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<td>电池 (Batteries)</td>
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O: 表示在该部件的所有均质材料中，此类有毒有害物质的含量均小于 SJ/T11363-2006 标准所规定的限量。

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Standards and Agency Approval

The following tables list regulatory standards and agency approvals:

### North America

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<td>EMI: FCC Part 15, Subpart B, ICES-003, Issue 2, Class A</td>
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<td>cTUV-us Mark</td>
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<tr>
<td>EMI: AS/NZS CISPR22:2006</td>
<td>N/A</td>
</tr>
</tbody>
</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:

<table>
<thead>
<tr>
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<th>Explanation</th>
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<tr>
<td>Typed Command</td>
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<tr>
<td>Buttons and Menus</td>
<td>Indicates a button to click, or a menu item to select.</td>
</tr>
<tr>
<td>&lt;Ctrl&gt;, &lt;Ctrl&gt;+&lt;Shift&gt;</td>
<td>A key or key sequence to press.</td>
</tr>
<tr>
<td>Links</td>
<td>The <em>italics in blue</em> text to indicate Cross-references, and hyperlinked cross-references in online documents.</td>
</tr>
<tr>
<td>Bold</td>
<td>Indicates a new term. For example: <strong>SpanWindow</strong> - the transmission frequency along the 1GHz spectrum allocated for each RF Port. It spans across 384MHz.</td>
</tr>
<tr>
<td>LCD Screen Output</td>
<td>The text that is displayed on an LCD console output.</td>
</tr>
<tr>
<td>ScreenOutput</td>
<td>The text that is displayed on a computer screen.</td>
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<td>Emphasis</td>
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Chapter 1
Preface

This guide introduces the ProStream 4000 hardware device and installation procedure. Furthermore, it describes the configuration of the underlying ProStream 4000 Platform upon which all applications run as well as the management of ProStream 4000 Web GUI where channel provisioning performs.

All the configuration procedures covered in this guide proceeds in stand-alone mode.

Organization of this guide

This installation guide is organized as follows:

- Chapter 1, Preface (this chapter), describes ProStream 4000 Platform, ProStream 4000 Web GUI and outlines the guide’s organization.
- Chapter 2, Introduction, describes the general capabilities of ProStream 4000 device.
- Chapter 3, Hardware Overview, provides an overview of ProStream 4000 hardware.
- Chapter 4, Getting Started with Platform, describes using the System Management Console (SMC).
- Chapter 5, Configuring ProStream 4000 on Platform, describes configuration of ProStream 4000 application.
- Chapter 6, Configuring Platform, describes general configuration on ProStream4000 platform.
- Chapter 7, Platform Operation, describes basic system startup and shutdown operations.
- Chapter 8, Platform Diagnostic Logs, describes event logs and the system message logger.
- Chapter 9, Using ProStream 4000 Web GUI, introduces the overview of ProStream4000 Web GUI.
- Chapter 10, Configuring Channel Input, has information about the procedure to configure input for channel.
- Chapter 11, Configuring Video Encoding Profile, has information about the procedure to configure video encoding profile.
- Chapter 12, Configuring Audio Encoding Profile, has information about the procedure to configure audio encoding profile.
- Chapter 13, Configuring Channel Output, has information about the procedure to configure output for channel.
- Chapter 14, Monitoring and Troubleshooting, covers maintenance and monitoring tasks, and Harmonic Support contact information.
- Appendix A, Technical Specifications, has references for H.264 compliance, H.264 encoding levels, and audio encoding bit rates for all codec types.
- Glossary, provides definitions for the most common abbreviations and acronyms used in this document.
This chapter describes the overview and capabilities of ProStream 4000 device. It includes the following sections:

- Overview
- Capabilities
- Input
- Processing
- Output

## 2.1 Overview

ProStream 4000 series multi-screen transcoder/encoder is designed to re-encode MPEG2 or MPEG4 AVC content to codec, resolution, and format that are appropriate for streaming to PC, mobile devices, and TV.

It is equipped with a compelling video/audio compression and pre-processing solution integrating into Harmonic’s robust processing platform that has full capability to execute encoding and transcoding of video/audio signal.

It supports a variety of audio/video codec, resolution, and output format including Apple HTTP live streaming, Microsoft Smooth Streaming, RTP, Windows Media, Flash, and TS (Transport Stream).

The functionality of multiple bitrate for video/audio encoding also enables great flexibility for streaming so as to achieve the optimized rate for extensive range of viewers.

![Figure 2–1: ProStream 4000 Deployment](image)

## 2.2 Capabilities

ProStream 4000 series transcoder is capable of encoding live video and audio to various codecs with a selectable frame size, frame rate, various audio codecs and transport formats.

ProStream 4000 models are available with:

- IP interface—accepts MPEG-2 TS/UDP/IP input signals
- SDI interface—accepts SDI and HD-SDI input signals
The all-IP architecture enables seamless, low-cost integration into existing headends, allowing operators to offer Mobile TV channels and Internet TV channels, as well as “Sync and Go” services. It supports a variety of audio/video codecs, and allows for future codec upgrades.

When delivering video content to different terminals, different codecs and output formats are required. The ProStream 4000 receives compressed MPEG2 or MPEG4 AVC content and transcodes it, as needed, before passing it to the streaming server.

ProStream 4000 main features are outlined as follows:

**Input**
- Support SDI (Serial Digital Interface) and HD-SDI input.
- Support MPEG-2 TS over IP input with either SPTS or MPTS, the video codec can be either MPEG2 or MPEG4 AVC.

**Processing**
- Support following audio codec output: AMR, AAC-LC, HE-AAC v1/v2, and WMA.
- Support single bit rate or multi bit rate for adaptive streaming.
- Resizing, de-interlacing, and cropping.
- Frame rate and GOP structure configurable.
- Built-in Apple HTTP live streaming fragmenter.
- Built-in Microsoft Smooth Streaming fragmenter.

**Output**
It delivers the encoded or transcoded output containing compressed video and audio. There are eight types of output format:
- Support MPEG-2 TS output.
- Support RTP/RTCP output.
- Support Adobe Flash RTMP output.
- Support Microsoft Windows Media Format output.
- Support Microsoft Smooth Streaming output for Silverlight.
- Support Apple HTTP live streaming for iPhone/iPad.
- Support 3gpp File output.
- Support ATSC M/H output for mobile broadcast application.

### 2.3 Input

ProStream 4000 receives its input from an Ethernet or SDI interface.

You can configure each device within a ProStream 4000 unit to receive input from an ethernet or SDI port. See [3.2.2 Ethernet Interfaces](#) on page 19, for more information about setting up the ethernet adapter connections.

<table>
<thead>
<tr>
<th>Input</th>
<th>Compressed video input format:</th>
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<tr>
<td></td>
<td>Uncompressed video input format:</td>
<td>SDI and HD-SDI signals</td>
</tr>
</tbody>
</table>

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2.3.1 MPEG-2 TS Over UDP/IP

ProStream 4000 processes MPEG-2 Transport Streams, either CBR or VBR, containing compressed video and audio, carried on UDP/IP, to a multicast address and UDP port.

2.3.2 Uncompressed SDI Input

ProStream 4000 is capable of processing uncompressed Serial Digital Interface (SDI) video input. It also supports uncompressed 8-bit or 10-bit digital video capture. You need to choose one of the two interfaces (i.e. RX0, RX1) for SDI input.

2.4 Processing

The ProStream 4000 has a unique software architecture that enables it to mix and match codec/applications on the same hardware platform.

2.4.1 Video Decoding, Encoding and Size

ProStream 4000 supports video transcoding for the following formats.

<table>
<thead>
<tr>
<th>Video Decoding—Decompress a video stream encoded as:</th>
<th>Video MPEG-2</th>
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<tr>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video Encoding—Compress an uncompressed video stream to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(the uncompressed video input comes from the MPEG-2 or H.264 decoded source)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Encoding—Compress an uncompressed video stream to:</th>
<th>Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG-4 SP</td>
<td></td>
</tr>
<tr>
<td>H.263</td>
<td></td>
</tr>
<tr>
<td>MPEG-4 AVC / H.264</td>
<td></td>
</tr>
<tr>
<td>WMV, VC-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video Size—Transcode to these resolutions, depending on the applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>352x288 max (CIF)</td>
</tr>
<tr>
<td>720x576 max (SD)</td>
</tr>
<tr>
<td>From 96x96 to 1920x1080P</td>
</tr>
</tbody>
</table>

The number of encoding profiles possible on the ProStream 4000 depends on the codec, resolution, frame rate, and whether it is Single Bit Rate (SBR) or Multi Bit Rate (MBR). It also depends on the input source format.
2.4.2 Audio Decoding and Encoding

ProStream 4000 supports audio transcoding for the following formats.

<table>
<thead>
<tr>
<th>Audio</th>
<th>Decoding—Decompress an audio stream encoded as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPEG-1 Layer II</td>
</tr>
<tr>
<td></td>
<td>AAC-LC/HE-AAC v1/v2, with ADTS and LATM encapsulation</td>
</tr>
<tr>
<td>Encoding—Compress an uncompressed audio stream to:</td>
<td>MPEG-1 Layer II</td>
</tr>
<tr>
<td></td>
<td>AMR-NB</td>
</tr>
<tr>
<td></td>
<td>AAC-LC</td>
</tr>
<tr>
<td></td>
<td>HE-AAC v1/v2</td>
</tr>
<tr>
<td></td>
<td>WMA</td>
</tr>
</tbody>
</table>

2.4.3 Pass-Through

ProStream 4000 can transfer audio, teletext, and private data streams and SCTE-35 message unchanged.

<table>
<thead>
<tr>
<th>Pass-through</th>
<th>Compressed input audio streams:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>■ MPEG-1 Layer II</td>
<td>■ AC3</td>
</tr>
<tr>
<td></td>
<td>■ AC3</td>
<td>■ AAC</td>
</tr>
<tr>
<td>Teletext</td>
<td>up to 2 Teletext PIDs</td>
<td></td>
</tr>
<tr>
<td>Private data</td>
<td>up to 1 Private Data PID</td>
<td></td>
</tr>
<tr>
<td>SCTE-35 pass-through</td>
<td>1 SCTE-35 PID</td>
<td></td>
</tr>
</tbody>
</table>

2.5 Output

ProStream 4000 delivers its transcoded output to an ethernet interface.
You can configure each device within a ProStream 4000 unit to deliver output through two ethernet ports. See 3.2.2 Ethernet Interfaces on page 19, for more information about setting up the ethernet adapter connections.

<table>
<thead>
<tr>
<th>Output</th>
<th>The compressed video output formats are:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MPEG-2 TS</td>
</tr>
<tr>
<td></td>
<td>RTP</td>
</tr>
<tr>
<td></td>
<td>RTMP (compatible with Adobe Flash products)</td>
</tr>
<tr>
<td></td>
<td>Windows Media formats (WMF)</td>
</tr>
<tr>
<td></td>
<td>Microsoft Smooth Streaming</td>
</tr>
<tr>
<td></td>
<td>Apple HTTP Live Streaming (HLS)</td>
</tr>
<tr>
<td></td>
<td>3rd Generation Partnership Project</td>
</tr>
<tr>
<td></td>
<td>Advanced Television System</td>
</tr>
<tr>
<td></td>
<td>Committee Mobile/Handheld</td>
</tr>
</tbody>
</table>

### 2.5.1 MPEG-2 TS Ethernet Output

This is an MPEG-2 Single Program Transport Stream (SPTS), containing compressed video and audio, carried over UDP/IP (ethernet interface), to a unicast or multicast address and UDP port.

### 2.5.2 RTP Output

This output consists of four distinct RTP/RTCP streams carried over UDP/IP (ethernet interface) to one unicast or multicast address and 4 UDP ports.

### 2.5.3 Adobe Flash RTMP Output

This output is delivered as an RTMP stream containing compressed video and audio, carried over UDP/IP (ethernet interface), to a unicast or multicast address and UDP port.

### 2.5.4 Windows Media Formats (WMF) Output

This output is delivered in Windows Media format (ASF), containing compressed video and audio.

### 2.5.5 Smooth Streaming Output

In this output mode, the ProStream 4000 outputs fragmented MP4 files along with manifest file to MS IIS server. It is delivered in Microsoft Smooth Streaming format, which contains compressed video and audio.

### 2.5.6 Apple Segmenter Output

This output is delivered in Apple HTTP streaming protocol (iPhone) format, containing compressed video and audio. In this output mode, the ProStream 4000 uploads streams to an FTP server in the form of many small Transport Stream files and the associated playlist (.m3u8) files needed for playback.
2.5.7 3gpp File Output

This output is delivered in 3rd Generation Partnership Project format (3gpp) containing compressed video and audio.

2.5.8 ATSC M/H Output

This output is delivered in Advanced Television System Committee Mobile/Handheld format (ATSC M/H) containing compressed video and audio.
Chapter 3
Hardware Overview

This chapter describes the hardware and initial installation procedure of ProStream 4000 device. It contains the following sections:

- Components
- Rail Mounting
- Real Panel Cable Connection
- Front Panel
- Hardware Characteristics
- Safety Precautions

3.1 Components

The ProStream 4000 shipping package comes with the following components:

Table 3–1: ProStream 4000 Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware components</td>
<td>Chassis (x1)</td>
</tr>
<tr>
<td></td>
<td>■ Cooling fan</td>
</tr>
<tr>
<td></td>
<td>■ Locking security cover</td>
</tr>
<tr>
<td></td>
<td>■ 19&quot; rack-mounting kit and rails</td>
</tr>
<tr>
<td></td>
<td>■ Power cord</td>
</tr>
<tr>
<td>Network Interface Module (xN)</td>
<td>Quad Gigabit Ethernet (UTP)</td>
</tr>
<tr>
<td>Solid-State Drive</td>
<td>SSD 16GB</td>
</tr>
<tr>
<td>Dongle (depending on configuration)</td>
<td>USB license dongle</td>
</tr>
</tbody>
</table>

3.1.1 Unpacking and Initial Installation

1. Choose a suitable location for ProStream 4000.
2. Unpack ProStream 4000 and its components carefully, and make sure that you have all the required components available.
3. If required, rack-mount the ProStream 4000 by attaching the rack-mounting kit to the chassis with screws. Fasten the rail onto the 19-inch rack. In this way, ProStream 4000 can be securely mounted.
4. If AC power is used, make sure that the power supply is switched to the correct voltage (110/220V). The power cord connects to the power connector on ProStream 4000’s rear panel.

**NOTE:** In case a redundant power supply is used, two power cords are needed instead of one. Ensure that each cord is plugged into a separate power circuit.
5. Make sure that all network connections are connected properly. Ensure that the Gigabit Ethernet ports and the Management/Logging Fast Ethernet ports are connected to the appropriate devices.

6. Insert the appropriate license dongle.

### 3.1.2 Rail Mounting

If rails are not already mounted, locate the five holes on each side of the chassis and locate the five corresponding holes on each of the rail. Attach a rail to each side of the chassis, and secure the rail to the chassis by inserting five screws through the holes on the chassis and the rail.

![Figure 3–1: Rail Mounting](image)

### 3.2 Real Panel Cable Connection

ProStream 4000 series transcoder comprises two types of model:
- ProStream 4000 model
- ProStream 4100 model

Figure 3–2 illustrates the rear panel of the ProStream 4000 model.

![Figure 3–2: ProStream 4000 – Rear Panel](image)
3.2.1 Power

ProStream 4000 has a single power supply unit whereas ProStream 4100 has dual power supply units. Figure 3–2 & Figure 3–3 shows the power supply of both models in the rear panel.

The ProStream 4000 & ProStream 4100 devices includes a locked front panel. There is a power switch for each device behind this panel, and you can use these switches to power on each device separately.

3.2.2 Ethernet Interfaces

ProStream 4000 unit has two device motherboards whereas ProStream 4100 unit has a single motherboard. ProStream 4000 motherboard has dual GbE ports (1&2) as well as a PCI card with quad GbE ports (3,4,5&6), as shown in Figure 3–2. In contrast, ProStream 4100 motherboard has a single GbE ports (1&2) as well as a PCI card with quad GbE ports (6,5,4&3), as shown in Figure 3–3.

The IP plugs are 10/100/1000 Ethernet auto-uplink copper connections. For best results, use the ports as follows:

- **Gigabit mode** — Preferred
- **100 Mbps mode** — Minimum
- **10 Mbps mode** — Not recommended, as it is not enough bandwidth for an input MPEG-2 video stream

The use of CAT.6 ethernet cable is also recommended.

3.3 Front Panel

Figure 3–4 & Figure 3–5 show the power switches on ProStream 4000 device where the front panel is removed. During normal operation, the front panel remains closed.
The front panel may be removed to access the power switches for each device mother board. To do so, unlock the key and press the latch on the right of the front panel fully to the left. Then lift the right edge, until you can unplug the front panel to reveal the power switches.

To power on:
1. For each onboard device, press the front panel power on/off button just once.
2. After a few seconds, the device is ready to process and waits for input data.

To power off:
1. For each onboard device, press the front panel power on/off button briefly (press longer for forced and immediate power-off).

When you have finished, replace the front panel and lock it with the key.

During normal operation you will only switch on a device when you first install the ProStream 4000. You can remotely power off each transcoding device using SNMP or NMX network management tool.

To add and configure the ProStream 4000 series device on your services network, see Chapter 4, *Getting Started with Platform*. 
### 3.4 Hardware Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POWER</strong></td>
<td></td>
</tr>
<tr>
<td>Input Voltage Range</td>
<td>100-264 VAC</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Single</td>
</tr>
<tr>
<td>Power On/Off Switches</td>
<td>2 — one for each mother board, on the front panel</td>
</tr>
<tr>
<td>Line Frequency</td>
<td>47-63 Hz</td>
</tr>
<tr>
<td>Typical Consumption</td>
<td>530 W</td>
</tr>
<tr>
<td><strong>PHYSICAL</strong></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>43.7 cm x 4.3 cm x 70.5 cm 17.2&quot; x 1.7&quot; x 27.75&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>18.1 kg 40 lbs</td>
</tr>
<tr>
<td><strong>ENVIRONMENTAL</strong></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>9 fans; air flow front to side</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>10º to +35º C 50º to 95º F</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-40º to +70º C -40º to +158º F</td>
</tr>
<tr>
<td>Operating Relative Humidity</td>
<td>8% to 90% non-condensing</td>
</tr>
<tr>
<td>Non-Operative Humidity</td>
<td>5% to 95% non-condensing</td>
</tr>
<tr>
<td>Electromagnetic Compliance</td>
<td>FCC Part 15 Class A CE Mark (EN 55022 Class A)</td>
</tr>
<tr>
<td>Safety</td>
<td>UL, CUL Canada EN 60950/IEC 60950-Compliant, TUV Germany, ROHS 5/6 - Directive 2002/EC</td>
</tr>
</tbody>
</table>

### 3.5 Safety Precautions

To protect your ProStream 4000 equipment from potential damage and to ensure your own personal safety, follow these safety guidelines when you operate the ProStream 4000 transcoder:

- Never operate ProStream 4000 with the cover removed.
- Before installing ProStream 4000, unplug the system to prevent electric or system board damage.
- To help prevent electric shock, plug the power cable into properly grounded sources. Use only properly grounded extension cords and adaptors, if they are needed.
- Make sure that nothing is lying on the ProStream 4000 power cable.
Be sure that the cables are located where they will not be stepped on or tripped over.
Do not spill food or liquids on your ProStream 4000 unit.
Do not push any objects into the free slots of your ProStream 4000 unit. Doing so will damage your ProStream 4000 unit and can cause fire or electrical shock, and short out interior components.
Keep your ProStream 4000 unit away from heat sources and radiators.
Do not block cooling vents.
Do not place your ProStream 4000 unit in a closed-in wall unit.
When you disconnect a cable, pull on its connector or on its strain relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins.
When you connect a cable, make sure that both connectors are correctly oriented and aligned before connecting to avoid bending connector pins.
This chapter outlines the instruction on how you manage System Management Console (SMC).

4.1 Using the SMC Web Interface

The System Management Console (SMC) for ProStream 4000 is the main interface for configuring, operating, and maintaining the server. SMC is equipped with both an efficient console-based interface and a user-friendly web-based interface.

The following sections describe:
- Connecting to the SMC
- Navigating through SMC

4.1.1 Connecting to the SMC

If the ProStream 4000 server has an IP address, you can access the server over the network to view the web-based SMC. Otherwise, you can connect a monitor, mouse, and keyboard to the server to view SMC locally.

SMC can be accessed through “http” or “https” following with your server’s IP address. For example, http://<applicationIP> or https://<applicationIP>.

Actually http will be redirected to secured https by browser automatically. You will then be prompted with security warning from the browser. You just need to confirm and proceed the procedures until the whole process is done.

The web-based SMC displays a interface that you can use it to remotely configure a ProStream 4000 server. When you first open a web browser to the server, the SMC opens to the Status screen.

Figure 4–1 shows the information that you see from ProStream 4000 server.
The left panel displays a snapshot of the server’s status, or “health.” Most SMC nodes show you:
- The server’s name and the percent of CPU currently being used on it.
- Refresh: You can click to start a new refresh. You can reset the auto-refresh time. The current auto-refresh time is shown, and the time of last refresh.

The main panel opens to the Status tab by default:

**Server**
Identifies the current server and hardware configuration.

**Storage**
Provides system and data free space amounts.

**System Lock**
Indicates whether the system is locked.

### 4.1.2 Navigating through SMC

This section assume that you have started the SMC and have the initial Status screen loaded. Navigate through the options by clicking a tab name to open it, and making the selections and entries as needed.

If a tab has sub-topics, they are listed.
- **Folder** indicates there are more subtopics, **Table** indicates there are no subtopics to click.

For example, the Platform tab has several subtopic folders, as shown in Figure 4–2.
Figure 4–2: SMC with tabs, topics, and subtopics

The tabs are explained below:
- **Status.** Display system information.
- **Configuration.** Click a subhead to configure selections.
- **Products.** Start, stop, and restart services.
- **Platform.** Click a subhead to configure selections.
- **Operation.** Manage anti-virus and physical disk information.
- **Diagnostics.** Access logs and diagnostic information.
- **Software information.** View software version verification.
- **Backup/Restore.** Back up and restore system configuration files.
- **User Download Area.** Download runtime library / client side application.

4.1.2.1 Path

The path shows your position in each tab, and allows you to navigate by clicking the level you wish to move to. Figure 4–3 shows the path for the Platform Network Interfaces screen.

Figure 4–3: Path display in SMC

4.1.2.2 Buttons

Move to the screen level you want by clicking the menu item or button choice for that screen. Figure 4–4 shows the Select buttons for First port identifier and Second port identifier, etc.
To back up one level on each tab, click the file folder icon located below the path display, if one is available. To back up to any level in the path, click the name of the level. For example, in Figure 4–4, if you want to return to Teaming, simply click Teaming in the path.

### 4.1.2.3 Select

When an entry field shows a Select button, you can type in your entry or click Select to display a list of options to choose from (see Figure 4–4). The list of options will display in a new browser window, and when you click an option, the entry field will be populated with your selection automatically.

### 4.1.2.4 Tasks

You can create, edit, and delete configuration settings. A Task menu displays on the right side of the screen to offer you the available tasks for the current configuration. Figure 4–5 shows the Task menu for the Network Interfaces.
4.1.2.5 Data Entry

Entry fields marked with an * (asterisk) are required entries.

**NOTE:** User-defined names may not contain the following characters: \ / " [ ] : | < > + = ; , ? * @. They may not consist entirely of any combination of periods (.) or spaces ( ).

In some settings where multiple entries are possible, the Add icon ( ) displays to the right of the field to facilitate adding entries to the setting. The icon appears only when the mouse pointer is positioned on that entry field. See Figure 4–6 for an example of an entry field with the Add icon and its attantud tool buttons.

![Interface role](figure)

**Figure 4–6: Add icon in SMC**

4.1.2.6 Apply

On most screens, when you are finished making entries and selections, click the **Apply** button to make the settings active (see Figure 4–7).

![Path](figure)

**Figure 4–7: Apply settings button**
This chapter mainly demonstrates the configuration of ProStream 4000 Application via System Management Console (SMC). It aims at setting up the functionalities for the management of ProStream 4000 Web GUI.

It contains the following sections:
- Configuring ProStream 4000
- Importing License File

5.1 Configuring ProStream 4000

It is essential to setup this configuration in order to have the functionalities implemented to ProStream 4000 transcoder and Web GUI.

1. In ProStream 4000 SMC, navigate to the Path: / Configuration / ProStream 4000.

   ![Figure 5–1: Configuring ProStream 4000 Application](image)

   **Table 5–1:**
   
<table>
<thead>
<tr>
<th>Status</th>
<th>Configuration</th>
<th>Products</th>
<th>Platform</th>
<th>Operation</th>
<th>Diagnostics</th>
<th>Software Information</th>
<th>Backup/Restore</th>
<th>User Do</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ProStream 4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manipulate the ProStream 4000 configuration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Path: / Configuration / ProStream 4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>![Apply]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>System Id: A6-F7-1E-21-3C-A5-27-F6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model: PS4K-HWP-IPI-G3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Firmware Version: 3.2.1.0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enable Legacy SNMP Traps: [ ]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Video Format RX0: PAL 720x576i 25fps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Video Format RX1: PAL 720x576i 25fps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Channel Setting URL:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>![PS4K]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Specify the configuration for ProStream 4000.

   **Enable Legacy SNMP Traps.** If selected, all legacy SNMP Traps can be reserved.

   **Video Format RX0.** You can select the video input standard of each plug of the SDI board for plug 0 (RX0) from the drop-down menu.

   **Video Format RX1.** You can select the video input standard of each plug of the SDI board for plug 1 (RX1) from the drop-down menu.

   **NOTE:** SDI input is only available on ProStream 4100 model. (See 3.2 Real Panel Cable Connection on page 18 for details).
From the drop-down menu for Video Format RX0 and Video Format RX1, you can select the adaptable video format:

- PAL 720x576i 25fps
- PAL 720x576i 25fps
- NTSC 720x480i 29.97fps
- HD 1920x1080p 25fps
- HD 1920x1080p 30fps
- HD 1920x1080i 50fps
- HD 1920x1080i 60fps
- HD 1280x720p 50fps
- HD 1280x720p 60fps

**Channel Setting URL.** Click this hyperlink to access the login page of ProStream 4000 Web GUI directly.

3. Click **Apply**.

### 5.2 Importing License File

ProStream 4000 encoder requires license file to determine the functionalities granted to the system. You need to import the license file and retrieve the license key for ProStream 4000 Web GUI functioning properly.

1. In the SMC, navigate to the Path: `/Configuration/ProStream 4000 License`.

2. Click **Import license file**.

3. A dialog box pops up and you select the license file to load.

4. After license file is imported successfully, the license key string will be generated as shown above.
Chapter 6
Configuring Platform

This chapter first describes the common initial configuration necessary to place the ProStream 4000 encoder on the network and run the System Management Console (SMC). It then describes the individual settings that vary depending on the specific role of ProStream 4000 encoder.

This chapter describes how to make the following settings:

■ Common Configuration
■ Individual Configuration
■ Firewall Setting
■ Server Hardening (Lock-Down Protection)
■ SNMP
■ Network Interface Teaming Settings

6.1 Common Configuration

ProStream 4000 is pre-configured to use DHCP for input/output interface. For management interface, BOOTP will be firstly used, if BOOTP timed-out, DHCP will be used. If ProStream 4000 server cannot get a management IP address by BOOTP and DHCP, the management interfaces will be assigned with default static IP address, 192.168.1.1.

If your network uses DHCP, the ProStream 4000 obtains its TCP/IP settings automatically when you connect it to the network.

If DHCP is not enabled, then you must connect a pointing device (such as mouse or trackball), a keyboard, and a monitor to the server. After connecting these, you can log in to the ProStream 4000 System Management Console (SMC) directly and configure the basic TCP/IP information needed to get started and use SMC remotely. See 4.1 Using the SMC Web Interface for instructions on using SMC.

After the initial configuration is completed, you can access SMC remotely via HTTP. To do so, open a browser on any machine that can connect to the ProStream 4000 system, and type in the URL for the ProStream 4000 server, using either the IP address or the host name/domain name format.

This section describes the following:

■ Setting the Static IP Address
■ Setting the Static IP address Routing Table Adjustments
■ Setting the Server Name
■ Setting Date and Time

NOTE: These changes take effect after you reboot the ProStream 4000 server. You must reboot before you can use SMC remotely, since it is a web-based console and relies on the IP address or host name to connect.

6.1.1 Setting the Static IP Address

To set the static IP address:
1. Navigate to /Platform/Network/Interfaces.
   Check the appropriate Local Area Connection link that corresponds to the management
   network interface, and click Open in the Task list on the far right of the screen.

2. Click Set static IP.
3. Fill in the **IP address** and **Subnet mask** that have been assigned to the ProStream 4000 server using standard dotted-four notation. Enter the **Default Gateway address**, if needed.

4. Click **Apply**.

When you install a ProStream 4000 server, the system automatically sets up the routing table. However, you might need to make adjustments to the routing table for your network. You can open existing routing tables entries only for viewing and deleting, not for editing.

### 6.1.2 To create a new routing table entry

1. Navigate to `/Platform/Network/Routing Table`.

2. Click **New** to create a new entry.
Enter **Network destination**.

Enter **Netmask**.

Enter **Gateway**.

Enter **Metric values (1 to 9999)**.

Enter **Interface**. (Optionally) You usually provide an IP address, but you can enter an interface ID number. If you leave this blank, the ProStream 4000 system will try to discover the most suitable interface to use.

Select a **Type (Active /Persistent)**. This is an optional field:

- **Active**: The routing table entry is static and remains valid until reboot.
- **Persistent**: The routing table entry is persistent and remains valid even after reboot.

3. Click **Apply**.

**NOTE:** The network route cannot take effect unless at least one of the network interfaces can reach the gateway.

### 6.1.3 Setting the Server Name

1. Navigate to /Platform/General.
2. Enter new **Host name**.
3. Click **Apply**.
6.1.4 Setting Date and Time

An accurate system date and time are crucial to providing most video services, especially for time-shifted broadcast services. The simplest way to keep accurate time on your network is to use one of the many Network Time Protocol (NTP) servers available in your network.

To set date and time:
1. Navigate to /Platform/Operating System.

2. Select the appropriate **Time Zone Region**.
3. Enter **Local date time**.
4. Click **Apply**.
6.1.5 Setting up Anti-virus Protection and Viewing Reports

To protect your platform from viruses, spyware, and malicious intrusion, ProStream 4000 includes anti-virus software in its installation. It has a real-time scan engine to ensure that the server is protected 24 hours a day.

The definition files are kept up to date. By default, this is done offline, with a patch. You can choose to do it online.

Real-time scans protect the server by scanning files when they are accessed or modified. This includes opening, running, copying, moving, renaming, and creating files. The scan profile is tuned to minimize the impact on the performance.

In addition, more complete scans supplement the real-time scans. These scans are more extensive, but require a little more CPU load. You can set the weekly schedule for times when your CPU usage is lowest.

When a risk is detected, the software will attempt to clean the risk. It will also send an alarm, a SNMP trap, and an NMX alarm. You can review logs and reports from the management console in path: /Operation / Anti Virus / Log.

To set up anti-virus software, and to view reports, navigate to / Operation / Anti Virus /.

| Anti Virus
| Manipulate the anti-virus
| Path: / Operation / Anti Virus

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>[ Table ]</td>
<td>Display the anti-virus version</td>
</tr>
<tr>
<td>Schedule Scan</td>
<td>[ Table ]</td>
<td>Configure scheduled scan</td>
</tr>
<tr>
<td>Live Update</td>
<td>[ Table ]</td>
<td>Configure live update</td>
</tr>
<tr>
<td>Log</td>
<td>[ Folder ]</td>
<td>Display the log of anti virus</td>
</tr>
</tbody>
</table>

Figure 6–8: Operation / Anti Virus

Complete the Version, Schedule Scan (optional), and Live Update sections to set up the anti-virus software. Use the Log folder tab to view the anti-virus reports.

6.1.5.1 View Anti-virus Version Information

To see information about the anti-virus program installed on your server, navigate to Operation / Anti Virus / Version.
6.1.5.2 Schedule the Anti-virus Scan

Now schedule the scans.
1. Navigate to /Operation / Anti Virus / Schedule Scan.

Scans are always scheduled weekly. Enter the **Day of the week**, and **Time** (using a 24-hour clock) that you want the weekly scan to begin.

2. Click **Apply**.

6.1.5.3 Enable Anti-virus Live Updates

To enable or disable live updates of anti-virus scans, follow these steps:
1. Navigate to /Operation / Anti Virus / Live Update.
2. Select **Enable** or **Disable**.
3. Click **Apply**.

6.1.5.4 View Anti-virus Logs and Reports

To view reports, navigate to Operation / Anti Virus / Logs.
There are three reports to view in the anti-virus Log File section:

- Risk History
- Scan History
- Event Log

The anti-virus Risk History log tab shows information about risks:

- **Risk**: The name of the risk.
- **File**: The name of the infected file.
- **Action**: The action the anti-virus program took to the infected file.
- **Date**: The date and time when the risk was found.
The anti-virus Scan History log table shows information about the anti-virus scan:

- **Scan status**: The status of a particular scan operation.
- **Scan type**: The type of scan, usually a Scheduled scan.
- **Started time**: the date and time when the scheduled scan started.
- **Completed time**: the date and time when the scheduled scan completed.
- **Total files scanned**: The number of files that were scanned.
- **Total files infected**: The number of files that were found to be infected.

The anti-virus Event Log lists the events that were discovered, with the time and date of each occurrence.

### 6.2 Individual Configuration

Make the following settings according to the requirements of ProStream 4000 server will perform.

This next several sections describes the configuration for the following tasks:

- Network Interface Configuration
6.2.1 Network Interface Configuration

The server can be configured with a number of Ethernet interfaces. You can configure the function for each of these interfaces depending on the role the server will play in the system, and the capabilities of the interface. For example, you should reserve the Management interface for monitoring functions. You can configure a single interface to serve more than one function.

Table 6–1 gives an overview of the interface tasks that can be assigned.

<table>
<thead>
<tr>
<th>Network Interface Function</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Use for system management and monitoring activities. Management traffic includes web interface access, remote desktop access, SSH (secure shell), FTP access, SNMP, Syslog, etc.</td>
</tr>
<tr>
<td>Input and Output</td>
<td>Use as the interface to perform video/audio stream input and deliver encoded/transcoded video/audio stream output.</td>
</tr>
<tr>
<td>Output</td>
<td>Use as the interface to deliver encoded/transcoded video/audio stream output.</td>
</tr>
</tbody>
</table>

To configure a network interface:
1. Navigate to /Platform/Network/Interfaces.
2. Click on the link to display the interface details.
3. Click Apply.

### 6.3 Firewall Setting

A firewall blocks incoming traffic on a network interface. It protects the platform from port attacks and virus intrusion attempts. The configuration is established automatically by the system and not allowed to enable or disable by the user.

After the firewall is configured and enabled, it allows only specified incoming TCP/UDP ports to pass through.

To check the configured firewall:

1. Navigate to Platform / Network / Firewall Setting.

![Figure 6–17: Check the firewall settings](image)
6.4 **Server Hardening (Lock-Down Protection)**

To dependably deliver the best performance, ProStream 4000 must run on a stable, reliable and predictable environment. To protect against trojans, backdoors, or virus code, only trusted code and signed applications are allowed. Software and patches are checked when an installation is attempted.

If either of these is true below, the installation is not allowed and an alarm is triggered:

- The binary is not digitally signed by Harmonic, Inc. or by a Harmonic trusted party (for example, Symantec).
- The software tries to execute on an un-authorized folder (for example, \temp).

6.5 **SNMP**

The SNMP settings determine how the ProStream 4000 server interacts on the network. This section includes:

- SNMP Settings
- Accepted communities
- SNMP Traps setting
- Downloading MIB data

6.5.1 **SNMP Settings**

1. Navigate to **Platform/SNMP Configuration**.

![SNMP Configuration](image)

Figure 6–18: SNMP configuration

Check / Uncheck **Send authentication trap**.

Check / Uncheck **Accept SNMP packets from any host**.

(Optional) **Accept SNMP packets from following host**. If **Accept SNMP packets from any host** is unchecked, you can add entries. Move the pointer to the right of **no Entry** to display the **Add** icon. Click the icon, then enter the name of a host.

2. Click **Apply**.
6.5.2 Accepted communities

You can designate a list of accepted communities that can use the SNMP services from the current server, and the access rights for that community.

To configure the accepted communities settings:

1. Navigate to Platform /SNMP Configuration /Accepted communities.

2. Create a new accepted community name, or edit (Open) an existing one.

   Accepted community name. Enter a name if creating a new one. The name will be used by the SNMP client for identification purposes.

   Community right. Select one: None / Notify / Read Only / Read and Write / Read and Create).

3. Click Apply.

6.5.3 SNMP Traps setting

To assign traps destinations:
1. Navigate to **Platform/SNMP Configuration /Traps setting**.

   ![Figure 6–21: SNMP Traps Setting](image)

   - **Community name**. Enter a name. (see also 6.5.2 Accepted communities on page 42).
   - Move the mouse pointer to the right of no entry to display the Add icon
   - **Trap destinations**. Click the plus icon beside “no entry”, to open an entry field and add traps destinations. To enter multiple destinations, click the Add icon next to the entry field.

2. To edit (Open) an existing one, checkmark the box beside it, then click **Open** from the Task list.
   - To create a new one, click **New** in the Task list.

   ![Figure 6–22: New SNMP Trap](image)

3. Click **Apply**.

---

### 6.5.4 Downloading MIB data

You can download the MIB files for the components of this ProStream 4000 server and view them or save them to disk.

1. Navigate to `/Platform/SNMP Configuration`
2. Click **Download mibs**.
3. Depending on your browser settings, you will be prompted to save or view the mib.zip file.
6.5.5 Certificate Management

You can load certificates for use with security authentication for certain requests, for example NDS RTSP setup requests. ProStream 4000 Platform currently supports the following certificates:

- X.509
- Base-64 encoded X.509
- P7B
- SPC
- PEM

To load a certificate:

1. Navigate to Platform/Certificate/Load Certificate.
   - Click Load Certificate.
   - Enter a certificate name and path, or click Browse to select a certificate path.
   - Enter your password.
2. Click Apply.

![Figure 6–23: Load Certificate](image)

To view or delete a certificate:

1. Navigate to Platform/Certificate/Show Certificates.
2. Select a certificate, and then click Open (to view) or Delete (to remove).

![Figure 6–24: Show Certificates](image)

6.5.6 Image Upgrade

Occasionally Harmonic releases patches to the ProStream 4000 system. In that event, you will need to load the patch in each ProStream 4000 server.
Before you upgrade a ProStream 4000 system, put it in offline mode.

Sometimes, an upgrade will require you to re-create user accounts. Before you start the upgrade, make a record of all the user accounts.

**NOTE:** Before upgrading, make a record of your user accounts. After the upgrade, check to see if you need to re-create any of them.

First download the patch to a location on the network. To load a patch:

1. Log in to the FTP server of the ProStream 4000 to be upgraded.
2. Navigate to `/Virtual/Upgrade`.
3. Upload the upgrade package (the cab file) using binary mode.
4. Connect to the SMC web interface of the ProStream 4000 and navigate to `/Software Information / Image Upgrade`.

You will see a list view if there are multiple upgrade packages available. If there is only one upgrade package available, the upgrade interface will open directly. If there are multiple upgrade packages, select one here, then click **Open** on the Task list.

5. Click **Start Patch** to apply the upgrade package.

6. Once the upgrade is started, the Upgrade Progress screen will be shown.
7. After the upgrade is finished, the following screen will be shown. The user needs to click **Continue** button and resume to SMC. The user can also download the upgrade log by clicking the **Download log** button. 

![Figure 6–27: Continue to resume SMC](image)

8. The server may reboot itself during the upgrade progress as part of the upgrade progress. During the reboot, the following screen will be shown. The Upgrade Progress screen will be shown again when the server boots up again.

![Figure 6–28: Reboot during upgrade](image)

6.5.6.1 **Automatic Upgrade Failure Recovery**

In case of software upgrade failure (e.g. power outage during upgrade, etc.), the system will attempt to recover from failure. During recovery, the system will reboot itself and resume from the last failure point. If failure repeats three times on the same upgrade process, the system will be considered as unrecoverable and require manual intervention to check the failure reason and take corresponding action.
NOTE: This recovery mechanism does not apply to the upgrade involving OS upgrade.

6.5.6.2 Upgrading by Swapping New CF/SSD

In the case you are upgrading the image by swapping with a new CF/SSD. You need extra procedure to retain your configuration.
1. Obtain the upgrade profile from Harmonic.
2. Navigate to / Backup/Restore / Configuration Backup/Restore
3. Click on “Save Configuration” and download the saved configuration to your local disk.
4. Swap the CF card and wait until the first time initialization to complete.
5. Navigate to / Backup/Restore / Configuration Backup/Restore
6. Click on “Restore configuration”.
7. For “Configuration to be restored”, click “Browse…” to select the saved configuration in step 3.
8. For “Custom restore profile”, click “Browse…” to select the upgrade profile from step 1.
9. For “Restore profile name”, click “Select” to select the custom profile.

6.5.7 User Management

You can add or delete user accounts.

To add a user:
2. Enter the parameters.
   Enter a Name for the user.
   Enter a Password. It must be a minimum of 6 characters. It cannot be changed for 48 hours.
3. Click Apply.

6.6 Network Interface Teaming Settings

Teaming means that a team of ports functions as a single virtual network interface, and does not appear any different to other network devices than a non-teamed port.
6.6.1 **Switch Fault Tolerance (SFT)**

Switch Fault Tolerance (SFT) provides a failover relationship between two ports when each port is connected to a separate switch. SFT supports two ports per team.

This teaming mode provides automatic redundancy for your server’s network connection. If the primary port fails, the secondary port takes over. SFT supports two to eight ports per team. This teaming mode works with any switch; all team members must be connected to the same network.

While SFT will also work with hubs, it is only recommended to be used for troubleshooting purposes.

6.6.2 **Teaming**

A team of ports functions as a single virtual network interface and does not appear any different to other network devices than a non-teamed port.

6.6.3 **Switch Requirements**

Spanning Tree Protocol (STP) must be enabled on the switch, except that the ports connected to the teamed ports should have Port Fast or Edge Port enabled. This teaming mode works with any switch.

Teams configured in SFT must have all members in the same subnet (same layer 3 broadcast domain) in both single and multiple switch environments.

To set this up on SMC:

1. Navigate to / **Platform** / **Network** / **Teaming** / **Setting** (See Figure 6–30.)

2. Click **New** to create a new teaming on adapter.

3. The window changes, and now has a place for you to enter the parameters. (See Figure 6–31).
4. Enter the parameters.

**Name.** Name for your teaming.

**First port identifier.** It is the NIC port identifier of the Ethernet interface.

**Second port identifier.** It is the NIC port identifier of the Ethernet interface.

**Enforce port priority (optional).** It is disabled by default. It specifies the teaming behavior. When enabled, traffic will return to the First port if it has recovered from failure. When disabled, traffic will remain at Second port even First port has recovered until Second port is detected failure.

**IPV4 address.** Specify IPV4 address for the teamed interface. You may also select from the existing IP address of the port to be teamed.

**Subnet mask.** Specify subnet mask for the teamed interface. You may also select from the existing subnet mask of the port to be teamed.

**Default gateway (Optional).** Specify default gateway for the teamed interface. You may also select from the existing default gateway of the port to be teamed.

5. Click **Apply.**
This chapter describes the following operating procedures:

- Shutting Down and Rebooting the System
- Starting, Stopping, and Restarting Modules
- Downloading Runtime Library / Client Side Application

### 7.1 Shutting Down and Rebooting the System

To shut down or reboot the system:

1. Navigate to / Platform / Operating System.
2. Choose one of the following options:
   - Reboot
   - Shut down
3. Click Apply.

![Operating System](image)

**Figure 7–1: Shut down or reboot**

### 7.2 Starting, Stopping, and Restarting Modules

To start, stop, or restart a module:

1. Navigate to / Products.
2. Select the product you want to manage.
3. Click the radio button for a module (for example, ProStream 4000). Depending on its current state, the Task menu offers the available actions for that service. Unavailable actions are greyed. You can also double-click the service name to access its state and mode settings.
4. Click Start the module/Stop the module/Restart the module button on the right side of the screen.
7.3 Downloading Runtime Library / Client Side Application

You can download runtime library / client side application before logging in SMC.

1. Click on the User Download Area at the login screen (as shown in Figure 7–3).

2. Click on the corresponding Download button of the desired file.
3. If it is an installer package, run the installer and follow the corresponding instruction.

**NOTE:** Alternatively, you can navigate to “SMC / User Download Area” to download the application.
This chapter describes the ProStream 4000 diagnostic logging feature. It includes the following sections:
■ Anti-Virus Logs and Reports
■ Event Logs
■ System Message Logger
■ Audit Trail Log

8.1 Anti-Virus Logs and Reports
You can view logs and reports posted by the anti-virus software included in ProStream 4000. From the System Management Console (SMC), navigate to Operation / Anti Virus / Log. For more information, see 6.1.5.4 View Anti-virus Logs and Reports on page 36.

8.2 Event Logs
There are three log files available via SMC to help you track status and identify trouble spots:
■ The Application log contains events that have been logged by application programs running on the ProStream 4000; these are helpful in troubleshooting problems with a specific application.
■ The Security log contains events related to possible security breaches, such as invalid password attempts.
■ The System log contains events that have been logged by the operating system or its components; these are helpful in troubleshooting operating system or device issues.

Each log provides information about the type of event, the source of the event, the date and time the event occurred, and an event identifier. You can view these details for any specific event in any of the three logs.

For each log, you can:
■ Select a specific type of event to display (for example, errors or warnings)
■ Display events from a specific source module or application
■ Restrict the display to events logged between particular days and times

To access the event log files from SMC, navigate to Diagnostics / Event Log and select a log type.

For example, to see security logs, select Security from Diagnostics / Event Log. Figure 8–1 on page 54 shows a security event log.
To use the System Message Logger you must:
Chapter 8 Platform Diagnostic Logs

System Message Logger

- Create a Basic Scope of messages to log
- Designate the Destination settings
- Create a Mapping of Basic Scope and Destination
- Activate the log (Mapping)

Figure 8–3 shows the System Message Logger menu.

<table>
<thead>
<tr>
<th>Status</th>
<th>Configuration</th>
<th>Service</th>
<th>Platform</th>
<th>Operation</th>
<th>Diagnostics</th>
<th>Software Information</th>
<th>Backup/Restore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>System Message Logger</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manipulate the system message logger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Path: / Diagnostics / System Message Logger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Value</td>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Scope</td>
<td>[Table ]</td>
<td>Manipulate basic scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File Log</td>
<td>[Table ]</td>
<td>Manipulate file log</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled File Log</td>
<td>[Table ]</td>
<td>Manipulate scheduled file log</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event Log</td>
<td>[Table ]</td>
<td>Manipulate event log</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Log</td>
<td>[Table ]</td>
<td>Manipulate network log</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syslog</td>
<td>[Table ]</td>
<td>Manipulate syslog</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These System Message Logger menu items are described in the following sections.

- **Basic Scope**
- **Destination Settings:**
  - File log destination
  - Scheduled file log destination
  - Event log destination
  - Network log destination
  - Syslog destination
- **Mapping**
- **Activating, adding, or removing a log**

### 8.3.1 Basic Scope

The Basic Scope defines a message scope.

To create, edit, or delete a basic scope of message and set the scope for that scope:
1. Navigate to /Diagnostics/System Message Logger/Basic Scope

![Basic Scope list](image)

**Figure 8–4: Basic Scope list**

2. Create a **New** Basic Scope name, or edit **Open** an existing one (see Figure 8–4).

![Basic Scope of Message](image)

**Figure 8–5: Basic Scope of Message**

3. Enter **Scope name**, if creating a new one (see Figure 8–5).

4. Click **Apply**.

### 8.3.2 Destination Settings

After you set the Basic Scope for a log, you can configure the Destination settings. This section describes the following:

- File Log Destination — rotates log files according to file size
- Scheduled File Log Destination — rotates log files according to time stamp
- Event Log Destination — writes to the system event log with the specified source name
- Network Log Destination — writes the log to a specified port number
- Syslog Destination — writes the log using syslog protocol

#### 8.3.2.1 File Log Destination

File Log Destination rotates the log file according to the log file size.

To configure File Log Destination settings:
1. Navigate to Diagnostics/System Message Logger/File Log.

![Figure 8–6: List of file logs](image)

2. Click on New button, or edit (Open) an existing one from the list.

![Figure 8–7: File Log Destination](image)

3. Enter Destination name, if creating a new one.
4. Enter Log file name.
5. Enter Log file size (in Bytes).
6. Enter Maximum number of files generated (minimum of 1).
7. Scope. Enter or select the basic scope for this file log.
8. Click Apply.

### 8.3.2.2 Scheduled File Log Destination

Scheduled File Log Destination rotates the log file according to a time stamp.

To configure Scheduled File Log Destination settings:
2. Click File Log Destination.
3. Create a (New) file log destination, or edit (Open) an existing one.

4. Enter Destination name (if creating a new one).
5. Enter Log file name.
6. Enter File rotation scheme (Crontab format).
7. Enter Maximum number of files generated (min 1).
8. Enter Scope for the file log.
9. Click Apply.

### 8.3.2.3 Event Log Destination

Event Log Destination writes the log to the system event log with a specified source name. To configure Event Log Destination settings:

1. Navigate to Diagnostics/System Message Logger/Event Log.
2. Create a (New) event log destination, or edit (Open) an existing one.

3. Enter Destination name.
4. Enter **Source name**.
5. Select **Log level** (Error / Warning / Information).
6. Enter or select **Scope** name for event log.
7. Click **Apply**.

### 8.3.2.4 Network Log Destination

Network Log Destination writes the log file to a specified port number. You can retrieve the log via telnet to the machine and port.

To configure Network Log Destination settings:
1. Navigate to **Diagnostics/System Message Logger/Network Log**.
2. Click **(New)**, or select an existing log to **(Open)** or **(Delete)**.

![Network Log Destination](image)

**Figure 8–10: Network Log Destination**

3. Enter **Destination name**.
4. Enter **Port number (1025 to 65535)**.
5. Enter or Select the **Scope** name for network log.
6. Click **Apply**.

### 8.3.2.5 Syslog Destination

Syslog Destination writes the log file using syslog protocol.
1. Navigate to **Diagnostics/System Message Logger/Syslog**.

![Syslog Destination](Image)

2. Create a **(New)** syslog destination, or edit **(Open)** an existing one.
3. For new ones, enter a **Destination name**.
4. Enter **IP address** (IP where the syslog daemon is located).
5. Select **Protocol** (TCP or UDP).
6. Enter **Port number** (binding port of syslog daemon).
7. Select **Facility** (log type):
   - Kernel message
   - User level
   - Mail system
   - System daemons
   - Security or authorization message
   - System log internal
   - Line printer subsystem
   - Network news subsystem
   - UUCP subsystem
   - Clock daemon
   - Private security or authorization message
   - Ftp daemon
8. Select **Level**:
   - Emergency
   - Alarm
   - Critical
   - Error
   - Warning
   - Notice
   - Info
   - Debug
9. Enter or select the **Scope** name for Syslog.
10. Click **Apply**.

### 8.4 Audit Trail Log

All the user action performed in SMC or via the management application interface will be logged. It is facilitated by System Message Logger with the Scope “PlatformAudit” and is enabled by default with the default setting as in Figure 8–12. To change the setting, please refer to **8.3.2.1 File Log Destination**.

To rotate the audit trail log based on schedule instead of log file size, please refer to **8.3.2.2 Scheduled File Log Destination**.

![Figure 8–12: File Log](image)
This chapter introduces the operation of ProStream 4000 Web GUI and channel alarms. It includes the following sections:

- Web GUI Introduction
- Logging in Web GUI
- Channel
- Button
- Channel Alarms

### 9.1 Web GUI Introduction

ProStream 4000 has an individual Web GUI which is used for channel provisioning. It encodes/transcodes the input transport stream in real time and adopts Ethernet or SDI as input mode. Through the configuration in Web GUI, the desired output format and multi bitrate can be generated by specifying the appropriate video and audio profile configuration.

The diagram below shows the relationship on how ProStream 4000 System Management Console (SMC) and Silverlight Web GUI are integrated into ProStream 4000 Platform.

![Figure 9–1: Web GUI and SMC on Platform](image)

The ProStream 4000 Service component inside the ProStream 4000 module hosts the coder and exposes a SOAP interface for channel provisioning. It also contains an Alarm Monitoring layer for raising alarms from the coder and output Platform management events for alarm notification.
In addition, the ProStream 4000 Management Implementation component implements the necessary WBEM interfaces for controlling, monitoring and configuring the ProStream 4000 Service.

**NOTE:** You’re required IE browser 6.0 or above with Silverlight 3.0 plug-in in order to view the Web GUI. (For detailed information, please refer to System Requirements in http://www.microsoft.com/silverlight/get-started/install/default.aspx).

### 9.2 Logging in Web GUI

ProStream 4000 Web GUI provides all necessary functionalities for configuring, monitoring and provisioning a ProStream4000 server.

Two ways to access Web GUI:
- Login via URL
- Login via SMC

#### 9.2.1 Login via URL

Web GUI can be accessed through “http” or “https” following with your server’s IP address and subsequent directory name (ps4k).

For example, http://<applicationIP>/ps4k or https://<applicationIP>/ps4k

Http will be redirected to secured https by browser automatically. You will then be prompted with security warning from the browser. You just need to confirm and proceed the procedures until the whole process is done.

#### 9.2.2 Login via SMC

Alternatively, you can first login SMC. (Refer to 4.1 Using the SMC Web Interface on page 23)

1. Navigate to the path of `/Configuration/ProStream 4000`.
2. Identify **Channel Setting URL**
3. Click the link to access Web GUI as shown below.

![Figure 9–2: Access Web GUI via SMC](image)
The ProStream 4000 Web GUI Login page appears.

![ProStream 4000 Web GUI Login](image)

Figure 9–3: Web GUI Login

You need to enter your User Name and Password login credential for authentication.

ProStream 4000 Web GUI main page is displayed as follows.

![ProStream 4000 Web GUI Main Page](image)

Figure 9–4: Web GUI Main Page

There are four panels on the main page as shown in Figure 9–4:

1. **Service Configuration**
2. **Received Channel Alarms**
3. **Input, Video Profiles, Audio Profiles, Output tab**
4. **Buttons**
9.3 Channel

On the Service Configuration panel, it displays all the available channels with the status showing beside. When Web GUI launches initially, it shows “Stopped” status for all channels. After you apply the configurations successfully, the status of channel will switch to “Running” subsequently.

**NOTE:** Total number of channel provided is subject to the license granted.

---

![Figure 9–5: Channel](image)

Firstly, you need to select and click on the desired channel you intend to configure, the channel is highlighted and ready for your configuration.

9.4 Button

You can utilize the buttons to perform audio/video encoding or transcoding channel. The following sub-sections describe the features of each button.

9.4.1 Apply button

![Apply](image)

Click this **Apply** button to apply all the current configuration on specific audio/video encoding or transcoding channel.

9.4.2 Play button

![Play](image)

Click this **Play** button to initiate the current configuration on the specific audio/video encoding or transcoding channel.

9.4.3 Stop button

![Stop](image)
Click this **Stop** button to stop the current configuration on the specific audio/video encoding or transcoding channel.

### 9.4.4 Refresh button

Click this **Refresh** button to refresh all the channel configurations that has been loaded to Web GUI.

### 9.4.5 Save SDP button

Click this **Save SDP** button to save the SDP file for the currently selected audio/video encoding or transcoding channel. An SDP file describes the RTP streams delivered by ProStream 4000 encoder (i.e. their IP addresses and UDP ports, resolution, etc).

This only applies to ProStream 4000 encoder where the outputs are RTP audio/video streams and Output Mode is chosen as RTP Output. (Refer to 13.2 RTP Output on page 83 for details).

### 9.4.6 Record File button

Click this **Record File** button to record the currently selected audio/video encoding or transcoding channel in a "3GPP" file.

This only applies to ProStream 4000 encoder where the outputs are RTP audio/video streams and Output Mode is chosen as RTP Output. (Refer to 13.2 RTP Output on page 83 for details).

### 9.4.7 Stop Record button

Click this **Stop Record** button to stop recording of the currently selected audio/video encoding or transcoding channel in a "3GPP" file.

This only applies to ProStream 4000 encoder where the outputs are RTP audio/video streams and Output Mode is chosen as RTP Output. (Refer to 13.2 RTP Output on page 83 for details).

### 9.4.8 Saving and Loading Settings

#### 9.4.8.1 Save Settings button

You can save the current channel configurations.

Click this **Save Settings** button to export or save the current channel settings to specific location.
9.4.8.2 **Load Settings Button**

You can load the previous saved settings to the current selected channel.

![Load Settings](image.png)

Click this **Load Settings** button import the previous saved settings from specific location to the specified channel.

9.5 **Channel Alarms**

The Channel Alarms panel demonstrates all the SNMP traps forwarded by ProStream 4000 system that interact on the network. It is crucial to have this SNMP traps forwarded to ProStream 4000 because it is a way to be notified there is a change occurred in the system. (Be sure that you need to setup SNMP traps setting in SMC for ProStream 4000 platform. Please refer to **6.5 SNMP** on page 41 for details).

9.5.1 **Receiving Channel Alarms**

You can monitor the Received Channel Alarm panel and keep track of all those associated alarm messages throughout your operation.

Click arrow button as shown below to expand or collapse for monitoring the up-to-date channel alarms.

![Figure 9–6: Received Channel Alarms](image.png)

9.5.2 **Saving Alarms**

Click **Save Alarms** button. All the Channel Alarms or SNMP Traps will be saved into a separate file.

**NOTE:** Once the system is shut down and restart, the SNMP list will be emptied.

9.5.3 **Clearing Alarms**

Click **Clear Alarms** button. All the Channel Alarms or SNMP Traps will be erased from the list.
Chapter 10
Configuring Channel Input

This chapter describes the configuration procedure for channel input using the ProStream 4000 Web GUI. It includes the following sections:

- Compressed Ethernet Input
- Uncompressed SDI Input

Select the **Input** tab and define the configuration for the input video/audio transport stream.

![Input tab](image)

**Figure 10–1: Input tab**

### 10.1 Compressed Ethernet Input

Ethernet Input allows transmission of input transport stream through internet with IP address. ProStream 4000 is able to process compressed transport stream to a multicast address and UDP port. You should select Ethernet TS Input if you intend to proceed ethernet video input.

You need to setup the following configuration for the ethernet input:

1. Set Primary or Secondary source as your source to receive the transport stream.
2. Configure the following PIDs for the input transport stream:
   - 1 Video PID
   - Maximum up to 8 Audio PIDs
   - Maximum up to 2 Teletext PIDs
   - Maximum up to 2 DVB-Subtitle PIDs
   - 1 SCTE-35 PID
1. To perform ethernet input, select the **Ethernet Input** radio button.

![Figure 10–2: Ethernet Input](image)

2. Enter the parameters for Ethernet Input of Input Mode.

**Switching Mode.** Primary Source and Secondary Source can be switched according to following four scenarios for your selection:

- **Single Source:** Only primary source is employed.
- **Manual Switch:** You need to manually choose in **Desired Source** drop down menu to determine whether Primary or Secondary source is used.
- **Automatic with Manual Fallback:** When Primary Source has recovered from failure, it is required to manually fallback from secondary source to primary Source.
- **Automatic with Automatic Fallback:** When Primary Source has recovered from failure, it will be automatically fallback from secondary source to primary source.

**Detection Threshold (ms).** The delay duration after the input has been considered failure, in milliseconds.

**Desired Source.** Choose Primary or Secondary source as your desired source to receive the transport stream.

### 10.1.1 Primary Source area

**Ethernet Interface.** Address of Ethernet interface that is used to receive the input audio/video stream.

**IP Address.** IP address of primary source that is used to receive the input audio/video stream. This must be a multicast address.

**UDP Port.** UDP port of primary source that is used to receive the input audio/video stream.

**Enable Source Specific Multicast.** If enabled, **SSM IP Address** field is required to fill in.

**SSM IP Address.** IP address that Source-Specific Multicast (SSM) requires.

### 10.1.2 Secondary Source area

**Ethernet Interface.** Ethernet interface address of secondary source that is used to receive the input audio/video stream.
10.1.3 **PID Inputs area**

- **Video PID**: It identifies the video stream to be transcoded from the input transport stream.
- **Audio PID #n**: Maximum up to 8 audio PIDs. It identifies the audio stream to be transcoded from the input transport stream. If set to 0, it is considered disabled.
- The total no. of enabled Audio PID Inputs reflects how many audio profiles are needed to configure. For example, 4 Audio PIDs indicates 4 audio profiles are required to configure. (Refer to 12.1 Configuring Audio Profile.)
- **Teletext PID #n**: Maximum up to 2 Teletext PIDs. It identifies the Teletext stream to be transferred from the input transport stream. If set to 0, it is considered disabled.
- **DVB-Subtitle PID #n**: Maximum up to 2 DVB-Subtitle Aids. It identifies the DVB-Subtitle stream to be transferred from the input transport stream. If set to 0, it is considered disabled.
- **Enable SCTE-35**: Select this checkbox to enable the input SCTE-35 message.
- **SCTE-35 PID**: PID assigned to the input SCTE-35 message.

### 10.2 **Uncompressed SDI Input**

ProStream 4000 transcoder is capable of processing uncompressed Serial Digital Interface (SDI) video input. It also supports uncompressed 8-bit or 10-bit digital video capture.

**NOTE**: SDI input is only available on ProStream 4100 model. (See 3.2 Real Panel Cable Connection for details).

You need to choose one of the two interfaces for SDI inputs (i.e. RX0, RX1) to determine which predefined video input format is used.

1. To perform SDI Input, select the **SDI Input** radio button.

   ![Figure 10–3: SDI Input](image)

2. Enter the parameters for SDI Input of Input Mode.
**SDI Interface.** The interface that SDI plug receives the input audio/video stream. This video stream is an SD-SDI stream with embedded audio.

There are 2 choices for video format:
- RX0
- RX1

Initially, you need to configure video format of RX0 and RX1 by navigating to SMC path /Configuration /ProStream 4000 (Refer to 5.1 Configuring ProStream4000 for details)

**Aspect Ratio.** Aspect Ratio of input video.

There are 3 choices for your selection:
- 4:3
- 16:9
- *Pass-Through:* The input aspect ratio can be detected in the WSS or AFD embedded SDI.
Chapter 11
Configuring Video Encoding Profile

This chapter describes configuration procedure for video encoding using the ProStream 4000 Web GUI. It includes the following sections:

- Configuring Master Video Profile
- Configuring Other Video Profiles

Select the Video Profile tab to setup the video profile to encode/transcode the input video stream.

![Figure 11–1: Video Profiles tab](image)

11.1 Configuring Master Video Profile

Video Profile 1 is considered as the master video profile which comprises main configuration for the video profile. Configuring Video Profile 1 is mandatory whereas the remaining video profiles (i.e. Video Profile 2 to Video Profile 8) are the optional setup used for setting multiple bitrate and additional configuration.

**NOTE:** If the output is audio-only, no video profiles need to be configured.

1. To configure video profile, select Video Profile 1 radio button.

![Figure 11–2: Video Profile](image)
2. Enter the parameters for video profile 1 (master profile).

**Use Video.** By default it is enabled.

**Codec.** Codec is used to encode or transcode the input video stream.

Choices for codec include: **MPEG-2, MPEG-4 SP, H.263, H.264, WM Video 8, WM Video 9** and **VC-1**. (The choices are limited by the license granted to your ProStream 4000 encoder.)

**Profile.** Profile of encoding video.

<table>
<thead>
<tr>
<th>Video Codec</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG-2</td>
<td>Main</td>
</tr>
<tr>
<td>MPEG-4 SP</td>
<td>Simple</td>
</tr>
<tr>
<td>H.263</td>
<td>0</td>
</tr>
<tr>
<td>H.264</td>
<td>Baseline, Main or High</td>
</tr>
<tr>
<td>VC-1</td>
<td>None</td>
</tr>
</tbody>
</table>

If video codec is WM Video 8, or WM Video 9, the profile is irrelevant.

⚠️ **CAUTION:** If video codec is VC-1, the profile must be set as None.

**Level.** Level of encoding video.

<table>
<thead>
<tr>
<th>Video Codec</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPEG-2</td>
<td>Main, High</td>
</tr>
<tr>
<td>MPEG-4 SP</td>
<td>0, 1, 2, 3</td>
</tr>
<tr>
<td>H.263</td>
<td>45</td>
</tr>
<tr>
<td>H.264</td>
<td>1, 1b, 1.1, 1.2, 1.3, 2, 2.1, 2.2, 3, 3.1, 3.2, 4, 4.1, 4.2, 5, 5.1</td>
</tr>
<tr>
<td>VC-1</td>
<td>None</td>
</tr>
</tbody>
</table>

If video codec is WM Video 8, or WM Video 9, the level is irrelevant.

⚠️ **CAUTION:** If video codec is VC-1, the level must be set as None.

**Video Bitrate (kbps).** The bitrate for the encoding video. Only have impact on elementary stream but not subsequent encapsulation process.

### 11.1.1 Cropping area

**Crop Input.** If selected, cropping is applied on the input video image.

**Top.** The number of video lines to be cropped (in pixels), starting from the top.

**Bottom.** The number of video lines to be cropped (in pixels), starting from the bottom.

**Left.** The number of video lines to be cropped (in pixels), starting from the left.
Right. The number of video lines to be cropped (in pixels), starting from the right.

11.1.2 Resolution area

Resize Input. If selected, it allows input frame size to change.
Output size. Select the dimension of output frame size from the drop-down menu.
Width. Width of the output frame size.
Height. Height of the output frame size.

11.1.3 Frame Rate area

Slide Show Mode. Select this checkbox to proceed slow frame rate on video.
Change Input Frame Rate. If selected, the frame rate can be altered. If not, the frame rate remains unchanged.
Output Frame Rate. Select the desired output frame rate.

11.1.4 Common Encoding Options

De-Interlace Input. If selected, it deinterlaces the video before encoding.
IDR/RAP Period (ms). Random Access Point (RAP) period is essential for a video encoder when it begins decoding.
For example, if the RAP Period is set to 500 ms, it indicates that the encoder might need to wait up to 0.5 s after power is on (0.5 s on average) before it can begin displaying.
Video Format. It is used in H.264 stream. No impact on encoding process but it could affect the displaying process on the encoder if it this data is applied.
Chromaticity. It is used in H.264 stream. No impact on encoding process but it could affect the displaying process on the encoder if this data is applied.
Aspect Ratio Conversion. The output aspect ratio can be changed by adding black bands. Choose from:
- Pass-through
- Sample: Square
- Display: 4:3
- Display: 16:9

Aspect Ratio Signaling. The output aspect ratio signaled in the stream. Choose from:
- Pass-through: signaled the aspect ratio chosen in "Aspect Ratio Conversion".
- Sample: Square
- Display: 4:3
- Display: 16:9

Frames only. If selected, it uses frames only for encoding video.

Do not send SEI Messages (iPod). For iPod streaming only. If selected, H.264 SEI messages will not be sent.

Closed Caption Pass-through. If selected, the input ATSC video closed captioning data will pass through.

Bottom Field First. If selected, the bottom field in the video will be encoded first.
11.1.5 Specific Encoding Options area

Enable Key-Frame Alignment. Enables the IDR alignment between bitrates. This function is available for the following output types:

<table>
<thead>
<tr>
<th>Output</th>
<th>Key-Frame Alignment Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTP output in multirate mode</td>
<td>Yes</td>
</tr>
<tr>
<td>MPEG-2 TS output in multirate mode</td>
<td>No</td>
</tr>
<tr>
<td>WMF output in multirate mode</td>
<td>No</td>
</tr>
<tr>
<td>iPhone output</td>
<td>No</td>
</tr>
<tr>
<td>Smooth Streaming output</td>
<td>Yes—automatically enabled</td>
</tr>
</tbody>
</table>

Fixed-Size GOP. Enables fixed size GOP mode.

Access Point is IDR. Each Access Point of the output video will be an IDR frame. This setting is mandatory for:
* DVB-H
* iPhone 3.0 / iPod
* Smooth Streaming

11.1.6 Logo/Slate Mode area

Logo/Slate Mode. There are two ways of configuring the Logo/Slate mode for insertion:
* Disabled: logo and slate insertion are disabled.
* FTP File: ingest pictures from an FTP Server. In this case, you need to fill in the FTP values below, and the path to the files corresponding to logo or slate picture.

FTP Server. The IP address of the FTP of the logo or slate picture.

FTP Login. The user login to the FTP server.

FTP Password. The user password to the FTP server.

Use FTP Active Mode. Enables/Disables FTP Active Mode.

11.1.7 Slate Insertion area

Enable Slate Insertion. Enables/Disables Slate Insertion. When enabled, the slate picture hides the video output and the audio is muted. Slate Insertion is common to all the video profiles. This parameter can be set dynamically while the device is running.

Slate File Path. The Slate Path entry depends on the selection in Logo/Slate Mode. If FTP File mode is selected, this is the path to the picture on the FTP server.

The supported graphics file formats are BMP, GIF, JPEG, EXIF, PNG and TIFF.

The process takes into account the alpha channel present in the picture. Alpha compositing is the process of combining an image with the video stream to create the appearance of partial transparency. When you omit the Slate Path (leave it blank), the video is turned off.

This parameter can be set dynamically while the device is running.

NOTE: If the picture contains an alpha channel, the slate doesn't entirely hide the video output.
11.1.8 Logo Insertion area

Enable Logo Insertion. Enables/Disables Logo Insertion.

Logo File Path. The Logo Path entry depends on the selection in Logo/Slate Mode. If FTP File mode is selected, this is the path to the picture on the FTP server.

The supported graphics file formats are BMP, GIF, JPEG, EXIF, PNG and TIFF.

The process takes into account the alpha channel present in the picture. Alpha compositing is the process of combining an image with the video stream to create the appearance of partial transparency.

Position. It defines the reference position of the logo:
- Bottom Left
- Bottom Right
- Center
- Top Left
- Top Right

Center position is determined by computing itself the right position of the logo.

Horizontal Gap Ratio (%)

The Horizontal Gap is defined by the percentage of the stream width between the horizontal reference position (Left or Right) and the nearest side of the logo.

Vertical Gap Ratio (%)

The Vertical Gap is defined by the percentage of the stream height between the vertical reference position (Top or Bottom) and the nearest side of the logo.

Resize Mode. Following four choices can be selected for resizing the logo:
- No — The original logo size is kept and applied to the frame directly.
- WidthBased — The logo width is resized according to the percentage of the width of the frame. The original aspect ratio of the logo can be kept.
- HeightBased — The logo height is resized according to a percent of the height of the frame. The original aspect ratio of the logo can be kept.
- Free — You can define the width and the height, as the percentage of the size of the frame.

If selected, you can enter the width and height percentages in the fields below.

Width Ratio

Width of the logo as the percentage of the frame width.

Height Ratio

Height of the logo as the percentage of the frame height.

11.2 Configuring Other Video Profiles

You are optional to setup video encoding parameters for Video Profile 2 to Video Profile 8 for additional configuration. For example, you setup multi-bitrate on Video Profile 2 and Video Profile 3.

In addition, multi-bitrate feature is only compatible with the following outputs:
- RTP Output
- Ethernet Output
1. Select Video Profile 2 radio button. (Or Video Profile 3 to Video Profile 8).

![Video Profile 2 to Profile 8](image.png)

2. Enter the parameters which are enabled to setup configuration for video profile 2 to video profile 8. (The grey-out field indicates it is disabled for input.)

(Please refer to previous section 11.1 Configuring Master Video Profile for configuration details).
Chapter 12
Configuring Audio Encoding Profile

This chapter describes configuration procedure for audio encoding using the ProStream 4000 Web GUI. It includes the following sections:

- Configuring Audio Profile

Select the **Audio Profile** tab to setup the audio profile to encode/transcode the input audio stream.

### 12.1 Configuring Audio Profile

The total no. of enabled Audio PID Inputs (See 10.1.3 PID Inputs area) determine how many audio profiles are required to configure. For example, four Audio PIDs indicates four audio profiles are required to configure.

There are maximum up to 8 audio profiles that are able to be configured.

1. To configure audio profile, select the **Audio Profile 1** radio button. (Similarly, you can set the Audio Profile 2 to Audio Profile 8 in the same way if desired).

2. Enter the parameters for audio profile.
   
   **Use Audio.** Select this checkbox to enable the audio encoding parameters you want to input.

### 12.1.1 Audio Encoding area

- **Codec.** Common codec that is used to encode/transcode the input audio stream.
### Codec for Ethernet TS Output or RTP Output:

<table>
<thead>
<tr>
<th>Codec for Ethernet TS Output</th>
<th>Codec for RTP Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass-Through</td>
<td>AMR</td>
</tr>
<tr>
<td>AAC-LC (ADTS)</td>
<td>AAC-LC (mp4-generic)</td>
</tr>
<tr>
<td>AAC-LC (LATM/LOAS)</td>
<td>AAC-LC (MP4A-LATM)</td>
</tr>
<tr>
<td>HE-AAC v1 (implicit SBR, ADTS)</td>
<td>HE-AAC v1 (implicit SBR, mp4–generic)</td>
</tr>
<tr>
<td>HE-AAC v1 (implicit SBR, LATM/LOAS)</td>
<td>HE-AAC v1 (explicit SBR, mp4–generic)</td>
</tr>
<tr>
<td>HE-AAC v1 (explicit SBR, LATM/LOAS)</td>
<td>HE-AAC v1 (implicit SBR, MP4A-LATM)</td>
</tr>
<tr>
<td>HE-AAC v2 (implicit SBR, ADTS)</td>
<td>HE-AAC v1 (explicit SBR, MP4A-LATM)</td>
</tr>
<tr>
<td>HE-AAC v2 (implicit SBR, LATM/LOAS)</td>
<td>HE-AAC v2 (implicit SBR, mp4–generic)</td>
</tr>
<tr>
<td>HE-AAC v2 (explicit SBR, LATM/LOAS)</td>
<td>HE-AAC v2 (explicit SBR, mp4–generic)</td>
</tr>
<tr>
<td>MPEG1-Layer II</td>
<td>HE-AAC v2 (implicit SBR, MP4A-LATM)</td>
</tr>
</tbody>
</table>

### Codec for ATSC M/H Output and Smooth Streaming Output:

<table>
<thead>
<tr>
<th>Codec for ATSC M/H Output</th>
<th>Codec for Smooth Streaming Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE-AAC v2 (implicit SBR, mp4–generic)</td>
<td>AAC-LC, WM Audio 9.2</td>
</tr>
</tbody>
</table>

### Codec for WMF Output and Segmenter Output:

<table>
<thead>
<tr>
<th>Codec for WMF Output</th>
<th>Codec for Segmenter Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>WM Audio Voice 9</td>
<td>AAC-LC (ADTS)</td>
</tr>
<tr>
<td>WM Audio 9.2</td>
<td>HE-AAC v1 (explicit SBR, ADTS)</td>
</tr>
<tr>
<td>WM Audio 10 Professional</td>
<td>HE-AAC v2 (implicit SBR+PS, ADTS)</td>
</tr>
</tbody>
</table>

### Codec for Adobe Flash Output:

<table>
<thead>
<tr>
<th>Codec for Adobe Flash Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC-LC</td>
</tr>
<tr>
<td>HE-AAC v1 (implicit SBR)</td>
</tr>
<tr>
<td>HE-AAC v1 (explicit SBR)</td>
</tr>
<tr>
<td>HE-AAC v2 (implicit SBR+PS)</td>
</tr>
</tbody>
</table>
**Mode.** Select the appropriate audio mode. You can select from the following options:
- Mono (L)
- Mono (R)
- Mono(L+R)
- Stereo

**Resampling.** The input resampling for encoding audio. You can select from the following options:

<table>
<thead>
<tr>
<th>Resampling Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>None, 8000 Hz, 11025 Hz, 12000 Hz, 16000 Hz, 22050 Hz, 32000 Hz, 44100 Hz, 48000 Hz</td>
</tr>
</tbody>
</table>

- **Bitrate.** The bitrate for encoding audio. This impacts only the input audio stream but not the subsequent encapsulation process. In addition, if audio Codec above is set as Pass-Through, this field will be disabled.

### 12.1.2 Audio Leveling area

**AGC.** If selected, it enables Automatic Gain Control (AGC) feature.

**Level (%).** Level of encoding audio within range of 0% - 300%.
Chapter 13
Configuring Channel Output

This chapter describes the configuration procedure for channel output using the ProStream 4000 Web GUI. It includes the following sections:

- Ethernet TS Output
- RTP Output
- Adobe Flash Output
- WMF Output
- Smooth Streaming Output
- Apple Segmenter Output
- 3gpp File Output
- ATSC M/H Output

NOTE: The output options are only available when license is granted to the ProStream 4000 device.

Select the Output tab so that the specified audio/video stream can be delivered according to your configuration.

![Output tab](Image)

**Figure 13–1: Output tab**

### 13.1 Ethernet TS Output

This is an MPEG-2 Single Program Transport Stream (SPTS), containing compressed video and audio, carried over UDP/IP (ethernet interface), to a unicast or multicast address and UDP port.

Through this Ethernet TS output mode, ProStream 4000 is capable of generating the multiplexed video/audio MPEG-2 output.

Also, several MPEG-2 SPTS can be delivered to the same or different ethernet interfaces by using various unicast/multicast addresses and ports for each interface.

You need to configure the followings for the output transport stream:

- 1 Transport Stream ID (TSID)
- 1 Program Number (ProgNum)
- 1 Program Map Table (PMT PID)
- 1 Video PID
- Maximum up to 8 audio PIDs
- Maximum up to 2 Teletext PIDs
- Maximum up to 2 DVB-Subtitle PIDs
- 1 SCTE-35 PID
1. To perform Ethernet TS output, select **Ethernet TS Output** radio button.

![Figure 13–2: Ethernet TS Output](image)

2. Enter the parameters for Ethernet TS Output.

### 13.1.1 Output Profile area

Click “Click here to add a new row” to add a new Output Profile. Then click **Edit**.

A dialog box appears for specifying the parameters for the Output Profile.

<table>
<thead>
<tr>
<th>Enable</th>
<th>Ethernet Interface</th>
<th>IP Address</th>
<th>UDP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>192.168.10.133</td>
<td></td>
<td>5014</td>
</tr>
</tbody>
</table>

**Enable.** Click the checkbox to enable the Output Profile.

**Ethernet Interface.** Ethernet plug that is used to deliver the output audio/video stream.

**IP Address.** IP address that is used to deliver the output audio/video stream. This can be a unicast or a multicast IP address.

**UDP Port.** UDP port that is used to deliver the output audio/video stream.

**NOTE:** A maximum of two TS output profiles are supported. If there is more than one TS output profile, only the SPTS output (with one video profile enabled) is supported.

### 13.1.2 TS Multiplexing area

**Several Audio AU per PES Packet.** If selected, it allows several Audio AU per PES Packet.

**PSI Chunk Period (ms).** Repetition rate between each PAT/PMT, in ms.

**TS Packets Scheduling.** Options are:
Chapter 13 Configuring Channel Output

13.2 RTP Output

This output consists of four distinct RTP/RTCP streams carried over UDP/IP (ethernet interface) to one unicast or multicast address and 4 UDP ports.

You just need to choose an unicast/multicast address and one UDP port for each channel to be delivered. The UDP port must be an even number (i.e. 5004).

The output is delivered based on following settings:

- **Video RTP stream** is delivered to the following:
  - Unicast/multicast Address, UDP port (i.e. 5004)

- **Video RTCP stream** is delivered to the following:
  - Unicast/multicast Address, UDP port+1. (i.e. 5005)

- **Audio RTP stream** is delivered to the following:
  - Unicast/multicast Address, UDP port+2. (i.e. 5006)

- **Audio RTCP stream** is delivered to the following:
  - Unicast/multicast Address, UDP port+3. (i.e. 5007)
1. To perform RTP output, select **RTP Output** radio button.

   ![Figure 13–3: RTP Output](image)

2. Enter the parameters for RTP Output.

   **Ethernet Interface.** Input the Ethernet interface that is used to deliver the output audio/video stream.

   **IP Address.** Input the unicast or multicast IP address that is used to deliver the output audio/video stream.

   **UDP Port**

   The first UDP port that is used to deliver the output audio/video stream. This port must be an even number (i.e. 5004). This port and the 3 subsequent ports will be used respectively for **Video RTP**, **Video RTCP**, **Audio RTP**, and **Audio RTCP** streams.

   For example, if the UDP Port is set to 5004, the following ports will be used on the same destination IP address:
   - 5004 for **Video RTP**
   - 5005 for **Video RTCP**
   - 5006 for **Audio RTP**
   - 5007 for **Audio RTCP**

   **Send SAP Announces.** If selected, SAP announces is enabled.

   **SAP Period (ms).** It defines the period between each SAP announces.

   **Use Default Session Name.** If selected, the default session name will be used in SDP file. (See **9.4.5 Save SDP button** for details).

   **Session Name.** If default session name is not used, you need to define the session name which will be used in SDP file. (See **9.4.5 Save SDP button** for details).

### 13.3 Adobe Flash Output

This output delivers its encoded or transcoded output which contains compressed video and audio in an Real Time Messaging Protocol (RTMP) stream. It is delivered to a unicast/multicast address and UDP port through UDP/IP Ethernet interface.
1. To perform Adobe Flash output, select **Adobe Flash Output** radio button.

![Adobe Flash Output](image)

**Figure 13–4: Adobe Flash Output**

2. Enter the **Stream Name** which will be used by the Adobe Flash server.
3. Click **Edit** button and Output Profile page appears as follows.

![Adobe Flash Output Profile](image)

**Figure 13–5: Adobe Flash Output Profile**

4. Enter the parameters for Adobe Flash Output Profile.
   - **Enable**. Select this checkbox to enable configuration for Adobe Flash Output.
   - **URL**. URL comprises:
     - Transport Protocol used. (i.e. rtmp)
     - IP address/Host Name of the Main Adobe Flash server (i.e. 10.50.100.137)
     - TCP destination (optional) (i.e. 1935)
     - Application name used in the Adobe Flash server (i.e. live)
   
   For example, rtmp://10.50.100.137:1935/live
   
   - **Authentication Mode**. Disable or Enable the Akamai Authentication.
   
   - **Username**. If enabled, enter the username for authentication.
   
   - **Password**. If enabled, enter the password for authentication.
   
   - **Client Address**. The IP address that ProStream 4000 uses to publish the stream to Adobe Flash server. This Akamai parameter is not mandatory — the default value 0.0.0.0 will work.

5. Click **OK** to confirm.

**NOTE:** Only up to two publishing points can be established for Adobe Flash output.
13.4 WMF Output

This output delivers its encoded or transcoded output in a Windows Media Format which contains compressed video and audio.

1. To perform WMF output, select WMF Output radio button.

![Figure 13–6: WMF Output](image)

2. Enter the parameters for WMF Output.

**WMF Mode.** From the drop-down menu, select the two WMF output modes that ASF data can be sent:
- Broadcasting ASF data using HTTP protocol
- Send ASF data to publishing point

13.4.1 Broadcasting ASF data using HTTP protocol area

When ASF data is broadcasted using HTTP protocol, the following parameters can be configured:
- **HTTP Port.** Local HTTP port that is used on encoder.
- **Max. number of clients.** It defines the maximum number of remote connections on encoder.

13.4.2 Send ASF data to publishing point area

When sending ASF data to a publishing point, the following parameters can be configured:

**URL on Windows Media Server.**

The URL includes:
- Transport Protocol used (i.e. http)
- IP address/Host Name of the Windows Media server
- TCP destination (optional)
- Name of the publishing point used in the Windows Media Server (i.e. PublishingPoint)
For example, URL: http://10.12.1.45/PublishingPoint
Use Template. If selected, the parameters in main URL is taken as template.

Optional URL to use as template. This optional URL takes the same parameters as main URL.

Username. Username that is used to connect on Windows Media Server.
Password. Password that is used to connect on Windows Media Server.
Remove publishing point after disconnection. If selected, the publishing point will be removed on Windows Media Server after disconnection.

13.4.3 Windows Media Metadata area
Click Input Metadata to input the free text as your own reference.

13.5 Smooth Streaming Output
This output delivers its encoded or transcoded output in a live smooth streaming format which contains compressed video and audio.

1. To perform smooth steaming output, select Smooth Streaming Output radio button.

2. Enter the parameters for Smooth Streaming Output.

Stream Name. Name of the stream. Special Character cannot be used as stream name.
For example, ~ ! @ # $ % ^ & * ( ) _ + { ] } : ; " ' < > ? - = \ / 

Resource ID. A universally unique identifier (uuid) of the resource/stream. In a multi-coder configuration, each device must have the same Resource ID.

Encryption Mode. Only KMS v1.0 minimal and full implementation are supported.

Primary Key Management Server URL. URL of key provider service (only a KMS server is supported).
Backup Key Management Server URL. URL of redundant key provider service (only a KMS server is supported).

Requestor ID. A universally unique identifier (uuid) of the device (which acts as a requestor of KMS). The Requestor ID must be unique among all devices that connect to the same KMS.

Crypto Period (s). Period of time ProStream4000 will wait until it retrieves a new encryption key. A value of 0 means that only one key is used.

### 13.5.1 Output Profile area

1. Click **Edit** and Output Profile parameter page appears.

![Figure 13–8: Smooth Streaming Output Profile parameter](image)

2. Enter the parameters on Output Profile parameter page for Smooth Streaming.
   - **Enable**. Select this checkbox to enable Output Profile configuration.
   - **Encryption**. Select this checkbox to enable the encryption for the outputs.
   - **Publishing Point URL**. The URL of the Live Smooth Streaming Publishing (on the IIS Media Services web server).
   - **Username**. Login credential for IIS Media Services output server connection (only basic authentication is supported).
   - **Password**. Login password for IIS Media Services output server connection (only basic authentication is supported).
   - **Enable TCP window scaling**. Select this checkbox to enable TCP window scaling for the outputs.

### 13.5.2 Multi–Machine Encoding area

- **Master**. Select this checkbox to enable the coder as master machine.

  **Sync. Message Output**
  - **Ethernet Interface**. The Ethernet interface for sending synchronization.
  - **IP Address**. The IP address for sending synchronization.
  - **UDP Port**. The UDP port for sending synchronization.

- **Slave**. Select this checkbox to enable the coder as slave machine.

  **Sync. Message Input**
  - **Ethernet Interface**. The Ethernet interface for receiving synchronization.
  - **IP Address**. The IP address for receiving synchronization.
UDP Port. The UDP port for receiving synchronization.

13.6 Apple Segmenter Output

This output is considered as Apple’s http streaming output which delivers its encoded or transcoded output in the iPhone’s specific streaming format, containing compressed video and audio.

It uses the Apple’s HTTP Streaming protocol when streaming to iPhone/iPod.

1. To perform Apple Segmenter output, select Apple Segmenter Output radio button.

13.6.1 Output Profile area

There are four publishing points available for Segmenter output profile. In Output Profile area as shown below, click Edit to edit the parameter for particular publishing point.
The Apple Segmenter Output Profile parameter page is displayed as follows.

![Segmenter Output Profile parameter page](image)

**Enable.** If selected, the parameters for Playlist Publishing Point, TS Chunks Publishing Point, and Encryption will be enabled.

### 13.6.1.1 Playlist Publishing Point area

**Root Playlists.** Click **Edit** button as shown in Figure 13–11 to setup the configuration for root playlist. It can be configured up to 4 root playlists in each publishing point.

**Enable.** If selected, the particular playlist can be configured.

**Playlist Path.** Relative path where the main .m3u8 chunks playlists will be uploaded.

**Used Profiles.** The encoding profiles in each playlist (from v1 to v8). Use semicolon to separate between encoding profiles. For example, v1;v2;v3;v4.

**Sub-Playlists Path**

The relative path where the sub-playlists will be uploaded. A sub-playlist is a .m3u8 playlist corresponding to a specific video encoding profile.

In the case of multi-rate encoding, use the string template `%%d` in the string—it will be replaced by the video encoding profile number.

For example, `output/stream %d/sub.m3u8` will output as follows:
A sub-playlist for video encoding profile #1 to `output/stream1/sub.m3u8`
A sub-playlist for video encoding profile #2 to `output/stream2/sub.m3u8`
and so on.

**Sub-Playlists URLs**

A URL which will define sub-playlists location in the root playlist.

In the case of multi-rate encoding, use the string template `%d` to substitute for the video encoding profile number, as described above for the Sub-Playlists Path field.

For example, `
./stream%d/sub.m3u8` will output `./stream1/sub.m3u8` as the location for multi-rate profile #1 in the root playlist, and so on.

**Use Separate Playlist Publishing Point.** If selected a separate playlist publishing point will be used and FTP site configuration will be enabled.

**FTP Server.** IP address of the destination FTP server.

**FTP Login.** Login name of the destination FTP server.

**FTP Password.** Login password of the destination FTP server.

**Use FTP Active Mode.** You can enables/disables the FTP Active Mode. FTP Active Mode allows user to specify data port to communicate on otherwise it is in Passive mode and the server side decides.

### 13.6.1.2 TS Chunks Publishing Point area

**Chunks Path**
The remote FTP directory, in respect to the FTP root path, where the files are to be uploaded. The user must have full read/write permissions in this directory, including rights to create/remove sub-directories.

The `%d` string template, when inserted in the path string, will be dynamically replaced by the video encoding profile number. In this way, you can assign a specific directory to each video encoding profile. For example, `output/stream%d` will output as follows:

Chunks from video encoding profile #1 to directory: [FTP_SERVER]/output/stream1/
Chunks from video encoding profile #2 to directory: [FTP_SERVER]/output/stream2/
and so on.

**Chunks URL Prefix.** The URL to be added as a prefix to chunks references in playlists. This is used to put TS chunks and playlists at separate locations.

**Playback Length (s).** The duration of TS chunks kept on the server to allow for rewinding, in seconds. For example, if your chunks length is 2 sec and your Playback length is 60 sec then 30 TS files will be kept at any one time on the publishing point.

**FTP Server.** IP address of the destination FTP server.

**FTP Login.** Login name of the destination FTP server.

**FTP Password.** Login password of the destination FTP server.

**Use FTP Active Mode.** You can enables/disables the FTP Active Mode. FTP Active Mode allows user to specify data port to communicate on otherwise it is in Passive mode and the server side decides.

### 13.6.1.3 Encryption area

**Encryption Mode.** The options are:
Chapter 13 Configuring Channel Output

Apple Segmenter Output

- **Disabled**— encryption is disabled
- **Verimatrix**— the transcoder can retrieve keys from a proprietary VERIMATRIX Video Content Authority System (VCAS) (See [http://www.verimatrix.com/](http://www.verimatrix.com/)).

**Key Change Period (s)**. Period of time, in seconds, that the encoder waits until it generates/retrieves a new encryption key. The value must be between 10 and 3600.

**Resource ID**. Program identifier on the proprietary Verimatrix Video Content Authority System (VCAS).

**VCAS Location**. URL to locate a Verimatrix Video Content Authority System (VCAS).

2. Click **OK** to return to Apple Segmenter main page. Enter the parameters in the **TS Multiplexing** area.

![Figure 13–12: TS Multiplexing for Segmenter Output](image)

### 13.6.2 TS Multiplexing area

**Several Audio AU per PES Packet**. If selected, it allows several Audio AU per PES Packet.

**PSI/Chunk Period (ms)**. Repetition rate between each PAT/PMT, in ms. In Segmenter output, it corresponds to chunk period.

**TS Packets Scheduling**

Options are:

- **DVB/ATSC Compliance**
- **Ordered by timestamps**

**CBR (Add Null Packets)**. If selected, the stream with Null Packets is allowed to achieve the total transport bitrate specified below.

**TS Bitrate (bps)**. The total desired transport bitrate, including video and audio elementary streams, encapsulation data, and null packets.

**TSID**. Transport Stream ID that will be affected to the generated output Single-Program Transport Stream (SPTS).
**ProgNum.** Program Number that will be affected to the only one program in the generated output SPTS.

**PMT PID.** Program Map Table PID that will be affected to the only one program in the generated output SPTS.

**Video PID.** PID that will be affected to the output video stream in the generated output SPTS.

**Audio PID #n.** PID that will be affected to the output audio stream #n in the generated output SPTS.

(This setting is unavailable if audio #n input has not been selected in the Input Mode).

**Teletext PID #n.** PID that will be affected to the output Teletext stream #n in the generated output SPTS.

(This setting is unavailable if Teletext #n input has not been selected in the Input Mode).

**DVB-Subtitle PID #n.** PID that will be affected to the output DVB-Subtitle stream #n in the generated output SPTS.

(This setting is unavailable if DVB-Subtitle #n stream input has not been selected in the Input Mode).

**SCTE-35 PID.** PID assigned to the output SCTE-35 message.

### 13.7 3gpp File Output

This output must work together with RTP Output. Subsequently, you also need to use Record File button to save the recorded file according to the Network Path defined in this section. (Please refer to 9.4.6 Record File button for details).

1. To perform 3gpp file output, select **3gpp File Output** radio button.

![Figure 13–13: 3gpp File Output](image)

2. Enter the parameters for 3gpp File Output.

   **Network Path.** It is the path where the recorded file has to be saved.

   **Username.** It is the username used to connect on network path.

   **Password.** It is the password used to connect on network path.

   **File Name.** File name of the recorded file on the network path.
13.8 ATSC M/H Output

1. To perform ATSC M/H output, select ATSC M/H Output radio button.

2. Enter the parameters for ATSC M/H Output.
   - **Ethernet Interface.** Address of ethernet interface that is used to deliver the output audio/video stream.
   - **IP Address.** IP address that is used to deliver the output audio/video stream. This must be a unicast or multicast address.
   - **UDP Port.** First UDP port that is used to deliver the output audio/video stream.
   - **Send SAP Announces.** If selected, it enables SAP announces.
   - **SAP Period (ms).** The period between each SAP announces.
   - **Use Default Session Name.** If selected, the default session name will be used in SDP file. (See 9.4.5 Save SDP button for details).
   - **Session Name.** If default session name is not used, you need to define the session name which will be used in SDP file. (See 9.4.5 Save SDP button for details).
This chapter shows how to view ProStream 4000 system status and settings and how to perform routine maintenance tasks.

To accurately troubleshoot a problem, you need to know what version of software you are running, hardware configuration information, and the ProStream 4000 modules licensed for use on your system.

The ProStream 4000 System Management Console (SMC) is an easy way to monitor status and view the system settings.

This chapter includes the following sections:

- **Platform Maintenance**
  - Viewing Status and System Information
  - Viewing Anti-Virus Reports
  - Maintenance Operation
  - Ping Utility
- **Solving Problems**
  - ProStream 4000 Web GUI Channel Status
- **Contacting Harmonic Support**
  - Contains contact information, including web address, mailing address, and contact phone numbers for Harmonic Inc.

### 14.1 Viewing Status and System Information

A snapshot of general status information is always available in the left panel of the ProStream 4000 System Management Console.

![Status screen](image-url)
Select the **Status** tab to display more system information as shown in Figure 14–1:

**Server**
Identifies the current server and shows what percentage of the CPU is currently being used. This allows you to monitor for overload conditions.

**Storage**
Provides system and data free space amounts.

**System Lock**
Indicates whether the system is locked.

### 14.1.1 Hardware Identification

When troubleshooting a problem, it is important to know exactly what hardware is installed on your system and how it is configured.

To find configuration information:
1. Navigate to /Platform/Hardware Identification.

![Hardware Identification](image)

Figure 14–2: Hardware Identification

2. (Optional) Click **Verify Hardware and Download log** to download a text file with complete system identification information.
3. (Optional) Click **Download Fingerprint XML** to download an xml file that includes your complete hardware configuration.

You can use this for troubleshooting. For example, if you get a “hardware identification inconsistent” message, you can compare to find any differences between the certified hardware configuration and the actual current configuration.

### 14.1.2 Software Information

It is also important to know what version of software is installed. To see the software version:
1. Navigate to /Software Information/Version.

![Version Table]

You can click Verify software version to confirm that the loaded software matches the installation disk. If it is not a match, you will get a message that says "Software verification result: Inconsistent found".

You can click Download software version verification log to download a text file with complete system identification information.

14.1.3 Diagnostics

Open the Diagnostics tab to read the event log, and open the system message logger.

![Diagnostics Table]

14.1.4 Viewing Disk Usage

View the storage capacity and usage for the hard disk storage on the ProStream 4000 system to monitor how much space is available.

14.1.4.1 View System Volume Usage

In the dynamic environment, it is important to know how much disk space is currently available and how much is in use, so you can balance disk loads appropriately.

SMC shows you the volume information for all volumes installed on this ProStream 4000 system. The information displayed includes total space, available space, and percentage of use. This allows you to track usage, and change volume characteristics if necessary.

To view system volume information, navigate to /Platform/Storage/System Volume.
14.1.4.2 View Data Volume Usage

To view data volume information, navigate to Platform/Storage/Data Volume.

---

14.2 Viewing Anti-Virus Reports

To see logs from the anti-virus software installed on your system, open the SMC to /Operation/Anti Virus/Logs.
14.3 Maintenance Operation

This section has information about the following maintenance procedures:

- Server Dump Files
- Backup and Restore Configuration
- Restore Profiles
- Replace Power Supply
- POST Beep Codes
- Management Events

14.3.1 Server Dump Files

In the event of a module crash on a ProStream 4000 server, the server creates dump files. Harmonic Support uses these dump files to diagnose specific problems on the server.

To view dump files:
1. Navigate to /Platform/General.

2. Make a note of the file path for dump files.
14.3.2 Backup and Restore Configuration

It is good practice to keep a backup file of your existing configuration, and it is a good idea to store a copy on a server that is not part of the configuration. The backup process restores all the necessary information from the user browser machine, not the server machine.

To back up or restore system configuration files:
1. Navigate to the Backup/Restore tab.
2. Click Configuration Backup/Restore.
3. Click the Restore Configuration button. A new window opens.

![Backup / Restore Window](image)

4. Select the configuration and profile to be restored.
5. Click Apply. The system will be rebooted after configuration is restored.

14.3.3 Restore Profiles

To restore profiles:
1. Navigate to / Backup/Restore / Configuration Backup/Restore
2. Click the Restore Profiles button. A new window opens:

![Restore Profiles Window](image)
3. Click the checkmark the profile you want restored, then click the Task button to restore it. If you want to restore the configuration on a different server, copy the configuration file to that server. Then, choose the FullRestore profile option to tell ProStream 4000 to do a complete full restore, using the saved configuration file. When upgrading the server machine, you will want to use the Custom profile so that the restore process restores the saved configuration.

14.3.4 Replace Power Supply

To replace a power supply:
1. Read the safety information in 3.5 Safety Precautions on page 21 and Installation guidelines on page 87 of the Problem Determination and Service Guide. For full details, see page 118 of the Problem Determination and Service Guide.
2. If only one power supply is installed, turn off the server and peripheral devices.
3. Disconnect the power cord from the power supply that you are removing.
4. Grasp the power-supply handle.
5. Press the orange release latch down and hold it down.
6. Pull the power supply part of the way out of the bay.
7. Release the release latch; then, support the power supply and pull it the rest of the way out of the bay.
8. Slide the replacement power supply into the bay until the retention latch clicks into place. Ensure that there are adequate cooling fans installed.
9. Connect the power cord for the new power supply to the power cord connector on the power supply.
10. Connect the power cord to a properly grounded electrical outlet.
11. Make sure that the DC power LED and the AC power LED on the power supply are lit, indicating that the power supply is operating correctly.

14.3.5 POST Beep Codes

When you turn on the power, the server performs a series of tests to check the operation of the server components and some optional devices. These tests are called power-on self-test (POST). If POST is completed without detecting any problems, a single beep sounds, and the server startup is completed. If POST detects a problem, more than one beep might sound, or an error message might be displayed.

See the Problem Determination and Service Guide for full details on beep codes and possible resolutions.

14.3.6 Management Events

Management events fired by both AsiaPlatform and the applications will be logged for troubleshooting purpose. There are two pages for the events:
1. Current Alarms. This page lists all the currently asserted non-transient management event.

![Image of Current Alarms](image1)

**Figure 14–11: Current Alarm for Management Events**

2. Alarm History. This page lists all the logged management events up to 3 months.

![Image of Alarm History](image2)

**Figure 14–12: Alarm History for Management Events**

14.3.6.1 Searching alarm history

To help search for particular event to aid troubleshoot. Check the “Search” checkbox and the management events can be search by date, type, severity, source module and service affecting.

14.4 Ping Utility

Ping is a computer network administration utility used to test whether a particular host is reachable across an Internet Protocol (IP) network.

To use the Ping utility:
1. Navigate to /Platform/Network/Network Utilities.
2. Click Ping.
3. Enter a destination (host name or host IP).
4. Click Apply.

![Figure 14–13: Ping utility](image)

### 14.5 ProStream 4000 Web GUI Channel Status

Table 14-1 lists the possible status messages displayed in ProStream 4000 Web GUI for a given channel.

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot play</td>
<td>The channel cannot play.</td>
</tr>
<tr>
<td>Data scrambled</td>
<td>The input data is scrambled. Check the quality of the incoming content.</td>
</tr>
<tr>
<td>Initializing</td>
<td>The channel is initializing (before running).</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Device is a spare device. It is not running, but currently monitoring the devices it is configured to spare.</td>
</tr>
<tr>
<td>Running</td>
<td>The channel is running.</td>
</tr>
<tr>
<td>Source configuration failed</td>
<td>The channel source could not be configured. Possible cause: the ethernet is physically disconnected.</td>
</tr>
<tr>
<td>Stopped</td>
<td>The channel is stopped.</td>
</tr>
<tr>
<td>Stopping</td>
<td>The channel is being stopped.</td>
</tr>
<tr>
<td>Unknown</td>
<td>The channel could not be contacted due to an internal error. Possible cause: The device may be offline. Reboot the device.</td>
</tr>
<tr>
<td>Waiting for data</td>
<td>The channel is waiting for input data to process.</td>
</tr>
<tr>
<td>Waiting for TS parsing</td>
<td>ProStream 4000 is checking the input transport stream.</td>
</tr>
</tbody>
</table>
14.6 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, refer to the following table for contact information in your region:

Table 14–2: Contacting Harmonic Support

<table>
<thead>
<tr>
<th>Region</th>
<th>Telephone Technical Support</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>888-673-4896 (888-MPEG-TWO) or 408-490-6477</td>
<td><a href="mailto:techhelp@harmonicinc.com">techhelp@harmonicinc.com</a></td>
</tr>
<tr>
<td>Europe, Middle East</td>
<td>+44 7699 391552</td>
<td><a href="mailto:support.emea@harmonicinc.com">support.emea@harmonicinc.com</a></td>
</tr>
<tr>
<td>Asia (excluding India and Russia)</td>
<td>+852-2116-1119</td>
<td><a href="mailto:hongkongtechsupport@harmonicinc.com">hongkongtechsupport@harmonicinc.com</a></td>
</tr>
<tr>
<td>India</td>
<td>+91 22 6793 9291</td>
<td><a href="mailto:support.sm@harmonicinc.com">support.sm@harmonicinc.com</a></td>
</tr>
<tr>
<td>Russia</td>
<td>+7 495 926 4608</td>
<td><a href="mailto:support.sm@harmonicinc.com">support.sm@harmonicinc.com</a></td>
</tr>
<tr>
<td>Africa</td>
<td>+972-54-900-7740</td>
<td><a href="mailto:support.sm@harmonicinc.com">support.sm@harmonicinc.com</a></td>
</tr>
<tr>
<td>China</td>
<td>+852-2116-1119</td>
<td><a href="mailto:dlchinatechsupport@harmonicinc.com">dlchinatechsupport@harmonicinc.com</a></td>
</tr>
</tbody>
</table>

The corporate address for Harmonic Inc. is:

Harmonic Inc.
4300 North First St.
San Jose, CA 95134, 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.+1.408.490.6770

The web address for Harmonic Inc. is www.harmonicinc.com.
Appendix A
Technical Specifications

This appendix contains information about:

- H.264 compliance reference materials
- H.264 encoding levels descriptions
- Audio encoding bit rate levels for all codecs

A.1 References for H.264 Compliance

Harmonic systems deliver streams fully compliant to ITU-T Rec. H.264 (03/2005), as described in the following reference number 1.

However, some applications enforce stricter rules than plain H.264. To ensure interoperability with other vendors, some encoding parameters must be set to specific values. The following references detail different use cases.

   SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS
   Infrastructure of audiovisual services - Coding of moving video
   Advanced video coding for generic audiovisual services

2. ETSI TS 101 154 V1.7.1 (2005-06)
   Digital Video Broadcasting (DVB); Implementation guidelines for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream.

3. ETSI TS 102 005 V1.2.1 (2006-04)
   Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in DVB services delivered directly over IP protocols.

4. ETSI TS 102 428 V1.1.1 (2005-06)
   Digital Audio Broadcasting (DAB); DMB video service; User Application Specification.
A.2 H.264 Encoding Levels

An H.264 encoding level is linked to the maximal bitrate, frame size, and frame rate, that can be used for video encoding. Table A-1 gives this relationship.

Table A-1: H.264 levels

<table>
<thead>
<tr>
<th>H.264 Level</th>
<th>Maximum number of macroblocks per frame</th>
<th>Maximum number of macroblocks per second</th>
<th>Maximum video bitrate (T-DMB, MPEG-2 TS, Adobe Flash)</th>
<th>Maximum video bitrate (RTP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>99</td>
<td>1,485</td>
<td>76,800</td>
<td>64,000</td>
</tr>
<tr>
<td>1b</td>
<td>99</td>
<td>1,485</td>
<td>153,600</td>
<td>128,000</td>
</tr>
<tr>
<td>1.1</td>
<td>396</td>
<td>3,000</td>
<td>230,400</td>
<td>192,000</td>
</tr>
<tr>
<td>1.2</td>
<td>396</td>
<td>6,000</td>
<td>460,800</td>
<td>384,000</td>
</tr>
<tr>
<td>1.3</td>
<td>396</td>
<td>11,880</td>
<td>921,600</td>
<td>768,000</td>
</tr>
<tr>
<td>2</td>
<td>396</td>
<td>11,880</td>
<td>2,400,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>2.1</td>
<td>792</td>
<td>19,800</td>
<td>4,800,000</td>
<td>4,000,000</td>
</tr>
<tr>
<td>2.2</td>
<td>1,620</td>
<td>20,250</td>
<td>4,800,000</td>
<td>4,000,000</td>
</tr>
<tr>
<td>3</td>
<td>1,620</td>
<td>40,500</td>
<td>12,000,000</td>
<td>10,000,000</td>
</tr>
<tr>
<td>3.1</td>
<td>3,600</td>
<td>108,000</td>
<td>16,800,000</td>
<td>14,000,000</td>
</tr>
<tr>
<td>3.2</td>
<td>5,120</td>
<td>216,000</td>
<td>24,000,000</td>
<td>20,000,000</td>
</tr>
<tr>
<td>4</td>
<td>8,192</td>
<td>245,760</td>
<td>24,000,000</td>
<td>20,000,000</td>
</tr>
<tr>
<td>4.1</td>
<td>8,192</td>
<td>245,760</td>
<td>60,000,000</td>
<td>50,000,000</td>
</tr>
<tr>
<td>4.2</td>
<td>8,704</td>
<td>522,240</td>
<td>60,000,000</td>
<td>50,000,000</td>
</tr>
<tr>
<td>5</td>
<td>22,080</td>
<td>589,824</td>
<td>162,000,000</td>
<td>135,000,000</td>
</tr>
<tr>
<td>5.1</td>
<td>36,864</td>
<td>983,040</td>
<td>288,000,000</td>
<td>240,000,000</td>
</tr>
</tbody>
</table>

1. This table is extracted from ITU-T Rec. H.264 (03/2005) [1], section A.3

Following are examples showing how to use Table A-1 to determine the optimal level setting.

Example 1: 720x576@25fps for IPTV.

A macroblock is a block of 16x16 pixels. If you encode at resolution SD = 720x576 pixels, the image size in macroblocks will be:

- width = 720 pixels = 720/16 macroblocks = 45 macroblocks.
- height = 576 pixels = 576/16 macroblock = 36 macroblocks.
- number of macroblocks per frame = 45 x 36 = 1620.

Looking at the table, you see that you can set the H.264 Level to 2.2 or above. But, if you do set the level to 2.2, the table shows that you must encode less than 20250 macroblocks per second, that is: 20250 / 1620 = 12.5 frames per second maximum.
If you want to encode in SD at 25 frames per second, you need:

- number of macroblocks per second = 1620 x 25 = 40500.

So, you must set the level to be equal to 3 or above. Then, you will be allowed to set the bitrate to 12 Mbps maximum, because IPTV needs MPEG-2 TS as an output format.

**Example 2: QVGA@12.5fps for Mobile TV. Output is RTP.**

QVGA = 320x240 pixels:

- width = 320 pixels = 320/16 macroblocks = 20 macroblocks.
- height = 240 pixels = 240/16 macroblock = 15 macroblocks.
- number of macroblocks per frame = 20 x 15 = 300.
- number of macroblocks per second = 300 x 12.5 = 3750.

Here, level 1.2 is enough, up to a bitrate of 384 kbps. For bitrates above 384 kbps (up to 768 kbps) you will raise the level to 1.3.

To set the H.264 level using ProStream 4000 Web GUI, see 11.1 Configuring Master Video Profile on page 72.

### A.3 Audio Encoding Bit Rate Levels

The following tables list the supported bit rates for audio encoding, for each output codec type.

**Table A-2: AMR NB Mono**

<table>
<thead>
<tr>
<th>Sampling Rate (Hz)</th>
<th>Bit Rate (kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8000</td>
<td>4.75, 5.15, 5.90, 6.70, 7.40, 7.95, 10.20, 12.20</td>
</tr>
</tbody>
</table>

**Table A-3: MPEG-1 Layer II**

<table>
<thead>
<tr>
<th>Sampling Rate (Hz)</th>
<th>Bit Rate (kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32000, 44100, 48000</td>
<td>64, 96, 112, 128, 160, 192, 224, 256, 320, 384</td>
</tr>
<tr>
<td>Sampling Rate (Hz)</td>
<td>AAC-LC</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Mono</td>
</tr>
<tr>
<td>8000</td>
<td>8, 10, 12, 16</td>
</tr>
<tr>
<td>11025</td>
<td>8, 10, 12, 16, 20, 24, 28, 32</td>
</tr>
<tr>
<td>12000</td>
<td>8, 10, 12, 16, 20, 24, 28, 32</td>
</tr>
<tr>
<td>16000</td>
<td>12, 16, 20, 24, 28, 32, 36, 40</td>
</tr>
<tr>
<td>22050</td>
<td>16, 20, 24, 28, 32, 36, 40, 48, 56</td>
</tr>
<tr>
<td>24000</td>
<td>16, 20, 24, 28, 32, 36, 40, 48, 56</td>
</tr>
<tr>
<td>32000</td>
<td>24, 28, 32, 36, 40, 48, 56, 64, 72, 80, 88, 96, 112, 128, 160</td>
</tr>
<tr>
<td>44100, 48000</td>
<td>32, 36, 40, 48, 56, 64, 72, 80, 88, 96, 112, 128, 160</td>
</tr>
</tbody>
</table>
## Table A-5: WMA

<table>
<thead>
<tr>
<th>Sampling Rate (Hz)</th>
<th>WMA Voice 9</th>
<th>WMA 9.2 (A/V) CBR</th>
<th>WMA Professional (A/V) CBR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mono</td>
<td>Mono</td>
<td>Stereo</td>
</tr>
<tr>
<td>8000</td>
<td>8000</td>
<td>5000, 6000, 8000</td>
<td>12000</td>
</tr>
<tr>
<td>11025</td>
<td>n/a</td>
<td>8024, 10024</td>
<td>n/a</td>
</tr>
<tr>
<td>12000</td>
<td>n/a</td>
<td>8024, 10024</td>
<td>n/a</td>
</tr>
<tr>
<td>16000</td>
<td>12000, 16000</td>
<td>10000, 12000, 16000</td>
<td>16000, 20000</td>
</tr>
<tr>
<td>22050</td>
<td>n/a</td>
<td>16024, 20008</td>
<td>20008, 22008, 32048</td>
</tr>
<tr>
<td>32000</td>
<td>n/a</td>
<td>20000</td>
<td>24000, 32000, 40000, 48000</td>
</tr>
<tr>
<td>44100</td>
<td>n/a</td>
<td>20008, 32048, 48024</td>
<td>31960, 48024, 64040, 80024, 96040, 128040, 160040, 192040, 256032, 320032</td>
</tr>
<tr>
<td>48000</td>
<td>n/a</td>
<td>n/a</td>
<td>63000, 64032, 95000, 96000, 127000, 128016, 160032, 191000, 192000</td>
</tr>
</tbody>
</table>
A

AAC
Advanced Audio Coding is a lossy audio compression technology associated with MPEG-4.

AC−3
Active Coding 3 is Dolby's third digital audio coding technology, and is synonymous with Dolby Digital.

ADTS
Audio Data Transport Stream is a standard for encapsulating encoded audio data into a data stream.

AFT
Adapter Fault Tolerance provides automatic redundancy for an adapter through failover from an active adapter to a standby adapter for switch port, cable, or adapter failure. It supports two to eight adapters per team and works with any hub or switch.

AMR−NB
Adaptive Multi-Rate Narrow Band is a codec adopted by 3rd Generation Partnership Project (3GPP) for use over mobile networks.

ANSI
American National Standards Institute.

ASF
Advanced Systems Format is a proprietary digital audio/digital video container format developed by Microsoft, that specifies the structure of a video/audio stream.

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

ATSC
Advanced Television System Committee.

B

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

Bottom Field First (BFF)
Use the bottom field of interlaced frame based video as the dominant field.
C

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

CBR
Constant Bit Rate.

CEA
Consumer Electronics Association.

channel
A system transcoding exactly one program.

CIF
Common Intermediate Format. Originally a set of standard video formats defined by their resolution (used in videoconferencing). Now refers to video resolution: 352x288 in PAL or 352x240 in NTSC.

codec
A device or software used for coding and decoding transformations of digital data or signal streams.

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.

D

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

DTS
Decoding Time Stamp.

DVB
Digital Video Broadcasting Group.

DVS
Digital Video Specification.

E

elementary stream
A constituent stream of a program, that carries only one type of data (audio, video, or closed-caption).
Encoding Profile

A combination of service allocation, output video size, frame rate, video bitrate, video codec, audio codec, audio bitrate, multiplexing/encapsulation, and all other parameters defining an audio/video stream output format.

EPG

Electronic Program Guide. A digital listing of scheduled TV or radio programs, typically displayed with navigation functions for viewers to select programming from a remote input device.

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.

G

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.

H

HD

High Definition.

HE-AAC

High Efficiency Advanced Audio Coding (see entry for AAC).

headend

The distribution point in a TV system.

Hertz (Hz)

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

I

IDR frame

An IDR frame is a particular kind of I frame used in MPEG-4 AVC encoding.

IEC


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.

ISO
International Standards Organization.

J

JVT
Joint Video Team. The Joint Video Team is a group of video coding experts from ITU-T Study Group 16 (VCEG) and ISO/IEC JTC 1 SC 29 / WG 11 (MPEG) created to develop an advanced video coding specification.

K

kBps
Kilobytes per second. One thousand bytes per second.

kbps
Kilobits per second. One thousand bits per second.

L

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

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.
Glossary

N

NTSC
National Television System Committee.

R

RAP Period
Random Access Point Period. The period between reference frames, for example in H264 it is the period between IDR frames.

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

RTMP
Real Time Messaging Protocol is a proprietary protocol developed by Adobe Systems, used for streaming audio, video and data over the Internet, between an Adobe Flash player and a server.

RTCP
Real Time Control Protocol is a companion protocol to RTP that allows monitoring of the data delivery.

RTP
Realtime Transport Protocol is an IP protocol that supports real-time transmission of data such as audio and video.

P

packet
A block of data used for transmission.

PAT
Program Association Table.

PES
Packetized Elementary Stream.

PIFF
Microsoft’s Protected Interoperable File Format (PIFF) specification defines a standard multimedia file format for delivery and playback of multimedia content.

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

PMT
Program Mapping Table.
port
A port is an input to or an output from a component, an adapter, or a module.

Profile
A profile refers to the encoding profile for the processing (encoding or transcoding) that the ProStream 4000 performs on the input program data stream. It includes the codec, size, bit rate, frame rate, and all other settings that determine the output format. The maximum number of profiles supported on each unit depends on the encapsulation type, and CPU utilization. You must acquire a license for each profile that you want to enable on the ProStream 4000.

Program
A program is made up of the video and audio data streams that you want to include in the output. The program is assigned to one or more profiles and it is converted to the specified format for that profile. In this way, a single program can be processed for different output targets.

PSIP
Program System Information Protocol.

PTS
Presentation Time Stamp.

Q

QAM
Quadrature Amplitude Modulation.

S

SAP
Session Announcement Protocol.

SDP
Session Description Protocol.

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.

SCTE
Society of Cable Telecommunication Engineers.

SD
Standard Definition.
**SDP**
Session Description Protocol. A text-based message format protocol defined by the IETF, used for describing a multi-media session.

**SEI**
Supplemental Enhancement Information is extra information that can be inserted into the bitstream to enhance the use of the video for a wide variety of purposes, in accordance with H.264/AVC/MPEG-4 Part 10. See also VUI.

**SFP Module**
A module that converts optical data into electrical data and vice versa.

**SFT**
Switch Fault Tolerance provides automatic redundancy across switches. An adapter connected to one switch will failover to a standby adapter connected to a different switch for a switch, switch port, cable, or adapter failure.

**SNMP**

**SPTS**
Single Program Transport Stream.

**T**
transport stream
One or more multiplexed MPEG-2 programs.

**T-STD**
Transport-System Target Decoder.

**V**

**VUI**
Video Usability Information is extra information that can be inserted into the bitstream to enhance the use of the video for a wide variety of purposes, in accordance with H.264/AVC/MPEG-4 Part 10. See also SEI.

**VBR**
Variable Bit Rate.

**VOD**
Video On Demand.
**W**

**WMA**

Windows Media Audio (originally MSAudio) is a proprietary audio compression format developed by Microsoft.

**WMV**

Windows Media Video is a compressed video file format for several proprietary codecs, developed by Microsoft.