      <port>multicast port</port>
      <ttl>TTL</ttl>
      <MTU>MTU (in bytes)</MTU>
    </multicast>
    <motion_estimation>Value from 1 (lowest) to 32 (highest)</motion_estimation>
    <SI>
      <service_id>ID (number) of the service</service_id>
      <name>Service Name</name>
      <PMT_PID>PID where to place PMT table</PMT_PID>
      <AUDIO_START_PID>Audio tracks are on this PID + track number</AUDIO_START_PID>
      <METADATA_PID>PID to place metadata (0x1FFF if not interested)</METADATA_PID>
      <Text>Text placed in metadata</Text>
      <metadata_bitrate>Metadata bitrate in bits/sec</metadata_bitrate>
    </SI>
  </root>
```

With \( AR\ Value \) in \{ 1:1 ; 3:4 ; 9:16 \}
<thumbnails>
  <thumbnail name="thumbnail name"
    number="thumbnail number"
    layer="thumbnail layer">
    <PosX>X position</PosX>
    <PosY>Y position</PosY>
    <size>
      <width>thumbnail width</width>
      <height>thumbnail height</height>
    </size>
    <RoundWidth>width of optional rounded corner</RoundWidth>
    <RoundHeight>height of optional rounded corner</RoundHeight>
    <PIDVideo>PID of the video</PIDVideo>
    <PIDAudio>PID of the audio (8191 if no PID)</PIDAudio>
    <SourceAddress>multicast address of source TS</SourceAddress>
    <SourcePort>multicast port</SourcePort>
    <audio_delay>audio delay (ms)
      (positive value)</audio_delay>
    <ResizeQuality>from 1 (lowest) to 3 (highest)</ResizeQuality>
    <QuarterResolutionDecoding>QRD</QuarterResolutionDecoding>
    <crop>
      <left>left crop</left>
      <top>top crop</top>
      <right>right crop</right>
      <bottom>bottom crop</bottom>
    </crop>
    <Channel>Metadata channel number</Channel>
    <Text>Metadata text</Text>
    <AudioLang>Audio language descriptor
      (3 char.)</AudioLang>
  </thumbnail>
  <thumbnail ... /thumbnail>
</thumbnails>

<auxiliary_audios>
  <auxiliary_audio name="auxaudio name"
    number="auxaudio number">AUXILIARY_AUDIO</auxiliary_audio>
  <auxiliary_audio ...
    /auxiliary_audio>
</auxiliary_audios>

</root>
</ack>
B.9 Setting the Whole Configuration

```xml
<set>
  <root>
    <NMS_IPAddress>IP address of the NMS</NMS_IPAddress>
    <background>BACKGROUND</background>
    <width>Width</width>
    <height>Height</height>
    <framerate>Frame rate (floating value)</framerate>
    <aspect_ratio>AR Value</aspect_ratio>
    With AR Value in { 1:1 ; 3:4 ; 9:16 }
    <bitrate>Bitrate value in bits/sec</bitrate>
    <mux_bitrate>12160000</mux_bitrate>
    <multicast>
      <address>multicast address</address>
      <port>multicast port</port>
      <ttl>TTL</ttl>
      <MTU>MTU (in bytes)</MTU>
    </multicast>
    <motion_estimation>Value from 1 (lowest) to 32 (highest)</motion_estimation>
  </root>
  <SI>
    <service_id>ID (number) of the service</service_id>
    <name>Service Name</name>
    <PMT_PID>PID where to place PMT table</PMT_PID>
    <AUDIO_START_PID>Audio tracks are on this PID + track number</AUDIO_START_PID>
    <METADATA_PID>PID to place metadata (0x1FFF if not interested)</METADATA_PID>
    <Text>Text placed in metadata</Text>
    <metadata_bitrate>Metadata bitrate in bits/sec</metadata_bitrate>
  </SI>
  <thumbnails>
    <thumbnail name="thumbnail name" number="thumbnail number" layer="thumbnail layer">
      <PosX>X position</PosX>
      <PosY>Y position</PosY>
      <size>
        <width>thumbnail width</width>
        <height>thumbnail height</height>
      </size>
      <RoundWidth>width of optional rounded corner</RoundWidth>
    </thumbnail>
  </thumbnails>
</set>
```

1. See B.5 Configuring the Background on page 81.
<RoundHeight>height of optional rounded corner</RoundHeight>
<PIDVideo>PID of the video</PIDVideo>
<PIDAudio>PID of the audio (8191 if no PID)</PIDAudio>
<SourceAddress>multicast address of source TS</SourceAddress>
<SourcePort>multicast port</SourcePort>
<audio_delay>audio delay (ms) (positive value)</audio_delay>
<ResizeQuality>from 1 (lowest) to 3 (highest)</ResizeQuality>
<QuarterResolutionDecoding>QRD</QuarterResolutionDecoding>

With QRD in { quarter; half; full }
<crop>
  <left>left crop</left>
  <top>top crop</top>
  <right>right crop</right>
  <bottom>bottom crop</bottom>
</crop>
<Channel>Metadata channel number</Channel>
<Text>Metadata text</Text>
<AudioLang>Audio language descriptor (3 char.)</AudioLang>

1. See B.6 Configuring Auxiliary Audio on page 83.
B.10 Examples

Example 1:

```plaintext
POST HTTP/1.1
Host: 192.168.0.111
User-Agent: HDMManager/1.0
Accept: */*
Content-Length: 32
Connection: Keep-Alive
<?xml version="1.0"?>
<ping/>
```

Example 2:

```plaintext
POST HTTP/1.1
Host: 192.168.0.111
User-Agent: HDMManager/1.0
Accept: */*
Content-Length: 49
Connection: Keep-Alive
<?xml version="1.0"?>
<get><thumbnails/></get>
```
Appendix C Metadata

The PS8K system includes one metadata stream with each thumbnail. The metadata stream uses the following format.

XML structure in MPEG private section:
Stream type referenced by the PMT = 99
private_section() {

table_id = 99 (8 uimsbf)
section_syntax_indicator = 1 (1 bslbf)
private_indicator = 1 (1 bslbf)
reserved = 0xFF (2 bslbf)
private_section_length = (no size limit (12 uimsbf)
table_id_extension = (16 uimsbf)
reserved
version_number = (0..31) (5 uimsbf)
current_next_indicator = 1 (1 bslbf)
section_number = 1 (8 uimsbf)
last_section_number = 1 (8 uimsbf)
Mosaic XML structure (n x 8 bslbf)
CRC_32 = 0xFFFF (32 rpchof)
}

<?xml version="1.0" encoding="ISO-8859-1"?>
<root>
  <Metadata>
    <Mosaic Name = "Sports"></Mosaic>
    <bitrate>4000000</bitrate>
    <aspect_ratio>3:4</aspect_ratio>
    <Resolution>
      <width>704</width>
      <height>480</height>
    </Resolution>
    <Text>...</Text>
    <thumbnails>
      <thumbnail number="1" name="Golf">
        <PosX>474</PosX>
        <PosY>320</PosY>
        <width>188</width>
      </thumbnail>
    </thumbnails>
  </Metadata>
</root>
<height>30</height>
<PIDAUDIO>14</PIDAUDIO>
<AudioLang>HEB</AudioLang>
<Channel>140</Channel>
<Text>...</Text>
</thumbnail>
<thumbnail number="2" name="Fox">
<PosX>65</PosX>
<PosY>130</PosY>
<width>188</width>
<height>30</height>
<PIDAUDIO>24</PIDAUDIO>
<AudioLang>ENG</AudioLang>
<Channel>141</Channel>
<Text>...</Text>
</thumbnail>
<thumbnail number="3" name="ESPN">
<PosX>60</PosX>
<PosY>10</PosY>
<width>188</width>
<height>30</height>
<PIDAUDIO>34</PIDAUDIO>
<AudioLang>ESP</AudioLang>
<Channel>142</Channel>
<Text>...</Text>
</thumbnail>
<thumbnail number="4" name="NBC">
<PosX>65</PosX>
<PosY>167</PosY>
<width>188</width>
<height>30</height>
<PIDAUDIO>44</PIDAUDIO>
<AudioLang>FRN</AudioLang>
<Channel>143</Channel>
<Text>...</Text>
</thumbnail>
<thumbnail number="5" name="CNN">
<PosX>65</PosX>
<PosY>18</PosY>
<width>188</width>
<height>30</height>
<PIDAUDIO>54</PIDAUDIO>
<AudioLang>EGP</AudioLang>
<Channel>144</Channel>
<Text>...</Text>
</thumbnail>
<thumbnail number="6" name="NFL">
<PosX>260</PosX>
<PosY>18</PosY>
<width>188</width>
<height>30</height>
<PIDAudio>64</PIDAudio>
<AudioLang>RUS</AudioLang>
<Channel>145</Channel>
<Text>...</Text>
</thumbnail>
</thumbnails>
</Metadata>
</root>
Appendix D Command Line Interface

Use the PS8K command line to write scripts or batches to send commands automatically. The command line application is called HDM_control.exe and is available from Harmonic Inc. When installed it is located in the manager installation directory, typically c:\Program Files\Harmonic\HDMManager.

The sections are:
- CLI Commands
- Examples

D.1 CLI Commands

Table D–1 lists the supported commands. Each command has a long and short version.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-help</td>
<td>Show help.</td>
</tr>
<tr>
<td>-h</td>
<td></td>
</tr>
<tr>
<td>-check</td>
<td>Check the command line syntax instead of sending commands.</td>
</tr>
<tr>
<td>-c</td>
<td></td>
</tr>
<tr>
<td>&lt;mosaic_server_address&gt;:&lt;port&gt;</td>
<td>Connect to this address for the next commands.</td>
</tr>
<tr>
<td>-load &lt;xml_file_path&gt;</td>
<td>Load a configuration file.</td>
</tr>
<tr>
<td>-lc &lt;xml_file_path&gt;</td>
<td></td>
</tr>
<tr>
<td>-multicast_output &lt;multicast_adr&gt;:&lt;multicast_port&gt;:&lt;ttl&gt;:mtu&gt;</td>
<td>Change the multicast output parameters.</td>
</tr>
<tr>
<td>-mo &lt;multicast_adr&gt;:</td>
<td></td>
</tr>
<tr>
<td>&lt;multicast_port&gt;:&lt;ttl&gt;:mtu&gt;</td>
<td></td>
</tr>
<tr>
<td>-nobackground</td>
<td>Remove the mosaic background.</td>
</tr>
<tr>
<td>-nb</td>
<td></td>
</tr>
<tr>
<td>-background &lt;image_file_path&gt;</td>
<td>Change the mosaic background (BMP or MPEG image file).</td>
</tr>
<tr>
<td>-b &lt;image_file_path&gt;</td>
<td></td>
</tr>
<tr>
<td>-background_multicast &lt;source_adr&gt;:&lt;source_port&gt;:&lt;video_pid&gt;</td>
<td>Change the mosaic background (multicast MPEG background).</td>
</tr>
<tr>
<td>-bm &lt;source_adr&gt;:</td>
<td></td>
</tr>
<tr>
<td>&lt;source_port&gt;:&lt;video_pid&gt;</td>
<td></td>
</tr>
<tr>
<td>-mux_bitrate &lt;bits/s&gt;</td>
<td>Change the mosaic multiplex bit rate (bits/s).</td>
</tr>
<tr>
<td>-mb &lt;bits/s&gt;</td>
<td></td>
</tr>
<tr>
<td>-video_format &lt;width&gt; &lt;height&gt; &lt;frame_rate&gt;</td>
<td>Change the mosaic video format.</td>
</tr>
<tr>
<td>-vf &lt;width&gt; &lt;height&gt; &lt;frame_rate&gt;</td>
<td></td>
</tr>
</tbody>
</table>
Table D–1: CLI Commands continued

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-video_bitrate &lt;bits/s&gt;</td>
<td>Change the mosaic video bit rate (bits/s).</td>
</tr>
<tr>
<td>-vb &lt;bits/s&gt;</td>
<td></td>
</tr>
<tr>
<td>-video_quality &lt;motion_estimation&gt;</td>
<td>Change the mosaic video quality (1 to 32).</td>
</tr>
<tr>
<td>-vq &lt;motion_estimation&gt;</td>
<td></td>
</tr>
<tr>
<td>-aspect_ratio &lt;aspect_ratio&gt;</td>
<td>Change the mosaic video aspect ratio (1:1, 3:4, 9:16, or 1:2.21).</td>
</tr>
<tr>
<td>-ar &lt;aspect_ratio&gt;</td>
<td></td>
</tr>
<tr>
<td>-thumbnail &lt;n&gt;</td>
<td>Select the thumbnail number for the next thumbnail commands.</td>
</tr>
<tr>
<td>-t &lt;n&gt;</td>
<td></td>
</tr>
<tr>
<td>-source &lt;source_adr&gt;: &lt;source_port&gt; &lt;video PID&gt; &lt;audio PID&gt;</td>
<td>Change the thumbnail source address and port (and possibly, PIDs). Enter the video or audio PID value.</td>
</tr>
<tr>
<td>-s &lt;source_adr&gt;: &lt;source_port&gt; &lt;video PID&gt; &lt;audio PID&gt;</td>
<td></td>
</tr>
<tr>
<td>-pids &lt;video_pid&gt; &lt;audio_pid&gt;</td>
<td>Change the thumbnail source PIDs.</td>
</tr>
<tr>
<td>-p &lt;video_pid&gt; &lt;audio_pid&gt;</td>
<td></td>
</tr>
<tr>
<td>-audio_delay &lt;delay_ms&gt;</td>
<td>Change the thumbnail audio delay (ms).</td>
</tr>
<tr>
<td>-ad &lt;delay_ms&gt;</td>
<td></td>
</tr>
<tr>
<td>-layer &lt;layer_number&gt;</td>
<td>Change the thumbnail layer number.</td>
</tr>
<tr>
<td>-l &lt;layer_number&gt;</td>
<td></td>
</tr>
<tr>
<td>-position &lt;X&gt; &lt;Y&gt; &lt;width&gt; &lt;height&gt;</td>
<td>Change the thumbnail position. Enter the coordinates on the X and Y axes where you want to position the upper left corner of the thumbnail, and the thumbnail width and height.</td>
</tr>
<tr>
<td>-po &lt;X&gt; &lt;Y&gt; &lt;width&gt; &lt;height&gt;</td>
<td></td>
</tr>
<tr>
<td>-size &lt;width&gt; &lt;height&gt;</td>
<td>Change the thumbnail size.</td>
</tr>
<tr>
<td>-sz &lt;width&gt; &lt;height&gt;</td>
<td></td>
</tr>
</tbody>
</table>

All numerical values can be specified in one of the following formats:

- <decimal_value>
- 0x<hexadecimal_value>
- 0<octal_value>

Bit rate values can be specified in one of the following units:

- <bits/s>
- <kbits/s>k
- <Mbits/s>M
D.2 Examples

To connect to the PS8K with the IP address 192.168.0.115 port 80 and change the background to the file located at c:\newbackground.bmp:

```
192.168.0.115:80
-background c:\newbackground.bmp
```

To change the source of thumbnail number 1 to mcast group 230.3.0.1 port 1000 video PID 160 and audio PID 161:

```
-t 1 230.3.0.1:1000 160 161
```

Suppose the system requires a change in the background artwork on a regular basis. A BASH shell script with the following information may be run to send commands to the PS8K. This will enable the automatic changing of files on a scheduled basis.

To perform this task, enter the following lines either in the command line or in a batch file:

```
HDM_Control.exe target ipsocket -b path/filename1
//This command applies the file "filename" to the PS8K.
HDM_Control.exe target ipsocket -nb
//This command removes any background files or multicast streams from the background of the PS8K.
HDM_Control.exe target ipsocket -b path/filename2
//This applies the file "filename" to the PS8K.
```

With sample values, this example looks like the following text:

```
HDM_Control.exe 192.168.169.65:80 -b c:\mosaic\videobackgrounddaytime.mpv
HDM_Control.exe 192.168.169.65:80 -nb

HDM_Control.exe 192.168.169.65:80 -b c:\mosaic\videobackgroundnighttime.mpv
```
Appendix E
XML Configuration

The xml file (config.xml) contained in config folder, describes for all templates, links between template ‘ObjectID’ and thumbnail number on Mosaic manager.

This file (config.xml) has to be configured once. You just have to be sure that when you create thumbnails on Mosaic manager, they have the correct number.

```xml
<?xml version='1.0' encoding='UTF-8' ?>
<vmConfig version='1.1'>
  <vmTemplate name='NSM_VRN_TD1'>
    <object objectid='9' thumbnail='1'/>
    <object objectid='11' thumbnail='2'/>
    <object objectid='12' thumbnail='3'/>
    <object objectid='13' thumbnail='4'/>
  </vmTemplate>
  <vmTemplate name='NSM_VRN_TD2'>
    <object objectid='9' thumbnail='1'/>
    <object objectid='10' thumbnail='2'/>
    <object objectid='11' thumbnail='3'/>
    <object objectid='12' thumbnail='4'/>
  </vmTemplate>
  <vmTemplate name='NSM_VRN_TD3'>
    <object objectid='9' thumbnail='1'/>
    <object objectid='10' thumbnail='2'/>
    <object objectid='11' thumbnail='3'/>
    <object objectid='12' thumbnail='4'/>
  </vmTemplate>
  <vmTemplate name='NSM_VRN_TD4'>
    <object objectid='8' thumbnail='1'/>
    <object objectid='9' thumbnail='1'/>
    <object objectid='10' thumbnail='1'/>
    <object objectid='11' thumbnail='1'/>
  </vmTemplate>
  <vmTemplate name='NSM_VRN_TD7'>
    <object objectid='9' thumbnail='1'/>
    <object objectid='10' thumbnail='2'/>
    <object objectid='11' thumbnail='3'/>
  </vmTemplate>
</vmConfig>
```

![XML configuration diagram](image)

Figure E–1: XML configuration
Appendix F

Network Configuration

Figure F–1: Network Configuration
An Example of Using a Symbol

To print Free Movies ON Demand with an IPG symbol font for ON, a special string format is used.

The correct syntax is Free movies %i20,41 %i19 Demand.

The IPG symbol ON is described in Figure G–1 as symbol number 29 in hexadecimal. Therefore %i20,41 (29 hexadecimal, 41 decimal) sets the symbol ON and %i19 returns the normal font. If %i19 is omitted, the rest of the string is printed with symbols.
## Appendix H
### Dell® PowerEdge PS8K Platform Capabilities

Table H–1: Thumbnail Limitations for PowerEdge R610 and PS8K

<table>
<thead>
<tr>
<th>In Coding</th>
<th>Resolution</th>
<th>Out Coding</th>
<th>Resolution</th>
<th>Number of Thumbnails</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG-2 SD</td>
<td>SD (720x576)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1280x720)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1920x1080)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.264 SD (720x576)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1280x720)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1920x1080)</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPEG-2 HD 720p</td>
<td>SD (720x576)</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1280x720)</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1920x1080)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD 1080i</td>
<td>SD (720x576)</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1280x720)</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1920x1080)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.264 SD</td>
<td>SD (720x576)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1280x720)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (1920x1080)</td>
<td>14</td>
<td></td>
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</table>
Table H–1: Thumbnail Limitations for PowerEdge R610 and PS8K

<table>
<thead>
<tr>
<th>Coding</th>
<th>Resolution</th>
<th>In</th>
<th>Coding</th>
<th>Resolution</th>
<th>Number of Thumbnails</th>
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</thead>
<tbody>
<tr>
<td>MPEG-2</td>
<td>SD</td>
<td>SD  (720x576)</td>
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<td></td>
</tr>
<tr>
<td>MPEG-2</td>
<td>HD 720p</td>
<td>HD (1280x720)</td>
<td>10</td>
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<tr>
<td>MPEG-2</td>
<td>HD 1080i</td>
<td>HD (1920x1080)</td>
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Table H–2: Thumbnail Limitations for the Older PowerEdge 1950 and PS8K

<table>
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<td>Coding</td>
</tr>
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<td>MPEG-2</td>
<td>SD</td>
<td>MPEG-2 SD</td>
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<tr>
<td>MPEG-2</td>
<td>HD 720p</td>
<td>MPEG-2 HD</td>
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<tr>
<td>H.264</td>
<td>SD</td>
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</tr>
<tr>
<td>H.264</td>
<td>HD 720p</td>
<td>H.264 HD</td>
</tr>
</tbody>
</table>
Glossary

A

AAC-LC
Advanced Audio Code Low Complexity

Alarm Indicator
Displayed in the title bar of each page. It appears in red when an alarm is issued and notifies of a fault and of its nature.

AC-3
Audio Code number 3

ASI
Asynchronous Serial Interface. A DVB-defined interface protocol for carrying MPEG-2 transport streams at a constant or defined transmission rate.

B

bandwidth
The maximum amount of data that a transmission device (cable, fiber-optics link, satellite feed, and so on) is capable of carrying.

BER
Bit Error Rate.

BISS
Basic Interoperable Scrambling System

C

CA
Conditional Access.

CAM
Conditional Access Module

CAS
Conditional Access System. Scrambles the programming material and allows conditional access to the descrambled information on the basis of subscriber authorization.

CBR
Constant Bitrate
CC
Closed Caption; Continuity Counter

Copper Cable
A copper cable is comprised of twisted copper wires insulated with plastic. It is often used for computer network cabling. It is terminated with RJ-45 electrical connector.

Cue Tone
A sequence of audio tones used to prompt an action.

D
data stream
The continuous flow of information from one location to another.

dBm
Power ratio in decibels (dB) of the measured power referenced to one milliwatt.

Dolby Digital

DPI
Digital Program Insertion

DVB
Digital Video Broadcasting

DVB-CI
Digital Video Broadcasting – Common Interface

DVB-S
Digital Video Broadcasting – Satellite

DVB-S2
Digital Video Broadcasting – Satellite – second generation

E
EDH
Error Detection and Handling

ES
Elementary Stream

Ethernet
A data link (physical interface) developed for local area networks (LANs) that supports transmission rates up to 10 Mbps. Fast Ethernet supports transmission rates up to 100 Mbps.
FTA
Free To Air

GbE
Gigabit Ethernet. A transmission technology based on the Ethernet frame format and protocol used in local area networks that provide a data rate of 1 billion bits per second.

GOP
Group Of Pictures

HD
High Definition

HDM
Harmonic Digital Mosaic

HE AAC
High Efficiency Advanced Audio Code

headend
The distribution point in a TV system.

Hertz (Hz)
A unit of frequency defined as one cycle per second. Abbreviated Hz.

I

I/O
input/output. Refers to a connection that inputs and outputs data.

IOM Card
Cards that have two independent ports that when active support input and output traffic simultaneously.

IP address
An identifier for a computer or device on an Internet Protocol (IP) network. Networks using IP route messages based on the IP address of the destination. An IP address is a 32-bit number written in dotted decimal notation: four 8-bit sections, separated by periods, converted from binary to decimal. Each section is a number from zero to 255.
L

LC
A high-density optical connector used for single-mode and multimode fiber-optic applications.

LFE
Low-Frequency Effects

M

MPEG

MPTS
Multi Program Transport Stream.

Multimode fiber
Optical fiber designed to carry multiple light rays or modes concurrently each at a lightly different reflection angle within the optical fiber core. Multimode fiber transmission is used for relatively short distances because the modes tend to disperse over longer lengths. For longer distances, singlemode fiber is used.

mux
Abbreviation for multiplexer.

N

NIC
Network Interface Card

O

OS
operating system.

P

packet
A block of data used for transmission.

PCR
Program Clock Reference

PES
Packetized Elementary Stream
PER  
Packet Error Rate  

PiP  
Picture in Picture  

PTS  
Presentation Time Stamp  

PW  
Password  

PID  
packet identifier. Integer values used in the MPEG-2 standard to identify an elementary stream of a program within a transport stream.  

port  
A port is an input to or an output from a component, an adapter, or a module.  

R  
Redundancy  
A back-up system of Harmonic components that ensures uninterruptable service in the event of a component failure.  

S  
SD  
Standard Definition  

SDI  
Serial Digital Interface  

SDT  
Service Description Table  

singlemode fiber  
Optical fiber designed for the transmission of a single ray or mode of light as a carrier and is used for long-distance signal transmission. For short distances, multimode fiber is used.  

Scrambler  
A broadcasting device that can encode the incoming traffic.  

SFP Module  
A module that converts optical data into electrical data and vice versa.
SMPTE 333–2008
Society of Motion Picture and Television Engineers – DTV closed-caption server to encoder interface.

SMPTE 334–1–2007
Society of Motion Picture and Television Engineers – Vertical ancillary data mapping of caption and related data.

SPTS
Single Program Transport Stream

STB
Set-Top Box

SR
Symbol Rate

T

tp
transponder

transport stream
One or more multiplexed MPEG-2 programs.

V

VBI
vertical blanking interval

VRN
Video Rich Navigation

VBR
Variable Bitrate