X75™HD/X75™SD

Multiple Path Converters and Frame Synchronizers

Installation and Operation Manual

Enabling Your
Integrated Content Environment

Edition D
175-000243-00

X75HD/X75SD

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Installation and Operation Manual

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March 2006

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Preface

Manual Information

Purpose

This manual details the features, installation procedures, operational procedures, and specifications of the X75HD/X75SD Multiple Path Converters and Frame Synchronizers.

Audience

This manual is written for engineers, technicians, and operators responsible for the installation, setup, and/or operation of the X75HD/X75SD Multiple Path Converters and Frame Synchronizers.

Revision History

Table P-1. Manual Revision History

Edition	Date	Details
Preliminary	December 2004	Preliminary release
A	January 2005	Initial release
B	April 2005	Addition of SD capabilities, new packages, options, and index
C	June 2005	Addition of X75OPT-HDDUOCON option, software upgrade procedures, and alarms list
D	March 2006	Addition of streaming and video/audio timing options, improved alarms list, specifications and features changes

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Table P-2. Writing Conventions

Term or Convention	Description
Bold	Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names
Italics	Indicates email addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE
`Code`	Indicates variables or command-line entries, such as a DOS entry or something you type into a field
>	Indicates the direction of navigation through a hierarchy of menus and windows
hyperlink	Indicates a jump to another location within the electronic document or elsewhere
Internet address	Indicates a jump to a Web site or URL
Note	Indicates important information that helps to avoid and troubleshoot problems

Obtaining Leitch Documents

Leitch documents can be viewed or downloaded from the Leitch Web site at www.leitch.com (go to **Support>Documentation**). Alternatively, contact your Leitch customer service representative to request a document.

Unpacking/Shipping Information

Leitch has carefully inspected, tested, and calibrated this product before shipment to ensure years of stable and troublefree service.

1. Check equipment for any visible damage that may have occurred during transit.
2. Confirm that you have received all items listed on the packing list.
3. Contact your Leitch dealer if any item on the packing list is missing.
4. Contact the carrier if any item is damaged.
5. Remove all packaging material from the product and its associated components before you install the unit.

Keep at least one set of original Leitch packaging, in the event that you need to return a product for servicing. If the original packaging is not available, you can purchase replacement packaging from Leitch at a modest cost, or supply your own packaging as long as it meets the following criteria:

- Withstands the weight of the product
- Holds the product rigid within the packaging
- Leaves at least two inches of space between the product and the container
- Protects the corners of the product

Ship products back to Leitch for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, Leitch will return the product prepaid after servicing.

Safety Terms and Symbols

Terms and Symbols Used in this Manual

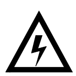
WARNING statements and icons identify conditions or practices that can result in personal injury or loss of life. High voltage is present. Uninsulated dangerous voltage within the product's enclosure may be sufficient to constitute a risk of electric shock to persons.

CAUTION statements and icons identify conditions or practices that can result in damage to the equipment or other property. Important operating and maintenance (servicing) instructions are included in the literature accompanying the product.

CAUTION statements and icons identify conditions or practices that can result in damage to the equipment or other property if proper care during use and transport is not taken.

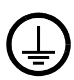
Terms and Symbols Found on the Product

DANGER: Indicates a hazard for high voltage, fire, or personal injury immediately accessible as one reads the marking

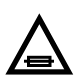


WARNING: Indicates a personal injury hazard not immediately accessible as one reads the marking

CAUTION: Indicates a hazard to property, including the product, or the need to take attention and refer to the manual



Protective ground (earth) terminal



FUSE: Replace with same type and rating of fuse

Observe precautions for handling electrostatic-sensitive devices

Section I—Startup

This section contains the following topics:

- "Chapter 1: Introduction" on page 3
- "Chapter 2: Applications" on page 35
- "Chapter 3: Module and Back Panel Descriptions" on page 51
- "Chapter 4: System Installation and Connections" on page 67
- "Chapter 5: Initial Configuration" on page 85

The content contained in this section will give you a general understanding of the X75HD/X75SD models. Features and options are described, along with details on how to install the system and begin operation.

Chapter 1

Introduction

Overview

Leitch Technology's X75™HD/SD models are standard and high-definition utility synchronizers and converters that combine video and audio processing capabilities with the ability to upconvert, downconvert, and crossconvert from most common input and output video formats.

X75HD/X75SD models are available in HD-SDI, SD-SDI, and DPS-575-compatible versions in both simultaneous or single-channel configurations. They are equally suited for analog, digital, or hybrid facilities—the ideal choice for broadcasters making the transition to digital and high-definition television (DTV and HDTV). Available in standard or high definition formats, video-only and audio/video configurations, the X75 provides a bridge between analog, digital and high-definition systems with analog, digital, and embedded audio.

This chapter describes the main features and applications of the X75HD/X75SD products, under the following topics:

- "General Description" on page 4
- "Main Features" on page 6
- "Front and Rear Panels" on page 9
- "Product Packages" on page 12
- "Typical Control Configurations" on page 23
- "Overview of Operating Modes" on page 25

General Description

Note

See "Product Packages" on page 12 for more specific information on what each X75HD/X75SD system package provides.

Offering unparalleled flexibility, the X75HD/X75SD provides up to nine video inputs and ten video output formats, depending upon the following available options:

- One HDTV optical fiber serial component digital video input and output
- Two HDTV serial component inputs (one can be selected as optical fiber) and one HDTV output (two coaxial and one fiber)
- Two SD-SDI serial component digital video inputs and outputs
- One 128 x 96 thumbnail streaming source and one 352 x 240 pixel (525) or 352 x 288 pixel (625) streaming-over-IP video/audio output
- Component analog video (Betacam™) input and output
- S-video (S-VHS/Hi8) input and output
- NTSC/PAL-M/PAL-B/SECAM composite video input and output
- RGB-S output
- DVI-D output

See page 35 for descriptions of some typical applications using these options.

Inputs

Inputs are capable of auto-detection, with user-selectable SMART alarms. Two input modes (both of which allow for either automatic detection or user-selection of inputs) are available for processing critical program paths for ingest, and bridging between routers/tape transports/servers, mobile broadcast, and edit suites.

Video Processing

Processing for video includes level/color control, aspect ratio conversion, 3D-adaptive color decoding, noise reduction, frame synchronization and time base correction for non-synchronous signals, analog-to-digital and digital-to-analog video conversion.

Other capabilities include the following:

- Up and down conversion
- Aspect ratio control
- High-definition cross-conversion

Audio Processing

Processing for audio includes level control, analog-to-digital and digital-to-analog conversion, and SD-SDI and HD-SDI serial digital signal embedding and de-embedding.

Other capabilities include the following:

- Sample rate conversions, synchronization, and timing-to-video for correction of lip sync errors
- Embedding/de-embedding of signals such as Dolby-E™ and AC-3™
- Processing of multiple channel program signals for surround-sound applications before or after compression
- Audio-follow-video routing
- Converting, adjusting, timing, demultiplexing, and multiplexing

Signal Control and Monitoring

You can control and monitor signals passing through the X75HD/X75SD using a variety of methods:

- Local X75HD/X75SD control panels
- Remote X75-RCP control panels
- Web server software
- Local DPS-575 control panels
- Remote RC-575 control panels
- CCS™ software applications and QuickTime Player

Operating Modes

There are three main operational modes: Auto Detect (default mode) M-Path (multiple path) processing, and Simulcast processing.

- The Auto Detect default mode detects any one input and processes it to all outputs.
- M-Path selects or detects input signals to processed output signals. The Default M-Path mode is **All Output Select**, for which a single input is processed to all outputs. In **Video Routing Mode,** M-Path allows for up to 4 processed paths; you choose the output first, and then select which input is to be processed to that output.
- Simulcast operation makes it possible for you to switch any two inputs to standard and high definition outputs.

See “Overview of Operating Modes” on page 25 for more information on modes of operation.

Main Features

You can access all of the features and functions of the X75HD/X75SD models from an X75HD/X75SD local control panel, an X75-RCP remote control panel, a CCS software application such as Pilot or Navigator, or a supported Web browser. Details of the available features begin in the “Available Packages” section (page 12) and the “Options” section (page 17). The following standard and optional features are described in the next pages:

General Functionality

- Upgradability from SDTV to HDTV
- Frame syncs for analog, SDTV and HDTV
- Upconversion, downconversion, crossconversion, and aspect ratio conversion
- Analog-to-digital conversion
- Digital-to-analog conversion
- Proc amps for analog, SDTV and HDTV
- Video test generation
- Optional video noise reduction and enhancement
- 8 or 16 channels of internal audio processing (gain, invert, swap, sync/delay, sum)
- Embedding and de-embedding for SD-SDI and HD-SDI
- Compressed audio capability (Dolby-E™ and AC-3™)
- Video and audio timing correction
- Streaming video capability
- SD memory card parameter settings storage
- Audio (and embedded) test generation
- Audio limiting capability
- Built-in Web server with thumbnail monitoring capability
- Redundant power supply

Note

Simultaneous up, down, and cross conversion requires the X75OPT-HDDUOCON software key option. Contact your Leitch sales representative to enable this option.

Input/Outputs

- Auto-detected inputs
- Two SD-SDI and two HD-SDI inputs
- Color black, tri-level sync and DARS reference inputs
- Optional NTSC/PAL-M/PAL-B/SECAM input with CAV and S-video inputs
- Ability to provide many outputs, including composite, component, SD-SDI, HD-SDI, HDTV fiber, DVI-D, and S-video
- SC and optional FC/ST fiber interface for HDTV
- Two or five AES inputs and outputs, at 75 or 110Ω
- Four analog audio inputs and outputs
- GPI inputs and outputs

Operation, Control, and Monitoring

- Three operating modes: Auto Detect, M-Path (multiple-path) and Simulcast
- Clean video and quiet audio switching capability
- Local and remote control panels
- Control for up to 200+ units from a single control panel
- X75 Web server software application
- Software GUI control and monitoring using CCS Pilot and Navigator, or monitoring using CoPilot
- SNMP and third-party interfaces
- *SMART* alarms (global parameters for all inputs—allowing custom-definitions for how and when alarms are activated, including priority settings for main and backup inputs)

Hardware Features

- SD (Secure Digital) removable media for storage of parameter settings; 128 MB included (the maximum size supported by the X75HD/X75SD is 1 GB)
- Front-to-back air flow
- Single and dual redundant power supplies

Summary of Benefits

Among the many benefits provided by the X75HD/X75SD, a major advantage is a reduction in the amount of equipment needed to perform everything that the X75HD/X75SD can do in just one 1RU. In a single system, the X75HD/X75SD combines HDTV frame synchronization along with up/down and cross/down conversion. It provides analog inputs and outputs with SD-SDI, HD-SDI, and HDTV optical, and delivers analog, digital, and embedded audio. The optional Dolby-E™/AC-3™ decompressor is built-in, thereby saving more rack space. Voice-over is part of the 8/16-channel audio option. The internal socket below the audio submodule allows the optional Dolby-E/AC-3 submodule to be plugged in, thereby saving more rack space.

Front and Rear Panels

Front Panel Description

Figure 1-1 and Figure 1-2 illustrate front blank, and front control panels, respectively.

X75HD/X75SD units with a blank front panel, must be configured and controlled remotely, using one of the following methods:

- Separate control panel such as an X75-RCP
- Local control panel on an X75HD/X75SD or DPS-575 unit
- CCS applications such as Pilot or Navigator
- Web server application using a common Web browser such as Internet Explorer™ or Netscape™
- SNMP (Simple Network Management Protocol) and third-party control software offered through Leitch CCS Protocol

Note

DPS-575 units do not have the **Ctrl** button found on X75HD/X75SD models. Button shortcuts on X75HD/X75SD models that require the **Ctrl** button are not accessible remotely via a DPS-575 unit. In these cases, the affected parameters must be accessed through the menu structure.

Blank front panels provide LEDs for alarm and status monitoring, (including major and minor alarm LEDs), and status LEDs for power and memory access.

Local and remote control panels contain LEDs that indicate alarm, status, and configuration information. For more detailed information on LCP controls and indicators, see the *Control Panels for X75 Systems Installation and Operation Manual.*

Figure 1-1. Blank X75HD/X75SD Front Panel

Rear Panel Description

Figure 1-3 on page 11 illustrates a typical rear panel with all module options installed. For more information on back panel connections, see “Chapter 3: Module and Back Panel Descriptions” on page 51.

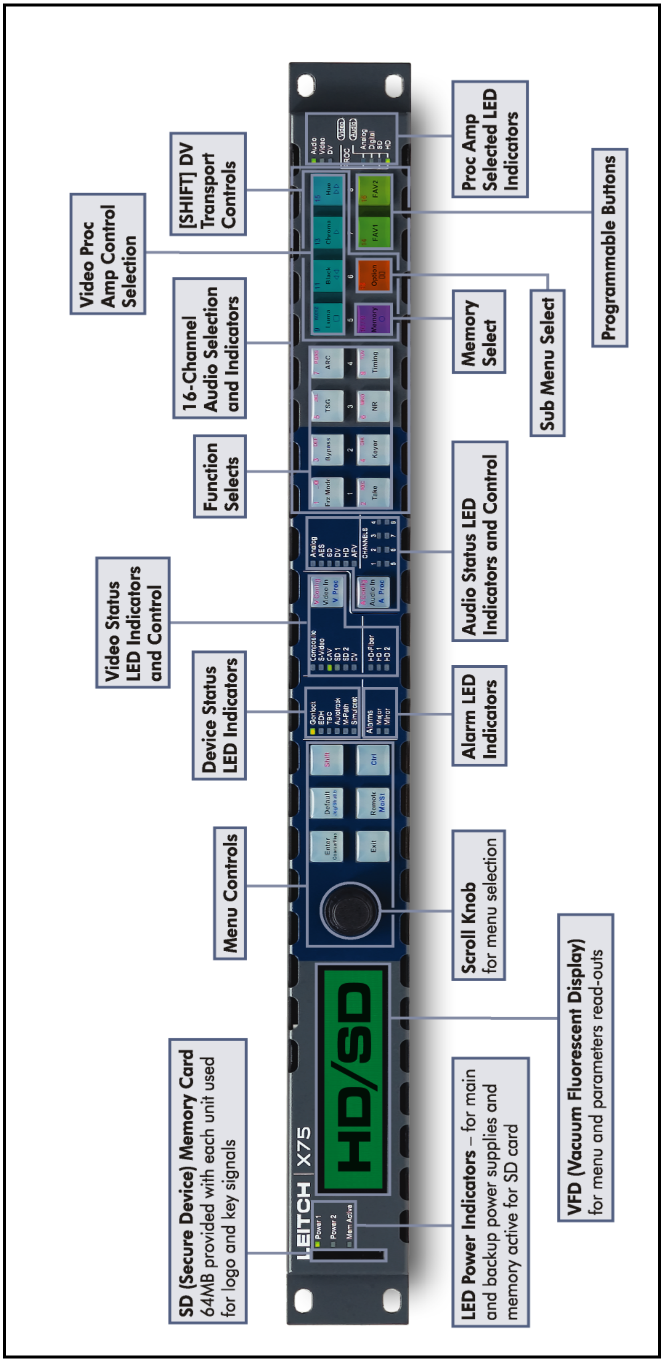


Figure 1-2. Front View of X75HD/X75SD with Local Control Panel

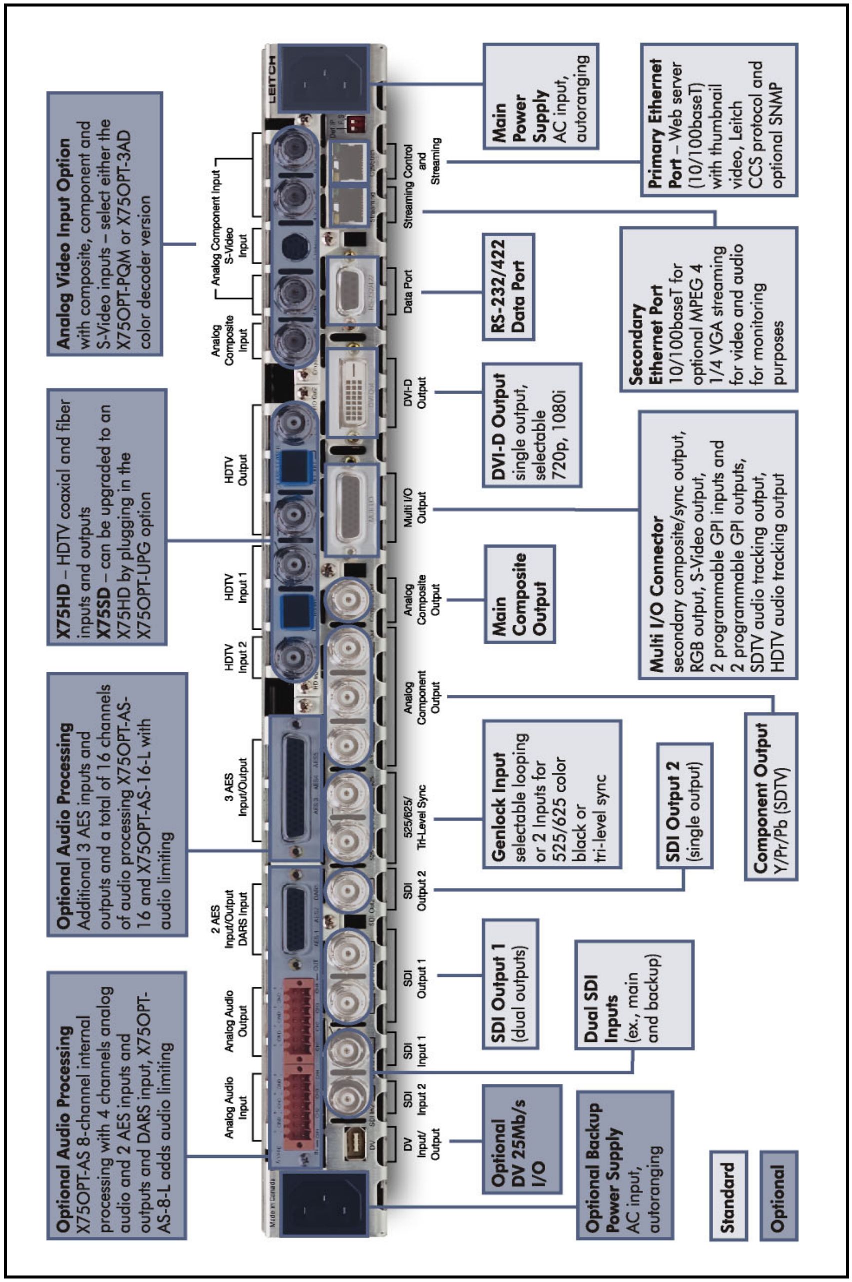


Figure 1-3. Rear View of X75HD/X75SD With All Available Options

Product Packages

X75HD/X75SD models are available in a wide range of product packages, and with a large number of options for modules, connectors, cables, software, and documentation. All of the frames described in the next pages are capable of single-channel up, down, and cross conversion. By purchasing the X75OPT-HDDUOCON software key (see page 21), you can enable simultaneous conversion capability on any of these frames.

See the following tables for more information:

- Table 1-1: "X75HD/X75SD Single-Channel Module and System Packages" below
- “X75HD/X75SD System Options” on page 17

Available Packages

Table 1-1 describes the various X75HD/X75SD product packages that you can order.

Table 1-1. X75HD/X75SD Single-Channel Module and System Packages

Product Code	Description	Major Features
X75HD Modules and Systems		
X75HD	1RU up/down/cross converter and synchronizer (video only), with local control panel	• 1RU frame with local control panel, single power supply and power cable • Auto-sensing standard (SDTV/HDTV) serial digital component synchronizer • Test signal generator • SD-SDI and HD-SDI inputs and outputs • Analog video outputs • Optional analog video inputs • 12-bit conversion • Multiple operational modes • SMART alarms and thumbnail streaming capability
X75HD-2PS	1RU up/down/cross converter and synchronizer (video only), with local control panel and redundant power supply	• Same features as the X75HD (including local control panel) • Additional power supply and power cable for full redundancy

Table 1-1. X75HD/X75SD Single-Channel Module and System Packages *(Continued)*

Product Code	Description	Major Features
X75HD-AV	1RU up/down/cross converter and synchronizer (video and audio), with local control panel	• Same features as the X75HD (including local control panel) • Internal 16-channel digital audio synchronizer module, providing separate/embedded audio • Coax cable set
X75HD-AV-2PS	1RU up/down/cross converter and synchronizer (video and audio), with local control panel and redundant power supply	• Same features as the X75HD (including local control panel) • Additional power supply for full redundancy • Internal 16-channel digital audio synchronizer module, providing separate/embedded audio • Coax cable set
X75HD-LC	1RU up/down/cross converter and synchronizer (video only), with blank front panel	• Same features as the X75HD, excluding the local control panel • Blank front panel
X75HD-LC-2PS	1RU up/down cross converter and synchronizer (video only), with blank front panel and redundant power supply	• Same features as the X75HD, excluding the local control panel • Additional power supply and power cable for full redundancy • Blank front panel
X75HD-LCAV	1RU up/down/cross converter and synchronizer (video and audio), with blank front panel	• Same features as the X75HD, excluding the local control panel • Internal 16-channel digital audio synchronizer module, providing separate/embedded audio • Blank front panel • Coax cable set

Table 1-1. X75HD/X75SD Single-Channel Module and System Packages *(Continued)*

Product Code	Description	Major Features
X75HD-LCAV-2PS	1RU up/down/cross converter and synchronizer (video and audio), with blank front panel and redundant power supply	• Same features as the X75HD, excluding the local control panel • Additional power supply for full redundancy • Internal 16-channel digital audio synchronizer module, providing separate/ embedded audio • Blank front panel • Coax cable set
X75SD Modules and Systems		
X75SD	1RU digital synchronizer (video only), with local control panel	• 1RU frame with local control panel, single power supply and power cable, and fan modules • Auto-sensing standard • Test signal generator • SD-SDI inputs and outputs • Analog video outputs • 12-bit processing • Multiple operational modes • SMART alarms and thumbnail streaming capability • Available X75OPT-AS-8 internal 8-channel digital audio synchronizer
X75SD-2PS	1RU digital synchronizer (video only), with local control panel and redundant power supply	• Same features as the X75SD (including local control panel) • Additional power supply and power cable for full redundancy
X75SD-AV	1RU digital synchronizer (video and audio), with local control panel	• Same features as the X75SD (including local control panel) • Internal 8-channel digital audio synchronizer module, providing separate/embedded audio • Coax cable set

Table 1-1. X75HD/X75SD Single-Channel Module and System Packages *(Continued)*

Product Code	Description	Major Features
X75SD-AV-2PS	1RU digital synchronizer, (video and audio), local control panel, and redundant power supply	• Same features as the X75SD, including local control panel • Additional power supply for full redundancy • Internal 8-channel digital audio synchronizer module, providing separate/embedded audio • Coax cable set
X75SD-LC	1RU digital synchronizer (video only), with blank front panel	• Same features as the X75SD, excluding the local control panel • Blank front panel and fan connection board
X75SD-LC-2PS	1RU digital synchronizer (video only) with blank front panel, and redundant power supply	• Same features as the X75SD, excluding the local control panel • Additional power supply and power cable for full redundancy • Blank front panel and fan connection board
X75SD-LCAV	1RU digital synchronizer (video and audio), with blank front panel	• Same features as the X75SD, excluding the local control panel • Internal 8-channel digital audio synchronizer module, providing separate/embedded audio • Blank front panel and fan connection board • Coax cable set
X75SD-LCAV-2PS	1RU digital synchronizer, (video and audio), with blank front panel and redundant power supply	• Same features as the X75SD, excluding the local control panel • Additional power supply for full redundancy • Internal 8-channel digital audio synchronizer module, providing separate/embedded audio • Blank front panel and fan connection board • Coax cable set
X75 DPS Equivalents		
X75-DPS-575	1RU digital video synchronizer, with PQM submodule and local control panel	• Same features as the X75SD • Includes X75OPT-PQM submodule, which supports component, composite, S-video, SD-SDI inputs, and SD-SDI outputs

Table 1-1. X75HD/X75SD Single-Channel Module and System Packages *(Continued)*

Product Code	Description	Major Features
X75-DPS-575AV	1RU digital synchronizer, with PQM video submodule, 8-channel digital audio synchronization, and local control panel	• Same as X75-DPS-575 • Includes X75OPTPT-AS-8 internal 8-channel digital audio synchronizer module for separate/embedded audio • Provides separate/embedded audio, 2 AES coax unbalanced input/outputs and coax unbalanced DARS input
X75-DPS-575LC	1RU digital video synchronizer, with PQM submodule and blank front panel	Same as X75-DPS-575, but excludes local control panel
X75-DPS-575LCAV	1RU digital synchronizer, with PQM video submodule, 8-channel digital audio synchronization, and blank front panel	Same as X75-DPS-575AV, but excludes local control panel

Options

Table 1-2 describes the various options available for X75HD/X75SD systems. Some can be installed in the factory at the time of purchase, while other options and upgrades can be ordered and installed at a later time. The X75OPT-HDDUOCON software key option (see page 21) is required for simultaneous up, down, and cross conversion.

For further information on the cables described in this table, see "Cables and Pinouts" on page 195.

Table 1-2. X75HD/X75SD System Options

Product Code	Description	Major Features
System Options		
X75OPT-A3D	Analog video input submodule with 3D adaptive comb filtering, composite, S-video, and analog component Betacam™ inputs	Field upgradable or factory installed
X75OPT-A3D-1	Same as the X75OPT-A3D, but with alternate color decoder algorithm	Field upgradable or factory installed
X75OPT-AS-8	8-channel audio synchronizer with 4-channel analog / 2 AES / 2 groups of SD and HD de-embedding and embedding possible	Mounts inside any X75HD/X75SD system, and includes the following: • Analog, AES/EBU, and embedded SD-SDI and HD-SDI audio I/O • Eight-channel processing • Audio analog-to-digital conversion • Audio digital-to-analog conversion • SD/HD audio embedding • SD/HD audio de-embedding • Audio synchronizing • Audio delay insertion • Audio processing amplification • Coaxial breakout cables set
X75OPT-AS-8-L	Audio synchronizer module with audio limiter	Same as X75OPT-AS-8, but with optional audio limiter soft key option

Table 1-2. X75HD/X75SD System Options*(Continued)*

Product Code	Description	Major Features
X75OPT-AS-16	16-channel audio synchronizer with 4-channel analog / 5 AES / 4 groups of SD and HD de-embedding and embedding possible	Mounts inside any X75HD/X75SD system, and includes the following: • Analog, AES/EBU, and embedded SD-SDI and HD-SDI audio I/O • 16-channel processing • Audio analog-to-digital conversion • Audio digital-to-analog conversion • SD/HD audio embedding • SD/HD audio de-embedding • Audio synchronizing • Audio delay insertion • Audio processing amplification • Coaxial breakout cables set
X75OPT-AS-16-L	Audio synchronizer module with audio limiter	Same as X75OPT-AS-16, but with optional audio limiter soft key option
X75OPT-DOLBY-1	Internal Dolby-E decoder submodule	Dolby-E and Digital (AC3) integrated decompression; includes firmware upgrade
X75OPTFIBER-FC	FC-type fiber connectors	FC-type fiber connectors (factory installed)
X75OPTFIBER-ST	ST-type fiber connectors	ST-type fiber connectors (factory installed)
X75OPT-HDUPG	HDTV submodule with up, down, or cross conversion	Inputs and outputs are coaxial and optical
X75OPT-PS	Power supply field power supply retrofit kit, including AC internal connection	Field upgradeable
X75OPT-PQM	Analog video input submodule with 3D adaptive comb filtering, composite, S-video, and analog component Betacam™ inputs	• Provides the same inputs as the X75OPT-A3D module, but with slightly lower quality combing and decoding technology • Field upgradable or factory installed

Table 1-2. X75HD/X75SD System Options*(Continued)*

Product Code	Description	Major Features
X75OPT-STR	Optional video and audio streaming for Ethernet monitoring (SDTV and down-converted HDTV)	Streaming submodule, field-upgradable
X75-RCP	Remote control panel for X75HD/X75SD	Can control DPS-475/575
Cable Options		
X75OPTCAB-MULTI	Cable set for multi input/output connectors • Sync/comp out • Blue, Green, and Red out • Y/C out • SDTV and HDTV audio delay • GPI1 and GPI2 in • GPI1 and GPI2 out	1 ft (30 cm) multi I/O breakout cable with the following connector types: • DB26(M) to 6 x BNC(F), 1 x XLR(F), 1 x MiniDin4(F), and 4 x RCA(F)
X75OPTCAB-DVI	Cable for DVI-D single-link output	DVI-D to DVI-D (digital-single link) cable
X75OPTCAB-8-C	1 cable set for 8-channel audio synchronizer, with the following unbalanced coax AES connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 5 x BNC(F)
X75OPTCAB-8-X	1 cable set for 8-channel audio synchronizer, with the following balanced XLR AES connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 3 x XLR(F) • 2 x XLR(M)
X75OPTCAB-8-CX	1 cable set for 8-channel audio synchronizer, with the following unbalanced coax AES and XLR connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 5 x BNC(F) • 3 x XLR(F) • 2 x XLR(M)

Table 1-2. X75HD/X75SD System Options*(Continued)*

Product Code	Description	Major Features
X75OPTCAB-16-C	2 cable sets for 16-channel audio synchronizer, with unbalanced coax AES connectors • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft (30 cm) breakout cables with the following connector types: • DB26(M) to 5 x BNC(F) • DB44(M) to 6 x BNC(F)
X75OPTCAB-16-X	2 cable sets for 16-channel audio synchronizer, with balanced XLR AES connectors • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft (30 cm) breakout cables with the following connector types: • DB26(M) to 3 x XLR(F) and 2 x XLR(M) • DB44(M) to 3 x XLR(F) and 3 x XLR(M)
X75OPTCAB-16-CX	2 cable sets for 16-channel audio synchronizer, unbalanced coax AES and balanced XLR AES • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft (30 cm) breakout cables with the following connector types: • DB26(M) to 5 x BNC(F), 3 x XLR(F), and 2 x XLR(M) • DB44(M) to 6 x BNC(F), 3 x XLR(F), and 3 x XLR(M)

Table 1-2. X75HD/X75SD System Options*(Continued)*

Product Code	Description	Major Features
Software Upgrades		
X75OPT-ASL	Audio limiter for X75OPT-AS-16 or X75OPT-AS-8 digital audio synchronizers	Field-upgradable software key
X75OPT-HDDUOCON	Software key, required for simultaneous up, down, or cross conversions.	Field-upgradable software key
X75OPT-NR	SDTV noise reducer	Three-dimensional SDTV digital noise reduction with the following features: • Impulse noise reduction • Gaussian random noise reduction • Compression “blocky-ness” and mosquito artifact reduction • Directional softening/sharpening filter
X75OPT-SNMP	Software upgrade that permits the X75HD/X75SD to communicate using SNMP over an Ethernet network	Field-upgradable software key
X75OPT-V2A	Automatic video/audio timing correction for lip sync problems	Field-upgradable software key
Spare Replacement Kit (X75SD and X75HD)		
X75SPR-KIT	Replacement parts for in-field servicing	Includes the following parts: • 2 fans • 4 stackers • 1 power supply with no connectors • 1 shaft encoder

Table 1-2. X75HD/X75SD System Options*(Continued)*

Product Code	Description	Major Features
Available Documentation		
X75MANUAL	*X75HD/X75SD Multiple Path Converters and Frame Synchronizers Installation and Operation Manual* (hardcopy) plus documentation CD	The *Documentation for X75HD/X75SD Systems and Control Panels* CD includes PDFs of the following documents: • *X75HD/X75SD Multiple Path Converters and Frame Synchronizers Installation and Operation Manual* • *Control Panels for X75HD/X75SD Systems Installation and Operation Manual* • *X75HD/X75SD Multiple Path Converters and Frame Synchronizers Quick Start Guide* • *X75HD/X75SD Module Installation Note* The CD also includes the *Control Parameter List* HTML document that contains specific descriptions about available menus, submenus, parameters, or options. All documentation is also available for download from the Leitch Web site at www.leitch.com.
X75MANUAL-RCP	*Control Panels for X75HD/X75SD Systems Installation and Operation Manual* (hardcopy) plus documentation CD	See above.

Typical Control Configurations

The X75HD/X75SD models can be configured, controlled, and monitored using the following methods:

- Local control panel on X75HD/X75SD models (see the *Control Panels for X75 Systems Installation and Operation Manual* for details)
- X75-RCP remote control panel (see the *Control Panels for X75 Systems Installation and Operation Manual* for details)
- Local control panel on DPS-575 frames on the same network
- RC-575 Remote control panel
- Web server control, viewable on a browser program such as Internet Explorer™ (IE) or Netscape™ (see "Configuring for HTTP Control via Web Browser" on page 98 or "Overview" on page 129 for details)
- CCS™ (Command and Control System) applications such as Pilot or Navigator (see the CCS application online help for details)
- SNMP (Simple Network Management Protocol) and third-party control software through Leitch CCS Protocol (see"Configuring Third-Party SNMP Software Control" on page 315 for details)

All remote methods of operation involve Ethernet connections. See Figure 1-4 on page 24 for an illustration of these various control configurations.

Note

The maximum recommended length for a standard 10/100Base-T cable is 328 ft (100 m).

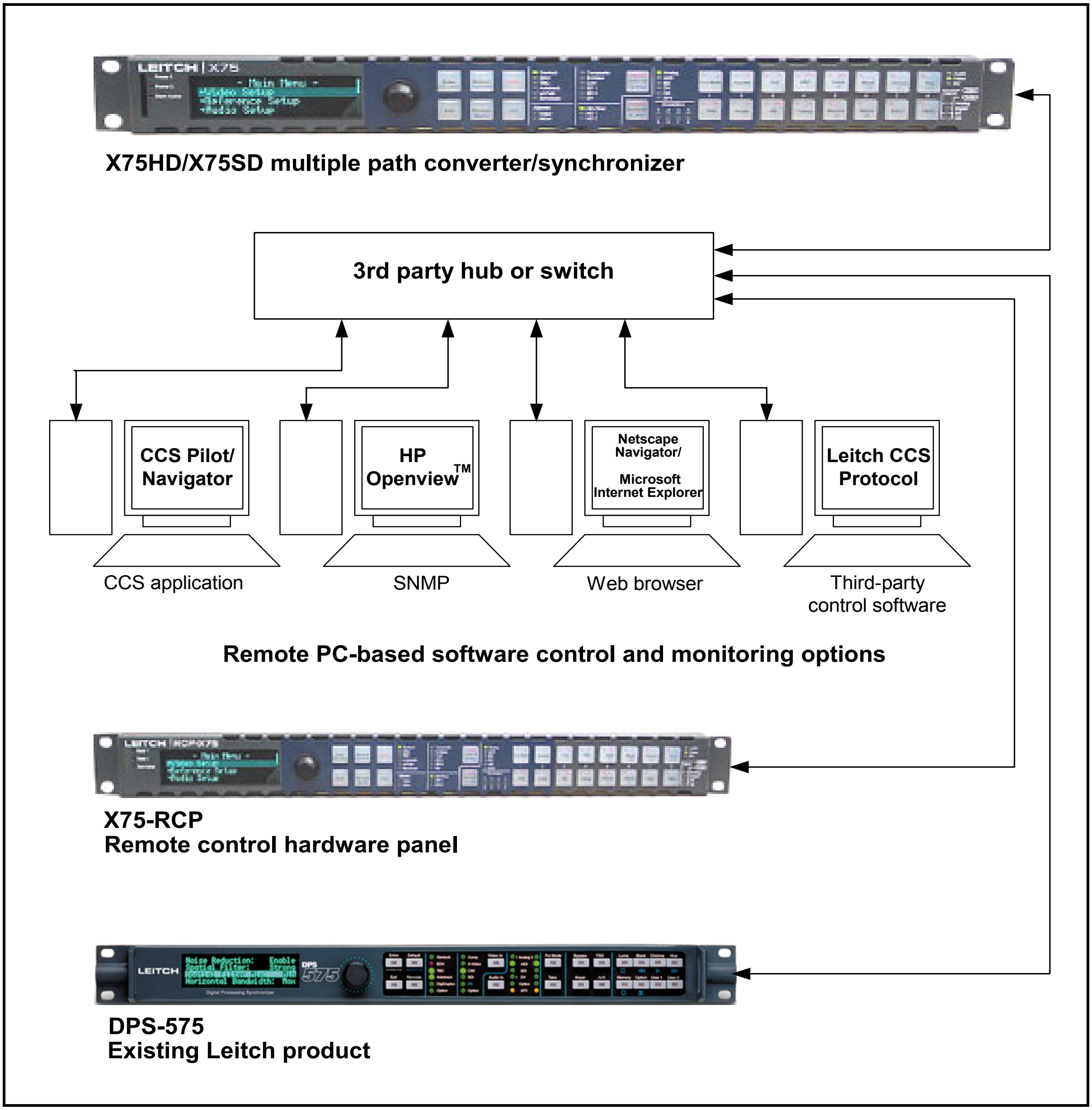


Figure 1-4. Typical Configuration, Control, and Monitoring Methods

Overview of Operating Modes

Video Functional Block Diagram

Fully loaded X75HD/X75SD frames are the aggregate of discrete modular solutions as indicated in Figure 1-5. The X75HD/X75SD contains four independent video frame synchronizers (each with its own video processing capabilities) and support for multiple processing functions including up/cross/down conversion, test signal generation, noise reduction, and aspect ratio conversion. Single or multiple input video processing is possible, allowing either one input signal to be sent to all outputs, or independent synchronization, phasing and processing capabilities for up to four video channels.

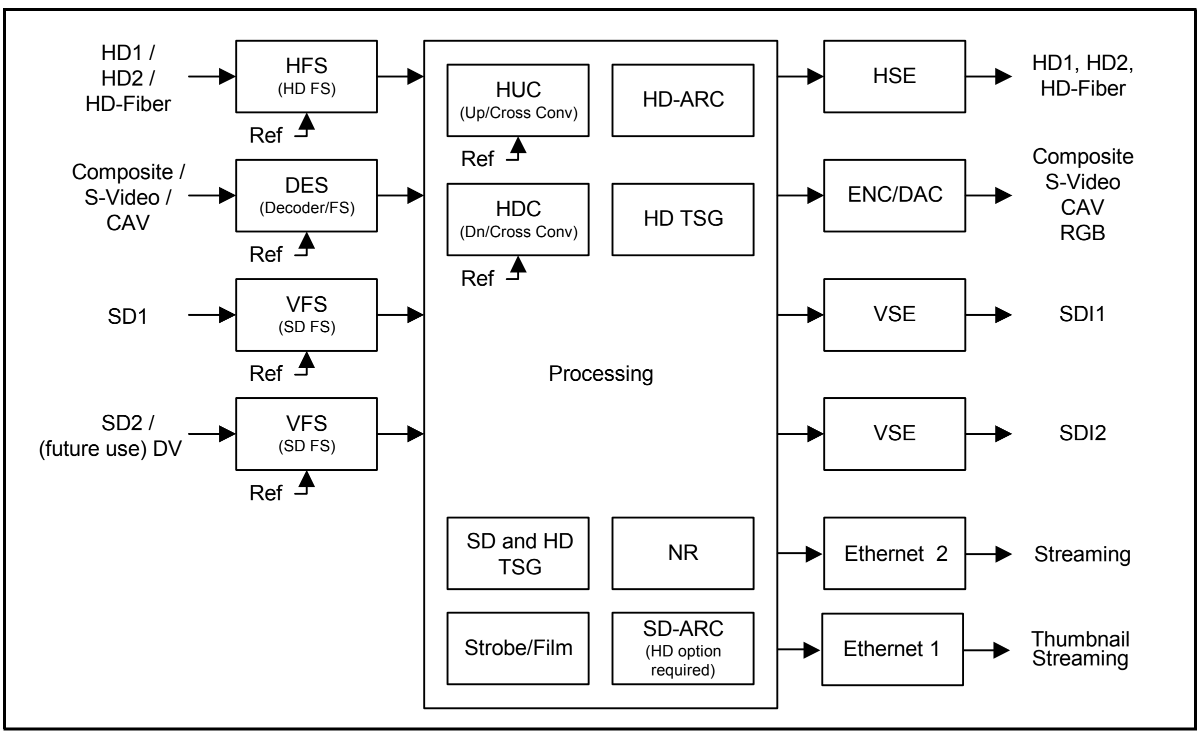


Figure 1-5. Video Functional Block Diagram

The controls for those processing blocks are located in the submenu located at **Video Setup>Processing**, and will appear automatically as the respective hardware and software options are installed.

Default (Auto Detect) vs. Video Routing and Simulcast Modes

There are two main operational modes for defining the input video: M-Path (multiple-path) processing, and Simulcast processing. A third, Auto Detect, is the default mode.

X75HD/X75SD units are shipped with *Auto Detect* video mode as the factory default setting. This mode sets the X75HD/X75SD to automatically detect analog, SD1, SD2, HD-F, HD1, HD2, composite, and S-video inputs. When video is connected to any of these inputs, the X75HD/X75SD automatically selects the applied input video and then sends the converted video to all outputs. The Video Input LEDs on the front panel show the selected video source.

In the video routing mode, an output is selected, and then the input to be processed to that output is selected. Depending on the configuration, up to four paths can be set up.

To operate an X75HD/X75SD frame in *Simulcast* mode (where any two inputs are selected to switch simultaneously between determined outputs, such as SDTV and HDTV), you will need to set up the unit to process signal information differently. To do this, see “Simulcast Operation” on page 32.

For more information on the conversion capabilities and options provided by the X75HD/X75SD, see “HD Conversion Capabilities” on page 349.

X75OPT-HDDUOCON Option

An X75 provides up, down, or crossconversion. With the addition of the HDDUOCON option, simultaneous up and down, or cross and down conversions are possible.

Table 1-3. "DUOCON" Conversion Capability

Conversion	With X75OPT-HDDUOCON	Without X75OPT-HDDUOCON
Upconversion and downconversion	Yes	No
Upconversion and crossconversion	No	No
Downconversion and crossconversion	Yes	No

Note

If you have routed a particular input feed to an output, (or series of outputs) for up, down, or cross-converting, and then begin setting up a new conversion pattern, the existing conversion will be disrupted immediately.

By selecting the M-Path mode, you can quickly route a particular input source to all of the X75's outputs simultaneously. To do this, use the **All Out Select** parameter. Follow this path: **Video Setup>Routing Setup>All Out Sel**.

Several examples of M-Path video processing are illustrated in Figure 1-6 on page 28 and Figure 1-7 on page 29.

When you need a single input video source to be processed and sent to all outputs, press the **Video In** button or select the **Video Setup>Routing Setup>All Out Sel** parameter to select the desired input video source to be processed. The X75HD/X75SD automatically routes the selected input to all outputs and inserts any selected processing blocks.

Note

Analog component video inputs are only available if your X75HD/X75SD system includes an X75OPT-PQM or X75OPT-A3D module.

When multiple and independent video channel processing is required, the Video M-Path parameter in **Video Setup>Routing Setup** menu allows each video output group to be assigned an input source.

Press the **Audio In** button or select the **Audio Setup>Routing>Audio In Src Select** parameter to select a single audio group type to be synchronized, processed and sent to all outputs. Depending on the selected input audio group type, the software automatically handles all internal processing, including de-multiplexing, signal routing, synchronization, and re-embedding.

The available input audio group types for selection are the following:

- User—When more than one audio input group types is selected
- Analog—Selects all four analog audio inputs for processing
- AES—Selects all AES inputs for processing

- SD—Selects the demuxed audio from SDI input for processing
- DV—Selects the DV input audio for processing (future release)
- HD—Selects the demuxed audio from HD-SDI input for processing
- Dolby Dec—Selects the internally decoded Dolby audio signals for processing

Note
The **Ctrl** and **A Proc** and audio **Gain** buttons provide quick access to the **Gain** controls for each SRC.

For complex audio processing applications, you can also manually route the signal by changing the parameters. Follow this path:

Audio Setup>Routing>Input and **Audio Setup>Routing>Output**

Each SRC can be independently configured to accept one of the available stereo audio inputs using the controls under the **Audio Setup>Routing>Input** menu.

The controls under the **Audio Setup>Routing>Output** menu allow each mono audio output to be independently derived from any of the SRCs, audio mute, or test tones.

Note
DV input and output is reserved for future use.

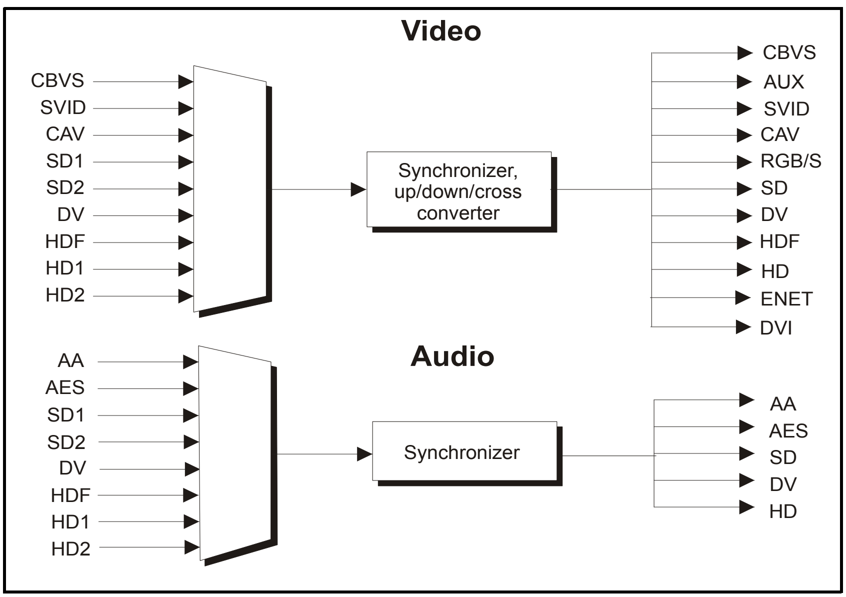


Figure 1-6. M-Path Single-Source Video and Audio Processing

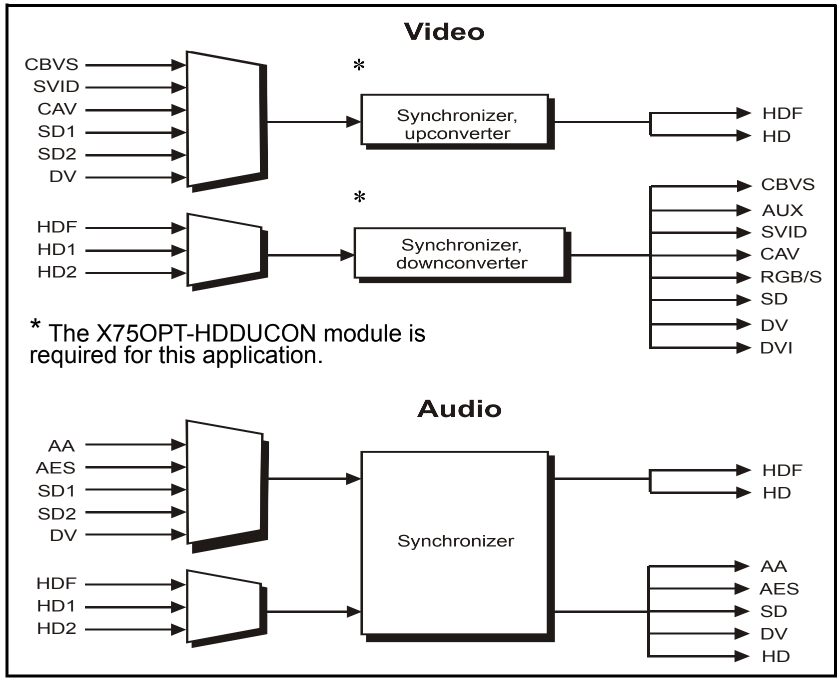


Figure 1-7. M-Path (Dual Source Video and Audio) Processing

Audio Processing

Depending upon your unit's options, the X75HD/X75SD can process up to 16 or 8 channels (8 or 4 stereo channels) of audio simultaneously with video. Any combination of audio is assigned from the inputs (four channel analog audio, 5/2 AES balanced or unbalanced, up to four groups demuxed from the SD-SDI and HD-SDI input) into the 16-channel processor.

Processed audio signals can be mapped to all outputs. When you select one audio input set, mono channels are mapped intelligently to provide outputs to all available channels. Audio outputs include the following: four channel analog audio, 5/2 AES balanced and unbalanced, up to four groups muxed into the SD-SDI and HD-SDI outputs.

Figure 1-8 on page 30 illustrates the audio processing flow in a 16-channel X75HD unit; Figure 1-9 on page 31 illustrates the audio processing flow in an 8-channel X75SD unit.

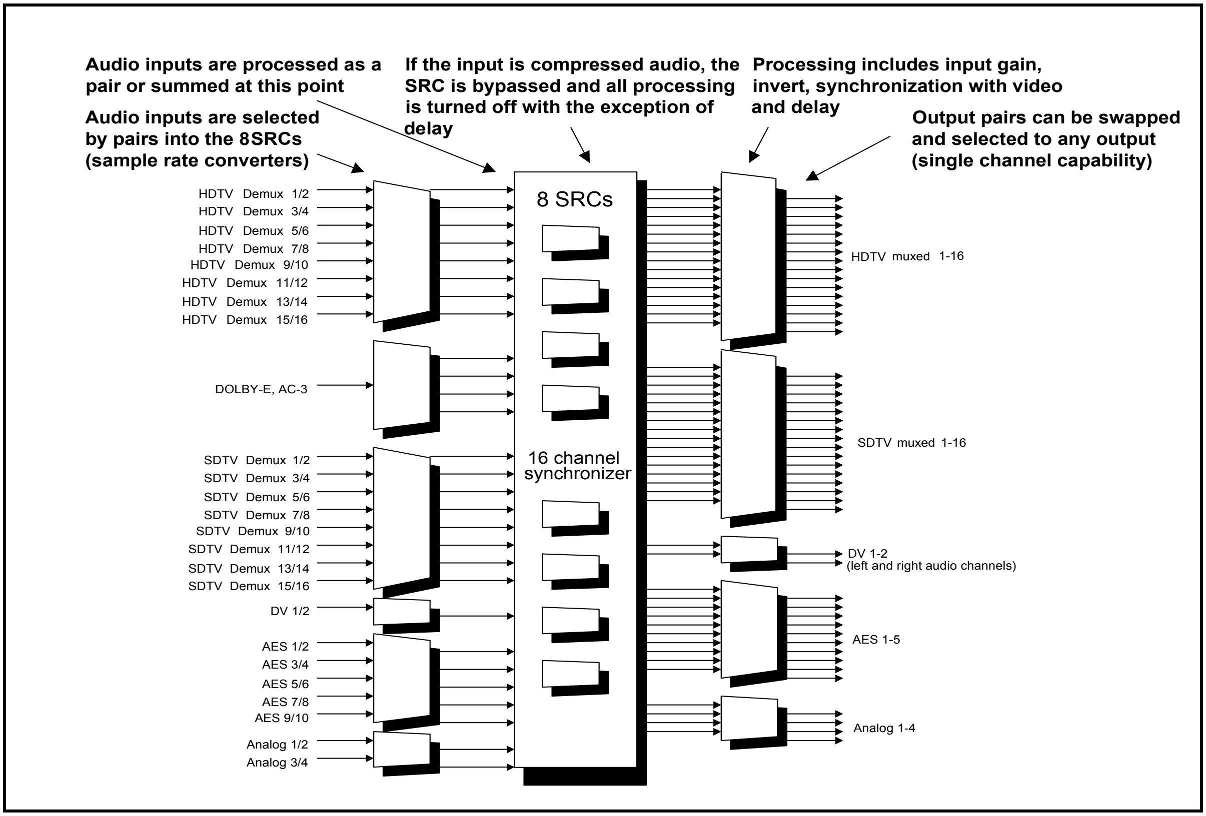


Figure 1-8. Audio Functional Block Diagram-16 Channel

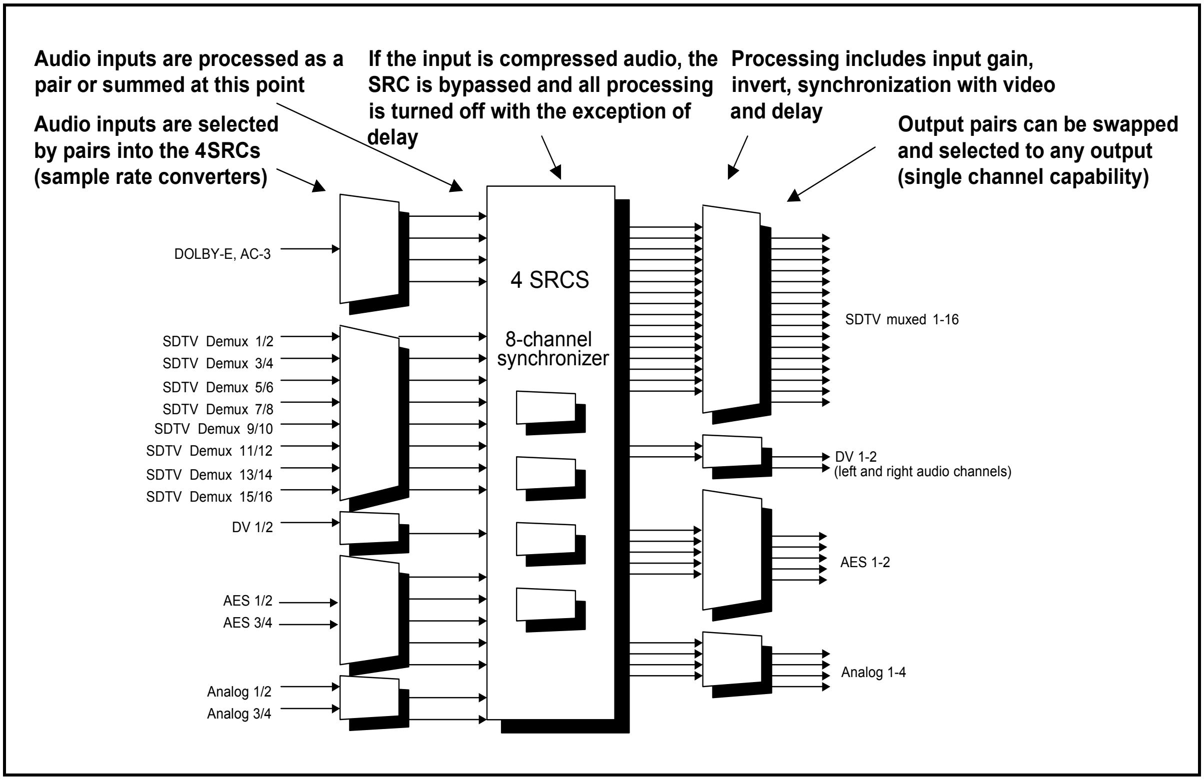


Figure 1-9. Audio Functional Block Diagram-8 Channel

Simulcast Operation

General Description

Using the Simulcast mode, you can quickly switch between the two input sources (Input A, and Input B) out of the many possible inputs. Select the video sources to both Input A and Input B via the following path: **Video Setup>Routing Setup>Simulcast**.

The **Simulcast Sel** parameter switches between the two inputs. This switching can also be activated from the GPI input. To operate the unit in Simulcast mode, use the **I/P Video Mode** parameter in the **Routing Setup** menu.

When you enable the Simulcast mode, the X75HD/X75SD can switch SDTV and HDTV inputs to simultaneous, deterministic SDTV and HDTV outputs. Use this mode when you need to alternate between both HDTV and SDTV signals and broadcast them together (for example, if you have an HDTV satellite feed carrying the programming and an SDTV local feed carrying the advertisements). Figure 1-10 shows a simplified illustration. For more information on selecting inputs for Simulcast processing, see “Processing Modes” on page 101.

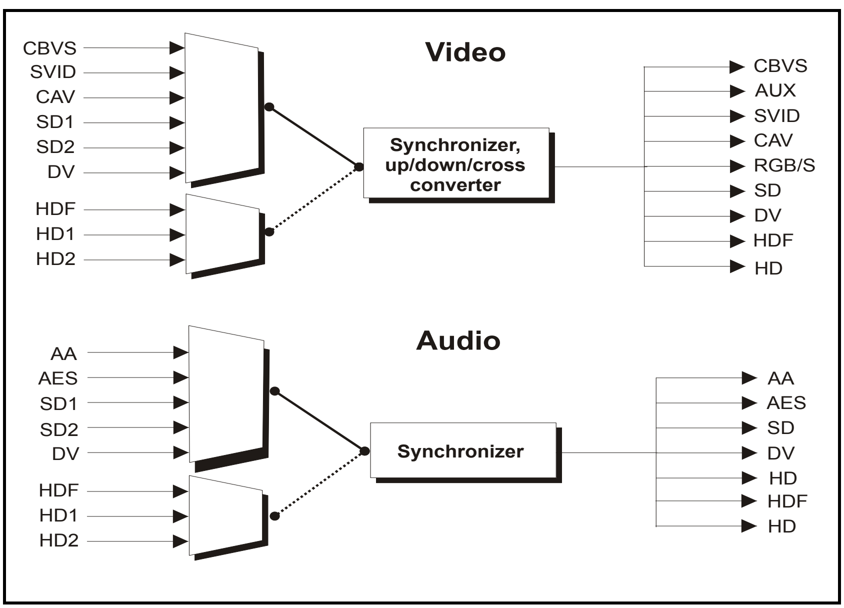


Figure 1-10. Simulcast Processing

Switcher Application

As a switcher, the X75HD switches between two SDTV inputs with clean outputs and voice-over (see Figure 1-11).

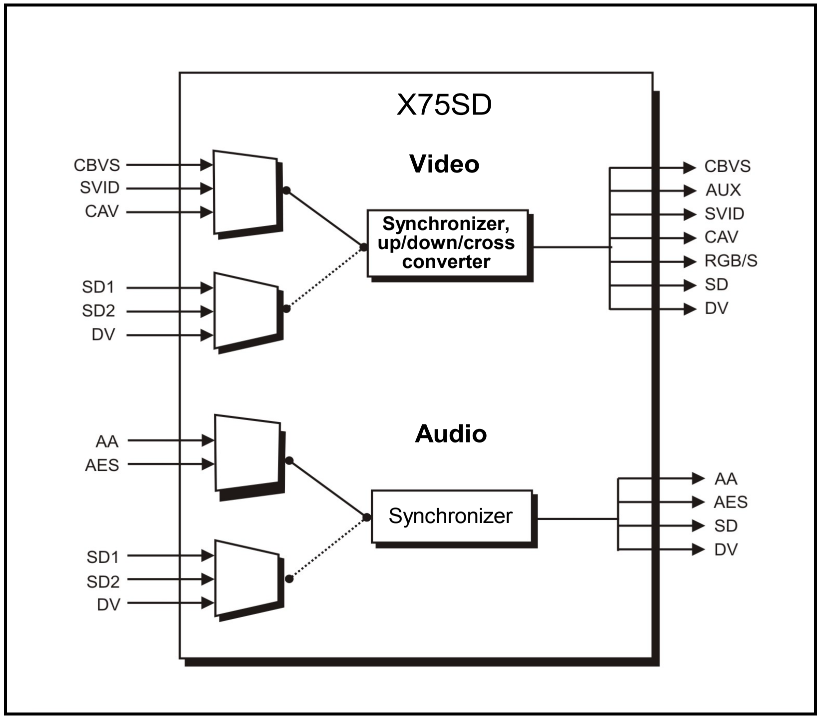


Figure 1-11. Simulcast Switcher Application

Chapter 2

Applications

Overview

X75HD and X75SD units function in many different ways, taking on a wide variety of roles. This chapter includes some common applications that may apply in your facility:

- "Input Video Processing" on page 36
- "Output Video Processing" on page 43
- "Input Video and Audio Processing" on page 44
- "Video and Audio Converting" on page 47
- "Bridging Router Switchers" on page 49
- "Simulcast Switching" on page 50

The multi-conversion and frame synchronization abilities of the X75HD/X75SD make it ideal for hybrid SDTV and HDTV broadcasts in cable, satellite, mobile, and production facilities.

In the following pages, a variety of typical applications are described, along with the settings required for quick setup.

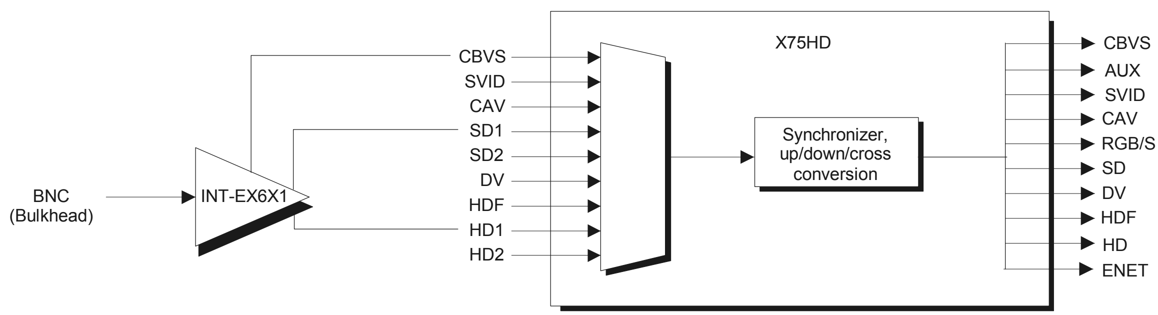
Input Video Processing

This section includes the following common input video processing applications:

- Table 2-1: "Input Video Processing for Mobile or Outside Broadcast Vehicles" on page 37
- Table 2-2: "Critical Input Video Processing for Satellite/Microwave Reception" on page 38
- Table 2-3: "Input Video Processing for News Production" on page 40
- Table 2-4: "Ingest Input Video Processing with Audio Decompressing and Processing" on page 41
- Table 2-5: "Ingest Input Video Processing with Internal Audio Decompression and Processing" on page 42

Table 2-1. Input Video Processing for Mobile or Outside Broadcast Vehicles

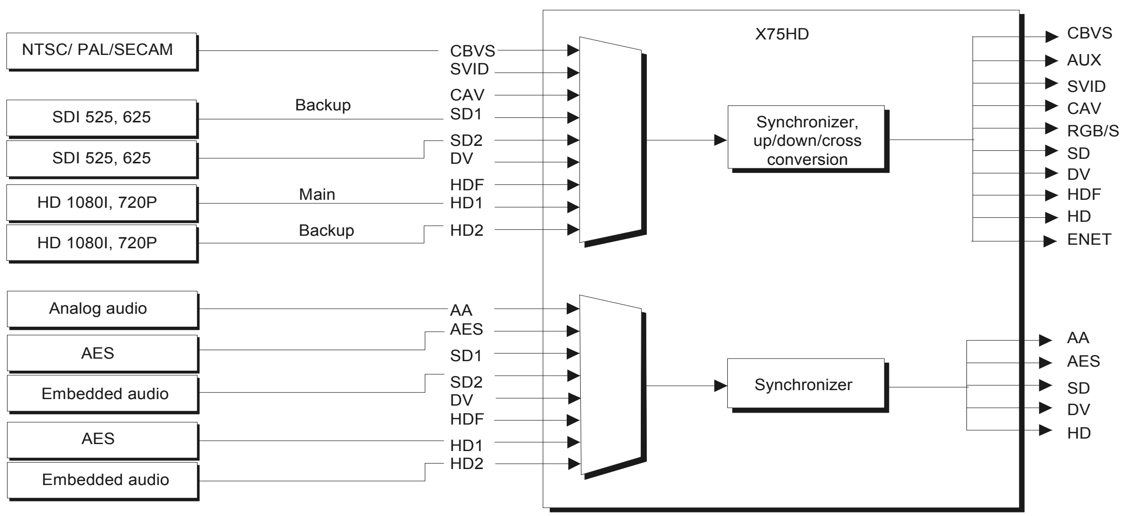
Description	Products
The X75HD auto-detects a composite, SD-SDI or HD-SDI input and then sends it through the video processing engine to provide multiple types of outputs. The X75HD automatically converts any composite, SD-SDI or HD-SDI signal to the required output format. A single BNC connector on the bulkhead of a mobile or outside broadcast vehicle feeds a wideband distribution amplifier. The wideband distribution amplifier feeds into the composite, SD-SDI and HD-SDI inputs of the X75HD. The X75HD is set up to auto-detect any of the three types of inputs and provide processed video to all of the outputs. You can preset the HDTV output to provide the required format (for example, 1080i or 720p) for production.	X75HD with these options: • X75OPT-A3D analog video input option • INT-EX6X1 (16 channel video wideband distribution amplifier)



Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>Auto Detect
Analog Video Source	Video Setup>Analog Input (A3D or PQM)>Composite
Analog In	Video Setup>Routing Setup>Auto Detect Setup>Normal
SD 1 In	Video Setup>Routing Setup>Auto Detect Setup>Normal
HD 1/HD-Fiber In	Video Setup>Routing Setup>Auto Detect Setup>Normal

Table 2-2. Critical Input Video Processing for Satellite/Microwave Reception

Description	Products
The X75HD auto-detects and then switches HD-SDI main and backup receivers (with an SDTV backup receiver) through the video processing engine to provide multiple types of outputs. Main (primary) and backup (secondary) HDTV receivers provide inputs which are automatically switched and processed to the required output format. A tertiary SDTV receiver provides a backup if both HDTV receivers do not have outputs.	X75HD-AV with X75OPT-A3D analog video input option



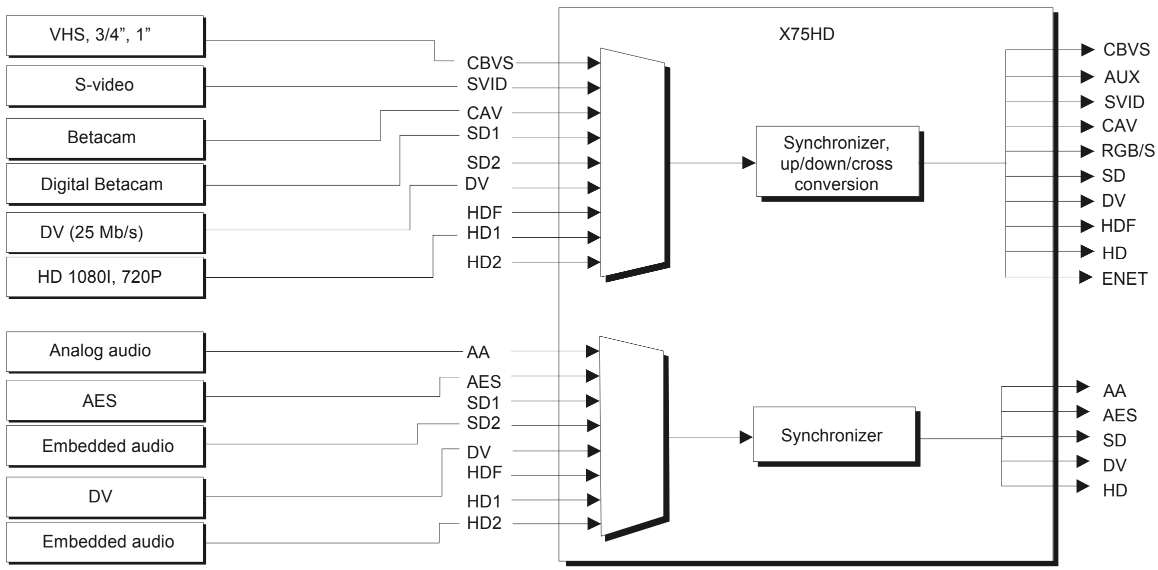
Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>Auto Detect
HD 1/HD-Fiber In	Video Setup>Routing Setup>Auto Detect Setup>Highest
HD 2 In	Video Setup>Routing Setup>Auto Detect Setup>High
SD 1 In	Video Setup>Routing Setup>Auto Detect Setup>Normal
Ch1-Aud Follows Vid	Audio Setup>Routing>Audio Follow Video>SRC 1>On
Ch1-AFV-HD1	Audio Setup>Routing>Audio Follow Video>SRC 1>AES1a/1b
Ch1-AFV-HD2	Audio Setup>Routing>Audio Follow Video>SRC 1>AES2a/2b
Ch1-AFV-SD 1	Audio Setup>Routing>Audio Follow Video>SRC 1>AES3a/3b

Table 2-2. Critical Input Video Processing for Satellite/Microwave Reception

Additional Factory Default Settings	
AA Out1	Audio Setup>Routing>Output>SRC1a
AA Out2	Audio Setup>Routing>Output>SRC1b
AES1 OutA	Audio Setup>Routing>Output>SRC1a
AES1 OutB	Audio Setup>Routing>Output>SRC1b
SD 1/HD1 OutA	Audio Setup>Routing>Output>SRC1a
SD 1/HD1 OutB	Audio Setup>Routing>Output>SRC1b

Table 2-3. Input Video Processing for News Production

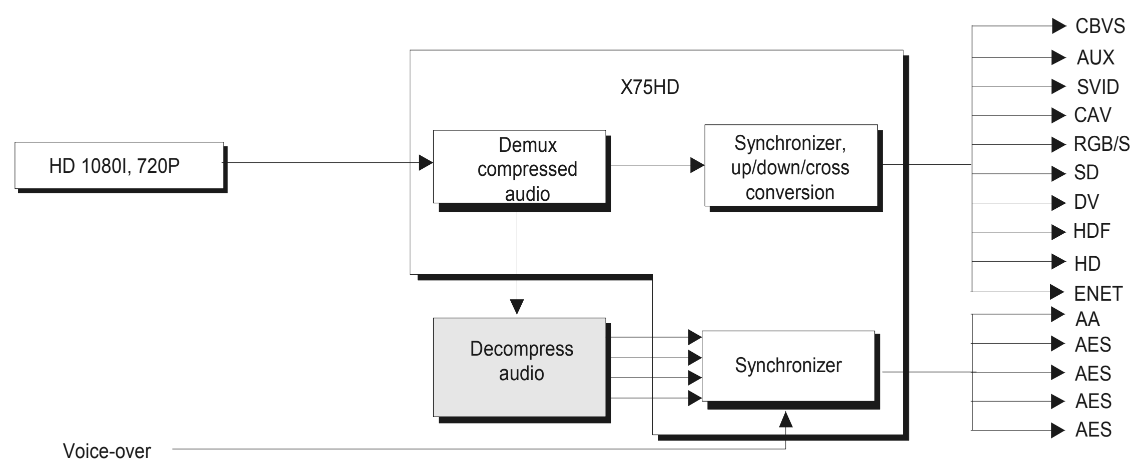
Description	Products
The X75HD selects and accepts inputs from various composite, SD-SDI or HD-SDI tape machines, and then sends the signal through the video processing engine to provide multiple types of outputs. Select and convert any tape format to the required output format.	X75HD-AV with X75OPT-A3D analog video input option



Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup> Composite/S-Video/CAV/SD 1/DV/HD 1 (Select one)
Audio In Src Select	Button Shortcut: Audio In or Audio Setup>Routing>Analog, AES, SD, DV, HD (Select one)

Table 2-4. Ingest Input Video Processing with Audio Decompressing and Processing

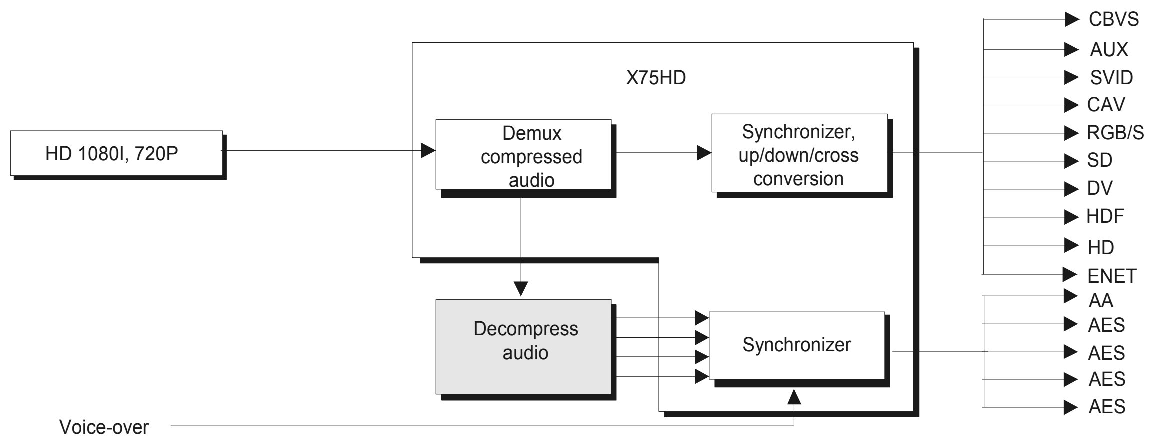
Description	Products
The X75HD processes HD-SDI signals with embedded compressed audio using an external audio decompressor. The system will also de-embed an embedded compressed audio stream and provide it as an AES stream into the audio decompressor. The X75HD processes decompressed audio streams (four AES, eight channels) and times them with the video signal. A discrete audio input can be used for a voice-over channel.	X75HD and audio decompressor (for example, Dolby™ Digital AC-3™, or E™).



Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup>HD1
SRC1 Input Select	Audio Setup>Routing>Input>AES1a/1b
SRC2 Input Select	Audio Setup>Routing>Input>AES2a/2b
SRC3 Input Select	Audio Setup>Routing>Input>AES3a/3b
SRC4 Input Select	Navigation Path: Audio Setup>Routing>Input>AES4a/4b
SRC5 Input Select	Audio Setup>Routing>Input>HDX1/2
AES5 OutA	Audio Setup>Routing>Routing>Output>SRC5a
AES5 OutB	Audio Setup>Routing>Routing>Output>SRC5b

Table 2-5. Ingest Input Video Processing with Internal Audio Decompression and Processing

Description	**Products**
HD-SDI video with embedded compressed audio is processed using the X75HD with the optional internal audio decompressor. The embedded compressed audio stream is de-embedded and provided as an AES stream into the internal audio decompressor. The decompressed audio streams (four AES, eight channels) are processed and timed with the video signal.	X75HD with optional Dolby-X75 internal audio decompressor



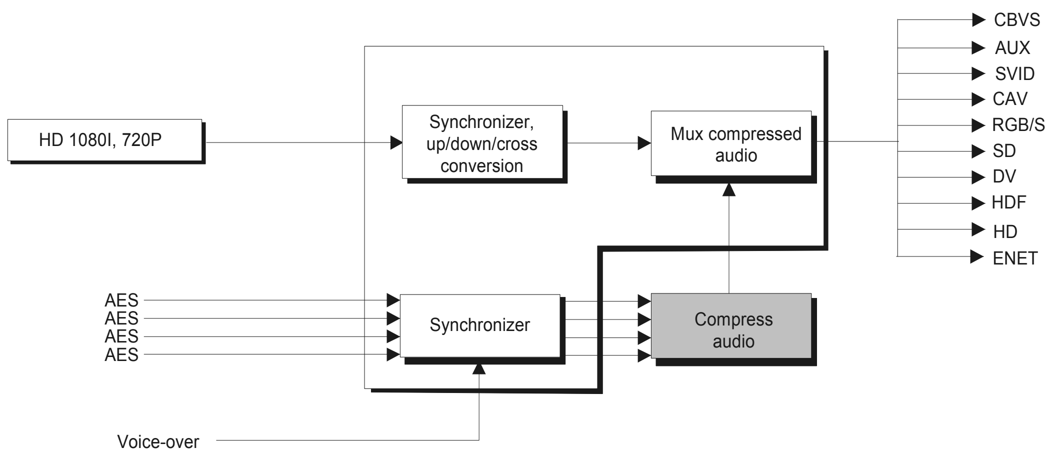
Required Settings	**Navigation Path**
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup>HD1
Dolby Input Select	Audio Setup>Routing>Input>HDX1/2 (Assuming the compressed audio is in Group 1: channels 1 and 2)
SRC1 Input Select	Audio Setup>Routing>Input>Dolby1/2
SRC2 Input Select	Audio Setup>Routing>Input>Dolby3/4
SRC3 Input Select	Audio Setup>Routing>Input>Dolby5/6
SRC4 Input Select	Audio Setup>Routing>Input>Dolby7/8

Output Video Processing

Table 2-6 describes a sample output video processing application commonly used with audio compression and processing.

Table 2-6. Output Video Processing with Audio Compression and Processing

Description	Products
The X75HD synchronizes and processes HDTV and AES signals. Using an external audio compressor, the four AES signals get decompressed. This compressed AES stream is later fed back to the X75HD/X75SD where it is re-embedded with the HD-SDI signal. A discrete audio input can be used for a voice-over channel.	X75HD-AV with an external audio compressor (for example, DOLBY™ Digital AC-3™, or E™).



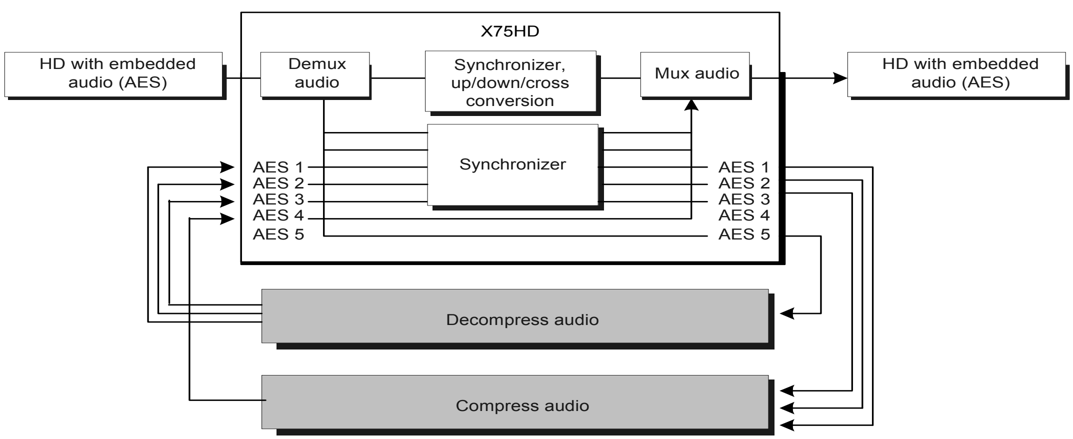
Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup>HD1
Audio In Src Select	Button Shortcut: Audio In or Audio Setup>Routing>AES

Input Video and Audio Processing

Tables 2-7 and 2-8 describe common input video and audio processing applications.

Table 2-7. Input Video, Embedded Audio, and Compressed Audio Processing with External Audio Compression and Decompression

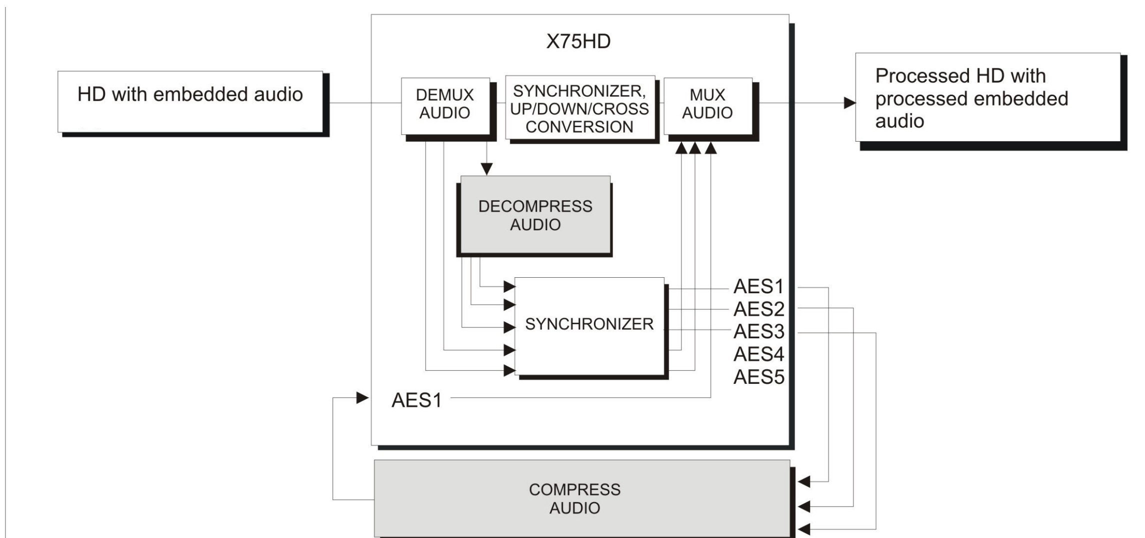
Description	**Products**
The X75HD processes HD-SDI video with embedded audio and embedded compressed audio using an external audio decompressor and compressor. The system also processes HDTV video and AES program signals. Embedded compressed audio is sent to an audio decompressor, providing three AES (5.1) signals to the X75HD. The X75HD processes the audio signals and then sends them to an audio compressor. The compressed audio signal is sent to the X75HD where it is embedded into the output processed program video signal.	X75HD-AV and external audio compressor and decompressor (for example, Dolby™ Digital (AC-3™) or E™).



Required Settings	**Navigation Path**
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup>HD1
Audio In Src Select	Button Shortcut: Audio In or Audio Setup>Routing>AES
SRC6 Input Select	Audio Setup>Routing>Input>HDX1/2
AES5 OutA	Audio Setup>Routing>Output>SRC6a
AES5 OutB	Audio Setup>Routing>Output>SRC6b

Table 2-8. Input Video, Embedded Audio, and Compressed Audio Processing with External Audio Compression and Internal Audio Decompression

Description	Products
HD-SDI video with embedded audio and embedded compressed audio is processed using the X75HD, an internal audio decompressor, and an external audio compressor. The HDTV video and AES embedded program signals are processed through the X75HD. Embedded compressed audio is sent to an internal audio decompressor, providing three AES (5.1) signals to the X75HD audio processor. Two embedded program audio streams are sent to the X75 audio processor. The X75HD processes the audio signals. The processed 5.1 audio signals are sent to an external audio compressor which feeds the compressed (5.1) signals into the X75HD where they are embedded into the program signal. The processed program audio signals are embedded into the output.	X75HD-AV, Dolby-X75 internal audio decompressor, and external audio compressor (for example Dolby-E™, AC-3™)



Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
All Out Sel	Button Shortcut: Video In or Video Setup>Routing Setup>HD1

Table 2-8. Input Video, Embedded Audio, and Compressed Audio Processing with External Audio Compression and Internal Audio Decompression *(Continued)*

Dolby Input Select	Audio Setup>Routing>Input>HDX1/2 (Assuming the compressed audio is in Group 1: channels 1 and 2)
SRC1 Input Select	Audio Setup>Routing>Input>Dolby1/2
SRC2 Input Select	Audio Setup>Routing>Input>Dolby3/4
SRC3 Input Select	Audio Setup>Routing>Input>Dolby5/6
SRC4 Input Select	Audio Setup>Routing>Input>Dolby7/8
AES1 OutA	Audio Setup>Routing>Output
AES1 OutB	Audio Setup>Routing>Routing>Output>SRC1a
AES2 OutA	Audio Setup>Routing>Routing>Output>SRC1b
AES2 OutB	Audio Setup>Routing>Routing>Output>SRC2a
AES3 OutA	Audio Setup>Routing>Routing>Output>SRC2b
AES3 OutB	Audio Setup>Routing>Routing>Output>SRC3a
SRC5 Input Select	Audio Setup>Routing>Routing>Output>SRC3b

Video and Audio Converting

Note

Many input and output choices are possible. This example is based on SD 1+AES1 inputs for up-conversion and CVBS+AA (analog audio) outputs for down-conversion.

Table 2-9 describes a common video and audio converting application, using a wrap-around for tape transports. (The X75OPT-HDDUOCON software key option is required for this application.)

Table 2-9. Wrap-Around for Tape Transports

Description	Products
The X75HD provides conversion and processing for video and audio for HDTV and all SDTV formats. Video and audio connections through the X75HD provide conversion and synchronization (along with time base correction, if required) for standard definition and high definition tape transports.	X75HD-AV

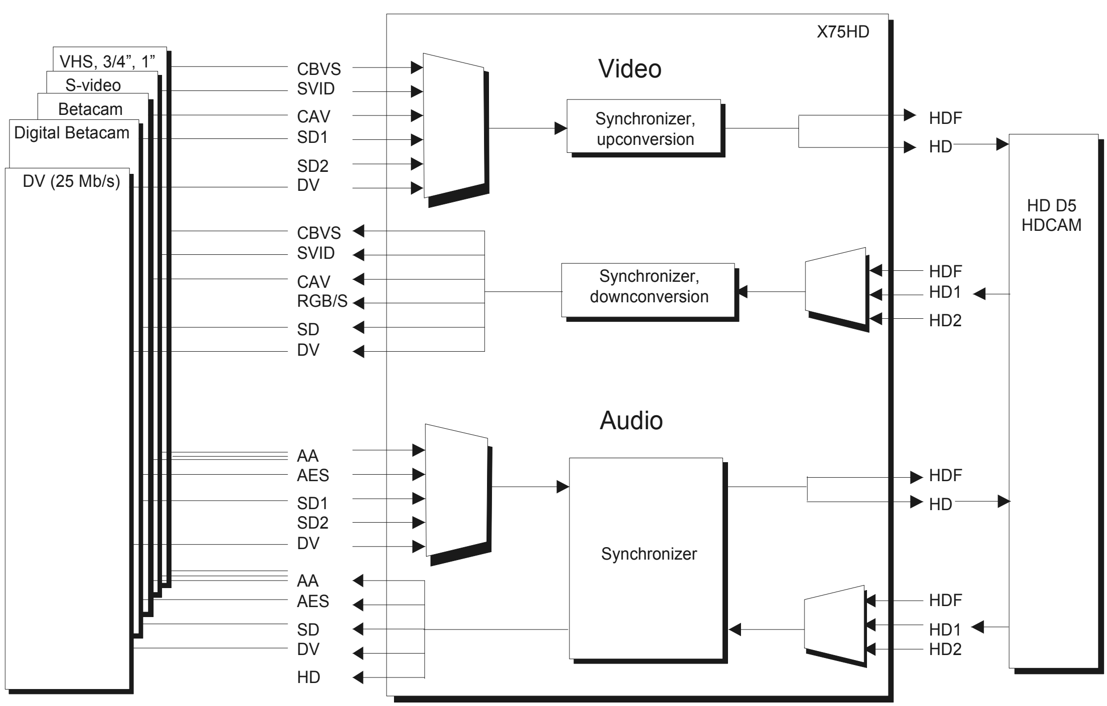


Table 2-9. Wrap-Around for Tape Transports

Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>M-Path (User)
HD Out Sel	Video Setup>Routing Setup>Video M-Path>SD 1
Analog Out Sel	Video Setup>Routing Setup>Video M-Path>HD 1
SRC1 Input Select	Audio Setup>Routing>Input>AES1a/1b
SRC2 Input Select	Audio Setup>Routing>Input>AES1a/1b
SRC3 Input Select	Audio Setup>Routing>Input>AES>HDX1/2
AA Out1	Audio Setup>Routing>Output>SRC3a
AA Out2	Audio Setup>Routing>Output>SRC3b

Bridging Router Switchers

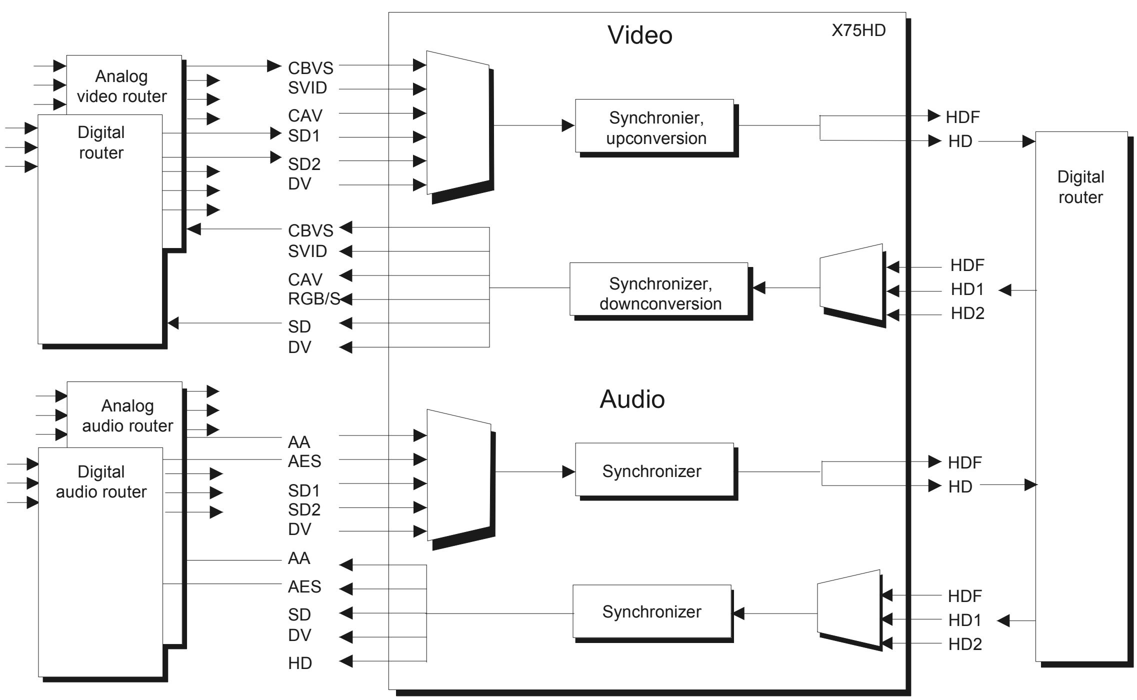
Note

The X75OPT-HDDUOCON software key option is required for this application.

Table 2-10 describes a common application for bridging router switchers. To configure the X75HD for this application, use the parameter settings shown for “Wrap-Around for Tape Transports” on page 47.

Table 2-10. Bridging Between Routing Switchers with Different Formats

Description	Products
The X75HD provides conversion and processing for video and audio for HDTV and all SDTV formats. Video and audio can be converted through the X75HD providing bridges between sources and destinations in hybrid facilities.	X75HD, Panacea and Integrator Routing Systems

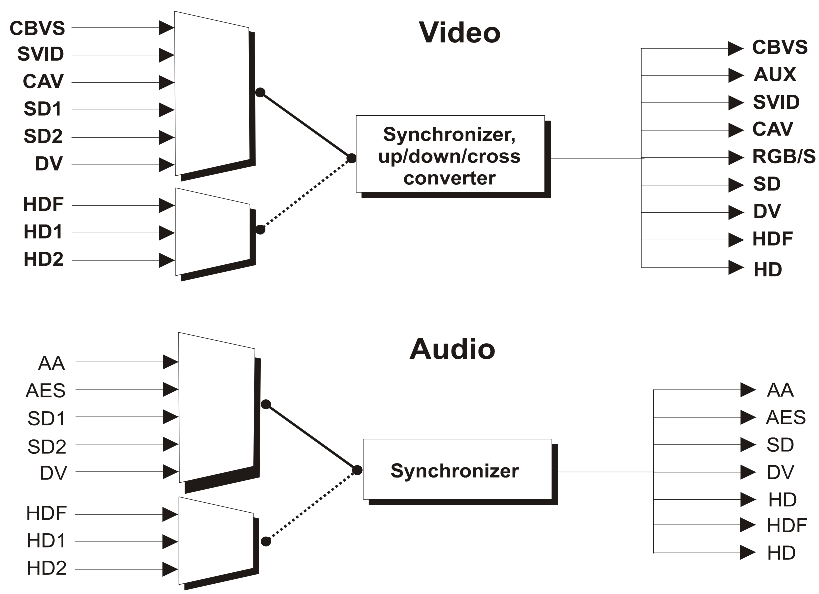


Simulcast Switching

Table 2-11 describes a common application for simulcast switching of SDTV and HDTV signals.

Table 2-11. Simulcast Switching of Standard and High Definition Signals

Description	Products
You can configure the X75HD to do an A/B switch using any two inputs; all inputs are provided simultaneously. In this example, A=HD, and B=SD. Simultaneous HD and SD outputs are available. You can perform the A/B switch manually or by GPI.	X75HD-AV



Required Settings	Navigation Path
I/P Video Mode	Video Setup>Routing Setup>Simulcast
Input A	Video Setup>Routing Setup>Simulcast>HD1
Input B	Video Setup>Routing Setup>Simulcast>SD1
Simulcast Sel	Video Setup>Routing Setup>Simulcast>Input A
Ch1-Aud Follows Vid	Audio Setup>Routing>Audio Follow Video>SRC 1>On
Ch1-AFV-HD1	Audio Setup>Routing>Audio Follow Video>SRC 1>HDX1/2
Ch1-AFV-SD 1	Audio Setup>Routing>Audio Follow Video>SRC 1>AES1a/1b

Chapter 3

Module and Back Panel Descriptions

Overview

This chapter briefly describes the X75HD/X75SD modules and their corresponding back panels, including card-edge LEDs and controls, jumper settings, and connector information. The following topics are included:

- "X75OPT-AS-16/X75OPT-AS-8 Modules and Back Panels" on page 52
- "X75OPT-A3D Module and Back Panel" on page 58
- "X75OPT-PQM Module and Back Panel" on page 60
- "X75HD Module and Back Panel" on page 63
- "X75OPT-STR Module and Back Panel" on page 65

See the following chapters for more information on back panel cables and connectors, servicing, and performance specifications:

- "Cables and Pinouts" on page 195
- "Servicing" on page 255

X75OPT-AS-16/X75OPT-AS-8 Modules and Back Panels

General Description

The X75OPT-AS-16/8 audio modules and associated back panels provide two/five AES inputs and outputs, one DARS input, a four-channel analog audio input, and a four-channel analog audio output. With this module, the X75HD/X75SD can process, embed, and de-embed 16/8 channels from/to SDTV and from/to HDTV.

Looking from the rear, this back panel is located in the top, left corner of the frame, above the SDTV video connectors.

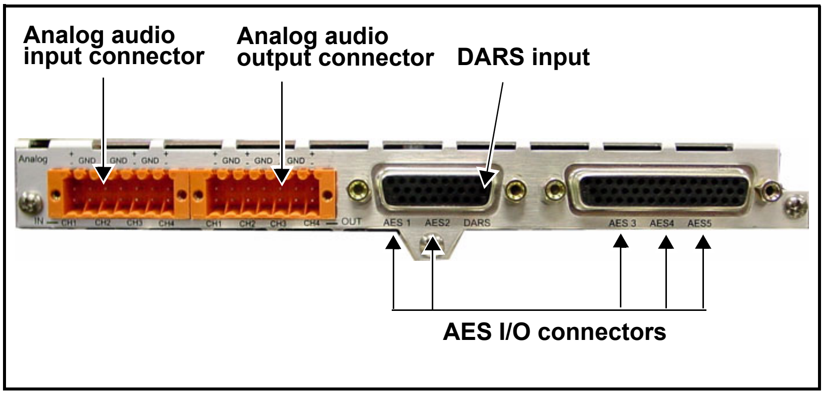


Figure 3-1. X75OPT-AS-16/X75OPT-AS-8 Back Panel

This module provides all audio processing for the X75HD/X75SD and is required to access, configure, and enable audio parameters in the **Audio Setup** submenu, including gain, delay, tone, mute, fade, voice-over, and AFV (audio follow video).

Required Jumper Settings and Local Configuration

Setting Jumpers

To configure the impedances of analog audio inputs and outputs, you must set specific jumpers.

Jumpers **1** through **12** are located at the rear of the module. Figure 3-2 on page 54 shows the location of the jumpers. See Table 3-1 for the correct placement of the jumpers. The white triangle next to each jumper indicates pin 1.

Table 3-1. Analog Audio Input and Output Impedance Jumper Settings

Input Settings				
Input Number	**Jumper Numbers**	**Channel**	**Pin Numbers**	**Setting**
1	J5	Left (1A)	1 and 2	600Ω
			2 and 3	100kΩ
2	J6	Right (1B)	1 and 2	600Ω
			2 and 3	100kΩ
3	J7	Left (2A)	1 and 2	600Ω
			2 and 3	100kΩ
4	J8	Right (2B)	1 and 2	600Ω
			2 and 3	100kΩ
Output Settings				
Output Number	**Jumper Numbers**	**Channel**	**Pin Numbers**	**Setting**
1	J1 and J9	Left (1A)	1 and 2	600Ω
			2 and 3	66Ω
2	J2 and J10	Right (1B)	1 and 2	600Ω
			2 and 3	66Ω
3	J3 and J11	Left (2A)	1 and 2	600Ω
			2 and 3	66Ω
4	J4 and J12	Right (2B)	1 and 2	600Ω
			2 and 3	66Ω

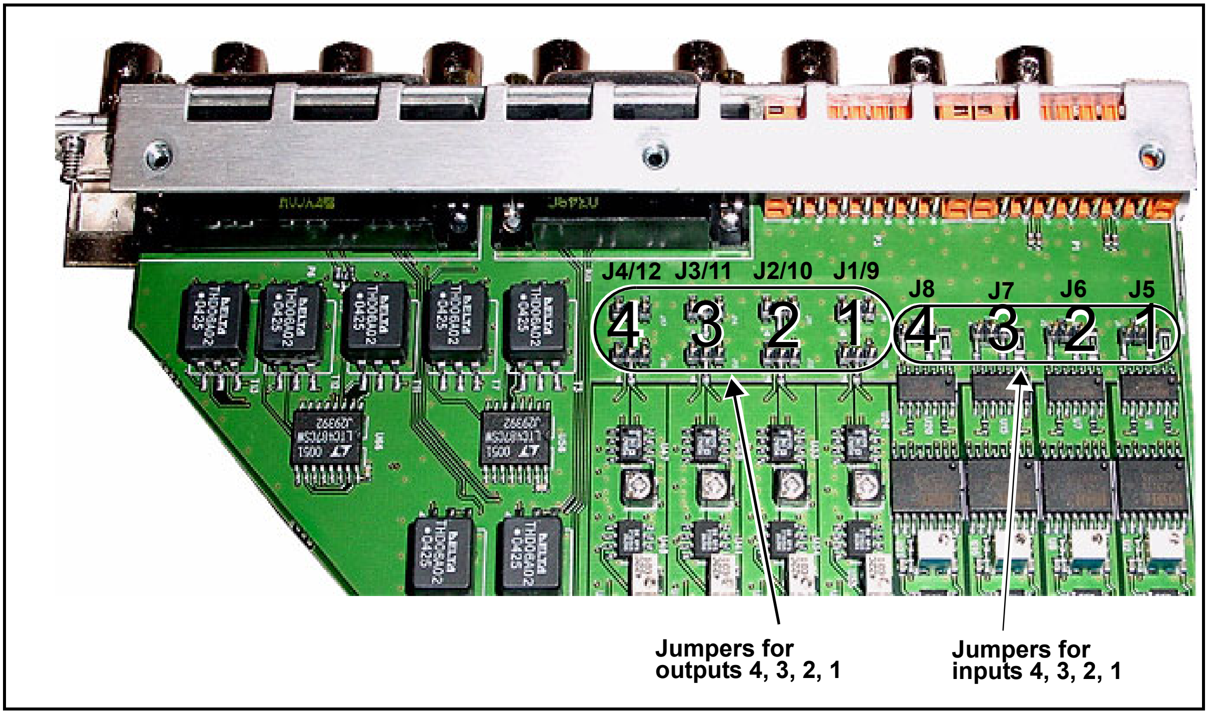


Figure 3-2. Jumper Locations for X75OPT-AS-16 and X75OPT-AS-8 Modules

Installing Audio Receptacles

To make analog audio input and output connections, you need to properly connect stripped wires for each audio channel to the provided audio receptacle. Once done, install the wired receptacle to the back panel audio input and output connectors. Follow these steps:

1. Insert a small, flathead screw driver into a rectangular hole of the audio receptacle.

   The corresponding round wire hole will open either directly above or directly below the screwdriver (see Figure 3-3).

2. Heeding the positive (+), negative (-), and ground (GND) markings on the back panel, place an appropriate stripped audio wire into the open hole.

   The top row of wire connection holes alternate between positive and ground. The bottom row of wire connection holes alternate between negative and ground. See Figure 3-3.

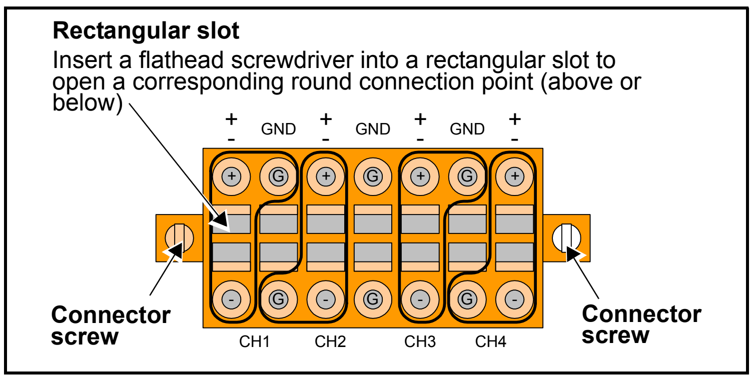


Figure 3-3. Installing Analog Audio Receptacles

3. Remove the screwdriver to lock the wire into place.
4. Repeat for other wire connections.
5. Once all wiring in completed, plug the receptacle into the analog audio input ports (each labelled **CH1 CH2 CH3 CH4**), and then secure the receptacle into place with the attached connector screws.

Special Control Considerations

For the AES input signals on DB-26 and DB-44 connectors, you can select either an **Unbalanced** or **Balanced** input from the **Audio Setup** submenu (accessed from the **Main** menu). For coaxial connections, select the default setting **Unbalanced**. For XLR connections, select the **Balanced** setting.

X75OPT-AS-16 or X75OPT-AS-8-L Audio Limiters

Audio limiters are available as software options on both the 16-channel and 8-channel versions of the X75OPT-AS audio synchronizers. The audio limiters have the following available options:

- Soft Limit Level
- Slope
- Attack Rate
- Attack Time
- Decay Rate
- Decay Time
- Noise Gate Level
- Noise Gate Time

Figure 3-4 shows the transfer function of the audio limiter. Table 3-2 on page 57 describes the various options of the audio limiter.

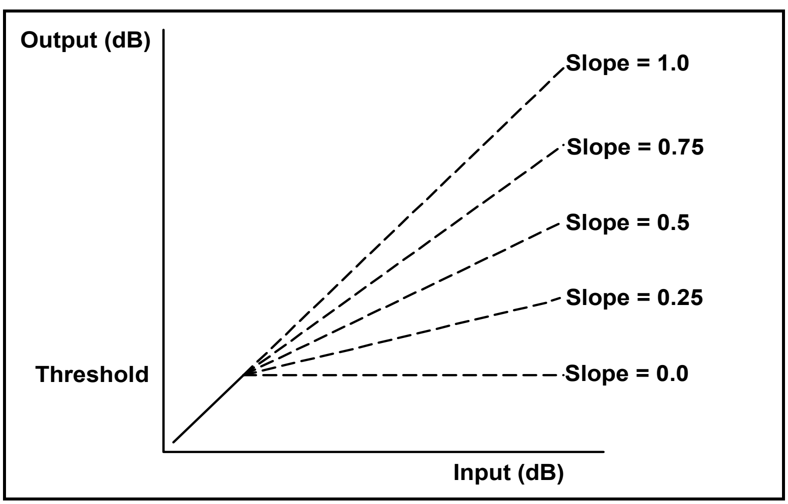


Figure 3-4. Audio Limiter Transfer Function

Table 3-2. Audio Limiter Options

Option	Description
Soft Limit Level	• Sets the threshold level for the input audio signal, measured in dB (decibels), where the audio signal limiter's attack and decaying function will be based • When a signal exceeds this level, compression will be applied
Slope	• Sets the amount a signal is reduced by the compressor • When the slope is set to 0.25, the audio input signal exceeding the soft limit threshold level will be reduced by the factor of 4 at the output.
Attack Rate	Controls the rate of attack soft limiting
Attack Time	• Activates limiter only after the input audio level remains over the Soft Limit Level for the duration specified in the Attack Time option • Audio that exceeds the specified Soft Limit Level for less than the specified Attack time will not activate the limiter • Attack Time indicates how long it takes for the compressor to act after a signal has exceeded the threshold level
Decay Rate	Controls the rate of decay soft limiting.
Decay Time	• Once the input audio signal has exceeded the Soft Limit Level and the limiter has been activated, the limiter remains active until the audio signal has returned below the Soft Limit Level for the duration specified in the Decay Time option • If the input audio signal returns below the Soft Limit Level for less than the specified Decay Time, the limiter remains active
Noise Gate Level	• Sets the noise gate threshold level, measured in dB. • When an input signal falls below this level, the noise gate will be applied.
Noise Gate Time	Indicates how long it takes for the noise gate to start or stop acting after the input signal has fallen below or risen above the threshold level.

X75OPT-A3D
Module and Back Panel

General Description

The optional X75OPT-A3D analog video input module and associated back panel provide selectable analog composite, component Betacam (CAV), and S-video inputs (see Figure 3-5).

The composite input is processed through a high-performance industry-leading 3D adaptive comb filter. The TBC mode is always used when the S-video input is selected. When component analog video is selected as the input, it is converted to digital and then further processed as required.

Looking from the rear, this back panel is located in the top, right corner of the frame, above the dual Ethernet ports.

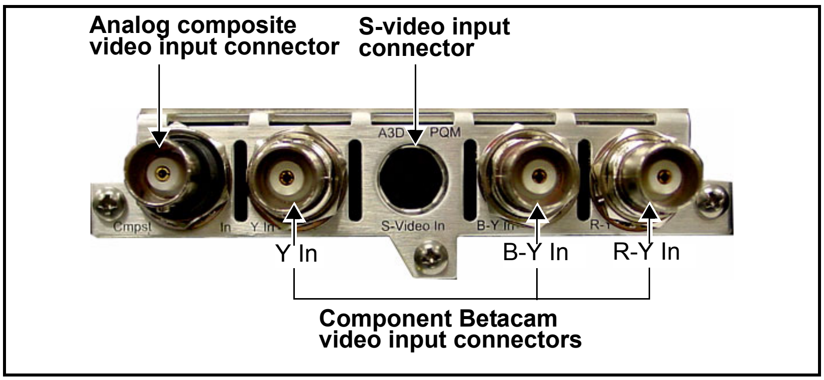


Figure 3-5. X75OPT-A3D Module Back Panel

To access, configure, and enable the analog video parameters associated with this module, enter the **Video Setup** parameter.

Special Control Considerations

Unlike SD-SDI inputs, only a single analog video source can be auto-detected. Therefore, you must pre-select the desired analog input video source (composite, S-video, or CAV) in order for the auto-detection to work across the HD-SDI/SD-SDI/analog inputs. To select a desired input, follow this path through the menu structure: **Video Setup>Analog Input>Analog Video Source**.

Additionally, set the **I/P Video Mode** parameter to **Auto Detect.**

For more information, see "Input Video Modes" on page 102.

X75OPT-PQM Module and Back Panel

General Description

The optional X75OPT-PQM module and associated back panel provide selectable analog composite, component Betacam (CAV), and S-video inputs (see Figure 3-6). This module is an economical alternative to the X75OPT-A3D option.

Composite input is processed through a 3D-adaptive comb filter. The TBC mode is always used when the S-video input is selected. When the component analog video input is selected, it is converted to digital and then further processed as required.

Looking from the rear, this back panel is located in the top, right corner of the frame, above the dual Ethernet ports.

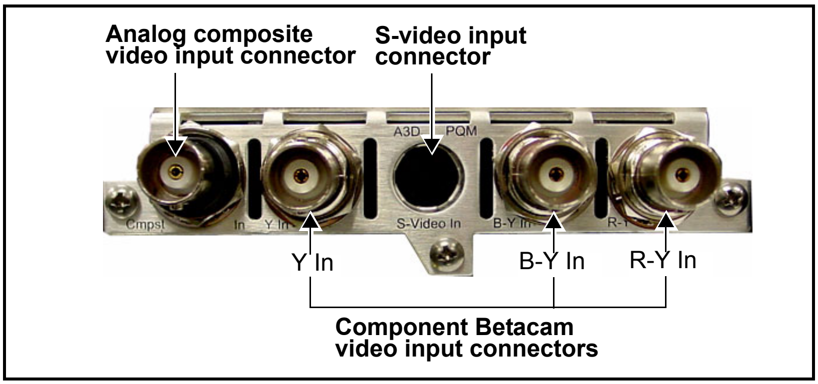


Figure 3-6. PQM-X75 Back Panel

To access, configure, and enable the analog video parameters associated with this module, enter the **Video Setup** parameter.

Special Control Considerations

Unlike SD-SDI inputs, only a single analog video source can be auto-detected. Therefore, you must pre-select the desired analog input video source (composite, S-video, or CAV) in order for the auto-detection to work across the HD-SDI/SD-SDI/analog inputs. To select a desired input, follow this path through the menu structure: **Video Setup**>**Analog Input**>**Analog Video Source**. Additionally, you must set the **I/P Video Mode** parameter to **Auto Detect**.

For more information see "Input Video Modes" on page 102.

Alternate PQM Color Decoding Algorithm (NTSC Only)

The current version of the PQM decoder code provides a superior separation of luma and chroma for the digital domain (SDI output). In some cases, however, when the luma and chroma are re-combined in the encoder, the resulting image may appear "soft" (see Figure 3-7).

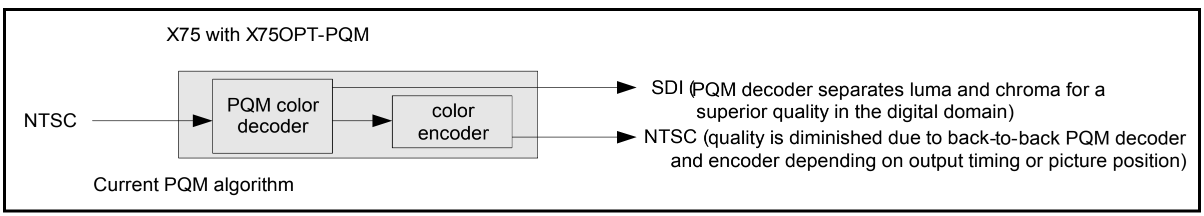


Figure 3-7. Current PQM Algorithm

Note

The alternate PQM algorithm results in diminished quality in the digital domain. If the SDI output is not being used, the alternate can be selected for an improved NTSC output.

When this condition occurs, the X75HD/X75SD has a useful alternate NTSC decoding algorithm that may provide better results. If an NTSC output is required (via back-to-back decoder/encoder), you can enable or disable the alternate PQM algorithm by following this path:

Video Setup>Analog Input (PQM)>Proc>Chroma Bandpass.

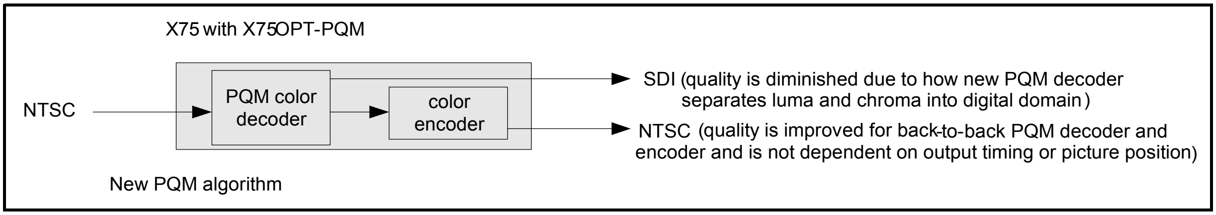


Figure 3-8. Alternate PQM Algorithm

X75HD Module and Back Panel

General Description

The X75HD (or X75OPT-HDUPG) module and associated back panel provides two HDTV coaxial inputs, two HDTV coaxial outputs, one HDTV fiber input, and one HDTV fiber output. This module provides and processes on-board up/down/cross-conversions.

The back panel is located in the top, middle of the frame, above the Multi I/O and DVI-D ports. X75HD modules are factory-installed in all X75HD systems, and available as an upgrade (X75OPT-HDUPG) for all X75SD and X75-DPS frames.

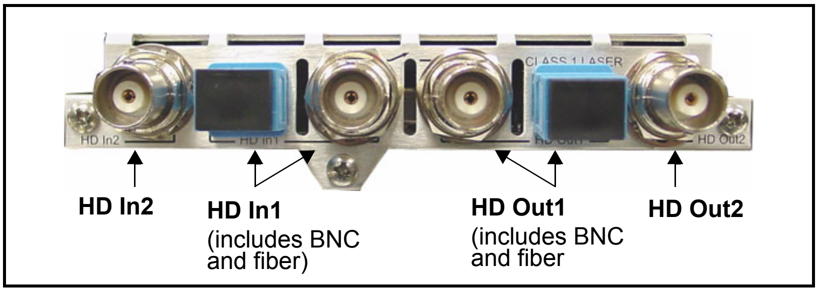


Figure 3-9. HD-X75 Back Panel

This module provides up, down, and crossconversion with both coaxial and fiber interfaces for HD. To access, configure, and enable the HDTV input and output parameters, enter the **Video Setup** parameter.

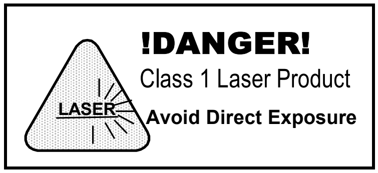
Caution

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED IN THIS MANUAL MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

Precautions

The HD-X75 fiber optic module is a CLASS 1 laser product.

Avoid looking directly at a laser. Laser radiation is invisible and can cause serious eye damage.



For more information on handling and connecting fiber optics, see "Understanding and Working With Fiber Optics" on page 257.

Special Control Considerations

The selection between HD1 and HD-Fiber is not automatic. You must pre-select the desired input video source first in order for auto-detection to work across the HD-SDI/SD-SDI/analog inputs. To select a desired input, follow this path through the menu structure: **Video Setup**>**HD Input**>**HD1/HDF Input Select**.

For more information, see "Input Video Modes" on page 102.

X75OPT-STR Module and Back Panel

General Description

Note

The streaming module requires its own network address. See the installation section beginning on page 279 for more information.

X75HD/X75SD units provide the following two types of streaming:

- A small "thumbnail" 128 x 96 pixel feed, which is available from the **Ctrl/Strm** port on all X75 frames (see page 138 for details)
- An optional, higher-quality 352 x 240 pixel (525) or 352 x 288 pixel (625) feed provided at the **Streaming** Ethernet port, which is generated by the X75OPT-STR module

The optional higher-quality (1/4 VGA) streaming uses MPEG4 codec video compression. The image can be displayed at up to 30 frames per second (25 fps for PAL) with a bit rate of 200 Kbps, adjustable up to 1Mbps (the frame rate drops each time you lower the bit rate). The streaming is viewable on Quicktime™ version 7.0 or above, and requires v. 1.7 or later X75 firmware. The X75OPT-STR module provides both audio and video streaming, delayed approximately four seconds. Although the thumbnail and the higher-quality streaming feeds are provided by different modules, they both show the same output image.

The following "broadcast" standards are among those that are *not* supported as a streaming output from the X75OPT-STR module:

- AVC
- AVI
- JVT
- MPEG4 Part 10 (H.264)
- SMPTE VC-1 (WM9 or Windows Media 9)

To select the *video* source for the X75OPT-STR module, follow this path:

Video Setup>Routing>Video M-Path>StrV Out Sel

To select the *audio* streaming sources, follow this path:

Audio Setup>Routing>Output>Stream Out A (left channel) and/or **Stream Out B** (right audio channel)

Minimum Requirements

The PC that monitors the X75HD/X75SD's streaming video using QuickTime should have the following minimum specifications when the lowest bit rate is used (200 KBps):

- Pentium 3 processor (16 MHz)
- 512 MB SD-RAM
- 300 MB free disk space
- 10 BaseT network connection
- 19-inch monitor

At the highest setting (1Mbps), the minimum requirements are the following:

- Pentium 4 processor, 3.0 GHz
- 512 MB SD-RAM
- 300 MB free disk space
- 100 BaseT network connection
- 19-inch monitor

For installation and configuration instructions, see page 279.

Chapter 4

System Installation and Connections

Overview

This chapter contains the following information:

- "Checking the Packing List" on page 68
- "Preparing for Installation" on page 70
- "Installing Rack Support Brackets and Cable Relief Bar" on page 72
- "Making Cable and System Connections" on page 75

Checking the Packing List

Before unpacking your product, read the “Unpacking/Shipping Information” on page xv.

Standard Items

The following items are included with every X75HD/X75SD system:

- One X75HD/X75SD Multiple Path Converters and Frame Synchronizers
- One AC power cable (773-254 or 773-505)
- Two rear support brackets (741-983A) and corresponding hardware
- Two cable relief support brackets (164-000306-00) and one corresponding cable relief bar (164-000305-00)

The following items are only included with X75HD/X75SD-AV and -LCAV systems:

- Two 2x7 analog audio terminal blocks (134-000228-00)
- Eight-channel audio module with X75OPTCAB-8-C breakout cable

Or

- Sixteen-channel audio module with X75OPTCAB-16-C and X75OPTCAB-8-C coax breakout cables

Optional Items

You may have additional items included in your shipment if you have ordered any of the available options or upgrades. Some options may include the following:

- X75OPT-A3D high performance 3D-adaptive decoder, composite, component Betacam, and S-video input
- X75OPT-AS-8/16 digital audio synchronizers
- X75OPT-ASL audio limiter software key for X75OPT-AS-8/16 digital audio synchronizers
- X75OPT-DOLBY-1 internal Dolby-E decoder submodule
- X75OPT-FIBER-FC and -ST fiber connectors
- X75OPT-HDUPG-HDTV submodule
- X75OPT-PS power supply kit
- X75OPT-PQM video module

- X75OPT-STR streaming module
- X75-RCP remote control panel
- X75OPTCAB-MULTI breakout cable
- X75OPTCAB-16-C breakout cable set
- X75OPTCAB-16-X breakout cable set
- X75OPTCAB-16-XC combination BNC/XLR audio breakout cable set
- X75OPTCAB-8-C breakout cable
- X75OPTCAB-8-XC breakout cable
- X75OPTCAB-8-X breakout cable
- X75OPTCAB-DVI cable
- X75OPT-ASL audio limiter
- X75OPT-HDDUOCON software upgrade key
- X75OPT-NR digital noise reduction and digital bandwidth filtering software key
- X75OPT-SNMP software upgrade
- X75OPT-v2A automatic video-to-audio timing tool
- X75SPR-KIT spare parts kit

Replaceable Parts Kit

The replaceable parts kit (X75SPR-KIT) includes the following items:

- 2 fans
- 4 stackers
- 1 power supply with no connectors
- 1 shaft encoder

Preparing for Installation

Prior to installing your system, ensure that certain environmental and electrical conditions are met.

Meeting Electrical Requirements

The X75HD/X75SD power supply has a universal input of 100-240 VAC at 47 to 63 Hz (nominal). There is no voltage selector switch. Ensure that a proper power supply source is available prior to operating your system.

Table F-25 and Table F-26 on page 346 describe the power consumption of individual components and system packages. These ratings refer to the total module power consumption (excluding that of the power supply) allowable within a X75HD/X75SD frame. The limits are based on the ability of the unit to dissipate heat over a temperature range of 32° to 122°F (0° to 45°C).

Each X75HD/X75SD frame has space for two power supplies; however, a single power supply can meet the requirements of a fully-loaded frame. An optional second power supply can be purchased to provide full backup redundancy. See "Installing a Redundant Power Supply" on page 293 for more information.

Meeting Environmental Requirements

Caution

To ensure proper ventilation and to prevent overheating, keep the front panel closed.

X75HD/X75SD units are cooled by forced air drawn in from the front and exhausted through vents at the rear. There must be free passage for air flow at the front and back of each unit to allow for adequate ventilation. Take care to select a dry, well-ventilated location with a minimum of dust.

X75HD/X75SD units are designed for mounting in a standard 19-in. (48-cm) rack using front-mounting ears and rear support brackets, occupying a 1RU vertical space of 1.75 in. (4.4 cm). When installing an X75 in a rack, ensure that there is adequate space behind the mounting ears and clearance for the rear connecting cables. Allow about 10 inches (25 cm) of slack in the rear connecting cables for frame access and maintenance.

After unpacking the unit, and before installing into a console or rack, allow at least 30 minutes for temperatures to equalize and to eliminate any condensation that may have developed. The X75 requires an ambient temperature of between 41° to 113°F (5° to 45°C), with a relative humidity of 10-90% (non condensing). Proper operating temperatures can be maintained only when the front panel is properly installed.

Installing Rack Support Brackets and Cable Relief Bar

Although the front-mounting ears provide the main support for the X75 within a rack, you must install additional brackets and a cable relief bar at the rear of the unit to support the weight of cabling and frame stacking. The following procedure describes how to install an X75HD/X75SD unit in a standard 19-inch rack using the provided front-mounting ears, rack support brackets, and cable relief bar.

1. Locate two sets of rack support brackets in the packing box, along with the cable relief bar and the provided screws.

   Each support bracket comes in two pieces and requires assembly. The cable relief bar is a single piece. (See Figure 4-1.)

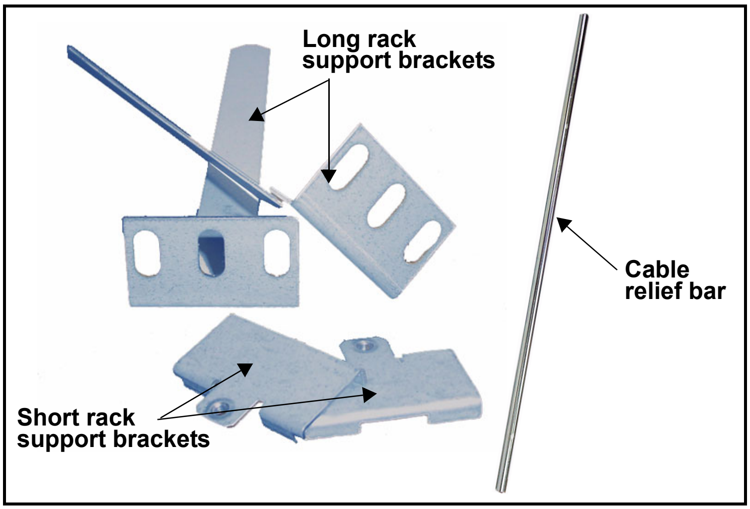


Figure 4-1. Rack Support Brackets

2. Attach the short rack support brackets to the sides of the X75HD/X75SD frame using the screws that are provided in the frame holes. (See Figure 4-2 on page 73.)

Caution

Do not use screws longer than those provided for the rear support brackets. Five 4-40 x 1/4-inch flat-head screws are provided for this purpose. Longer screws could cause internal damage.

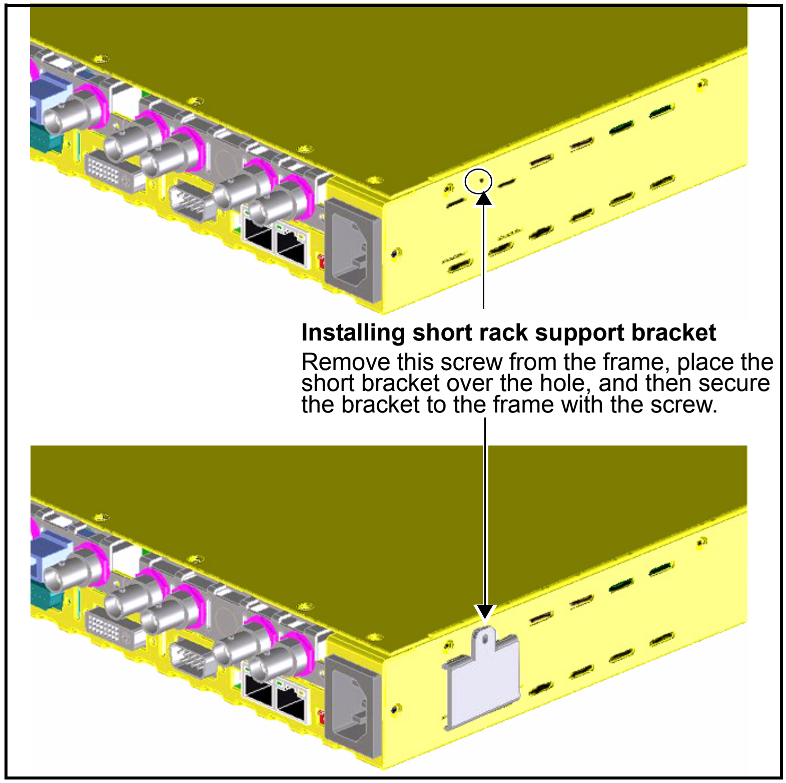


Figure 4-2. Location of Short Bracket Support Screw

3. Attach the cable relief bar between the long rack support brackets using the provided screws.

   You can secure the cable relief bar through any of the screw holes on the rack support bracket. (See Figure 4-3.)

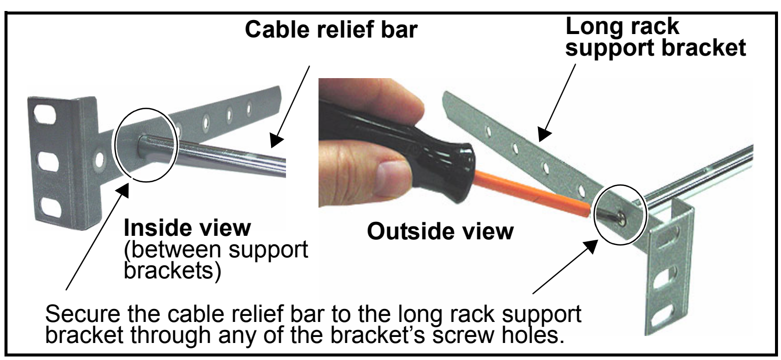


Figure 4-3. Installed Cable Relief Bar

4. Using the screws that are provided, attach the ends of the rack support brackets to the rear of the rack.

   Ensure that the holes on the rack support brackets face outward, away from the frame. (See Figure 4-4.)

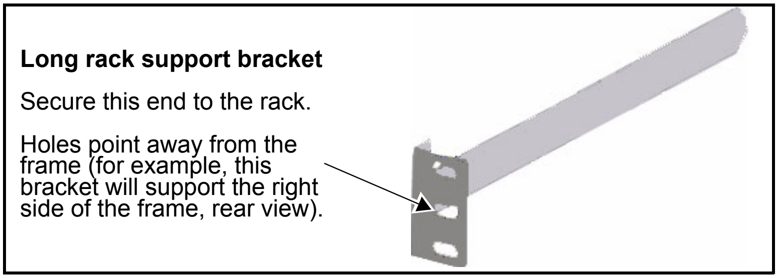


Figure 4-4. Long Rack Support Bracket

5. Push the X75HD/X75SD into the front of the rack, ensuring that the rack support brackets slide into the slotted rack supports. (See Figure 4-5.)

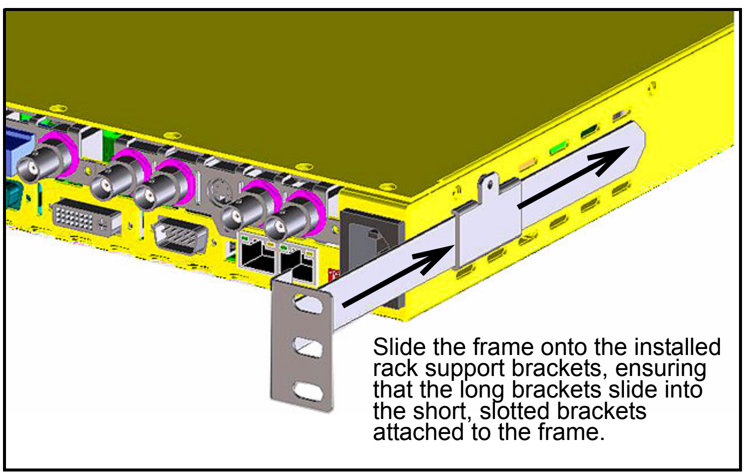


Figure 4-5. Installed Long and Short Rack Support Brackets

6. Attach the frame's front-mounting ears to the rack using the appropriate rack screws.

Making Cable and System Connections

Some connections to the X75HD/X75SD are provided via supplied breakout cable(s), while others are made directly to the frame via single-link cabling. Figure 4-6 identifies the various connectors on the X75HD/X75SD back panel:

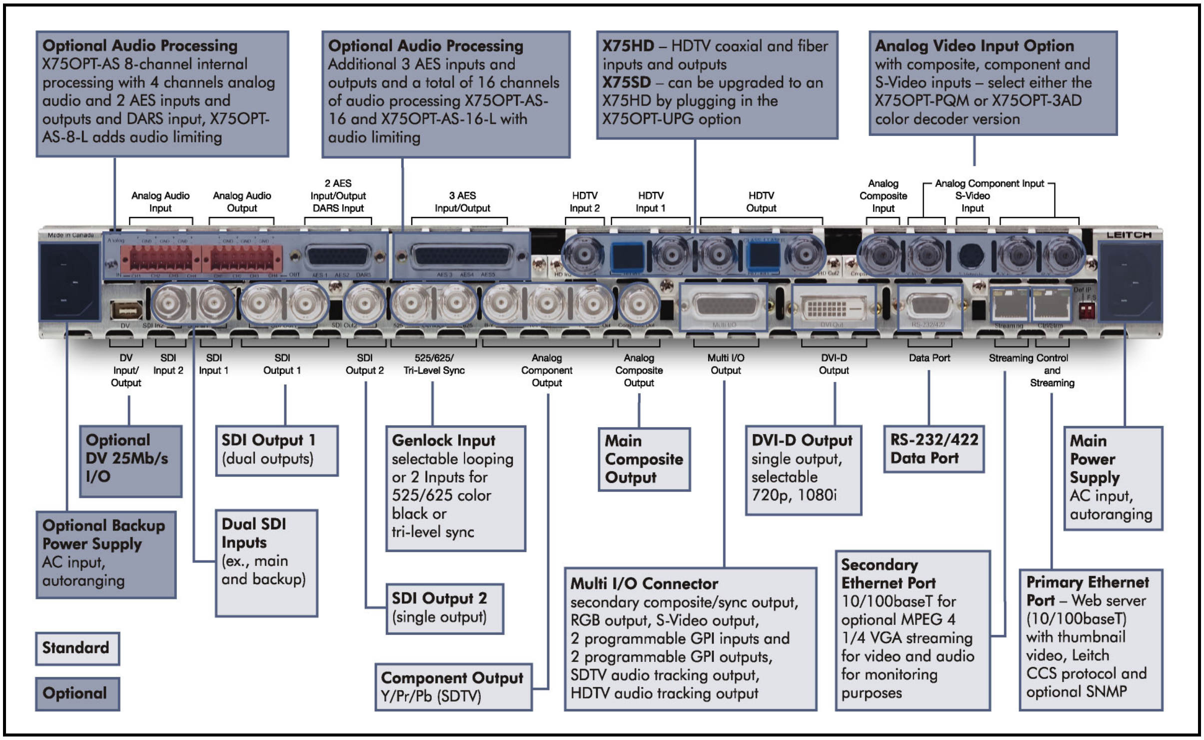


Figure 4-6. X75HD/X75SD Back Panel

When making cable connections, maintain approximately 10 in. (25 cm) of slack in the rear connecting cables (wrap or tie extra cable around the cable relief bar). This allows you to pull the frame out from the rack for servicing without needing to remove any cable connections.

Multi-Purpose Breakout Cable and Connections

The optional X75OPTCAB-MULTI breakout cable connects to the high-density DB-26M connector on the back of the unit labelled Multi I/O. Input connections include GPI 1 and GPI 2. The cable provides the following output connections:

- S-video (Y/C)
- RGB (Blue, Green, Red)
- Aux Composite or Sync
- GPI 1 and GPI 2
- SDTV audio delay
- HDTV audio delay.

For pinout descriptions of this cable, see "Multi I/O Cable (X75OPTCAB-MULTI)" on page 203.

S-Video (Y/C) Output

This four-pin mini-DIN connector on the Multi I/O breakout cable provides processed, synchronized/time base-corrected S-video (Y/C) output.

RGB (Blue, Green, Red) Video Output

These Red, Green, Blue, and Sync BNC connectors provide processed, synchronized/time base-corrected RGB(S) (RGB with auxiliary sync) video output. You can turn all three RGB channels' sync signals on or off independently. If RGB without auxiliary sync is sufficient, reassign the Sync/Composite connection as an auxiliary composite output.

Synchronized Composite Output

As described above, you can reassign the sync composite connection on the Multi I/O breakout cable. This capability is set by the **Aux Sync/Comp** option in the **Video Setup** menu.

GPI 1 and GPI 2 Input/Output

To use a GPI-based external controller as a trigger for internal functions of the X75HD/X75SD unit, use the two RCA-jack GPI inputs provided on the Multi I/O breakout cable. To configure the function triggered by each GPI input, navigate to **System Config**>**Setup**>**GPI Input**.

To trigger external devices, use the two RCA-jack GPI outputs provided on the Multi I/O breakout cable. Configure the functionality of this output by navigating to **System Config**>**Setup**>**GPO Output**.

SD Audio Delay Output

This BNC connector provides the varying width TTL pulse that is directly proportional to input-to-output propagation delay of the selected SDTV signal path. Some external audio synchronizer devices can use this pulse signal to auto-synchronize the audio signal to the video.

HD Audio Delay Output

This BNC connector provides the varying width TTL pulse that is a direct output from the HDTV frame synchronizer output. The pulse width is directly proportional to the frame synchronizer's input-to-output propagation delay. Some external audio synchronizer devices can use this pulse signal to auto-synchronize the audio signal to the video.

Video Connections

The following are direct single-link video connections (not via breakout cables) visible on the rear of the X75HD/X75SD.

Digital Video Input

This six-pin IEEE-1394 connector, labelled **DV**, is reserved for future use.

Serial Digital Input

These BNC connectors, labelled **SDI In 1** and **SDI In 2**, accept serial digital ITU-R BT.601 video and embedded audio data at a rate of 270 Mb/s. SDI In 1 has a relay bypass capability to SDI Out 1.

Serial Digital Outputs

These BNC connectors, labelled **SDI Out 1** and **SDI Out 2**, provide the processed and synchronized serial digital ITU-R-BT.601 video and embedded audio at an output rate of 270 Mb/s.

HDTV Serial Digital Inputs

There are three HDTV video input connectors on the X75HD frame that allow for three possible input choices. Choose from **HD-Fiber**, **HD In1**, or **HD In2**.

HDTV Serial Digital Outputs

There are three available outputs on the X75HD frame: **HD Fiber**, **HD Out1**, and **HD Out2**. All three outputs will contain the same content.

Genlock Input

X75HD/X75SD models accept NTSC, PAL-B and Tri-Level Sync as the reference sources to provide the stable clock-to-output signals. The two **Genlock** BNC ports can be set either to **Loop-Thru** or **Split** operation. You can select any feed for the **Tri-Level Sync**, but in **Split** mode operation, you must select the port at which the signal is connected. To select the port, follow **Reference Setup>GL Source Config**. All other genlock parameters are accessible in the **Reference Setup** menu.

There are three genlock connection modes: **Loop-thru**, **Split-525**, and **Split-625**.

- **Loop-thru** disconnects the internal terminations, connects the loop-through path and feeds the looped signal to the genlock subsystem
- **Split-525** disconnects the loop-through path and connects the terminations to both ports (the genlock source becomes the 525 Genlock BNC connector)
- **Split-625** disconnects the loop-through path and connects the terminations to both ports (the genlock source becomes the 625 Genlock BNC connector)

The genlock signal must be a stable, time base-corrected source, such as color bars or black burst. You can choose one of the following reference sources for the frame:

- **External** reference input (either color black or tri-level sync)
- **Freerun** (the internal clock generated by the X75HD/SD)
- Any video input, including **SD-SDI 1**, **SD-SDI 2**, **HD**, or **Analog Video**.

  When the input video is selected as the reference source, the unit runs in one clock system; therefore it is in the *delay* mode rather than the synchronization mode.

The **GL Standard Set** parameter selects the operational video standard mode for the genlock circuitry. You can manually force it to a specific standard to match the source being fed into the Genlock port, or set it to **Auto** to let X75 unit to automatically detect and configure its circuitry.

When a valid signal is connected to the genlock input, all video outputs from the X75HD/SD will be genlocked to this signal. When this occurs, the **Genlock** LED will be lit. When no external reference is supplied to the genlock input, the unit will operate using its own internal clock source.

Component Analog Video Outputs

These three BNC connectors, labeled **B-Y**, **R-Y**, and **Y Out**, are used to output the signals to analog component devices, such as Betacam VTRs.

Composite Video Output

This BNC connector, labeled **Composite Out**, provides processed, synchronized versions of any of the input signals.

DVI Output

This connector, labelled **DVI-Out**, is a digital-only transmitter that provides up to 330 MHz bandwidth signal and supports 1080i/59.94, 1080i/50, and 720p/59.94, and 720p/50 outputs. From this output, connect the optional X75OPTCAB-DVI DVI-D to DVI-D (digital, single-link) cable to your DVI monitor.

Composite Video Input

This BNC connector, labelled **Cmpst In**, is used to feed composite 1 V pk-to-pk 75Ω video to the X75HD/X75SD. The input video signal must be direct color or monochrome (such as from a satellite feed or live camera).

S-Video Input

This four-pin mini-DIN connector, labelled **S-Video**, is used for S-video (Y/C) signals, such as from an S-VHS or Hi-8 device. The internal time base corrector automatically processes any signal received at this port.

Component Analog Video Inputs

These three BNC connectors, labeled **Y In**, **R-Y In**, and **B-Y In**, are used to input the signals from analog component devices, such as Betacam VTRs.

If component analog video input is not needed, the **CAV-Y In** connection can be reassigned as a second composite video input with the **CAV-Y Composite** option in the **Video Setup/Analog Input/Proc** menu (see "Chapter 8: Video Configuration" on page 143).

Audio Connections

On X75HD/X75SD systems equipped with an HDTV audio option, up to eight stereo channels can be processed from any of the following inputs:

- 4 analog mono channels
- 2 or 5 x AES
- SDTV embedded (four groups, eight mono channels)
- HDTV embedded (four groups, sixteen mono channels)

DARS Inputs

The DARS input is available on the standard X75OPTCAB-8-C coax cable, optional X75OPTCAB-8-X XLR cable, or optional X75OPTCAB-8-CX combination BNC/XLR breakout cable.

The **DARS Bal/UnBal Sel** parameter selects between the unbalanced (coax) and balanced (XLR) type of connection. Primarily, the DARS (Digital Audio Reference Signal) is used for the audio synchronization.

AES/EBU Inputs

The **AES1** and **AES2** inputs are available on the standard X75OPTCAB-8-C coax, optional X75OPTCAB-8-X XLR cable, or optional X75OPTCAB-8-CX combination BNC/XLR breakout cable.

The **AES3**, **AES4** and **AES5** inputs are available only on the standard X75OPTCAB-16-C coax, optional X75OPTCAB-16-X XLR cable, or optional X75OPTCAB-16-CX combination BNC/XLR breakout cable.

The **AES# Bal/UnBal Sel** parameters select between the unbalanced (coax) and balanced (XLR) type of connection. Only one input connection type is supported.

AES/EBU Outputs

The **AES1** and **AES2** outputs are available on the standard X75OPTCAB-8-C coax, optional X75OPTCAB-8-X XLR cable, or optional X75OPTCAB-8-CX combination BNC/XLR breakout cable.

The **AES3**, **AES4** and **AES5** outputs are available only on the standard X75OPTCAB-16-C coax, optional X75OPTCAB-16-X XLR cable, or optional X75OPTCAB-16-CX combination BNC/XLR breakout cable.

Both the unbalanced (coax) and balanced (XLR) AES audio signals are present at all time on both D-Sub connectors.

Analog Audio Inputs and Outputs

Four channels (two stereo pairs) of analog audio inputs and outputs are supported. The analog audio input and analog audio output connectors are labelled **In CH1** to **In CH4**, and **Out CH1** to **Out CH4**, respectively. Each balanced analog audio input channel can be configured as 600Ω or high impedance.

Two analog audio receptacles (included with purchase of an X75OPT-AS-16 or X75OPT-AS-8 module) must be plugged into these connectors before configuration. See “X75OPT-AS-16 or X75OPT-AS-8-L Audio Limiters” on page 56 for more information.

Remote Control Ports

Supported remote control methods include the following:

- 10Base-T or 100/Base-T Ethernet (used for control through a TCP/IP-based network) using a CCS™ (Command and Control System) application such as Pilot or Navigator, or using a controller such as the X75-RCP remote control panel or an X75HD/X75SD local control panel
- Web browser program such as Internet Explorer™ or Netscape™
- SNMP (Simple Network Management Protocol) and third-party control software through Leitch CCS Protocol
- GPI (General Purpose Interface) input/output used for remote triggering of functions such as Freeze or triggering of external devices

Ethernet Ports

The 10/100Base-T Ethernet connector, labelled **Ctrl/Strm**, connects X75HD/X75SD models to a TCP/IP-based network for remote control and status monitoring. Web-browsing software, an X75-RCP remote control panel, or a frame-mounted local control panel then control the unit. See “Configuring for HTTP Control via Web Browser” on page 98 for details about controlling the unit from your Web browser.

When using Ethernet, you must configure the IP Address, Subnet Mask, and Default Gateway settings of the unit for your network; your network administrator can provide you with these settings. The network settings are located in the **System Config>Setup** menu. When all the changes are made, the **Save IP** function must be performed to actually save the changes in non-volatile memory.

A second port, labelled **Streaming**, is activated when the optional X75OPT-STR module is installed. For more details, see "X75OPT-STR Module and Back Panel" on page 65.

Chapter 5

Initial Configuration

Overview

This chapter describes the various configurations and settings that are required before you begin operating the X75HD/X75SD. Although you can modify all parameters and settings at any point during operation, there are certain control options and configurations that you need to set first, including those listed below:

- "Initial Power-Up and Control Steps" on page 86
- "Configuring Network Settings" on page 88
- "Remotely Controlling X75HD/X75SD Systems" on page 95
- "Processing Modes" on page 101
- "Configuring Video" on page 105
- "Configuring Audio" on page 107

Unless otherwise specified, instructions in this chapter are provided for making changes via a local or remote control panel.

For more details on using local and remote control panels, see the *Control Panels for X75 Systems Installation and Operation Manual*.

Initial Power-Up and Control Steps

> **Note**
>
> The current system IP address and network settings can be viewed on a local or remote panel VFD screen. If you do not have access to a control panel, and cannot remember the set IP address of your system, see "Forgotten IP address" on page 222 for more information.

1. If you have an X75OPT-AS-8/16 audio option card, ensure all jumper settings have been made.

   See "X75OPT-AS-16/X75OPT-AS-8 Modules and Back Panels" on page 52 for details about the jumper settings.

   The X75OPT-AS-8/16 audio module is shipped with the following jumper settings: 100 kΩ for input impedance, and 66Ω for output impedance. If 600Ω impedance is required, all input and output jumpers should be placed on pins 1 and 2.
2. Install the X75HD/X75SD in a rack and make the required system connections (see the instructions beginning on page 72).
3. Plug the unit into a grounded electrical source.

   The unit is factory configured with default settings, including the following network settings:

   - IP address: 192.168.100.250
   - Subnet mask: 255.255.255.0
   - Gateway: 192.168.100.250
   - Machine name: Leitch X75

   (Upon request, Leitch can preconfigure X75HD/X75SD systems with specific IP addresses and network settings. Please contact your Leitch customer service representative for more details.)
4. Using a frame-mounted local control panel, configure the network settings for each system by assigning a unique IP address to each unit, configuring the subnet mask to be the same for all units on a shared network, and changing the gateway if required (see "Configuring Network Settings" on page 88 for details).
5. If you are controlling the unit remotely via remote control panel, make the required Ethernet connections (see "Remotely Controlling X75HD/X75SD Systems" on page 95 for details).
6. If you are controlling the unit via a third-party Web browser, launch the Web browser (see "Configuring for HTTP Control via Web Browser" on page 98 for details).
7. If you are controlling the unit via a third-party SNMP browser, make the appropriate connections and download/configure the appropriate MIB and SNMP agent files (see "Configuring SNMP Support" on page 311 for details).

8. Configure your video (and audio) input settings prior to operation (see “Configuring Video” on page 105 and “Configuring Audio” on page 107 for details).

Configuring Network Settings

When shipped, the X75HD/X75SD is configured with a default IP address, subnet mask, and default gateway. If you intend to control the unit remotely, or connect it to a network hub/switch along with other X75HD/X75SD units, you will need to reconfigure the IP with unique network settings. Local control (with a direct Ethernet crossover connection to a PC) does not require any IP configuration.

Supported Network Protocols

The X75HD/X75SD supports the following network protocols for remote/network control:

- Leitch CCS Protocol (for example, using an X75-RCP remote control panel).

  See "Remotely Controlling X75HD/X75SD Systems" on page 95 for details.
- HTTP (for example, using a Microsoft Internet Explorer 6.0).

  See "Configuring for HTTP Control via Web Browser" on page 98 for details.
- SNMP (for example, using NuDesign Visual MIBrowser Pro 3.1).

  See "Configuring SNMP Support" on page 311 for details.

Making Required Hardware Connections

If you are connecting an X75HD/X75SD directly to a PC (no network connection), connect one end of a crossover Ethernet cable to the **Ctrl/Strm** RJ-45 port on the back of the X75HD/X75SD, and the other end to the PC **Ethernet** port.

If you are establishing a network connection, connect a straight-through 10/100Base-T Ethernet cable between the X75HD **Ctrl/Strm** port and the network hub/switch.

Setting IP and Subnet Mask Addresses

To allow devices to communicate on a network, you need to set all devices to the same subnet (network location). When shipped, X75HD/X75SD units are configured with the same default IP (device identifier) and subnet addresses. These addresses need to be changed so that each unit is uniquely identified and the network location of all units is accurately reflected.

An IP address is made up of a four-item set of numbers (octet). The default (factory-configured) IP address for every X75HD/X75SD unit is **192.168.100.250**. For a class C network, you must change the first three items in the octet to identify the location (address) of the unit on your network, and also change the last item in the octet to uniquely identify the device from other X75HD/X75SD units.

The default subnet mask address for every X75HD/X75SD is 255.255.255.0.

Setting the IP Address of a Single Unit with LCP or RCP

Follow these steps to configure the network addresses using a local or remote control panel:

1. Apply power to the RCP or the LCP-enabled X75HD/X75SD unit.

   When ready for configuration, the X75HD/X75SD main menu shows on the display screen.

2. Follow this path: **System Config**>**Setup** (in the RCP, select **Device Setup**).

3. Scroll to the **Device IP** parameter, and then press **Enter**.

   If this is a new unit being configured, the default IP displays. Otherwise, the current IP address of the unit displays.

4. Change the IP address by following these steps:

   a. Press **Enter** to navigate to one of the four number sets in the octet.

   b. Modify the address value by using the scroll knob to set a new number.

   c. Press **Enter** to move to the next item in the octet, and then repeat step (b) above.

   d. Press **Exit** when you are finished configuring the address.

5. Scroll to the **Subnet Mask** parameter, and then press **Enter.**

   If this is a new unit being configured, the default subnet mask displays. Otherwise, the current subnet displays.

6. Repeat the procedure described in step 4, this time for the subnet mask.

7. Scroll to the **Gateway** parameter, and then press **Enter**.

   If this is a new unit being configured, the default gateway displays. Otherwise, the current gateway address displays.

8. Repeat the procedure described in step 4, this time for the gateway parameter.

9. Select **Save IP**, and then press **Enter**.

10. Select **Yes** option and then press **Enter**.

11. Press **Exit** to return to the **Setup** menu.

12. Navigate to the **Setup** menu, select **Reboot**, and then press **Enter**.

    To restart an X75HD/SD unit with a blank front panel, unplug it and then reapply power.

Setting the IP Addresses of Multiple Units

If you have multiple X75HD/X75SD systems that require network configuration, you will need to set unique IP addresses and assign a subnet mask and gateway address for each of them one at a time. The following procedure summarizes the required steps:

1. Apply power to the first X75HD/X75SD unit with a frame-mounted local control panel.

   When ready for configuration, the main X75HD/X75SD menu shows on the display screen.

2. Configure the network settings for this unit, as described in the procedure on page 89.

3. Restart the X75HD/X75SD unit.

4. Plug in the next X75HD/X75SD system, configure its network information, and then restart the unit.

   Follow this procedure for all remaining X75HD/X75SD units that require configuration.

5. If you will be using a remote panel, configure the RCP’s network settings in the same way as you would for an X75HD system (see page 95).

6. Connect all X75HD/X75SD systems and remote panels to a network hub or switch using a 10/100Base-T Ethernet cable.

7. Ensure that all configured X75HD/X75SD units are detected on the network.

   To do this, press **Remote** on the front panel of either an RCP or a frame-mounted local control panel. All units configured with the same subnet mask address will display (you will see a list of all detected IP addresses).

   If a unit or RCP is not detected, ensure that the subnet mask address is accurate. Alternatively, confirm that all units were restarted after configuring any network settings.

Note

If configured to be on the same network, the following items will be detected: X75HD/X75SD systems, X75-RCP panels, and any DPS-575 systems.

Changing the PC Network Settings

In unusual situations, such as correcting a failed software upgrade, you may need to change your PC network settings. Follow these steps to change the settings:

Note

You will probably require administrator privileges on your PC to change the IP Address

1. Change the IP Address of the PC to match that of the X75HD/X75SD, by following theses steps:

   a. Click **Start>Settings** and then click **Control Panel**.

      This opens the Control Panel window.

   b. Double-click **Network and Dial-up Connections,** and then double-click **Local Area Connection.**

   c. Click the **General** tab, and then click **Properties**.

      This opens a new **Local Area Connection Properties** window.

   d. On the **General** tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**..., ensuring you are working on the correct Ethernet adapter for the CCS network.

      The IP Address of the **Internet Protocol TCP/IP Properties** box appears.

      Figure 5-1 shows the portion of the Internet Protocol TCP/IP Properties box where you enter the IP Address, Subnet Mask, and Default Gateway of your PC.

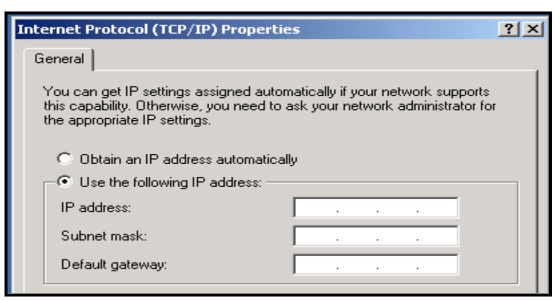


Figure 5-1. Portion of IP Address Box

   e. Note whether **Obtain an IP address automatically** is selected.

      You may need to re-select this option later when you revert back to the original PC IP Address.

f. Select **Use the following IP address**, and in the **IP address** box, type a new computer IP Address to match the first three octets of the IP Address of the X75HD/X75SD, and then add a different fourth octet.

(For example, if the X75's IP Address is 192.168.100.50, you could type 192.168.100.181).

g. In the **Subnet Mask** field, type: `255.255.255.0`

This value applies to Class C IP addresses; confirm the number with your network administrator.

h. Enter the same **Default Gateway** number as the one on the X75HD/X75SD, or leave blank.

i. Click **OK** to close the **TCP/IP Properties** box, and then close the two **Local Area Connection** boxes.

2. Verify the network settings were accepted by following the ipconfig procedure, as described below:

a. Click **Start**, point to **Programs**>**Accessories** and then click **Command Prompt** to open the **Command Prompt** window on the PC.

b. Type the following at the MS-DOS command prompt, and then press ENTER:

```
ipconfig
```

The IP Address, Subnet Mask, and Default Gateway of the PC appear. (In some situations, the Default Gateway value is not shown. See Figure 5-2.)

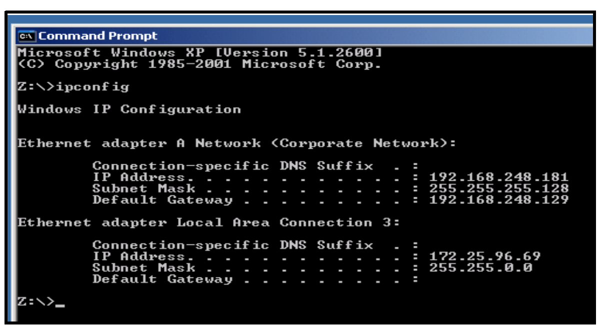


Figure 5-2. IP Address, Subnet Mask and Default Gateway of PC

c. Write down the IP Address, Subnet Mask, and Default Gateway numbers of your PC.

d. Compare the network numbers of the X75HD/X75SD, with the numbers found in step 2c.

In general, the two Subnet Mask and Default Gateway numbers should be identical. The first three octets of the two IP Addresses also are generally identical. For example, if the X75HD/X75SD has an IP Address of 192.168.248.50, the PC could have an IP Address of 192.168.248.181.

3. If the network settings match, click **Close**.

Note

Where more than one network is involved and the Point-to-Point option has been selected (see CCS PIlot/Navigator online help), the network address values may be entirely different.

Remotely Controlling X75HD/X75SD Systems

This section provides the following general configuration procedures:

- "Preparing for Remote Control via Control Panel" (below)
- "Selecting a Remote Unit to Control" on page 96

See your *Control Panels for X75 Systems Installation and Operation Manual* for more information about using an X75-RCP remote control panel.

Preparing for Remote Control via Control Panel

Note

A frame-mounted local control panel can also remotely control other networked X75HD/X75SD units. Procedures described in this section also apply to local panel control. See "Using a Frame-Mounted Local Control Panel for Remote Operation" on page 97 for more information.

Control panels remotely control X75HD/X75SD units via broadcast. Switchers and routers in the network need to be configured accordingly. Follow these steps to prepare your X75HD/X75SD models for remote control:

1. Using an LCP, reconfigure each X75HD/X75SD and X75-RCP unit with unique IP addresses and other appropriate network settings, including shared subnet mask addresses.

   See "Setting IP and Subnet Mask Addresses" on page 89 for details.

2. Restart each X75HD/X75SD and X75-RCP unit, and then wait 20 seconds to allow for network detection.

3. Connect all X75HD/X75SD systems and remote panels to a TCP/IP-based network hub or switch using 10/100Base-T Ethernet cable.

   On X75-RCP units, use the **Control** connector; on X75HD/X75SD units with frame-mounted local control panels, use the **Ctrl/Strm** port at the back of the X75HD/X75SD unit.

4. Discover all units found on the network, and then select the one you wish to control. See "Selecting a Remote Unit to Control" on page 96 below for details.

Selecting a Remote Unit to Control

Note

If the network settings are not configured properly (either on the RCP or individual X75HD/X75SD units), the units may not be detected. Confirm all network settings, if required.

You can remotely control all X75HD/X75SD systems that share the same subnet, using an X75-RCP panel or a frame-mounted local control panel. Both examples of remote control are described in the sections that follow.

Using an X75-RCP for Remote Operation

Note

Instead of IP addresses, you can give alphabetical names to individual X75HD/X75SD units that will appear in the list To create an alphabetical name for an X75 unit (for example, **Studio_B**), follow this path: **System Config>Setup> Machine Name**. Use the scroll knob and the **Enter** button to create the name. When you have reached the end of the name, press **Enter**.

Follow these steps to select and control a detected X75HD/X75SD over the network:

1. Ensure all connections and network settings have been made.
2. On the X75-RCP, press the **Remote** button to bring up a list of available units for control (see Figure 5-3).

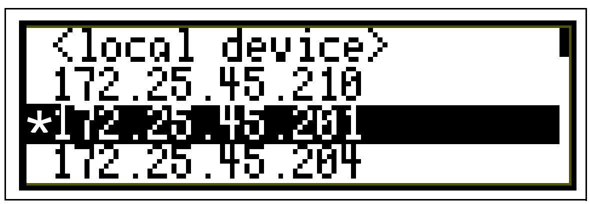


Figure 5-3. List of Systems Available for Remote Control

The **<local device>** option shown on-screen represents the unit you are using (the local unit that is in front of you), and is always available on this list. An asterisk (*) beside the name indicates that this is the remote system currently being controlled by the panel.

3. Use the control knob to scroll through the list of available X75HD/X75SD devices, highlight the unit you wish to control, and then press **Enter**.

   The X75-RCP screen reads **Connecting...**

4. Wait a few moments.

   The menu of the selected X75HD/X75SD unit appears along with all of that unit's settings.

5. Operate the selected unit as required.

   Once a unit is selected for remote control, all front panel features operate as if you were actually at the front panel of the selected remote unit. This means that the VFD panel, status indicators, and buttons (with the exception of the **Remote** and **Option** button) all control and/or reflect the status of the remote unit, *not* the one you are physically operating.

6. To switch to another unit, or to control the local device you are physically operating, click **Remote**, and then select a new device to control.

7. Select **<local device>** to resume normal single-unit operation.

Note

The light on the **Remote** button flashes while the unit is remotely controlling a device.

Using a Frame-Mounted Local Control Panel for Remote Operation

After ensuring that all connections and network settings have been made, you can also remotely control X75HD/X75SD units that are on the network using a frame-mounted local control panel. To do this, click **Remote** on the LCP to enter Remote mode, and to view the list of X75HD/X75SD units available for control on the same subnet. The procedure remains the same for selecting and operating devices remotely via the LCP, as it does for the X75-RCP.

Configuring for HTTP Control via Web Browser

Once the networking parameters of the X75HD/X75SD have been configured appropriately, and it is connected to the Ethernet network, the built-in Web server allows a standard Web browser to control the X75HD/X75SD unit. Before controlling your unit in this way, note the following system and browser requirements:

- The X75HD/X75SD supports Web browsers that are compatible with HTML 4.0 (and later).
- Although most standard Web browsers can be used with the X75HD/X75SD for HTTP control, the following browsers have been tested and approved by Leitch: Microsoft® Internet Explorer 6.0, Netscape® Navigator™ 7.2, and Mozilla® Firefox™ 1.0.

Procedure

To select a unit for control, follow these steps:

1. Ensure all required connections and network settings have been made locally on your X75HD/X75SD unit(s).
2. Open a supported Web browser, and then type the IP address of the unit you wish to control into the **Address**, **Location**, or **URL** field of your Web browser (the name of the field depends on the Web browser you are using). For example, type the following to control an X75HD/X75SD unit with this IP address:

   ```
   http://192.168.100.250
   ```

   The Web browser then displays the Home page of the X75HD/X75SD Control interface (Web server).

See “Chapter 7: Web Server Software Control” on page 129 for more information.

Note

Web browser control is only available for X75HD/X75SD units, and not for X75-RCP panels.

Configuring for CCS Software Control

The Windows-based CCS software applications, such as Pilot and Navigator, provide control of the X75HD/X75SD via a Windows-based PC and enables you to accomplish these tasks:

- Discover remote CCS devices dynamically on your CCS network without knowing their IP addresses
- Build custom hierarchical views of the distributed network for each network user, using icons, colored text, and other visual information
- Design, model, and test your CCS system
- Set up user accounts and groups with different access rights to CCS devices and their control parameters
- Centrally navigate, control, and monitor CCS devices over a local- or wide-area network
- Set alarms to signal visual, auditory, or e-mail alerts when CCS devices go off-line or malfunction
- Transfer software upgrades to CCS devices
- Diagnose and correct problems with the CCS network or devices
- Monitor the integrity of video signals throughout a facility

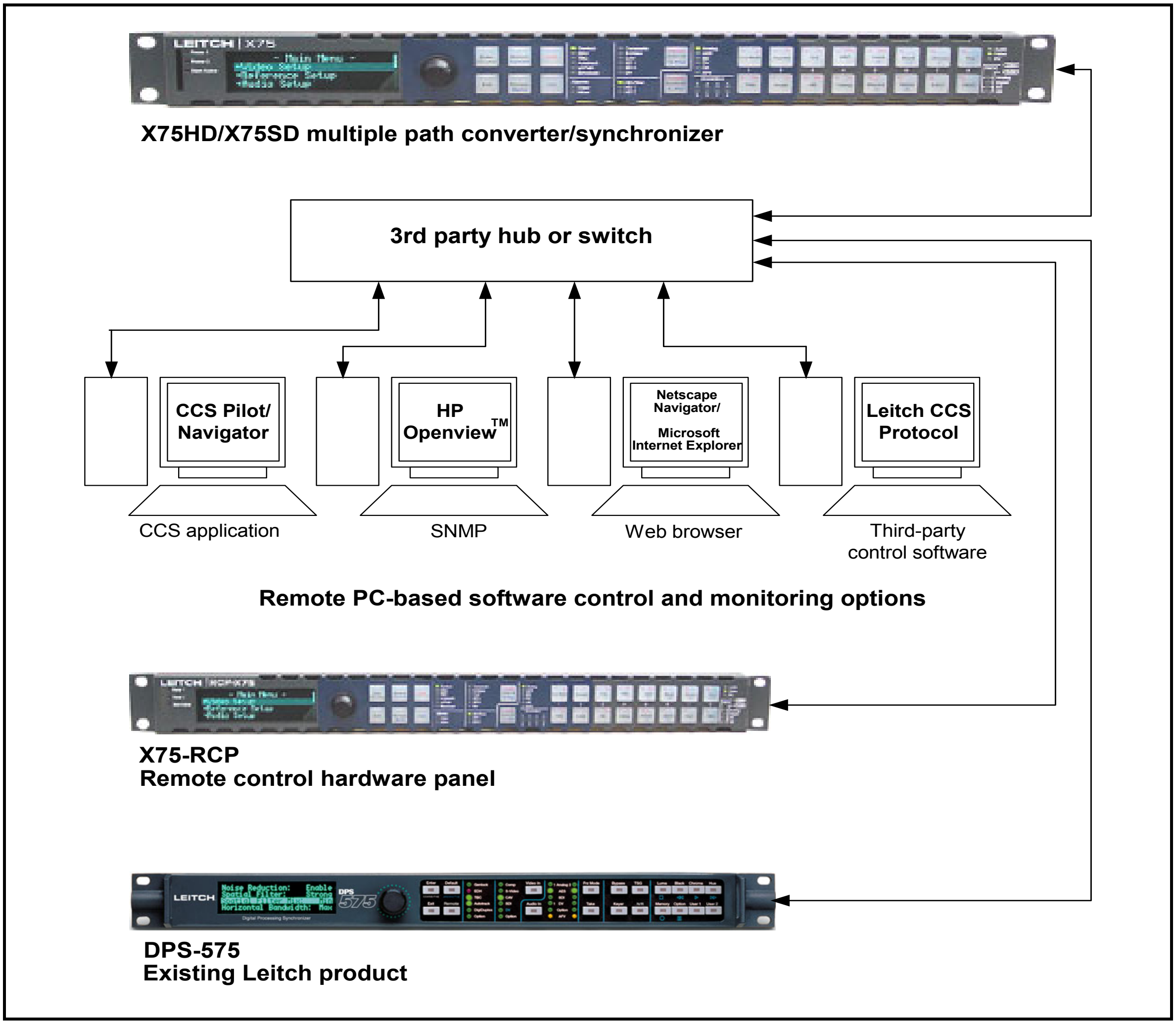


Figure 5-4. Network Configuration Diagram

Configuring for SNMP and Third-Party Software Control

SNMP is an industry-standard protocol that allows other (non-Leitch) control software to remotely monitor and control X75HD/X75SD units. Leitch provides a MIB file that you can download off the Leitch Web site for this purpose. The file defines the parameters of the X75HD/X75SD, and is required for third-party software control.

See “Configuring SNMP Support” on page 311 for details.

Processing Modes

General Information

Note

If you are missing certain option modules, the corresponding outputs will not be available.

Video M-Path configuration is performed on the following groups of video outputs:

- Analog (includes five analog output types: composite, CAV (Y, B-Y, R-Y), S-video, RGB, Aux-composite)
- HD (with various options, such as HD 1, HD 2, HD-Fiber, and DVI/HD)
- SD-SDI 1
- SD-SDI 2
- StrV (streaming video

These output groupings are used for configuration purposes. You can individually set each of these output groups to accept a specific input source. In addition, there are four special routable blocks in the SDTV video configuration path that may be included in the input path for any input signal.

Alternatively, you can use the **AllOutSelect** parameter to select an input source for all output groups simultaneously. Table 5-1 summarizes the video output groups and available input sources.

Table 5-1. Video Output Groups and Available Video Input Sources

Output Groups	Physical Outputs Forming Part of this Output Group	Input Source to Assign to Each Output Group
• Analog • HD • SD 1 • SD 2 • StrV	• Composite, CAV, S-Video, Aux, RGB • HD 1, HD 2, HD Fiber, DVI • SDI 1 • SDI 2 • Streaming and future-use DV	• Composite • S-Video • CAV • SD 1 • SD 2 • DV (future use) • HD Fiber • HD 1 • HD 2

Input Video Modes

Note

If you make manual changes to the input/output paths, **Auto Detect** mode will automatically revert to **M-Path (User)** mode.

Note

Precedence levels that can be assigned include **Highest**, **High**, **Normal**, **Low**, and **Lowest**. (For example, if the X75HD/X75SD unit detects two input signals, it will accept an HD signal tagged **Higher** over an SD-SDI signal that is tagged **Normal**.) See "Selecting a Video Source" on page 105 for more information.

The **Input Video Mode** for manual configuration is **M-Path (User)**. In this mode you assign input sources to each output group. However, if you set the **Input Video Mode** to **Auto Detect**, the X75HD/X75SD system will automatically detect the incoming input signal(s) and then send it to all output groups.

In the default **Auto Detect** mode, the X75HD/X75SD senses the presence of valid input signals, and then processes them to all outputs. This mode is a useful redundancy feature: If one input signal disappears, the X75HD/X75SD will automatically switch to **AllOutSelect** control, and will process whatever input is detected and send it to all outputs. If the X75HD/X75SD detects more than one valid input, it will refer to the precedence order set by you in the **Auto Detect Setup** submenu, or it will apply the default priority order.

A third input video mode is **Simulcast Enable**. In this mode you can assign two different input sources to selected output groups for the purpose of switching between the sources. In most instances, you would use a GPI control to switch between the selected input sources at the required time. When you change an input source, the **AllOutSelect** control also changes the output mappings accordingly.

Configuration Exceptions and Further Information

There are a few exceptions to the input source/output group mapping process described in the previous sections, including the following:

- "Mutually Exclusive Inputs"
- "AllOutSelect Limitations"
- "SD-ARC Limitation"
- "Strobe or Film Mode and Closed Captioning"

Mutually Exclusive Inputs

Several input settings are mutually exclusive. For example, the back of the X75HD/X75SD allows for up to three HD input sources; however, only one of these input sources can be accepted at a time. In this example, all output groups must be set to the same HD input type, *not* to three different input types. If you attempt to map different HD inputs to various output groups, only the last setting you make will apply. Previous HD input mappings will change to reflect the last setting.

This scenario of mutually exclusive HD inputs also applies to the following input types:

- SDI 2 and future-use DV
- Analog (Composite, CAV, and S-video)

These groupings are not independent inputs. Only one input type in each of these groups can be selected for each output group.

AllOutSelect Limitations

The **AllOutSelect** control lists all available input sources. But in cases where you have manually assigned different input sources to various output groups, **AllOutSelect** will not able to reflect a single input type. Instead, **M-Path** control becomes selected.

As soon as you manually configure any of the **M-Path** menu output groups, **AllOutSelect** control will change over to the **M-Path** control.

Note that if you change **AllOutSelect** to a single input type, and you return to **AllOutSelect** control, all manual changes done previously during **M-Path** configuration will be overridden.

SD-ARC Limitation

When SD-ARC selects one of the standard definition inputs, it uses the data path from the main board to the HD board for SD aspect ratio conversion. The same data path is also used for the up-conversion. Due to this limitation, when the HD-output selects any one of the standard definition inputs, the software also changes the SD-ARC source selection.

Strobe or Film Mode and Closed Captioning

The SDTV Strobe or Film mode does not support the passing of the closed captioning data to the outputs, as this process does not guarantee the continuation of the metadata.

Configuring Video

Selecting a Video Source

Note

If you press the **Video In** button and then manually select a video source, the X75HD/X75SD unit reverts to **User-Select** mode. Video modes are found under **Routing Setup**>**Input Video Mode**.

X75HD/X75SD units are shipped with **Auto Detect** video mode as the factory default setting. This mode sets the X75HD/X75SD to automatically detect composite, S-video, CAV, SD-SDI 1, SD-SDI 2, future-use DV, HD-SDI Fiber, HD-SDI 1, and/or HD-SDI 2 inputs. When video is connected to any of these inputs, the X75HD/X75SD automatically selects the applied input video and then sends out the converted video to all outputs. The **Video Input** LEDs on the front panel show the selected video source. For information on certain exceptions and limitations applied to video source selection, see "Mutually Exclusive Inputs" on page 103.

For analog video sources, only a single video source can be automatically detected. Therefore, you must pre-select the desired analog input video source first in order for auto-detection to work across the HD-SDI/SD-SDI/analog inputs.

To change the input signal type, follow these steps:

1. Press **Video In** on the control panel, or navigate to the **Video Setup>Routing Setup** menu and then select **AllOutSelect**).

   All available inputs will display on the control panel screen.

2. Using the control panel knob, scroll through the list of input types, and then press to **Enter** to select one.

When multiple video sources are connected, the **Auto Detect Setup** menu determines the selection of the input video. For example, if the X75HD/X75SD unit detects two input signals, it will accept the signal tagged as **Higher** over another lower-precedence signal. Found in the top-level **Video Setup>Routing Setup** menu, precedence levels include **Highest**, **High**, **Normal**, **Low**, and **Lowest**. When multiple input types are present and assigned the same precedence level, the X75HD/X75SD uses the following default ordering:

1. Analog video input
2. SD-SDI 1 input
3. SD-SDI 2/DV input
4. HD-SDI 1/HD-SDI Fiber input
5. HD-SDI 2 input

Using the **Video Switch Delay** parameter in the **Video Setup>Routing Setup>Auto Detect Setup** menu, you can enter the delay value in seconds to prevent inadvertent switching of the input video sources. Figure 5-5 graphically illustrates a single-source signal process, where one selected video input is fed to all outputs.

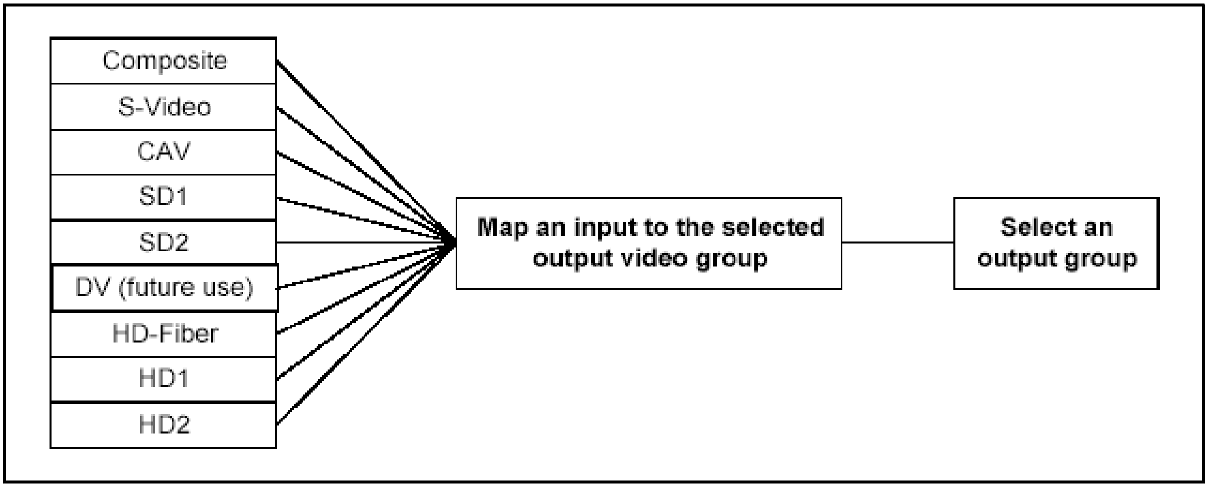


Figure 5-5. Single Source Processing

Adjusting Video Levels

Various control panel buttons provide quick access to the video processing parameters of a selected video source. Simply press a button and use the control knob to change the selection. For more information on configuring video, see "Video Configuration" on page 143.

For more information on using a local or remote control panel, see "Chapter 6: Operation via Front Panel Controls" on page 115 or refer to the *Control Panels for X75 Systems Installation and Operation Manual*.

Configuring Audio

This section briefly describes how to select a single audio source and how to quickly adjust audio levels. For more information about audio configuration, see "Audio Configuration" on page 151.

For more information on using a local or remote control panel, see "Operation via Front Panel Controls" on page 115 or refer to the *Control Panels for X75 Systems Installation and Operation Manual*.

Selecting an Audio Source

Directly press the **Audio In** button to select any *one* set of audio inputs to be sent out to *all* audio multiple output sets. The LEDs to the top, right side of this button indicate which input is currently selected.

Adjusting Audio Levels

When a single audio source is selected and sent to all outputs, press the **Ctrl** and **A. Proc** buttons to quickly access the audio level controls of the selected audio input.

The selected audio input channels' gain controls are mapped to the numbered buttons on the control panel accordingly. The mapped buttons will illuminate during audio proc control. The **Audio Proc** LEDs on the lower, right corner of the front panel indicate which processing block is currently selected.

Tracking and Delaying Audio

Each audio sample rate converter (SRC) can be configured to automatically track the processing delay of one of the video outputs. To apply the internal audio tracking feature, follow this path: **Audio Setup>Global Audio Config>I/O Delay Config**. Select one of the four or eight **I/O Delay SRC**s, and then select the accompanying video signal to track with that audio SRC.

Configuring the GPI

The GPI inputs are internally pulled HIGH. External contact closure to ground will trigger the assigned function set by the user.

In the **System Config>Setup** menu, the two **GPI-1 Function** and **GPI-2 Function** parameters allow the selection of pre-defined or user assigned GPI functions:

- Disabled—No action will be taken
- Freeze—Will freeze all the internal frame synchronizers memory
- Simulcast A/B—Switches between simulcast video source A and video source B
- Voice-Over—Ramps down the program audio channels and mixes the voice-over channel to the program audio outputs.
- Fav1— Activates the GPI set parameter in the Favorite list 1.
- Fav2—Activates the GPI set parameter in the Favorite list 2.

For instructions on how to add a parameter and assign it as a GPI input in a Favorites list, see “Using the FAV1 and FAV2 Function” on page 176.

Configuring an X75OPT-A3D-1 Module

Note

The X75OPT-A3D-1 module requires version 1.4 or higher software installed on the X75HD/X75SD unit.

The X75OPT-A3D-1 module is similar to the X75OPT-A3D, but uses an alternate color decoder algorithm. Typically, these modules are factory installed. However, if you add a new X75OPT-A3D-1 to an existing X75HD/X75SD unit, or if the module is moved from one X75 unit to another, the module must be reconfigured.

Follow these steps to configure the X75OPT-A3D-1 module:

1. Turn the X75 power on while simultaneously holding the SHIFT + CTRL buttons.
2. When the Leitch logo appears on the display screen, release the buttons.

   The factory calibration mode is now enabled.
3. Follow this parameter path: **System Config>Calibration>Analog Input (A3D)>Ext Notch Filter>Enable.**
4. Press the **Exit** button twice.
5. Select **Save Cal**, and then select **Yes.**

   The X75OPT-A3D-1 module is now functional. To make the version change visible in the **Status/Version Info** menu, you must first reboot the X75HD/X75SD unit.

Launching QuickTime Player for Streaming Video

Using the X75OPT-STR streaming option, you can play streaming video in a **Graphical Navigation** window of CCS Navigator.

You can also view the streaming video separately, without CCS Navigator. In either case, you must have QuickTime Player version 7.0 or later installed on your PC. See page 65 for more information.

CCS Navigator Streaming Installation

To add a button to launch streaming video using CCS Navigator, follow these steps:

1. With Navigator in Build mode, place a button on a **Graphical Navigator** page.

   For information on creating buttons, see your CCS Pilot/Navigator manual or online help.

2. Right-click on the button and then select **Properties...** from the menu that appears.

   The **Object Properties** dialog box opens.

3. Select the **Rules** tab, and then click the **New Rule** button.

   A new line appears in the **Rules** table.

4. In the new rule's **Event** list, select **OnMouseClick**.

   The default **Condition** setting for this event is **Always**; you can leave that as it is, or you can change it by clicking the **Condition** button. See "Defining Conditions" in your CCS Pilot/Navigator manual or online help for information on completing the **Condition** dialog box.

5. From the new rule's **Action** list, select **Launch Application**.
6. Click the **Action Properties** button.

   The **Action Property** dialog box opens.

7. Enter the following information in the **Action Property** dialog box:
   - **Command**: c:\program files\quicktime\quicktimeplayer.exe
   - **Arguments**: rtsp://172.25.101.101:554/x75streaming
   - **Initial Directory:** leave field blank

8. Click **OK** to close the **Action Properties** dialog box, and then close the **Object Properties** window.

   When you enter Control mode, the new button will open a QuickTime Player and play streaming video from the X75HD/X75SD.

Section II—Operation

This section contains the following topics:

- "Operation via Front Panel Controls" on page 115
- "Web Server Software Control" on page 129
- "Video Configuration" on page 143
- "Audio Configuration" on page 151
- "Special Function Buttons" on page 163

Chapter 6

Operation via Front Panel Controls

Overview

This chapter describes the main areas of the front panel, and provides the following general descriptions:

- "Front Panel Description" on page 116
- "Using the Control Knob and Menu Control Buttons" on page 117
- "Getting Visual Feedback: Status and Alarm LEDs" on page 122
- "Video Input LEDs" on page 126
- "Audio Input LEDs" on page 126
- "Control Mode Status LEDs" on page 127

This chapter does *not* give specific descriptions about available menus, submenus, parameters, or options. See the *X75HD Control Options* html file available from the Leitch Web site at www.leitch.com or on the accompanying X75HD/X75SD CD.

Detailed information on using front panel controls can be found in the *Control Panels for X75 Systems Installation and Operation Manual*. Some limited control information (such as information on video and audio proc amp status LEDs, and audio proc amp channel mappings) can be found in the following chapters:

- "Video Configuration" on page 143
- "Audio Configuration" on page 151
- "Special Function Buttons" on page 163

Front Panel Description

The front panel (Figure 6-1) is divided into several areas for control and monitoring, including the following:

- VFD screen for viewing menu options, selections, feedback, and device information

  Changes to the display intensity and screen saver functionality can be made within the **Setup** submenu (press the **Option** button) in order to prolong the life of the VFD

- Control knob and buttons for scrolling, selecting, and setting menu options

  The push and turn shaft encoder (knob) is used for menu navigation and selection, and for coarse and fine parameter adjustment; the knob direction can be changed to your preference from within the **Setup** submenu (press the **Option** button)

- Programmable and device-dedicated control buttons
- Status and alarm LEDs for monitoring the current mode and operating conditions of the unit

Information about each of these areas is available in this chapter.

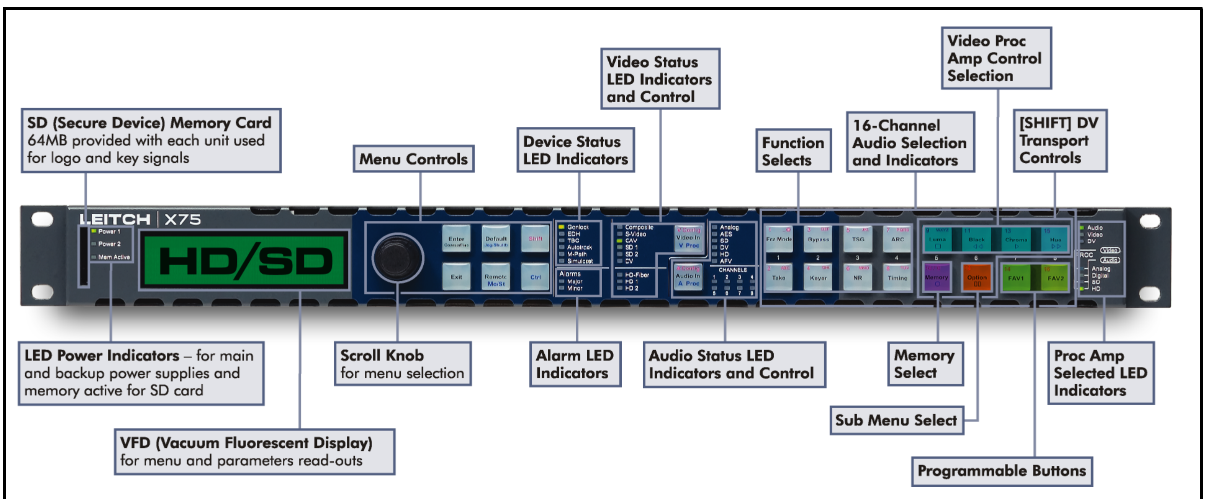


Figure 6-1. X75HD/X75SD Front Panel

Using the Control Knob and Menu Control Buttons

All menus and device settings for the X75HD/X75SD can be selected and configured by using the control knob and menu control buttons. Figure 6-2 shows the location of the control knob and various menu control buttons on the device. Use these items to open and navigate menus, scroll through and select options, and adjust various parameters and settings.

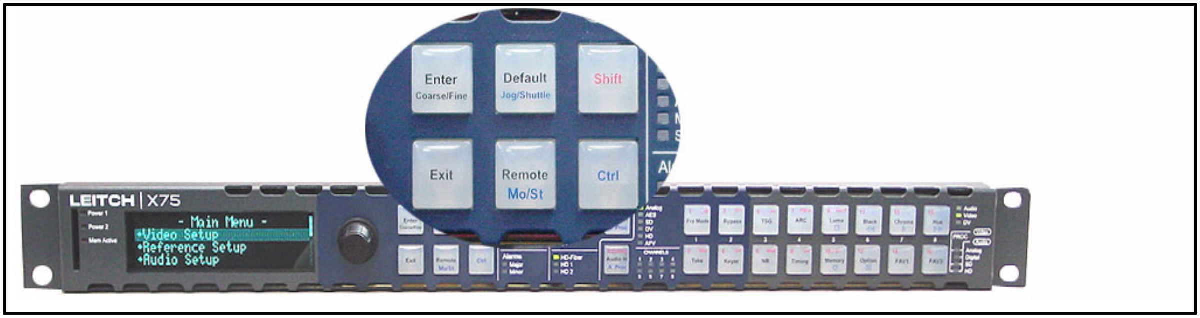


Figure 6-2. Control Knob and Menu Control Area

Setting the Direction of the Control Knob

If desired, you can change the direction of the control knob. To do this, press the **Option** button, open the **Setup** menu, and then select the **Shaft Direction** parameter.

Set the direction of the knob to either **Clockwise = Up** or **Clockwise = Down**.

Using Multi-Function Buttons

Many of the buttons on the X75HD/X75SD control panel are multi-functional, and can have up to three functions assigned to them. To select a certain function from a multi-function button, perform one of the following steps:

- Press the desired multi-function button. The assigned default function is written in *black* text on the button face, either near the top or in the middle of the button.
- Press **Shift** and the desired multi-function button simultaneously. The assigned function is written in *red* text on the button face near the top of the button.
- Press **Ctrl** and the desired multi-function button simultaneously. The assigned function is written in *blue* text on the button face near the bottom of the button.

For more information on front panel buttons, see the *Control Panels for X75 Systems Installation and Operation Manual*.

Navigating Through the Menus

There are eight main menu items available. Each of them open up into several layers of submenus and parameter options that you can scroll through and edit as required. Table 6-1 briefly describes each of the eight main menu items.

Table 6-1. Main Menu Items

Menu Name	Menu Description
Video Setup	Configures and controls the video settings
Audio Setup	Configures and controls the unit’s audio settings
Reference Setup	Configures and controls the genlock and other reference settings
System Config	Configures settings of the initial setup parameters
Global Frame Rate	Sets the unit’s frame rate per second
SD Operating Standard	Provides a read-only view of the selected or detected SD-SDI operating standard
HD Output Standard	Provides a read-only view of the selected HD-SDI operating standard

Procedure

To navigate through the menus of an active X75HD/X75SD system, follow these steps:

1. With the X75HD/X75SD **Main** menu displayed, rotate the control knob to scroll through the menu items.
2. Press **Enter** to open a selected submenu.
3. Scroll through the options and parameters using the control knob, and then press **Enter** to make a selection.

   See “Changing Parameters” on page 120 for more information.
4. Press **Exit** to go back a step in the menu structure.

Changing Parameters

Once you have selected an option from a particular menu or submenu, use the control knob on the front panel to set the new value for the parameter by following the methods described below.

Alternatively, you can use the X75-RCP to remotely control the X75HD/X75SD. See "Configuring Network Settings" on page 88 and "Remotely Controlling X75HD/X75SD Systems" on page 95 for more information on configuring the X75HD/X75SD for remote control.

Setting Discrete Options

The control knob cycles through discrete parameter and value options (such as **Auto**, **On**, **Off**). Depending on the parameter type, it will either wrap or clip when the control knob reaches the end of the option list.

- A wrapping parameter returns to the beginning of its range/list of options after you have scrolled through all of them.
- A clipping parameter requires you to scroll back through the range/list of options to return to the beginning of the list.

Procedure

To set a discrete parameter option, follow these general steps:

1. Navigate to the required menu or submenu, and select a parameter.
2. Highlight a parameter with the control knob, and then press **Enter**.
3. Press **Exit** to accept your new value and return to the previous menu or submenu.

   Selected settings affect the output immediately.

Setting a Numeric Value

For parameters that have a numerical range of values, the VFD panel shows both a numeric and a visual representation of the range. Figure 6-3 shows this representation.

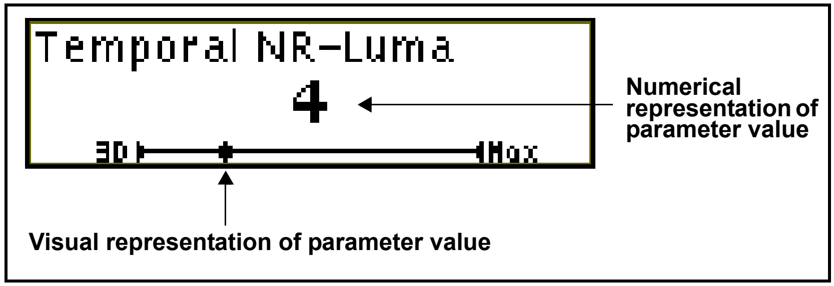


Figure 6-3. VFD Showing Numerical Range of Values

To set a parameter with a numerical value, follow these general steps:

1. Navigate to the required menu or submenu, and then select a parameter.
2. Change to **Coarse** adjustment mode if required (**Fine** mode is the default mode when you first enter a parameter adjustment screen).

   As an example, you can use the control knob to either adjust a value in increments of 0.02 (**Fine** mode) or 0.50 (**Coarse** mode).

   a. Press **Enter** to switch to **Coarse** mode where you can make large adjustments more quickly.

      When in Coarse mode, the **Enter** button lights up.

   b. Press **Enter** again to return to Fine mode.
3. Use the control knob to select a new value, and then press **Enter** to set it.

   Selected settings affect the output immediately.
4. To reset the parameter to its default value, press **Default** on the front panel.

   The **Default** LED lights up whenever the current value of the parameter is equivalent to the default value (whether you reached this value by pressing the **Default** button, or by scrolling to it with the control knob).
5. Press **Exit** to accept your new value and return to the previous menu or submenu.

Getting Visual Feedback: Status and Alarm LEDs

The status and alarm LEDs provide visual feedback on the current mode and operating conditions of the unit. These LEDs are located together in the center of the panels, as shown in Figure 6-4.

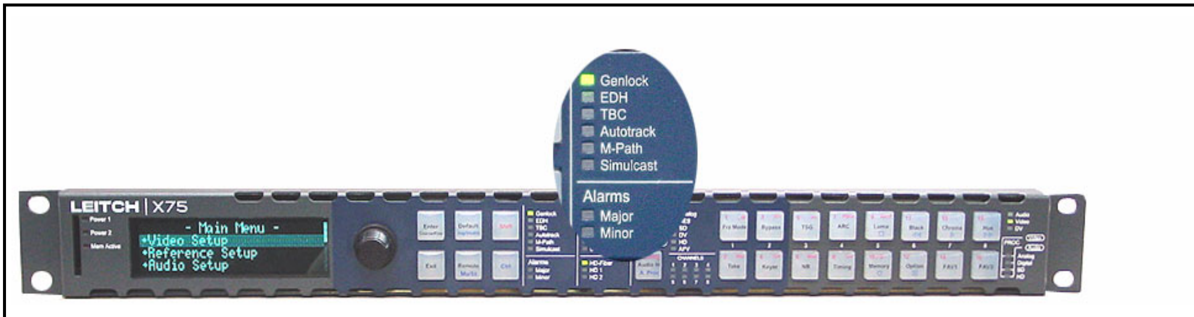


Figure 6-4. Status LED Area

Genlock Status LED

The **Genlock** LED indicates the current status of the external genlock source.

Table 6-2. Genlock LED Status Definitions

LED Status	Operating Condition
On	The control panel is configured to Auto Genlock and a stable genlock source is detected.
Off	Genlock is not selected.
Flashing	The genlock source is not stable or is missing.

EDH Status LED

The **EDH** LED indicates the current configuration and status of Error Detection Handling (EDH) in the input standard serial digital video stream. The EDH LED receives both SD-SDI 1 and HD-SDI 2 inputs for status reporting.

Table 6-3. EDH LED Status Definitions

LED Status	Operating Condition
On	The EDH feature is monitoring incoming video from both SD-SDI inputs.
Off	The EDH feature is turned off.
Flashing	EDH detection is enabled and EDH errors have been detected, or the incoming SDI feed does not include EDH. For an EDH error count and other related information, follow this path: **Video Setup>SD1 or SD2 Input>EDH**.

TBC Status LED

The **TBC** LED indicates whether or not the composite input signal is timebase-corrected by the unit's TBC circuitry.

Table 6-4. TBC LED Definitions

LED Status	Operating Condition
On	The internal time base corrector is operating and correcting the input signal, usually for heterodyned signals from sources such as a VTR.
Off	The internal time base corrector is not active (the unit may be in Sync mode).

Autotrack Status LED

The **Autotrack** LED indicates whether or not the audio Auto Track mode is enabled. You can independently set each audio synchronizer to track the selected output video channel to auto compensate the propagation delay introduced in the processed video path. Also, you can add the additional delay with the Audio Delay controls. Follow this path: **Audio Setup>Input Setup>Delay**

Table 6-5. Autotrack LED Definitions

LED Status	Operating Condition
On	Any one of the **I/O Delay SRC#** parameters in **Audio Setup>Global Audio Config>I/O Delay Config** is set to an option that is other than **None**.
Off	The audio delay feature is turned off.

M-Path Status LED

The **M-Path** LED indicates whether or not the unit is in M-Path mode. If the **M-Path** LED is not lit, the Simulcast mode is in effect.

Table 6-6. Digi-Triplex LED Definitions

LED Status	Operating Condition
On	The M-Path mode is enabled (one or more input signals are selected and routed to the outputs).
Off	The M-Path mode is not enabled.

Simulcast Status LED

The **Simulcast** LED indicates when the unit is in Simulcast mode. If the **Simulcast** LED is not lit, the M-Path mode is in effect.

Table 6-7. Simulcast LED Definitions

LED Status	Operating Condition
On	The Simulcast mode is enabled.
Off	The Simulcast mode is not enabled.

Major and Minor Alarm LEDs

The **Major** and **Minor Alarm** LEDs are activated from the enabled list of alarms found in the selected frame's parameters. Local and remote control panels only detect alarms that are activated on X75HD/X75SD models that are currently being accessed.

Major alarms appear as red LEDs; minor alarms are amber. See page 323 for a detailed list of all possible alarms.

Table 6-8. Major and Minor Alarm LEDs

LED Status	Operating Condition
On	Alarms are detected.
Off	No alarms are detected.

Mem Active LED

This LED indicates there is activity on the SD card.

Video Input LEDs

Directly press the **Video In** button to select a video source manually and to send out to all outputs. The LEDs to the left side of this button indicate which input is currently selected. The M-Path selection allows any output group to be assigned with the video input sources. When more than one video source is selected and mapped to multiple output groups, the M-Path and corresponding video input source LEDs will light. When the selected input signal is absent, the LED flashes.

See "Video Configuration" on page 143 for more information.

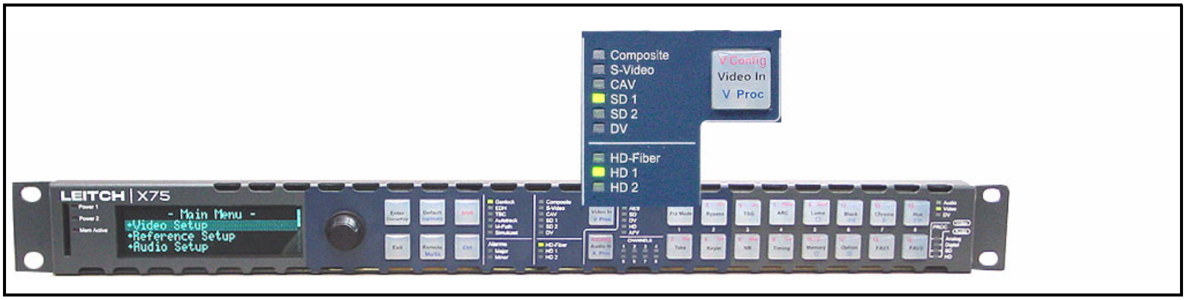


Figure 6-5. Video Input LED Area

Audio Input LEDs

Directly press the **Audio In** button to select any *one* set of audio inputs to be sent out to all multiple audio output sets. The LEDs to the top, right side of this button indicate which input is currently selected. When the selected input signal is absent, the LED flashes.

See "Audio Configuration" on page 151 for more information.

Figure 6-6. Audio Input LED Area

Control Mode Status LEDs

The **Audio**, **Video**, and **DV** LEDs indicate the current focus of control.

- The **Audio** LED lights when an audio parameter adjustment is made.
- The **Video** LED lights when a video parameter adjustment is made.
- The **DV** LED lights when the DV control is enabled.
  (The DV function is reserved for future use.)

Figure 6-7. Control Mode Status LED Area

Chapter 7

Web Server Software Control

Overview

Note

Web browsers do not automatically update when server information changes. As a result, your Web page may contain stale information. Using the **Back** and **Forward** buttons on your browser may also present you with stale data. Before monitoring a device, be sure to click **Refresh** on your browser to get the latest information from the X75HD/X75SD server.

Once the networking parameters of the X75HD/X75SD have been configured appropriately, and it is connected to the Ethernet network, you can control the unit through standard Web browsing software (for example, Microsoft® Internet Explorer 6.0, Netscape® Navigator™ 7.2, or Mozilla® Firefox™ 1.0). See "Configuring for HTTP Control via Web Browser" on page 98 for more information.

Controlling the X75HD/X75SD remotely from your PC through a standard Web browser gives you the same options for control and alarm monitoring as other local and remote control methods, without the additional costs of purchasing control panels or specialized software applications. Using a Web browser to control the X75HD/X75SD does not require any special hardware or software.

The following topics are discussed in this chapter:

- "Launching the Web Server Software" on page 130
- "Controlling Devices" on page 131
- "Navigating Menus and Options via the Menu Navigation Tree" on page 137
- "Monitoring Alarms" on page 138
- "Getting Help" on page 141

Launching the Web Server Software

To access the X75HD/X75SD, open a supported Web browser on your computer (supported browsers include Microsoft Internet Explorer 6.0, Netscape Navigator 7.2, and Mozilla Firefox 1.0, among others).

In the **Address**, **Location**, or **URL** field of your Web browser (the name depends on the browser), type `http://` followed by the **IP Address** of the X75HD/X75SD you want to control. For example, if the X75HD/X75SD is configured with the IP Address 10.0.0.1, enter the following location into your Web browser:

```
http://10.0.0.1
```

The Web browser then displays the Home page of the X75HD/X75SD Control interface (hereafter referred to as the "Web server"), as shown in Figure 7-1.

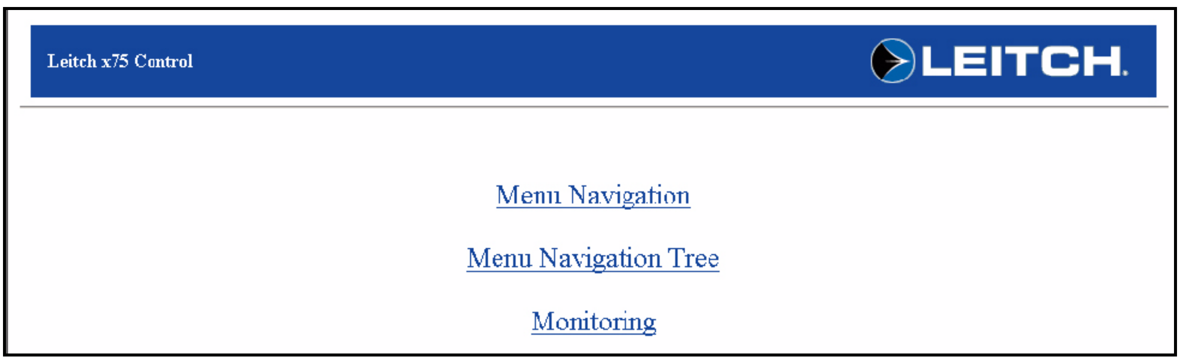


Figure 7-1. X75HD/X75SD Control Home Page for Web Server

The Home page provides three options:

- **Menu Navigation Tree** (see page 131)
- **Menu Navigation** (see page 137)
- **Monitoring** (see page 138)

Click an option to open the desired control page.

Controlling Devices

Click **Menu Navigation** from the Home page to open the **Main** menu page. The **Main** menu page provides access to all available X75HD/X75SD menus and options. These menus mirror those menus that are accessible through the local and remote control panels.

Navigating from the Main Menu Page

The **Main** menu page lists several major submenus through which you can navigate to a required parameter/setting. Click a menu to open the corresponding configuration page. Continue to navigate through the resulting submenus until you reach the desired parameter.

The **Main** menu also has a number of individual parameters that can be set directly from this page. Click a parameter name from the **Main** menu table to change the value; a separate parameter configuration page will open.

Figure 7-2 on page 132 describes the **Main** menu page interface. Figure 7-3 on page 133 illustrates the sequence of pages that results during navigation.

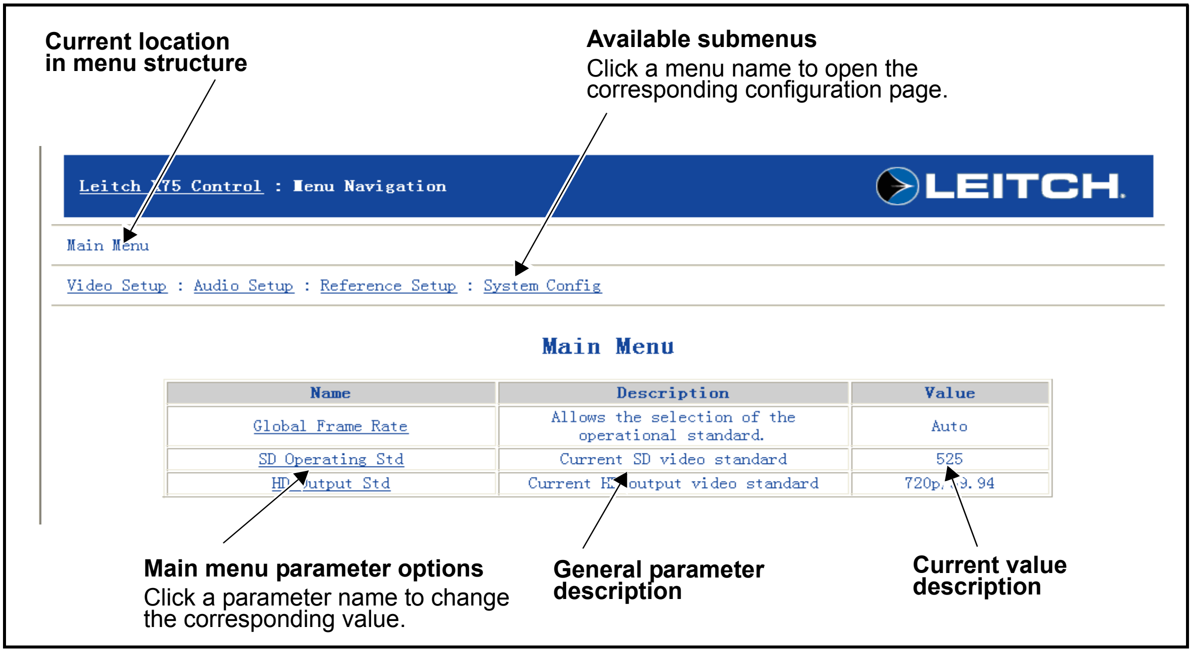


Figure 7-2. Main Menu Page

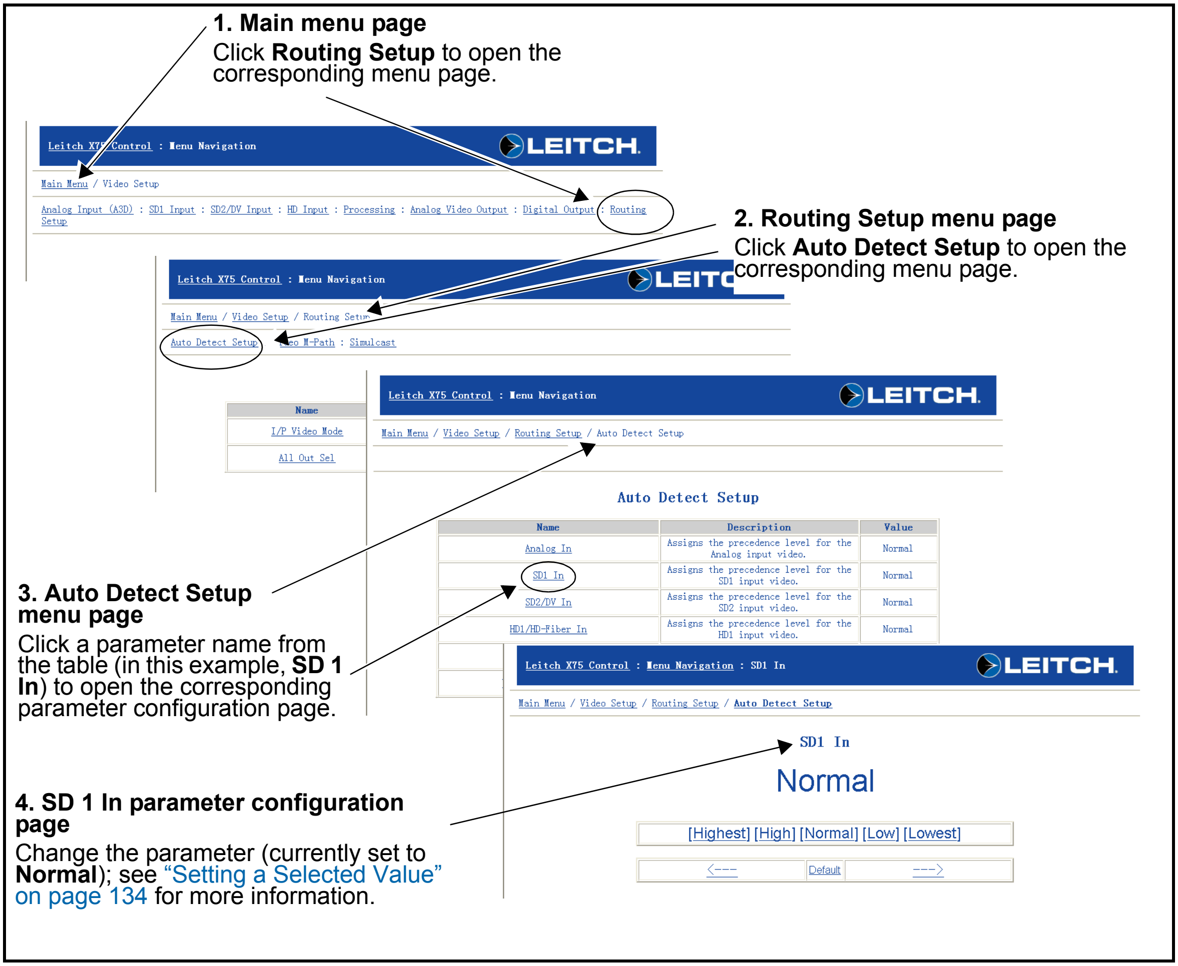


Figure 7-3. Sequence of Pages that Result During Navigation (Example)

Setting a Selected Value

To set a parameter value, navigate through the required menu and submenu structure until you reach the desired option. Click the parameter name from the table to open the corresponding parameter page and to modify its value.

Individual parameter pages show a minimum, maximum, and default value for the selected option. Click a minimum or maximum value, or enter a specific value in the provided text field, to change the parameter setting. Alternatively, you can click the ---> or <--- arrows to increase or decrease the values incrementally, or click **Default** to return the parameter to its factory setting. (See Figure 7-4.)

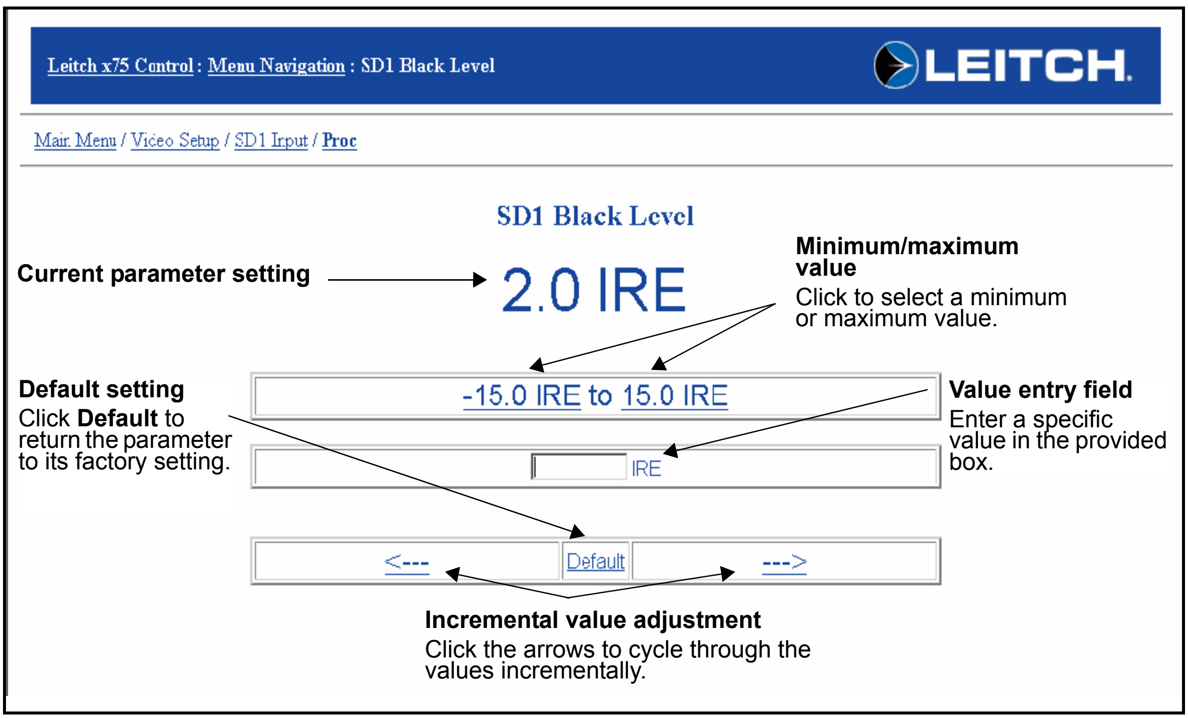


Figure 7-4. Setting a Parameter Value (Range)

For parameter options with discrete values, all of the available values are displayed. Click one of the values to set the option for that value. Alternatively, you can click the ---> or <--- arrows to cycle through the values, or click **Default** to return the parameter to its factory setting. (See Figure 7-5).

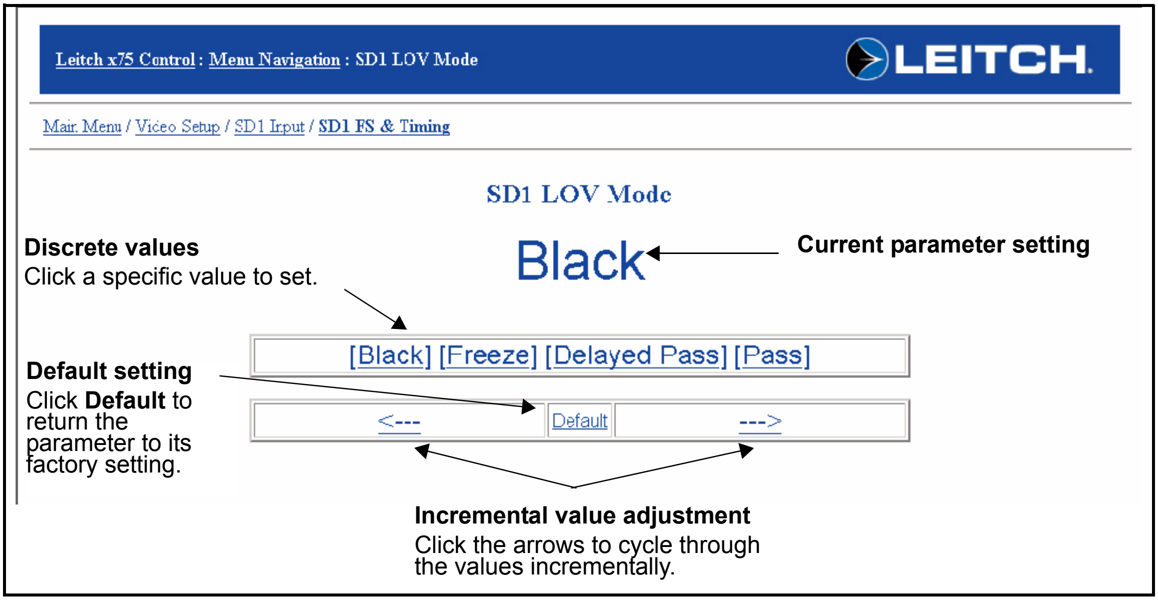


Figure 7-5. Setting a Parameter Value (Discrete)

Note

To ensure that the values shown on your screen are current, be sure to refresh the screen on your browser regularly.

Some parameters show read-only options that cannot be changed. Others may be disabled and unavailable for configuration. (See Figure 7-6 on page 136.) If you require more information about the read-only function, click **Read Only** to open a Help page. The Help page provides general information about read-only and disabled parameters. See “Getting Help” on page 141 for more information.

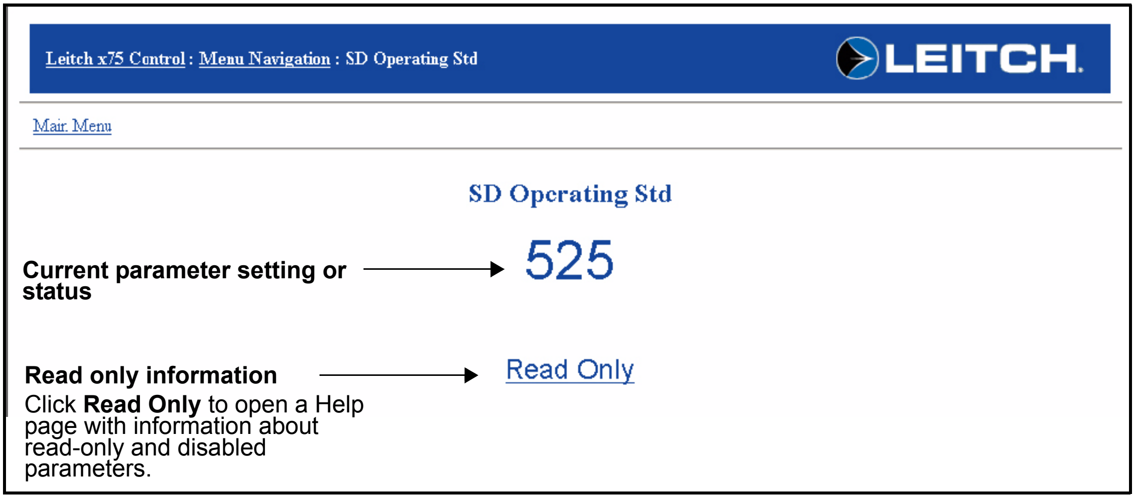


Figure 7-6. Viewing a Read Only Parameter

Navigating Menus and Options via the Menu Navigation Tree

Click **Menu Navigation Tree** from the Home page to present the X75HD/X75SD menu structure for selecting and setting options. These menus mirror the menus that are accessible through the local and remote control panels of the unit.

The menu listings display available menus and submenus. Click any of these to open the corresponding configuration page. Figure 7-7 shows a sample of the **Menu Navigation Tree** page and a resulting configuration page that opens when you click a submenu.

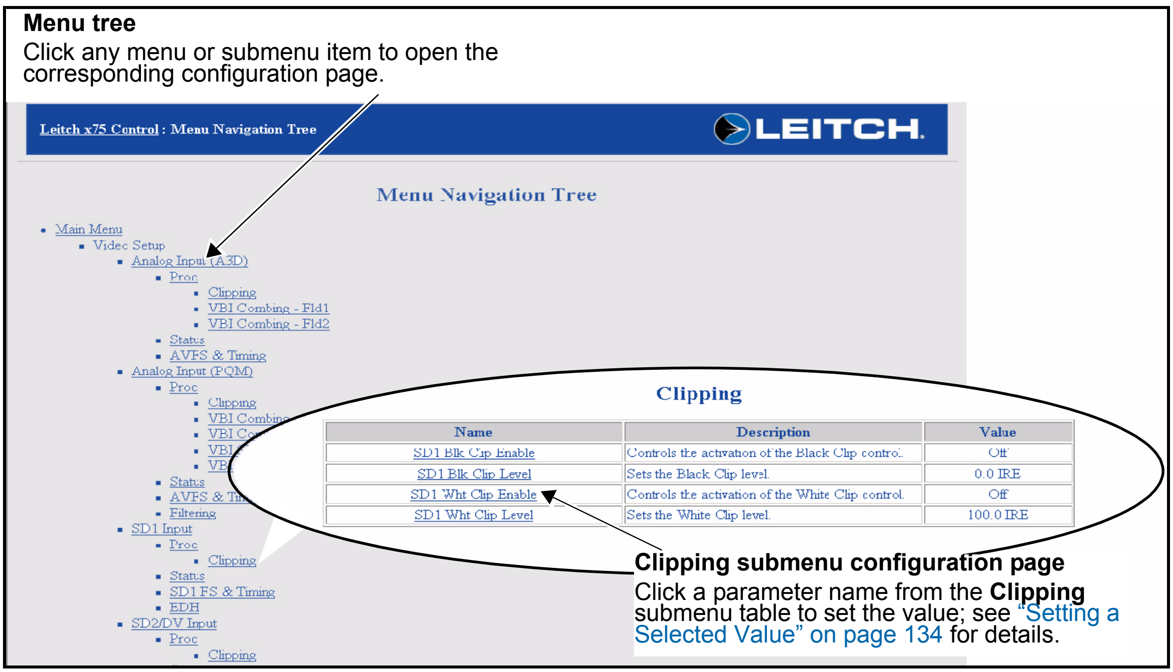


Figure 7-7. Menu Navigation Tree Control Page

Monitoring Alarms

Click **Monitoring** from the Home page to open the **Leitch X75 Alarms** page. On this page, you can view or change the status of the active and disabled alarms (see Figure 7-9 on page 139). For a complete list of all of the possible alarms, see page 323.

Thumbnail Streaming

All X75HD/X75SD units provide a “thumbnail” streaming video output that originates from the **Ctrl/Strm** Ethernet port and is displayed both in the Alarms page of the X75 Web Server and in the Control window of CCS Pilot and Navigator. To activate the streaming in the Web Server, click **Enable Streaming** at the top left corner of the Alarms page (see Figure 7-8).

The frame size of the thumbnail image is 128 x 96 pixels. On the X75HD/X75SD Web server, the default refresh rate is once every 10 seconds, but you can adjust it to a rate of between 5 and 300 seconds. (It can also be turned off entirely.) The control for the refresh rate is located at the bottom of the **Alarms** page.

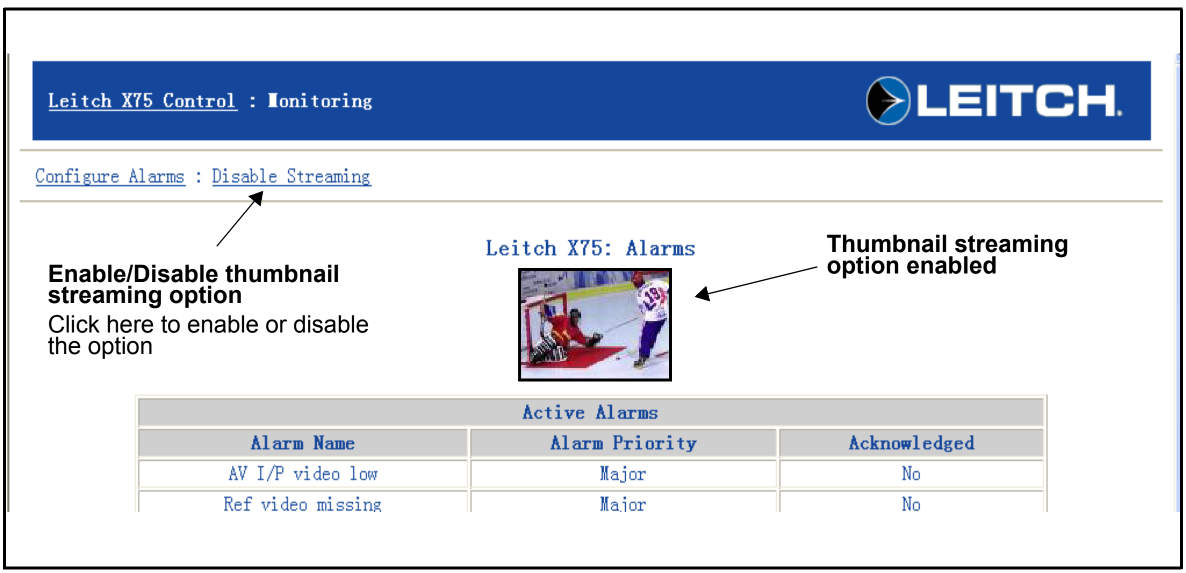


Figure 7-8. *Monitoring Page with Streaming Enabled*

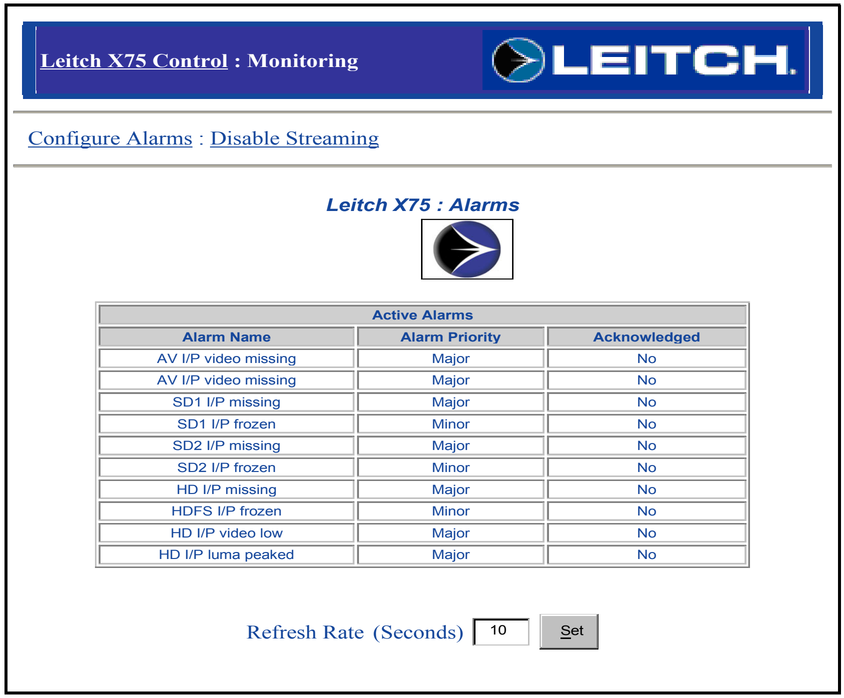


Figure 7-9. Alarm Monitoring Page

Click **Configure Alarms** from the Monitoring page to open up the alarm configuration page (see Figure 7-10 on page 140). The Configure Alarms page allows enabling of the disabled alarms and also can change each alarm's reporting properties.

Click the **Edit** in the **Action** column to change the selected alarm's properties (see Figure 7-11 on page 140).

Leitch X75 Control : Configure Alarms LEITCH.

Monitoring

Leitch X75 : Configure Alarms

Alarm Name	Trigger Time	Clear Time	Alarm Priority	Alarm Disabled	Acknowledged	Action
AV I/P video missing	0.0	0.0	10	No	No	Edit
AV I/P Burst missing	0.0	0.0	8	No	No	Edit
AV I/P not locked	0.0	0.0	8	No	No	Edit
AV I/P frozen	5.0	0.0	4	No	No	Edit
AV I/P video low	5.0	0.0	6	No	No	Edit
AV I/P luma peaked	5.0	0.0	6	No	No	Edit
AV I/P chroma peaked	5.0	0.0	6	No	No	Edit
AV I/P video missing	0.0	0.0	10	No	No	Edit
AV I/P Burst missing	0.0	0.0	8	No	No	Edit
AV I/P not locked	0.0	0.0	8	No	No	Edit

Figure 7-10. Configure Alarms Page

Leitch X75 Control : Configure Alarms LEITCH.

Monitoring

Leitch X75 : Configure Alarms

Alarm Name	Trigger Time	Clear Time	Alarm Priority	Alarm Disabled	Acknowledged	Action
AV I/P video missing	0.0	0.0	10	No	No	Save
AV I/P Burst missing	0.0	0.0	8	No	No	Edit

Figure 7-11. Editing Alarms Page

Getting Help

For certain parameters, help text is provided to answer why a parameter may be disabled or is available only as a “read-only” item. On parameter setting pages where you cannot change the value, click **Read Only** to open the provided Help page. The Help page provides general information about read-only and disabled parameters. See Figure 7-12.

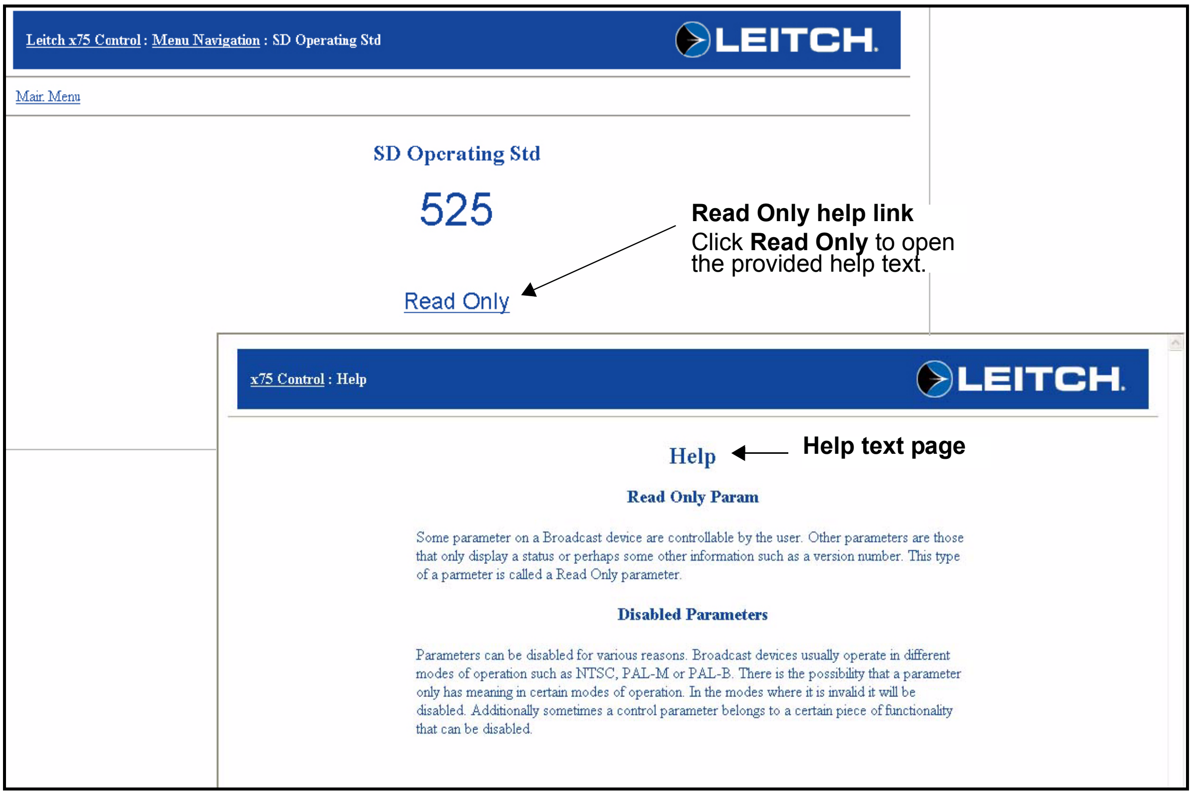


Figure 7-12. Read Only Parameter Sample

Chapter 8

Video Configuration

Overview

This chapter briefly describes the major video configuration options that can be changed in the course of normal operation.

The following topics are found in this chapter:

- "Selecting a Video Source" on page 144
- "Adjusting Video Levels" on page 146
- "Video/Audio Timing Tool" on page 147

See the following for more detailed information:

- *Control Panels for X75 Systems Installation and Operation Manual* for control panel shortcuts to video settings
- *X75HD/X75SD Control Parameter List* HTML document (available for download from either the Leitch Web site at www.leitch.com or from the included *Documentation for X75 Systems and Control Panels* CD) for lists of all available menus and parameter options

Selecting a Video Source

General Information

Note

If you have not installed the appropriate modules, the corresponding sources are not available for selection.

With control panel video shortcuts, you can select an input (or multiple inputs) and immediately send it to all video outputs by pressing the **Video In** button. The LEDs on the left side of this button indicate which input is currently selected. The M-Path (multiple inputs) selection allows any output group to be assigned with the video input sources. When two or more video sources are selected and mapped to multiple output groups, the M-Path and corresponding video input source LEDs will be lit. When the selected input signal is absent, the LED flashes. Available inputs include the following:

- M-Path
- Composite
- S-Video
- CAV
- SD 1
- SD 2
- DV (future use)
- HD Fiber
- HD 1
- HD 2

If the **Auto Detect** feature is enabled when a selected input option is not installed or detected, the panel accepts the next available input. If the selected video signal is absent, the corresponding video input LED flashes.

Procedure

Note

If you press the **Video In** button and then manually select a video source, the X75HD/X75SD unit reverts to **M-Path (User)** mode. Video modes are found under **Video Setup>Routing Setup** > **Input Video Mode**.

X75HD/X75SD units are shipped with **Auto Detect** video mode as the factory default setting. This mode sets the X75HD/X75SD to automatically detect analog, SD-SDI 1, SD-SDI 2, future-use DV, HD-SDI Fiber, HD-SDI 1, HD-SDI 2, composite, and S-video inputs. When video is connected to any of these inputs, the X75HD/X75SD automatically selects the applied input video and then sends out the converted video to all outputs. The **Video Input** LEDs on the front panel show the selected video source.

For analog video sources, only a single video source can be automatically detected. Therefore, you must pre-select the desired analog input video source first in order for auto-detection to work across the HD/SD/analog inputs.

Similarly, you must select HD input sources (HD-SDI 1, HD-SDI 2, and HD-SDI Fiber) and SD-SDI 2 or future-use DV inputs first, for the auto-detection to function.

To change the input signal type, follow these steps:

1. Press **Video In** on the control panel, (or navigate to the **Video Setup>Routing Setup** menu and then select **AllOutSelect**).

   All available inputs will display on the control panel screen.

2. Use the control panel knob to scroll through the list of input types, and then press to **Enter** to select one.

When multiple video sources are connected, the **Auto Detect Setup** setting determines the selection of the input video. For example, if the X75HD/X75SD unit detects two input signals, it will accept the signal tagged as **Higher** over another signal that has been given a lower-precedence. Found in the top-level **Video Setup>Routing Setup** menu, precedence levels include **Highest**, **High**, **Normal**, **Low**, or **Lowest**. When multiple input types are present and assigned the same precedence level, the X75HD/X75SD uses the following default ordering:

1. Analog video input
2. SD1 input
3. SD2/DV input
4. HD1/HD-fiber input
5. HD2 input

Figure 8-1 graphically illustrates a single-source signal process, where one selected video input is fed to all outputs.

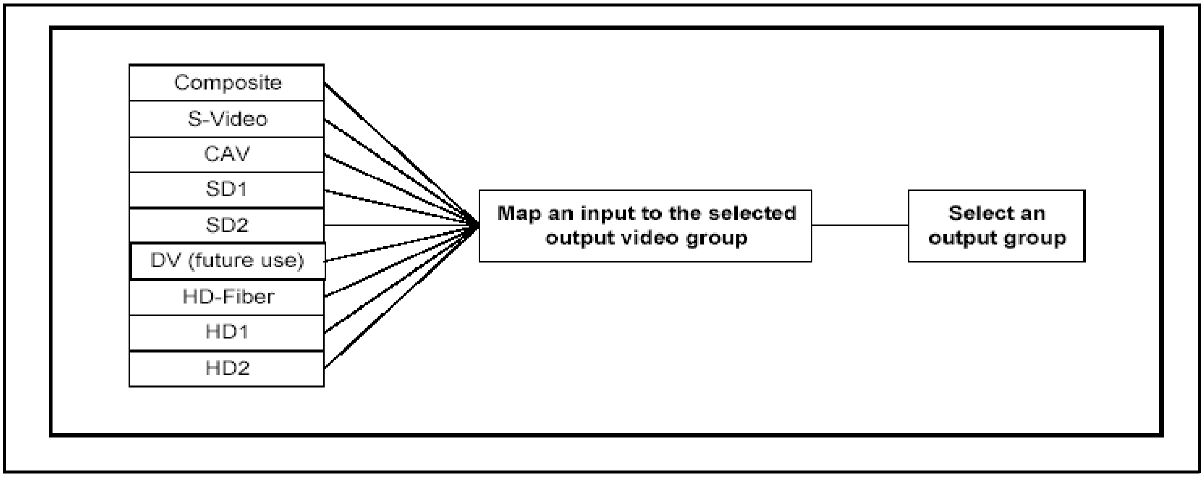


Figure 8-1. Single-Source Processing

Adjusting Video Levels

Various control panel buttons provide quick access to the video processing parameters of a selected video source. Simply press a button and use the control knob to change the selection.

For more details, see "Video Proc Amp" on page 166.

Video/Audio Timing Tool

The X75OPT-V2A video/audio timing tool is a software upgrade that makes it possible to correct lip sync problems that occur during conversions. (The video/audio timing tools consists of a receiver and transmitter; the transmitter is free; the receiver is an optional upgrade requiring a software key.) The V2A enables a receiving X75HD/X75SD to analyze video and audio test signals and then detect any time propagation differences that may occur during the following processes:

- Up-, cross-, and down conversion
- Analog to digital conversion
- Digital to analog conversion
- MPEG coding and decoding

The feature can be enabled to operate manually or automatically. The automatic mode aligns received video and audio signals that are up to 1.3 seconds apart.

Note

CCS versions 3.1.2 and earlier do not reliably distinguish between disabled audio parameters and read-only audio parameters.

A user menu (**Video/Audio Timing**) includes the timing tool's parameters. The menu's parameters perform the following functions:

- Display the time by which each audio channel is leading or lagging the video (either SD1, SD2, HD, and/or analog)
- Enable you to load the currently measured video delays to the audio delay parameters, effectively performing audio/video synchronization

The X75OPT-V2A video/audio timing tool will only insert audio delays, and thus will not account for situations in which the measured audio processing paths (shown in the middle box of Figure 8-2 on page 148) are longer than the video processing paths—even though the tool will be able to display it. If audio is lagging behind the video, the V2A feature can measure the difference, but the user must add the video delay; it cannot be automatically corrected.

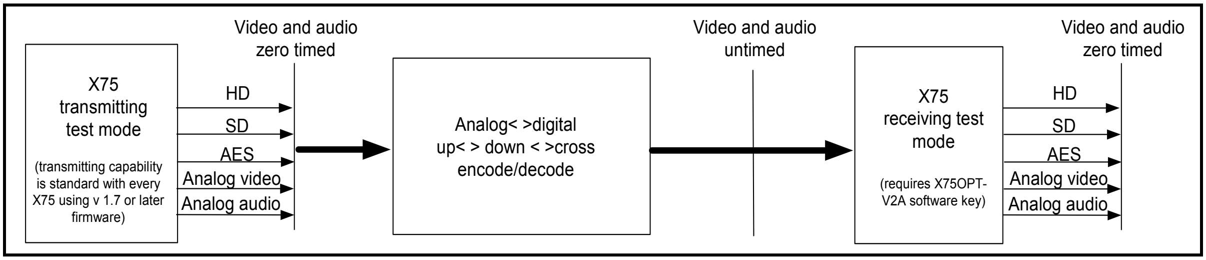


Figure 8-2. X75OPT-V2A Video/Audio Timing Feature

Transmitter

Firmware versions 1.7 or later are capable of transmitting a special V2A video/audio test pattern. This pattern may be used directly to measure a system's relative video/audio timing delays, or recorded for later use. To manually configure an X75HD/X75SD unit to output this test pattern, follow these steps:

1. If an X75HD sub-module is present, perform the following steps to enable the HD TSG:
    i. Navigate to the **Video Setup>Processing>HD TSG & Slide** menu.
    ii. Set the **HD-TSG Select** parameter to **Color Bars 100%**.
    iii. Set the **HD-TSG Enable** parameter to **On**.

2. Enable the SD TSG by performing the following steps:
    i. Navigate to the **Video Setup>Processing>SD TSG & Slide** menu.
    ii. Ensure that the **Keyer/TSG Insert** parameter is configured to the correct video path.
    iii. Set the **SD-TSG Select** parameter to **Bars 100%**.
    iv. Set the **SD-TSG Enable** parameter to **On**.

3. Set all audio left-channel outputs to **Tone 3** and all audio right-channel outputs to **Tone 4**.

4. Navigate to the **Video/Audio Timing** menu and set the **V2A Tx Enable** parameter to **Enable.**

To disable the V2A blank insertion, set the **V2A Tx Enable** parameter to **Disable**.

Receiver

Note

To prevent processing errors, you must ensure all unused audio channels are routed to **Tone** or **Mute**. The receiver takes approximately 5 seconds to generate audio/video timing information for all of the inputs.

The V2A receiver simultaneously monitors the inputs to the X75's audio sources and compares them against one of the unit's video inputs. To configure an X75 unit for V2A reception, follow these steps:

1. Route the audio inputs containing V2A signals to the SRCs to be used in the unit's final processing (see "Selecting an Audio Source" on page 153 and "Advanced Audio Inputs and Outputs Selection" on page 160 for details).
2. Select a video input under the **Video/Audio Timing>V2A Rx Video Src** parameter.

   For analog and HD inputs, the source will be that which is currently selected in the X75A3D/X75PQM and X75HD submodules respectively.

Parameters under **Video/Audio Timing>V2A Status** indicate whether or not a valid V2A test signal is detected on the unit's inputs. If a valid V2A test signal is detected, the relative video delay will be indicated by a series of parameters under the **Video/Audio Timing>Video Delay** sub-menu. A series of parameters under the **Video/Audio Timing> Channel Swap** sub-menu report whether or not the unit detects a left/ right channel swap for stereo pairs.

You can automatically set the measured video delays to the unit's audio delay parameters using the **Video/Audio Timing>Align Leading Audio** parameter. Setting this parameter to **Yes** updates the unit's audio delay parameters with the currently displayed V2A video delays, effectively compensating for measured video/audio timing differences.

Typical Applications

Figure 8-3 illustrates three typical applications for the timing tool.

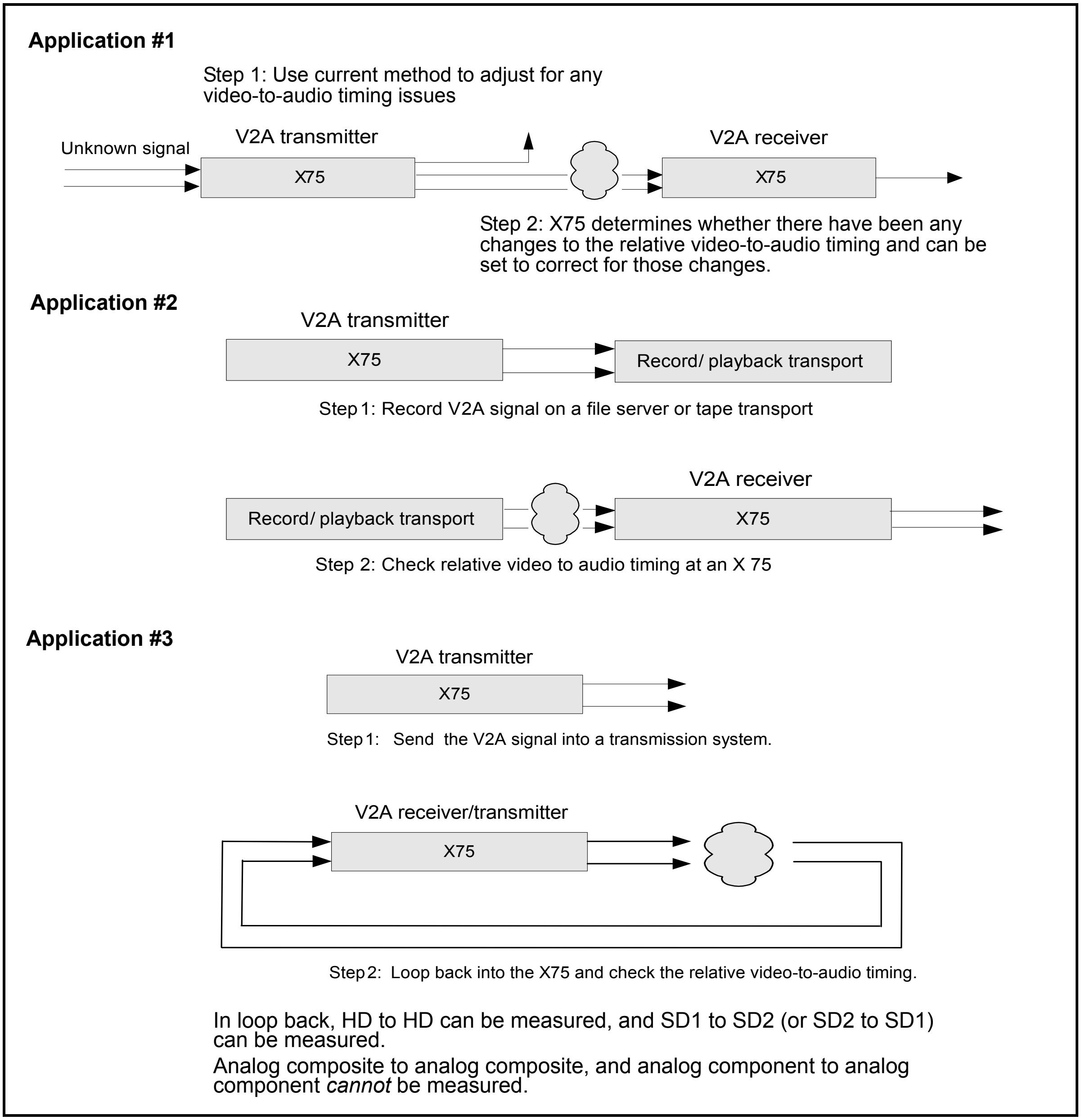


Figure 8-3. X75OPT-V2A Applications

Chapter 9

Audio Configuration

Overview

This chapter describes the audio configuration options that can be changed in the course of normal operation.

The following topics are found in this chapter:

- "General Information" on page 152
- "Selecting an Audio Source" on page 153
- "Adjusting Audio Levels" on page 155
- "Audio LED and Buttons Map" on page 156

See the following for more detailed information:

- *Control Panels for X75 Systems Installation and Operation Manual* for control panel shortcuts to audio settings
- *X75HD/X75SD Control Parameter List* HTML document (available for download from either the Leitch Web site at www.leitch.com or from the included *Documentation for X75 Systems and Control Panels* CD) for lists of all available menus and parameter options

General Information

With control panel shortcuts, you can select an input (or multiple inputs) and immediately send it to all audio outputs. Directly press the **Audio In** button to select any one set of audio inputs to be sent out to all audio multiple output sets. The LEDs to the top, right side of this button indicate which input is currently selected. When the selected input signal is absent, the LED flashes.

Available audio input groups include the following:

- User
- Analog—4 mono channels of analog audio input
- AES—5 channels
- DV (future use)
- SD—8 or 16 channels from the SD-SDI de-embedder
- HD—8 or 16 channels from the HD-SDI de-embedder
- Dolby—10 channels from the internal Dolby encoder

Note

The optional X75OPT-AS-8/16 module is required for synchronizing, delaying and processing mono audio for SD-SDI and HD-SDI inputs.

Depending upon which input you have selected, the X75 unit automatically and logically maps all output channels. When you select two or more audio input groups, the **Audio In Src Select** parameter is automatically set to the **User** setting, and this control is available from the **Audio Setup>Routing** submenu.

To switch between mono and stereo audio processing control, press the **Ctrl** and **Mo/St** buttons simultaneously. When mono control is active, each button controls an individual gain. When stereo control is active, the top and bottom front panel buttons work together (are “married”) so that either button will adjust the gain in stereo pairs.

Selecting an Audio Source

Press the **Audio In** button to select any *one* set of audio inputs to be sent out to *all* audio multiple output sets. The LEDs to the top, right side of this button indicate which input is currently selected. This table shows how the signals are routed internally and mapped to audio outputs.

Table 9-1. Audio Source Groupings

Default Output Mapping	Input Audio Source Groups					
	Analog	**AES**	**DV (future use)**	**SD-SDI X**	**HD-SDI X**	**Dolby**
AA_Out1	AA1	AES1a	DV_a	SDX1	HDX1	Dolby1
AA_Out2	AA2	AES1b	DV_b	SDX2	HDX2	Dolby2
AA_Out3	AA3	AES2a		SDX3	HDX1	Dolby3
AA_Out4	AA4	AES2b		SDX4	HDX2	Dolby4
AES1_OutA	AA1	AES1a	DV_a	SDX1	HDX1	Dolby1
AES1_OutB	AA2	AES1b	DV_b	SDX2	HDX2	Dolby2
AES2_OutA	AA3	AES2a		SDX3	HDX3	Dolby3
AES2_OutB	AA4	AES2b		SDX4	HDX4	Dolby4
AES3_OutA		AES3a		SDX5	HDX5	Dolby5
AES3_OutB		AES3b		SDX6	HDX6	Dolby6
AES4_OutA		AES4a		SDX7	HDX7	Dolby7
AES4_OutB		AES4b		SDX8	HDX8	Dolby8
AES5_OutA		AES5a		SDX9	HDX9	DolbyAuxL
AES5_OutB		AES5b		SDX10	HDX10	DolbyAuxR
SD1/HD1_OutA	AA1	AES1a	DV_a	SDX1	HDX1	Dolby1
SD1/HD1_OutB	AA2	AES1b	DV_b	SDX2	HDX2	Dolby2
SD2/HD2_OutA	AA3	AES2a		SDX3	HDX3	Dolby3
SD2/HD2_OutB	AA4	AES2b		SDX4	HDX4	Dolby4
SD3/HD3_OutA		AES3a		SDX5	HDX5	Dolby5

Table 9-1. Audio Source Groupings *(Continued)*

Default Output Mapping	**Input Audio Source Groups**					
SD3/HD3_OutB		AES3b		SDX6	HDX6	Dolby6
SD4/HD4_OutA		AES4a		SDX7	HDX7	Dolby7
SD4/HD4_OutB		AES4b		SDX8	HDX8	Dolby8
SD5/HD5_OutA		AES5a		SDX9	HDX9	
SD5/HD5_OutB		AES5b		SDX10	HDX10	
SD6/HD6_OutA				SDX11	HDX11	
SD6/HD6_OutB				SDX12	HDX12	
SD7/HD7_OutA				SDX13	HDX13	
SD7/HD7_OutB				SDX14	HDX14	
SD8/HD8_OutA				SDX15	HDX15	
SD8/HD8_OutB				SDX16	HDX16	

Adjusting Audio Levels

When an audio source group is selected and sent to all outputs, press the **Ctrl** and **A. Proc** buttons to quickly access the audio level controls of the selected audio input.The selected audio input channels' gain controls are mapped to the numbered buttons on the control panel accordingly. The mapped buttons illuminate during audio proc control. The **Audio Proc** LEDs on the lower, right corner of the front panel indicate which processing block is currently selected.

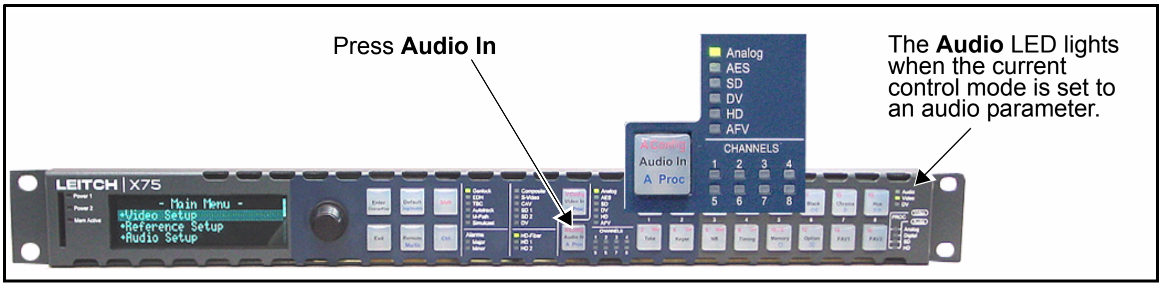


Figure 9-1. Audio Input Control Area

Audio LED and Buttons Map

Note

For audio input configuration, an optional X75OPT-AS-8/16 module must be installed.

When you press the **Audio In** or **Ctrl + A Proc** button on a local or remote control panel, or if you make audio input selections via your Web browser software or other control application, certain parameters and audio proc amp buttons get mapped, and various **Channel** LEDs and **Audio I/P** LEDs will light according to the selected input configuration. The following tables describe the LEDs and buttons that are assigned to selected input sources.

Tables 10-1 through 10-6 in "Chapter 10: Special Function Buttons" describe the various channels, LEDS, gain controls, and control panel buttons that are affected/activated by the selection of certain analog, AES, SD-SDI, and/or HD-SDI demuxed audio inputs. Use the **Ctrl** + **A Proc** buttons to switch between the audio input types.

Selecting an Audio Input

Directly press **Audio In** to select any one input group to be sent out to all audio outputs. Alternatively, open the **Audio Setup** menu and navigate to the **Routing** submenu. From here you can select and configure your audio inputs.

After configuring your audio inputs, the following LEDs will light (see Figure 9-2 on page 157 for their locations):

- The **Audio Mode** LEDs on the far right side of the front panel (top) indicate the current mode of operation.
- The **Audio Proc** LED on the far right side of the front panel indicates the current processing audio group.
- The **Audio Input** LEDs to the top, right of the button indicate which input group is currently selected.
- The **Audio Channel** LEDs immediately to the right of the button indicate which audio channels are mapped and internally routed to the SRC channels.

  See "Audio Proc Amp" on page 167 for information on LED and channel mappings on a frame-mounted local control panel or X75-RCP remote control panel.

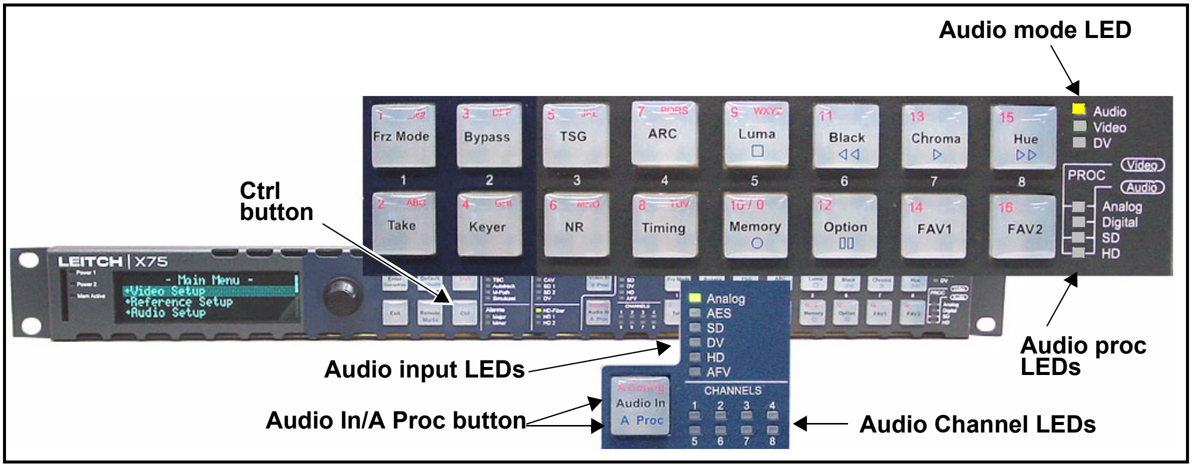


Figure 9-2. Location of Audio LEDs

Accessing Audio Level Controls

Press the **Ctrl** and **A Proc** buttons together to quickly access the audio level controls of a selected audio input. Along with LEDs, the selected audio input channel's gain controls will be mapped to specific numbered buttons on the right side of the front panel. These buttons will light during audio processing and configuration.

See "Audio Proc Amp" on page 167 for information on LED and channel mappings on a frame-mounted local control panel or X75-RCP remote control panel.

Tracking and Delaying Audio

Each audio sample rate converter (SRC) can be configured to automatically track the processing delay of one of the video outputs. To apply the internal audio tracking feature, follow this path: **Audio Setup>Global Audio Config>I/O Delay Config**. Select one of the four or eight **I/O Delay SRC**s, and then select the accompanying video signal to track with that audio SRC.

AFV (Audio Follows Video) Mode

Note

The AFV mode currently functions on the SD-SDI 1 output.

In AFV mode, each of the selectable video inputs has an audio input selection linked to it. With this feature enabled, the audio input selection for the channel automatically changes when the video input is changed.

You can enable or disable AFV mode through the **Audio** menu. The **<channel>-AFV-<input>** parameters specify the audio input channel (“**<channel>**”) to be automatically switched when the **SD Out Sel** parameter is switched to a specified input (“**<input>**”). For example, the **Ch1-AFV-SD1** parameter specifies the audio input for **SRC Channel 1** will be automatically switched when the **SD Out Sel** parameter changes to **SD1**.

When AFV mode is enabled for any single SRC channel, the AFV LED on the front panel of the unit will be lit.

You can override AFV mode by manually selecting a different audio input. This will not, however, turn AFV mode off—the next time the video input selection is changed, the audio will again follow it. AFV mode can only be disabled through the audio menus.

Figure 9-3 on page 159 shows the default AFV audio and video assignments. It illustrates the linked audio channels in AFV mode when the video is switched from the composite input to SD-SDI 1 video. When the AFV is enabled for all SRC channels, the composite input video selection also routes analog input channels 1 and 2 to SRC channel 1, and analog input channels 3 and 4 to SRC channel 2. When SD-SDI 1 input video is selected, all four groups of de-multiplexed audio channels are routed through eight SRC channels.

You can assign different audio inputs to each SRC channel, as well as enable and disable the AFV function for each video input to create a complex routing.

Video Inputs

Toggles between inputs

SRC Input Channels	Cmpst	S-Vid	CAV	SD1	SD2	DV	HDF	HD1	HD2
CH1	AA1/2	AA1/2	AES1a/1b	SDX1/2	SDX1/2	DV_a/b	HDX1/2	HDX1/2	HDX1/2
CH2	AA3/4	AA3/4	AES2a/2b	SDX3/4	SDX3/4	DV_a/b	HDX3/4	HDX3/4	HDX3/4
CH3	AA1/2	AA1/2	AES3a/3b	SDX5/6	SDX5/6	DV_a/b	HDX5/6	HDX5/6	HDX5/6
CH4	AA3/4	AA3/4	AES4a/4b	SDX7/8	SDX7/8	DV_a/b	HDX7/8	HDX7/8	HDX7/8
CH5	AA1/2	AA1/2	AES5a/5b	SDX9/10	SDX9/10	DV_a/b	HDX9/10	HDX9/10	HDX9/10
CH6	AA3/4	AA3/4	AES1a/1b	SDX11/12	SDX11/12	DV_a/b	HDX11/12	HDX11/12	HDX11/12
CH7	AA1/2	AA1/2	AES2a/2b	SDX13/14	SDX13/14	DV_a/b	HDX13/14	HDX13/14	HDX13/14
CH8	AA3/4	AA3/4	AES3a/3b	SDX15/16	SDX15/16	DV_a/b	HDX15/16	HDX15/16	HDX15/16

Figure 9-3. Default AFV Channel Assignment

Advanced Audio Inputs and Outputs Selection

In hybrid analog and digital standard definition processing for audio, typically 4 audio channels are used. Users of X75 for hybrid analog/ digital standard definition video processing with audio have discovered the M-PATH video and audio multiple path processing capabilities and have asked for an enhancement.

Today's X75 embedded audio functionality allows for the 8 or 16 processed audio channels to be embedded into both SD-SDI outputs.

If you are processing two video signals, each with 4 channels of audio, the processed audio can only be selected into two different groups (for example group 1 and group 2).

For ease of configuration across multiple processes in a facility, the 4 audio channels are typically embedded into group 1. The new free enhancement allows the user to place the processed audio channels for each video channel into the same embedded group (typically group 1).

The 16 processing audio channels can be embedded in any sequence independently on SD-SDI, SD-SDI2 and HD-SDI outputs. Embedded audio processing for X75 requires that an audio module be installed.

For custom applications, the X75 unit provides full input and output routing control. You can select multiple audio input sources simultaneously and route them internally to meet your application requirements (see Figure 9-4 on page 161). Each SRC can be assigned to any stereo input sources. Mono-based audio outputs can select any SRC outputs, including the summation, tones, and mutes. More than one audio input LED will light when multiple audio input sources are selected (for example, **Analog** and **AES**).

As Figure 9-4 on page 161 shows, the audio output is simultaneously sent to three embedders (HD, SDI 1, and SDI 2); routing blocks are located in front of the two SDI -‘embedders to allow these embedders to be independently configured.

To make changes to these audio input and outputs, follow this path:

Audio Setup>Routing

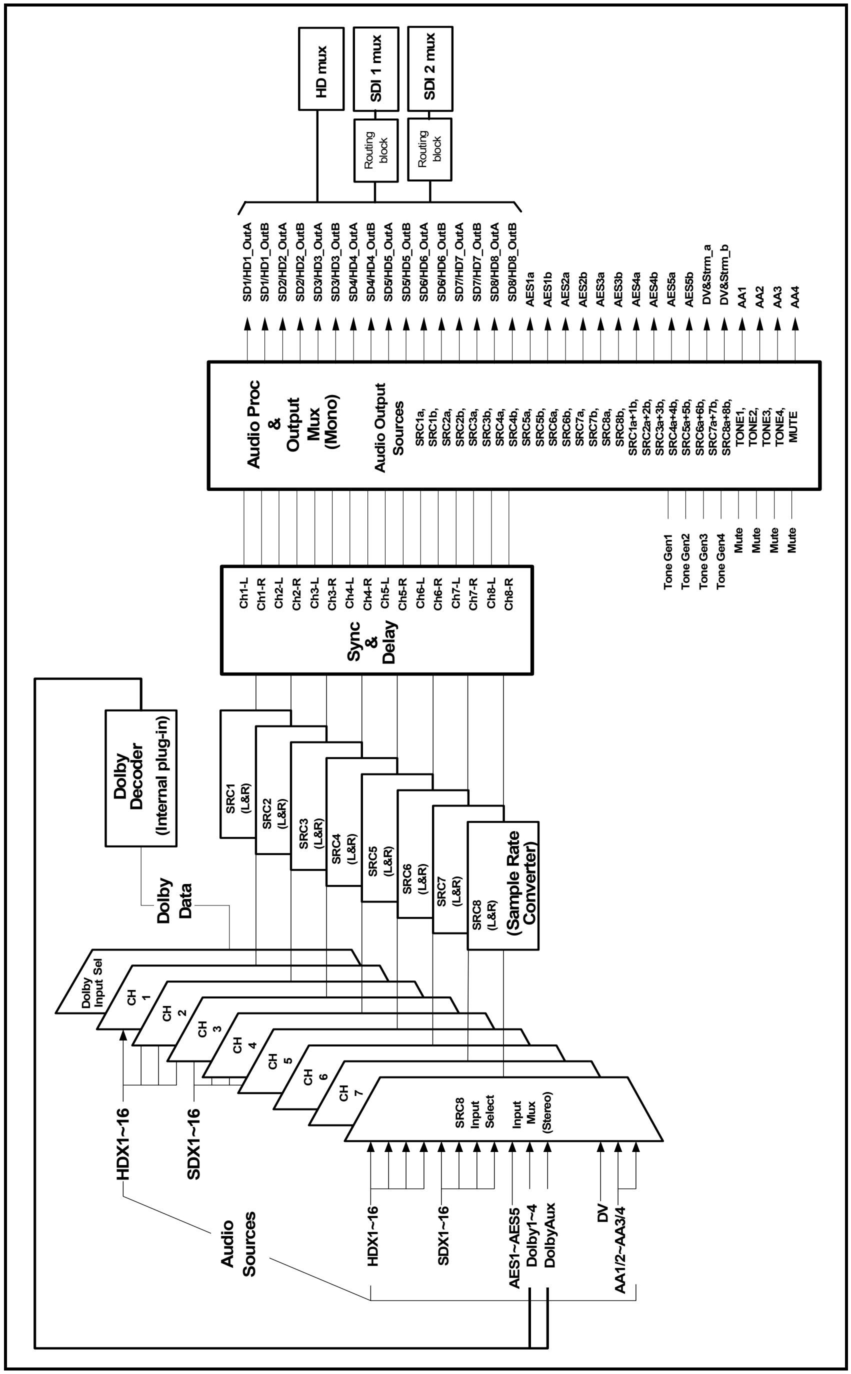


Figure 9-4. Advanced Audio Signal Routing

Chapter 10

Special Function Buttons

Overview

This chapter describes various special function buttons found on the frame-mounted local control panel or X75-RCP remote control panel, including the following:

- "Using the Freeze Control" on page 165
- "Using Proc Amp Controls" on page 166
- "Using the Memory Function" on page 172
- "Using the FAV1 and FAV2 Function" on page 176
- "Using the Bypass Function" on page 178
- "Using the Mo/St Button Function" on page 178
- "Using the Noise Reduction" on page 178
- "Using the Test Signal Generator" on page 180
- "Using the ARC Function" on page 184
- "Using the Timing Control" on page 188
- "Using Option Controls" on page 188
- "Display Screen Setup Parameters" on page 191

See the following for more detailed information:

- *Control Panels for X75 Systems Installation and Operation Manual* for control panel shortcuts to various audio and video settings

- *X75HD/X75SD Control Parameter List* HTML document (available for download from either the Leitch Web site at www.leitch.com or from the included *Documentation for X75 Systems and Control Panels* CD) for lists of all available menus and parameter options

Using the Freeze Control

The freeze control freezes individual frames or fields of the incoming video source. The Freeze mode only affects the currently active video proc amp block.

To use the freeze shortcut, follow these steps:

1. Press **Frz Mode** to open a menu in the VFD panel where you can select a mode to apply to the incoming video.
2. Press **Frz Mode** multiple times to cycle through the different modes.

   Available modes include the following:

   - Field 1
   - Field 2
   - Frame
3. Press **Take** to activate the selected Freeze mode and apply it to the incoming video.

   The **Take** button flashes while the Freeze mode is active.
4. Press the **Take** button repeatedly to toggle between live and freeze modes.

Note

The **Mute In Freeze** option (**Audio** menu) specifies whether or not audio output will be muted while the video is frozen in Frame or Field mode.

Using Proc Amp Controls

Video Proc Amp

There are four internal input video proc amps: HD-SDI, SD-SDI 1, SD-SDI 2, and Analog.

- HD-SDI 1, HD-SDI 2, and HD-SDI Fiber inputs share the HD video proc amp.
- SD-SDI 1 input has its own dedicated SD-SDI 1 video proc amp.
- SD-SDI 2 and future-use DV inputs share the SD-SDI 2 video proc amp.
- Composite, S-video and CAV inputs share the analog video proc amp.

The four most commonly used video processing controls are available from the control panel as the hot buttons, and include the following:

- **Luma**: Can be mapped to Analog Luma Gain, SD-SDI 1 Luma Gain, SD-SDI 2 Luma Gain, HD-SDI Luma Gain
- **Black**: Can be mapped to Analog Black Level, SD-SDI 1 Black Level, SD-SDI 2 Black Level, HD-SDI Black Level
- **Chroma**: Can be mapped to Analog Chroma Gain, SD-SDI 1 Chroma Gain, SD-SDI 2 Chroma Gain, HD-SDI Chroma Gain
- **Hue**: Can be mapped to Analog Hue Phase, SD-SDI 1 Hue Phase, SD-SDI 2 Hue Phase

The VFD briefly displays the selected video proc amp block when the **Ctrl** and **V Proc** buttons are pressed simultaneously.

Video Proc Amp Status LEDs

The three **Video Proc** LEDs (Analog, SD-SDI, HD-SDI) on the far right side of the front panel become active whenever the control panel is set to adjust the video parameters. They indicate which input video processing block is currently selected for the adjustments.

- **Analog**: Lights when the analog video proc amp is selected
- **SD**: Lights when the SD-SDI 1 or SD-SDI 2 video proc amp is selected. When a shortcut (front panel) button is pressed, the parameter prefix on the VFD display indicates which video processing block is currently active
- **HD**: Lights when the HD-SDI video proc amp is selected

Audio Proc Amp

When an X75OPT-AS-8 or X75OPT-AS-16 module is installed, you can synchronize, delay, and process up to 8 or 16 mono channels for each of the two embedder (SD-SDI and HD-SDI) inputs. Depending on the selected audio source group type, the numbered buttons 1 through 8/16 are mapped accordingly to allow quick access to its audio gain controls.

The audio source group types include the following:

- 4 mono channels of analog audio
- 5 AES channels (2 in the X75SD)
- DV audio (future use)
- 16 channels from the SD-SDI demultiplexer
- 16 channels from the HD-SDI demultiplexer

Tables 10-1 through 10-6 in the following pages describe the button mappings for single and multiple audio source configurations.

Single Source Configuration

Tables 10-1, 10-2, 10-3, and 10-4 show the mapped buttons on the control panels and the parameters affected when you use a single source of analog, AES, SD-SDI demuxed, or HD-SDI demuxed audio, respectively.

For more information about the items in these tables (for example, what each of the column headings refers to), see “Appendix to Tables” on page 170.

Table 10-1. Analog Audio Inputs Selected

Selected Inputs	Lit Channel LEDs	Lit Audio Input LEDs	Mapped Parameters	Mapped Buttons on Control Panel	Lit Audio Proc LEDs
AA1/2	1	Analog	Gain1, Gain2	1, 2	Analog
AA3/4	2		Gain3, Gain4	3, 4	

Table 10-2. AES Audio Inputs Selected

Selected Inputs	Lit Channel LEDs	Lit Audio Input LEDs	Mapped Parameters	Mapped Buttons on Control Panel	Lit Audio Proc LEDs
AES1	1	AES	Gain1, Gain2	1, 2	Digital
AES2	2		Gain3, Gain4	3, 4	
AES3	3		Gain5, Gain6	5, 6	
AES4	4		Gain7, Gain8	7, 8	
AES5	5		Gain9, Gain10	9, 10	

Table 10-3. SD-SDI Demuxed Audio Selected (SDX)

Selected Inputs	Lit Channel LEDs	Lit Audio Input LEDs	Mapped Parameters	Mapped Buttons on Control Panel	Lit Audio Proc LEDs
SD1/2	1	SD	Gain1, Gain2	1, 2	SD
SD3/4	2		Gain3, Gain4	3, 4	
SD5/6	3		Gain5, Gain6	5, 6	
SD7/8	4		Gain7, Gain8	7, 8	
SD9/10	5		Gain9, Gain10	9, 10	
SD11/12	6		Gain11, Gain12	11, 12	
SD13/14	7		Gain13, Gain14	13, 14	
SD15/16	8		Gain15, Gain16	15, 16	

Table 10-4. HD-SDI Demuxed Audio Selected (HDX)

Selected Inputs	Lit Channel LEDs	Lit Audio Input LEDs	Mapped Parameters	Mapped Buttons on Control Panel	Lit Audio Proc LEDs
HD1/2	1	HD	Gain1, Gain2	1, 2	HD
HD3/4	2		Gain3, Gain4	3, 4	
HD5/6	3		Gain5, Gain6	5, 6	
HD7/8	4		Gain7, Gain8	7, 8	
HD9/10	5		Gain9, Gain10	9, 10	
HD11/12	6		Gain11, Gain12	11, 12	
HD13/14	7		Gain13, Gain14	13, 14	
HD15/16	8		Gain15, Gain16	15, 16	

Multiple Audio Input Source Configurations

Tables 10-5 and 10-6 show the mapped buttons on the control panels and the parameters affected when you use multiple sources of analog, AES, SD-SDI and SD-SDI audio. Use the **Ctrl** + **A Proc** buttons to switch between the audio input types.

Table 10-5. Multiple Audio Inputs Selected

Selected Inputs	Lit LED Channels	Lit Audio Input LEDs	Mapped Parameters
AA1/2	1	Analog	Gain1, Gain2
AA3/4	2		Gain3, Gain4
AES1	3	AES	Gain5, Gain6
AES2	4		Gain7, Gain8
SD1/2	5	SD	Gain9, Gain10
SD3/4	6		Gain11, Gain12
HD1/2	7	HD	Gain13, Gain14
HD3/4	8		Gain15, Gain16

Table 10-6. Ctrl + A Proc Buttons Pressed

Lit LED Channels	Mapped Buttons on Control Panel	Lit Audio Proc LEDs
1	1, 2	Analog
2	3, 4	
3	5, 6	AES
4	7, 8	
5	9, 10	SD
6	11, 12	
7	13, 14	HD
8	15, 16	

Appendix to Tables

Tables 10-1 through 10-6 describe the various channels, LEDS, gain controls, and control panel buttons that are affected/activated by the selection of certain inputs. Table 10-7, below, provides some general information and definitions about each of these items.

Table 10-7. Table Definitions

Item	Description
Items Applied/Enabled when you Press the "Audio In" Button	
Selected Inputs	This identifies the selected input source. Select an input using the X75 Web server software (via a Web browser), or by pressing Audio In Src on a control panel.
Lit Channel LEDs	This identifies the audio channels (and their LEDs) that correspond with your selected audio input source. Find these eight LEDs directly to the right of the Audio In/A Proc button on a control panel.

Table 10-7. Table Definitions *(Continued)*

Item	**Description**
Lit Audio Input LEDs	This identifies the audio input LED that lights when an input source is selected. Find these LEDs above, and to the right, of the Audio In/A Proc button on a control panel. Options include Analog, AES, SD-SDI, HD-SDI, and AFV (Audio Follow Video).
Mapped Parameters	This identifies the selected audio input channel's gain controls/parameters that are now enabled and available once a certain audio input source is selected.
Items Applied/Enabled when you Press the "Ctrl" + "A Proc" Buttons	
Mapped Buttons on Control Panel	This identifies the audio proc amp buttons on the right side of the control panel (labelled 1 through 16) that become mapped to/correspond with the selected audio input channel's gain controls. Mapped buttons are backlit; unmapped buttons remain dimmed. Once mapped, press a numbered button to enable the gain controls assigned to it.
Lit Audio Proc LEDs	This identifies the audio proc LED that lights when an audio input source type is selected. Find these four LEDs on the far right side of the control panel. Options include Analog, Digital, SD-SDI, and HD-SDI.

Audio Proc Amp Status LEDs

The four Audio Proc LEDs (**Analog**, **Digital**, **SD-SDI**, **HD-SDI)** on the far right side of the front panel indicate the selected audio input group that is being adjusted for the audio gain.

- Analog: Lit during analog audio channels gain adjustments
- Digital: Lit for AES and future-use DV channel audio gain adjustments
- SD-SDI: Lit during SD1 or SD2 (SD-SDI demuxed) channel audio gain adjustments
- HD-SDI: Lit during HD1 or HD2 (HD-SDI demuxed) channel audio gain adjustments.

Using the Memory Function

Note

A preset can not be saved if there is not enough space, the save protection tab is enabled, or the first 100 default names are used.

Using the **Memory** button, you can store and recall user settings for up to 100 presets on an SD card, or up to 10 presets in the X75 itself.

When storing each "package" of parameter settings, the memory will automatically save to a default file naming structure (**X75Save00** in an SD card, or **Preset Slot 1** in an X75). Files on the SD card can be renamed later, using Windows Explorer in a PC.

Once all of the available default filenames are "used up" you must delete the existing files, overwrite the existing files, or rename these files to make room for new default names.

Table 10-8 compares the process of saving in the X75 memory to that of saving in an SD card.

Table 10-8. Comparison of SD Card and X75 Memory Saving

Item	SD Card	X75 Memory
Default naming convention	X75Save00, X75Save01, etc.	Preset Slot 1, Preset Slot2, etc.
Limit to number of saved presets	100 using default naming convention (up to 1000 can be visible when at least 900 have been renamed)	10 slots
Number of characters allowable in the filenames	24	63

File Naming Conventions

When using SD card presets, filenames have a limit of 24 characters (before the extension), must have the extension of ".psf", and must reside in the x75preset directory.

The following are some examples of usable and unusable file naming conventions (files are assumed to be in the /x75preset directory):

Example 1

"*my preset that has a long name.psf*"
(30 characters)

Result: Will not work (will not display)

Example 2

"*my preset w24 characters.psf*"
(24 characters)

Result: Will work

Example 3

"*non-proper ext.txt*"
(Extension is.txt)

Result: Will not work (will not display)

Example 4

"*test.txt.psf*"
(the last four characters are is ".psf", making the filename valid)

Result: Will work.

The various procedures for formatting, saving, recalling, renaming, and deleting presets are outlined below.

Formatting an SD Card

New SD cards must be formatted in an X75 before use. Follow this path to format a card:

1. Insert the card into the slot
2. Press the **Memory** button.
3. Select **SD Card Format**, and then press **Enter**.
4. Click **Yes** when prompted.

A confirmation message will appear briefly.

Saving a Preset

To save a preset, follow these steps:

1. Press **Memory**.

   A menu pops up with the following options:

   - List Preset
   - Save Presets
   - SD Card List Presets
   - SD Card Save Presets

2. Select **Save Presets** to save the settings to the X75, or press **SD Card Save Presets** to save the settings to the SD card.

   A list of ten slots appears in the X75 memory, or up to 1000 filenames appear in the SD card.

   When saving to the X75, the slots are named **Preset Slot 1**, **Preset Slot 2**, etc., or simply **Empty**. When saving to an SD card, the default filenames are **X75Save00**, **X75Save01**, **X75Save02**, etc., in addition to an option to create a new **Preset**.
3. Overwrite an old file, or, in the X75, scroll to the slot where you wish to save the entry, and then press the **Enter** button.
4. To save a new preset, scroll to a slot that is empty in the X75, or scroll to the **New Preset** option for the SD card, and then press the **Enter** button.

Recalling a Preset

To recall a preset, follow these steps:

1. Press **Memory**.
2. Select **List Presets** (to recall a setting stored in theX75) or **SD Card List Presets** (to recall a setting stored in the SD card).
3. Scroll to the preset you would like to recall.
4. Press **Memory** again, or press **Enter**.

   A menu opens with the following options:

   - Restore Preset
   - Delete Preset
   - Rename Preset
5. Scroll through the list, select **Recall Preset**, and then press **Enter**.

   Your preset is recalled.

Renaming a Preset

To rename a preset, follow these steps:

1. Press **Memory**.
2. Select **List Presets** for items stored in the X75, or **SD Card List Presets** for items in the SD card.
3. Scroll to the preset you would like to rename, and then press **Enter**.

4. In the new list, select **Rename Preset**, and then press **Enter**.

   You will be prompted to enter a new name.

5. Enter a new name.

Deleting a Preset

To delete preset, follow these steps:

1. Press **Memory**.
2. Select **List Presets** for items stored in the X75, or **SD Card List Presets** for items in the SD card.
3. Scroll to the preset you would like to delete, and then press Enter.
4. Select **Delete Preset**, and then press **Enter**.

   The item is deleted from the list.

Using the FAV1 and FAV2 Function

Note

If the listed favorite is a menu mode (video M-Path), it cannot be set as a GPI parameter.

The **Fav1** and **Fav2** buttons store lists of favorite menu locations or controllable parameters. Using these buttons, you can “go to” a Favorite, delete a Favorite, or set a Favorite to be activated by GPI.

The procedures described below apply when the **1 Click Fav** capability is *not* enabled. If the **1 Click Fav** capability is enabled (see page 177), you can still access the full list of favorites by following this path: **Option** button>**Favorite 1** or **Favorite 2**.

Reaching a Favorite

To go to a favorite, follow these steps:

1. Press **Fav1** or **Fav2**.

   A menu opens with the following options:

   - List Favorites
   - Add Favorite

2. Select **List Favorites**.
3. Scroll to the desired favorite, and then press **Enter**.

Deleting a Favorite

To delete a favorite, follow these steps:

1. Press **Fav1** or **Fav2**.

   A menu pops up with the following options:

   - List Favorites
   - Add Favorite

2. Select **List Favorites**.
3. Scroll to the favorite you want to delete.
4. Press **Fav1** or **Fav2** again.

   A menu opens with the following options:

   - Delete Favorite
   - Move Up
   - Move Down
   - Set as GPI Parameter

5. Scroll to **Delete Favorite**, and then press **Enter**.

   A confirmation box appears stating that the favorite was deleted.

Note

The **Move Up** and **Move Down** options are used to change the order of the presets.

Setting a GPI Activation

To set a parameter to be activated by a GPI input signal, follow these steps:

1. Press **Fav1** or **Fav2**.

   A menu pops up with the following options:

   - List Favorites
   - Add Favorite

2. Select **List Favorites**.
3. Scroll to the favorite you wish activated by a GPI input signal.
4. Press **Fav1** or **Fav2** again to store the parameter.

   A menu opens with the following options:

   - Delete Favorite
   - Move Up
   - Move Down
   - Set as GPI Parameter

5. Scroll to **Set as GPI Parameter**, and then press **Enter**.

   An arrow (>) is placed just before the parameter name, indicating that the favorite is now set as a GPI-triggered parameter.

Note

The **Move Up** and **Move Down** options are used to change the order of the presets.

1 Click Capability

The Favorites feature has an additional **1 Click Fav** capability that makes it possible for you to directly access the first item in your favorites list, saving several steps. In this mode, the first item in the Favorites list appears on the screen directly, and you can execute it by pressing **Enter**.

To enable this feature, follow these steps:

1. Press the **Option** button.
2. Rotate the control knob and then select **Setup**.
3. Press the **Enter** button.
4. Scroll to **1 Click Fav**, select **Yes**, and then press the **Enter** button.

When **1 Click Fav** is enabled, the normal functionality of the **Fav 1** and **Fav 2** shortcut buttons (as described on page 176) is locked out. In this instance, access the Favorites by following this path: **Option** button>**Favorites 1** or **Favorite 2**.

Using the Bypass Function

In Bypass mode, no processing is applied to the **SDI 1 In** video signal; the signal is instead passed directly to the **SDI 1 Out** connector that is closest to the **SDI 1 In** connector. (Only one of the two **SDI 1 Out** connectors provides a bypass output.)

To activate Bypass mode, press the **Bypass** button. From the resulting **Bypass Menu**, select **On** or **Off**, and then press **Enter**. When the unit is powered off, or forced by the user, this relay is not energized to pass the signal straight through the output without any processing. The **Bypass** button flashes when the Bypass mode is active.

Using the Mo/St Button Function

The **Mo**no/**St**ereo button located just left of the **Ctrl** button changes the audio channels control style. Pressing the **Ctrl** and **Mo/St** buttons toggles between the mono or stereo level and delay adjustments. This button is also mapped to the **Audio Control Style** parameter in the **Audio Setup>Global Audio Config** menu.

In mono control style, when adjusting the audio processing parameters such as the level, each numbered button is mapped directly to the individual gain controls. In stereo control style, even though a single button is pressed, both L/R channels are adjusted at the same time.

Using the Noise Reduction

Note

If you are working in either the SD-SDI or HD-SDI noise reducer menu, the **NR** button will light up. If either of the noise reducers is enabled, the **NR** button will stay lit even if you exit the menu. In SD-SDI, the enabling parameter is **Noise Reduction**; in HD-SDI the enabling parameter is **HD NR Enable**.

When the X75HD/SD unit is equipped with the X75OPT-NR option, it provides superior noise handling and image enhancement features on SDTV video processing paths. Press the **NR** button for quick access to the noise reduction menu.

The **SDNR Insert** parameter under the **Video Setup>Processing>SD NR/Enhancement** menu selects a video input source to be processed by this block. All video output groups using the video input source selected by the **SDNR Insert** parameter will automatically have the SD noise reducer inserted into their video processing paths.

SD NR/Enhancement

The optional video noise and artifact reducer is based on Leitch's AVARI (Advanced Video Artifact Reducer I) technology. This feature is capable of impulse noise reduction, Gaussian random noise reduction, compression blockiness and mosquito artifact reduction and the sharpening and softening of images.

The impulse noise reducer is particularly effective in reducing satellite noise. It automatically detects impulse noise and applies a median filter when necessary. To achieve the ideal setting, adjust the **Impulse Noise Level** control to reduce more impulse noise, but not to the extent that excessive motion artifacts are generated.

AVARI technology uses a recursive 3D directional filter that reduces Gaussian noise and compression artifacts, which includes the ability to block artifacts and mosquito noise. For ideal effectiveness, adjust the **Noise/Artifact Level** control up to see more effect on filtering, but not to a level where excessive blurring is visible.

The directional softening/sharpening filter can be used in various applications. For example, the softening filter can be used as a compression pre-filter to reduce mosquito noise, and the sharpening filter can be used to enhance picture appearance. The **Soften/Sharpen** control provides this function; a negative value achieves a softening effect, and a positive value results in a sharpening effect. While adjusting these controls, the **Split Screen** feature may be used to compare the filtered video against unfiltered video.

The overall filter delay is approximately 1 line when the **Minimum Delay** parameter is set to **Yes**, and approximately 1 field when set to **No**. The overall performance is slightly better when **Minimum Delay** is set to **No**.

HD NR/Enhancement

The HD digital noise reduction and enhancement controls are included as a standard feature with the HD submodule and may be applied to the X75HD's HD outputs.

When equipped with the X75OPT-NR option, for the up-converted HD output signal, you can use either (or both) of the SD or HD noise reduction functions. To use the **SD NR/Enhancement** feature in this case, set the **SDNR Insert** parameter to the appropriate SD video input as described in the previous section.

Using the Test Signal Generator

An X75HD/X75SD unit provides HDTV(8-bits) and SDTV(10-bits) internal test signals. Table 10-9 on page 181 and Table 10-10 on page 182 respectively show the list of test signals for each standard, and these options are directly accesible through the **TSG** button.The SD Keyer and the test signals function share the same processing block. Using the **Keyer/TSGInsert** parameter in **Video Setup>Processing>SD TSG & Slide**, you can select a video source to be processed by this block. All video output groups using the video input source selected at the **Keyer/TSG Insert** parameter will automatically have the Keyer/TSG inserted into their video processing paths.

Table 10-9. HDTV Test Signals

HD-SDI 1080	HD-SDI 720
Black	Black
Color Bars 100%	Color Bars 100%
Color Bars 75%	Color Bars 75%
Color Bars 100% 4:3	Color Bars 100% 4:3
Horizontal Sweep Y-only	Horizontal Sweep Y-only
Horizontal Sweep	Horizontal Sweep
White	White
10-Step	10-Step
5-Step	5-Step
Ramp Y-only	Ramp Y-only
Ramp	Ramp
Multiburst Y-only	Multiburst Y-only
Multiburst	Multiburst
Pluge	Pluge
Aspect 4:3	Aspect 4:3
RP219-1	RP219-1
RP219-2	RP219-2
RP219-3	RP219-3
RP219-4	RP219-4

Table 10-10. SDTV Test Signals

SD-SDI 525	SD-SDI 625
SMPTE Bars	Bars 100%
EIA Bars	Black
Full Field Bars	Gray
Bars/Reverse	White
Bars/Red	Luma Ramp
Bars 100%	Modulated Ramp
Black	Luma 5-Step
Gray	Modulated 5-Step
White	Shallow Ramp
Luma Ramp	Luma Sweep 5.5MHz
Modulated Ramp	Chroma Sweep
Luma 5-Step	VIRS
Modulated 5-Step	Cross Hatch
Shallow Ramp	Pluge
Multiburst-60IRE	SIN(X)/X
Luma Sweep 5.5MHz	Timing Bowtie
Chroma Sweep	Matrix 1
Pulse and Bar	FF Bounce
NTC7 Composite	SDI EQ Test
NTC7 Combination	SDI PLL Test
FCC Composite	Zone Plate
VIRS	Bars/Red 100%
Cross Hatch	EBU Bars
Pluge	EBU Bars/Red
SIN(X)/X	Multiburst 5.0MHz
Red Field	Multiburst 5.8MHz
Timing Bowtie	Multiburst 420mV

Table 10-10. SDTV Test Signals *(Continued)*

SD-SDI 525	SD-SDI 625
Matrix 1	Pulse & Bar 2410t
Matrix 2	Pulse & Bar 248t
FF Bounce	Pulse & Bar 2t
SDI EQ Test	Luma 10-Step
SDI PLL Test	Valid Ramp
Zone Plate	Multipulse 5.8MHz
SDI Pathological	Shallow Ramps
30 Hz	VITS 17
	VITS 18
	VITS 19
	VITS 20
	VITS 330
	VITS 331
	Red Field 75%
	Red Field 100%
	Ramp 100
	Ramp 120
	UBM Ramps
	SDI Pathological
	25 Hz

Using the ARC Function

Note

The ARC mode requires an HD-SDI module to operate in both HD-SDI and SD-SDI formats.

The **SD-ARC Insert** parameter under the **Video Setup>Processing> ARC (SD-SDI Out)** menu selects a video input source to be processed by the SD aspect ratio converter. All video output groups using the video input source selected by the **SD-ARC Insert** parameter will automatically have the SD-ARC inserted into their video processing path. The HD-ARC is always available for HD outputs.

The **ARC** button provides quick access to the ARC (SD-SDI Out) and ARC (HD-SDI Out) controls. When the HD video processing block is currently selected, pressing the **ARC** button takes you straight to the ARC (SD-SDI Out) variable controls. When the SD 1, SD 2 or Analog video proc amp block is currently selected, pressing the **ARC** button takes you straight to the ARC (HD-SDI Out) variable controls.

Depending on the video configuration, you must manually select the appropriate ARC controls to apply the settings to outputs. The following options are available when the **ARC** button is pressed:

- Aspect Ratio Lock
- H. Size
- H Position
- V Size
- V Position

The manually adjusted User settings can be saved or recalled from the four ARC Presets that are available from each ARC (HD-SDI Out) and ARC (SD-SDI Out) menus.

The X75HD/X75SD also provides viewing modes to allow the quick selection of predefined input and output aspect ratios.

ARC (HD-SDI Out)

Figure 10-1 on page 186 illustrates the options in the ARC (HD-SDI Out) preset. The following viewing modes are available:

- Anamorphic
- Pillar Box
- Middle Cut
- 14:9 Pillar Box
- 21:9 Letter Box

ARC (SD-SDI Out)

Figure 10-2 on page 187 illustrates the options in the ARC (SD-SDI Out) preset. The following viewing modes are available:

- Anamorphic
- Letter Box
- Center Cut
- 14:9 Letter Box
- 21:9 Letter Box

Figure 10-1. ARC (HD Out) View Modes

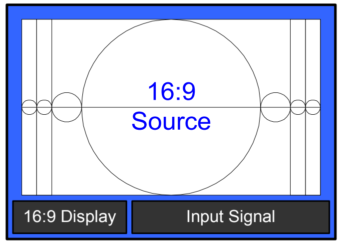
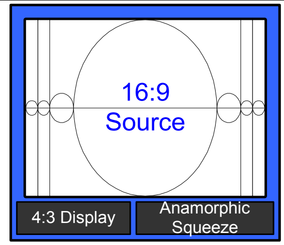
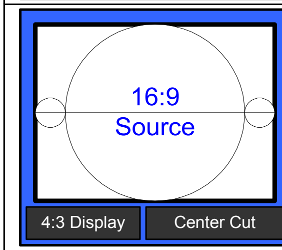
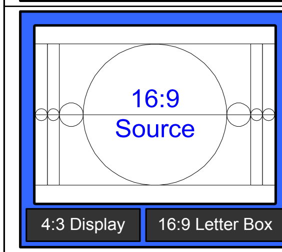
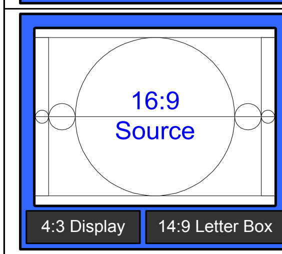
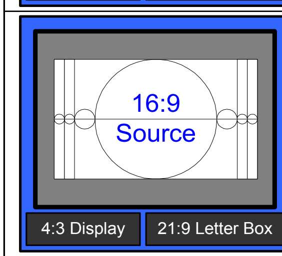
16:9 Input	4:3 Display Output Viewing Options
	
	
	
	
	

Figure 10-2. ARC (SD-SDI Out) Viewing Modes

Using the Timing Control

Using the **Timing** button, you can quickly access the currently selected video processing block's phase controls. When multiple input video sources are selected and processed, pressing the **Ctrl** and **V Proc** buttons allows you to switch between the processing blocks and leads you directly to the selected timing controls.

The **Proc** LEDs on the right side of the front panel and the display show the currently selected and active block.

- When the Analog processing block is selected, press the **Timing** button to access the **AVFS & Timing** submenu.
- When an SD processing block is selected, press the **Timing** button to access the **SD1 FS & Timing** or **SD2 FS & Timing** submenus.
- When the HD processing block is selected, press the **Timing** button to access the **HD Out V-Phase** parameter under the **Processing** menu, and press the **Exit** button to access the HD Out H-Phase control.

The timing controls for the down-converted signal can be adjusted with the **SD-ARC/HD Dn V-Ph** and **SD-ARC/HD Dn H-Ph** controls from the **Video Setup>Processing** menu.

Using Option Controls

The **Option** control panel shortcut allows quick access to certain parameters, some of which become enabled with the purchase and installation of various optional modules and upgrades.

To access the list of **Option** parameters, press the **Option** button, and then select one of the following items:

- **History**: The last ten parameters that you have viewed or modified appear chronologically in the **History** list. The most recent event appears at the bottom of the list. This list is deleted if the control panel loses its power.
- **Active Alarms**: Using this parameter, you can set the parameters for alarms on your network of X75-RCP-enabled devices. For each alarm, you can make the following settings:
    - Trigger Time
    - Clear Time

    - Priority
    - Alarm Mute
    - Acknowledged
- **Alarms Log**: The last 20 alarms (minor and major) are listed in the Alarms Log. This is a read-only list; it can only be cleared by disconnecting power to the control panel.
- **Configure Alarms**: Use this parameter to set the parameters for alarms on your network of X75-RC- enabled devices. For each alarm, you can access the following options:
    - Trigger Time
    - Clear Time
    - Priority
    - Alarm Mute
    - Acknowledged

For a complete list of all the possible alarms, see page 323.

- **Favorite 1** and **Favorite 2**: Use these two lists to retain the ten most-needed parameters. With each parameter listing that you wish to save, press **Favorite 1** or **Favorite 2** from the **Options List**, and then select **Add**. The message “Item added” appears. See “Using the FAV1 and FAV2 Function” on page 176 for more information.
- **Preset**: This shortcut leads you directly to the **Memory** menu (see “Using the Memory Function” on page 172).
- **MuteKeepAlive:** The X75HD/X75SD unit sends out a “keep alive” message at approximately every 15 seconds. The keep alive checks to determine if the device is still active and resides on the control network. The following options are available:
    - **No**: The keep alive message is broadcast every 15 seconds by the X75 unit to be discovered by the client control systems.
    - **Yes**: Suppresses the keep alive message unless it is requested by any client control system.

      If the X75 is repowered with the **Mute KeepAlive** option set to **Yes**, a client device such as a remote control panel will not be able to discover the unit until the control panel is repowered.
- **Home**: This option returns you to the **Main** menu.

- **Path**: Using this feature, you can establish the path of the parameter that you are currently viewing or adjusting. To obtain the path, select **Path** from the options list, and then press **Enter**. Rotate the control knob to view the entire path.
- **Lock Panel**: By selecting and entering this parameter, all card-edge controls are locked out, preventing accidental changes. To remove the Lock Panel function, press **Ctrl** + **Exit**. If you are using a DPS-575 or RC-575 to control the X75, press the **Default** + **Exit** buttons on the DPS-575 or RC-575 to remove the locked panel function.
- **Setup**: The **Setup** menu contains a number of parameters that affect how your display screen operates (see "Display Screen Setup Parameters" on page 191).

More information on each of these control options can be found in the *Control Panels for X75 Systems Installation and Operation Manual*.

Rebooting Shortcut

To reboot the X75HD/X75SD unit without using the power switch, press the SHIFT + CTL + NR buttons simultaneously.

Display Screen Setup Parameters

The display screen Setup parameters affect the way in which the display screen functions on your panel. These settings do not affect how parameters are seen on other panels.

To access the display screen Setup Menu, follow these steps:

1. Press the **Option** button.
2. Rotate the control knob and select **Setup**.
3. Press the **Enter** button.

The display screen Setup parameters are described in the following pages.

Scroll Mode

In *Wrap* mode, when you scroll through menus and non-numeric parameters, the module considers the list as a circular set of data. When the last parameter in the list is reached, the first parameter in the list immediately follows it. In *Don't Wrap* mode, the module stops when the last parameter in the list is displayed. To return to the first parameter, you must scroll through the entire list in the opposite direction. The **Scroll Mode** options globally affect all non-numeric parameters as they appear on the control panel where you have made this setting. Numeric values are not affected by Scroll Mode options.

Display Intensity

To accommodate different equipment room lighting conditions, you can set the panel to five levels of display intensity: 100%, 75%, 50%, and 25%.

Screen Saver Timeout

To extend the life of the display device, the screen saver automatically shuts off the display after a preset period of inactivity. Using the **Screen Saver Timeout** parameter, you can set the duration of inactivity after which the control panel display turns off, or you can disable the screen saver. The available time options are 5, 10, 20, and 30 minutes.

To exit the screen saver mode, press the control knob or any button. No parameters will be changed when you exit the screen saver mode.

Screen Saver Select

The screen saver can be set to either **Blank** or **Default**. The **Default** screen saver consists of a line of scrolling text.

Shaft Direction

Using this parameter, you can determine whether the clockwise rotation of the control knob moves a parameter list up or down. The setting of this parameter only applies to navigation, and does not effect the adjustment of numeric values. To make numeric values increase, the control knob must always be turned the knob clockwise. To make values decrease, you must always turn the knob counter-clockwise.

1 Click Favorite

The Favorites feature has an additional **1 Click Fav** capability that makes it possible for you to directly access the first item in your favorites list, saving several steps. In this mode, the first item in the Favorites list appears on the screen directly, and you can execute it by pressing **Enter**. To enable the **1 Click Fav** capability, select **Yes.** See page 177 for details.

Backlite

This feature illuminates the X75's buttons in dark locations; buttons that have been activated when the **Backlite** is enabled will now flash.

To enable this feature, follow this path:

Option button>**Setup**>**Backlite**>**On**.

Section III—Appendixes

This section contains the following topics:

- "Cables and Pinouts" on page 195
- Troubleshooting on page 221
- Servicing on page 255
- Software on page 303
- Alarms on page 321

These appendixes contain extra information useful for configuring, operating, and servicing your X75HD/X75SD system.

Appendix A

Cables and Pinouts

Overview

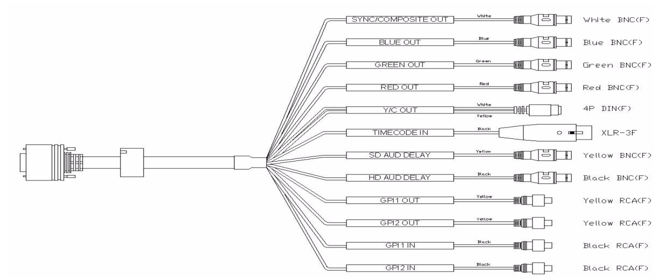
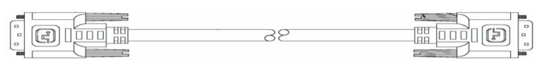
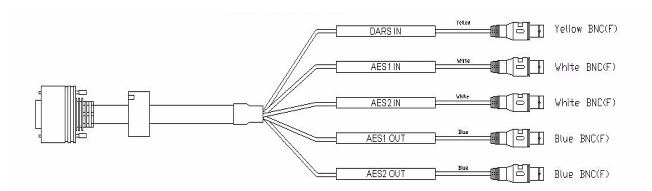
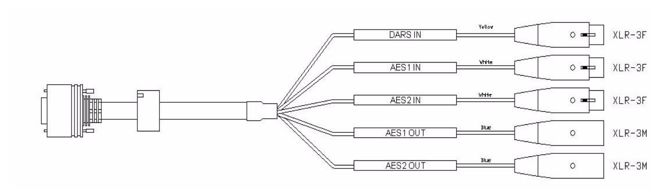
This appendix describes various cable options and I/O, video, and audio cable pinouts (both standard and optional) available for use with the X75HD/X75SD. The following topics are covered in this chapter:

- "Summary of Cables and Cable Sets" on page 196
- "Analog Audio Connections" on page 202
- "Multi I/O Cable (X75OPTCAB-MULTI)" on page 203
- "DVI-D Output Cable (X75OPTCAB-DVI)" on page 205
- "Audio Coax Cable (X75OPTCAB-8-C)" on page 206
- "Audio Coax Cable (CAB-X75HD-COAX)" on page 208
- "Audio BNC/XLR Cable (X75OPTCAB-8-XC)" on page 210
- "Audio BNC/XLR Cable (CAB-X75HD-COMBO)" on page 213
- "Optional Audio XLR Cable (X75OPTCAB-8-X)" on page 216
- "Optional Audio XLR Cable (X75OPTCAB-XLR)" on page 218

Summary of Cables and Cable Sets

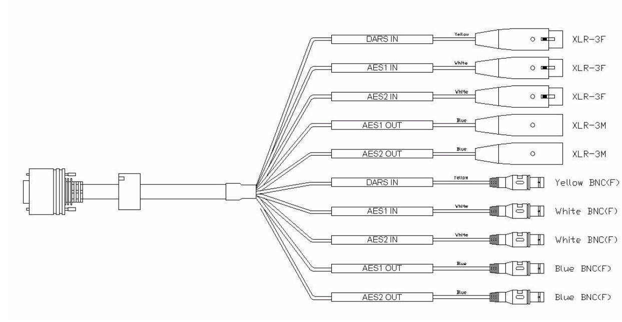
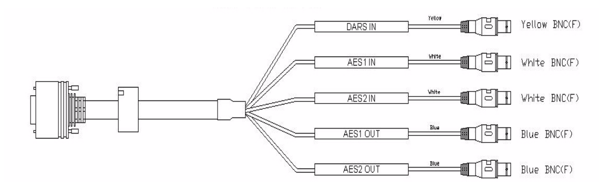
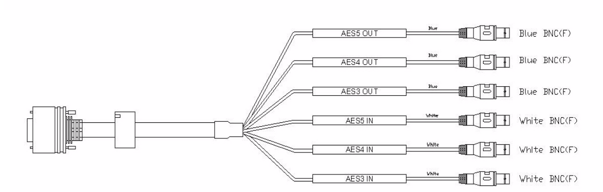
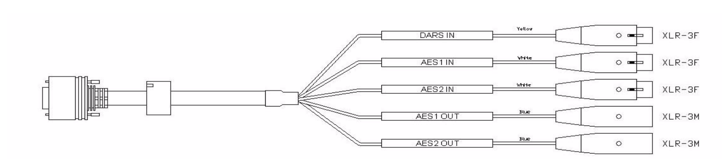
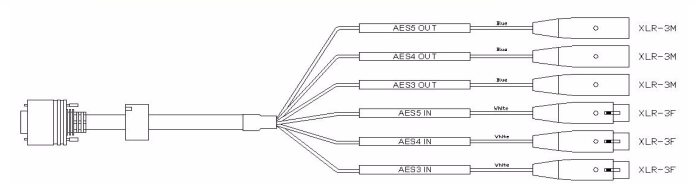
Table A-1 lists all of the standard and optional cables and cable sets used in different X75HD/X75SD packages. Details begin on page 203.

Table A-1. Cables and Cable Sets

Part Number	Type	Components
Multiple Input/Output Set		
X75OPTCAB-MULTI	Single cable	X75OPTCAB-MULTI 
DVI-D Output		
X75OPTCAB-DVI	Single cable	X75OPTCAB-DVI 
Audio Cables and Cable Sets		
X75OPTCAB-8-C	Single cable (BNC)	X75OPTCAB-8-C 
X75OPTCAB-8-X	Single cable (XLR)	X75OPTCAB-8-X 

Standard/Optional	Description	Major Features
Optional	One cable for multi input/output connectors • Sync/comp out • Blue, Green, and Red out • Y/C out • SDTV and HDTV audio delay • GPI1 and GPI2 in • GPI1 and GPI2 out	1 ft (30 cm) multi I/O breakout cable with the following connector types: • DB26(M) to 6 x BNC(F), 1 x XLR(F), 1 x MiniDin4(F), and 4 x RCA(F)
Optional	One cable for DVI-D single-link output	DVI-D to DVI-D (digital-single link) cable
Standard (X75SD)	One cable for 8-channel audio synchronizer, with the following unbalanced coax AES connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 5 x BNC(F)
Optional	One cable for 8-channel audio synchronizer, with the following balanced XLR AES connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 3 x XLR(F) • 2 x XLR(M)

Cables and Cable Sets (Continued)

Part Number	Type	Components
Audio Cables and Cable Sets (Continued)		
X75OPTCAB-8-CX	Single cable (BNC and XLR)	X75OPTCAB-8-CX 
X75OPTCAB-16-C	Cable set (BNC)	X75OPTCAB-8-C and CAB-X75HD-COAX  
X75OPTCAB-16-X	Cable set (XLR)	X75OPTCAB-8-X and CAB-X75HD-XLR  

Cables and Cable Sets (Continued)

Standard/Optional	Description	Major Features
Optional	One cable for 8-channel audio synchronizer, with the following unbalanced coax AES and XLR connectors: • AES1, AES2, and DARS in • AES1 and AES2 out	1 ft (30 cm) breakout cable with the following connector types: • DB26(M) to 5 x BNC(F) • 3 x XLR(F) • 2 x XLR(M)
Standard (HD)	Two cable sets for 16-channel audio synchronizer, with unbalanced coax AES connectors • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft. (30 cm) breakout cables with the following connector types: • DB26(M) to 5 x BNC(F) • DB44(M) to 6 x BNC(F)
Optional	Two cable sets for 16-channel audio synchronizer, with balanced XLR AES connectors • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft (30 cm) breakout cables with the following connector types: • DB26(M) to 3 x XLR(F) and 2 x XLR(M) • DB44(M) to 3 x XLR(F) and 3 x XLR(M)

Table A-2.

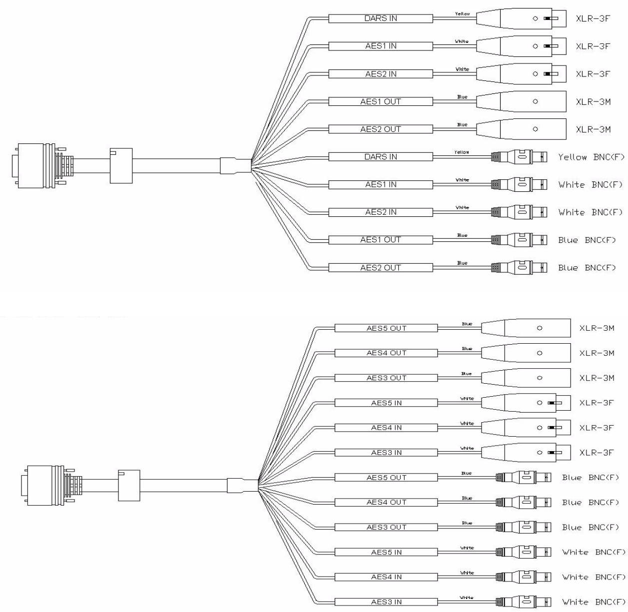
Part Number	Type	Components
Audio Cables and Cable Sets (Continued)		
X75OPTCAB-16-CX	Cable set (BNC and XLR)	X75OPTCAB-8-CX and CAB-X75HD-COMBO 

Table A-3.

Standard/Optional	Description	Major Features
Optional	Two cables for 16-channel audio synchronizer, unbalanced coax AES and balanced XLR AES • AES1, AES2, and DARS in • AES1 and AES2 out • AES3, AES4, and AES5 in • AES3, AES 4, and AES 5 out	2 X 1 ft (30 cm) breakout cables with the following connector types: • DB26(M) to 5 x BNC(F), 3 x XLR(F), and 2 x XLR(M) • DB44(M) to 6 x BNC(F), 3 x XLR(F), and 3 x XLR(M)

Analog Audio Connections

Figure A-1 shows the analog audio input and output terminal blocks.

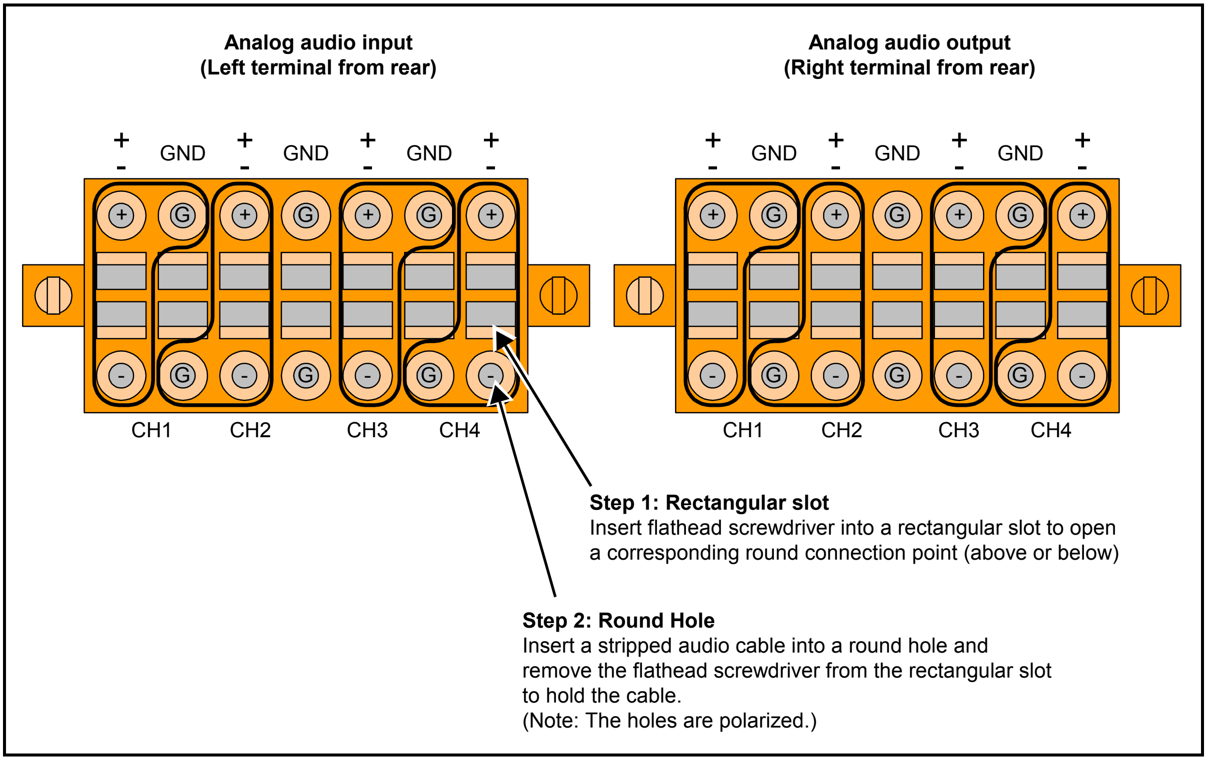


Figure A-1. Analog Audio Input and Output Terminal Blocks

Multi I/O Cable (X75OPTCAB-MULTI)

Figure A-2 identifies the cable connectors available on the optional multiple input/output X75OPTCAB-MULTI cable.

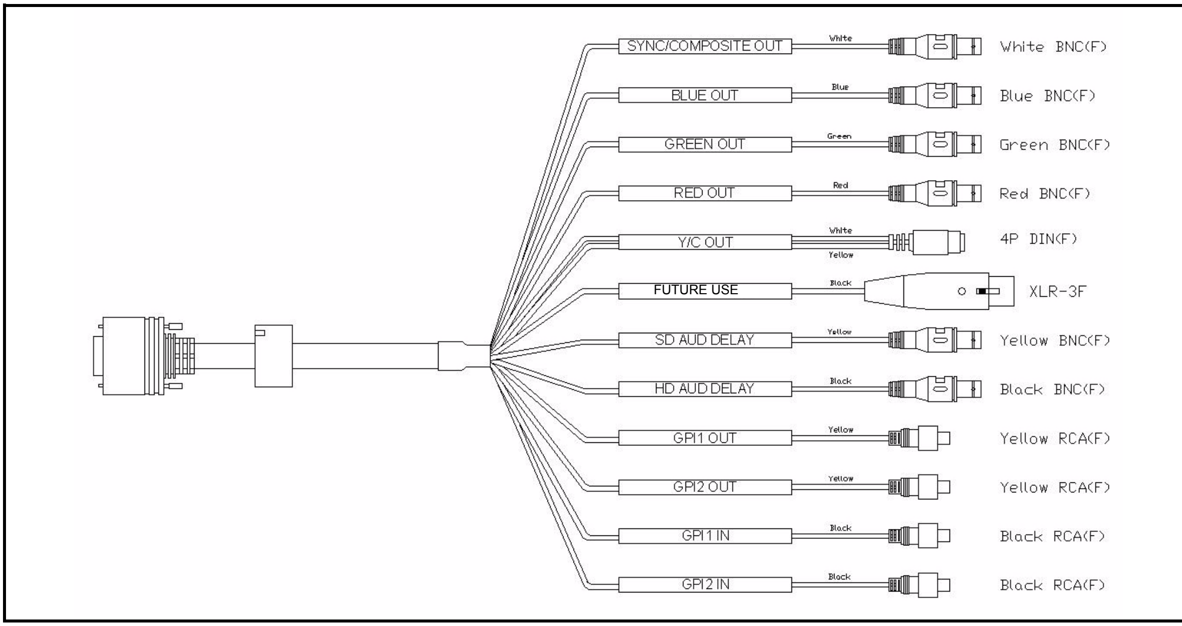


Figure A-2. X75OPTCAB-MULTI Cable Connectors

Figure A-3 shows the pinouts for the X75OPTCAB-MULTI DB-26M connector.

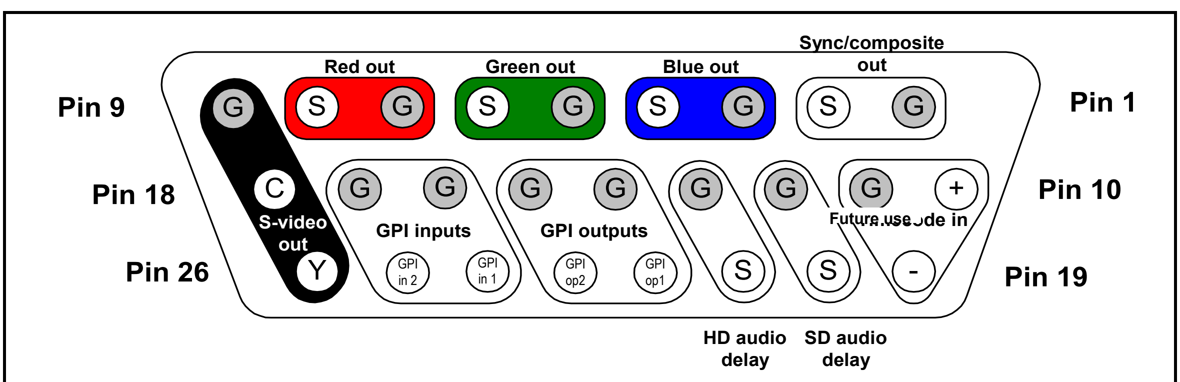


Figure A-3. X75OPTCAB-MULTI I/O Connector Pinout

Table A-4 describes each pin on the X75OPTCAB-MULTI DB-26M connector and its connection type.

Table A-4. X75OPTCAB-MULTI Pinout Descriptions

Pin Number	Connection Type	Description
1	BNC-Gnd	Sync/composite out ground
2	BNC	Sync/composite out signal
3	BNC-Gnd	Blue out ground
4	BNC	Blue out signal
5	BNC-Gnd	Green out ground
6	BNC	Green out signal
7	BNC-Gnd	Red out ground
8	BNC	Red out signal
9	4-Pin DIN-1-Gnd 4-Pin DIN-2-Gnd	S-video (Y) ground S-video (C) ground
10	XLR-2	Future use
11	XLR-1-Gnd	Future use
12	BNC-Gnd	SDTV audio delay ground
13	BNC-Gnd	HDTV audio delay ground
14	RCA-Gnd	GPI out 1 ground
15	RCA Gnd	GPI out 2 ground
16	RCA Gnd	GPI in 1 ground
17	RCA Gnd	GPI in 2 ground
18	4-Pin DIN-4	S-video (C) out
19	XLR-3	Future use
20	BNC	SDTV audio delay out
21	BNC	HDTV audio delay out
22	RCA	GPI out 1
23	RCA	GPI out 2
24	RCA	GPI in 1
25	RCA	GPI in 2
26	4-Pin DIN-3	S-video (Y) out

DVI-D Output Cable (X75OPTCAB-DVI)

The optional DVI-D to DVI-D digital single-link cable connects a monitor to the DVI Out port on the back of the X75HD/X75SD unit. This is a straight connection cable with no breakouts, and a single DVI-D connector for digital video output.

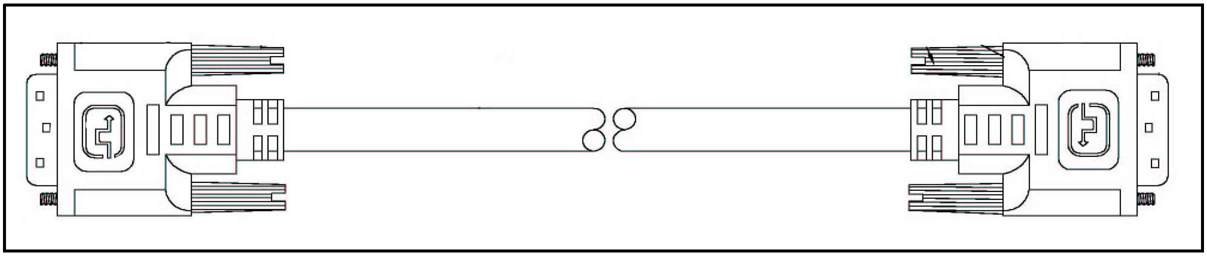


Figure A-4. DVI-D to DVI-D Cable

Audio Coax Cable (X75OPTCAB-8-C)

Figure A-5 identifies the cable connectors available on the AES/EBU audio X75OPTCAB-8-C coax cable, supplied standard with each X75SD unit.

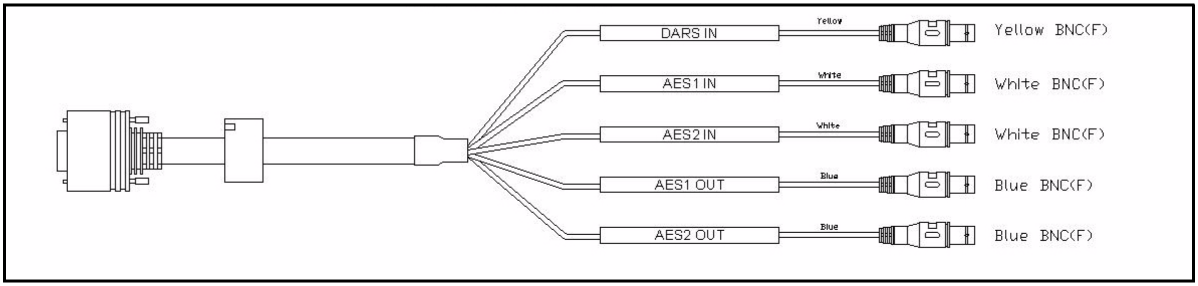


Figure A-5. X75OPTCAB-8-C Cable Connectors

Figure A-6 shows the pinouts for the X75OPTCAB-8-C DB-26M connector.

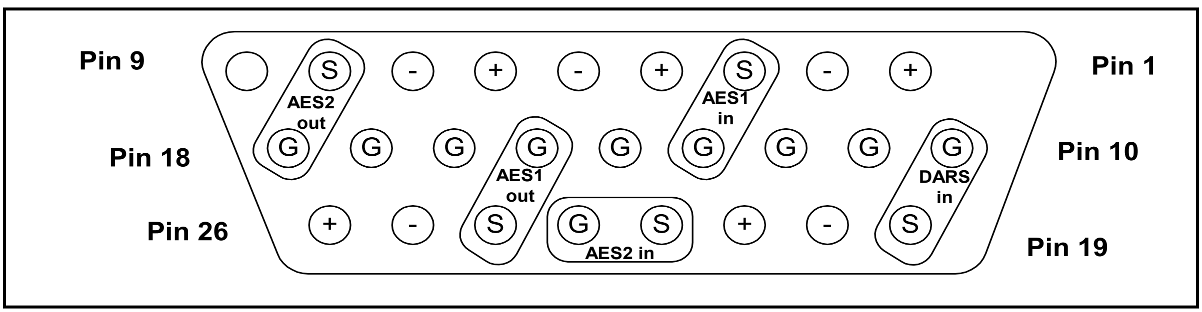


Figure A-6. X75OPTCAB-8-C Connector Pinout

Table A-5 describes each pin on the X75OPTCAB-8-C DB-26M connector and its connection type.

Table A-5. X75OPTCAB-8-C Pinout Description

Pin Number	Connection Type	Description
1	NC	N/A
2	NC	N/A
3	BNC	Unbalanced AES1 in

Table A-5. X75OPTCAB-8-C Pinout Description *(Continued)*

Pin Number	Connection Type	Description
4	NC	N/A
5	NC	N/A
6	NC	N/A
7	NC	N/A
8	BNC	Unbalanced AES2 out
9	NC	N/A
10	BNC-GND	Unbalanced DARS in ground
11	NC	N/A
12	NC	N/A
13	BNC-GND	Unbalanced AES1 in ground
14	NC	N/A
15	BNC-GND	Unbalanced AES1 out ground
16	NC	N/A
17	NC	N/A
18	BNC-GND	Unbalanced AES2 out ground
19	BNC	Unbalanced DARS in
20	NC	N/A
21	NC	N/A
22	BNC	Unbalanced AES2 in
23	BNC-GND	Unbalanced AES2 in ground
24	BNC	Unbalanced AES1 out
25	NC	N/A
26	NC	N/A

Audio Coax Cable (CAB-X75HD-COAX)

Figure A-7 identifies the cable connectors available on the CAB-X75HD-COAX cable, which is one of two parts in the X75OPTCAB-16-C cable set (the X75OPTCAB-8-C is the second cable in the set). The CAB-X75HD-COAX supports unbalanced audio signals. Both cables are supplied standard with each X75HD unit.

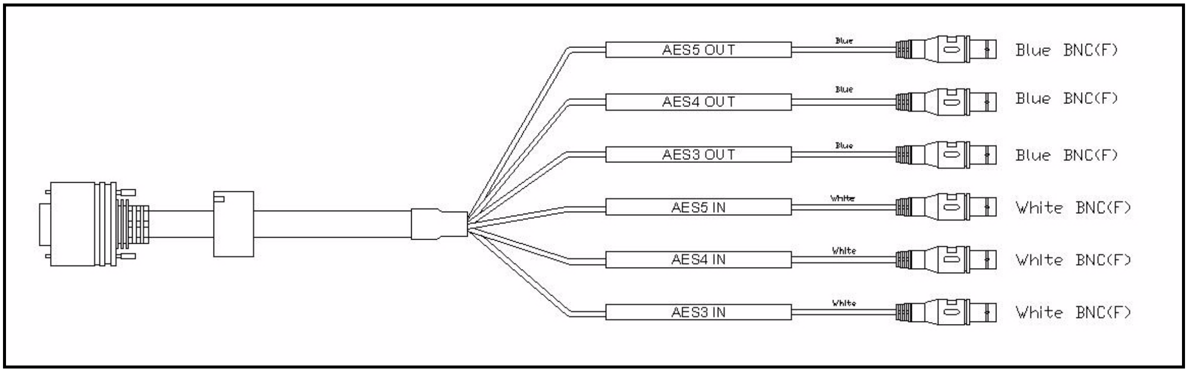


Figure A-7. CAB-X75HD-COAX Cable Connectors

Figure A-8 shows the pinouts for the X75OPTCAB-16-C DB-44M connector.

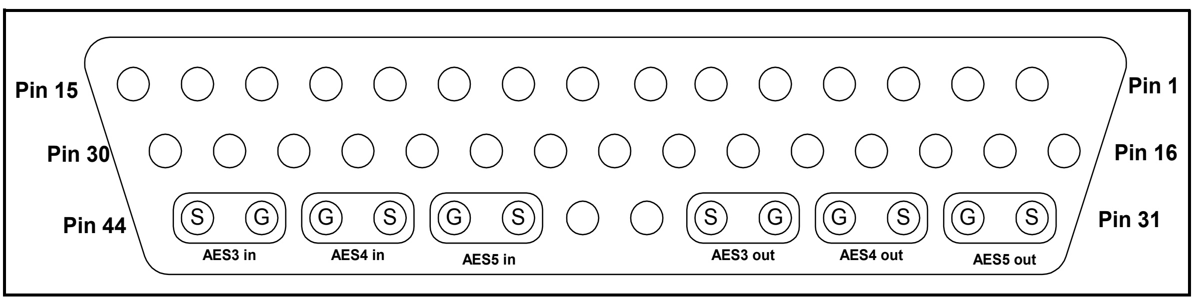


Figure A-8. CAB-X75HD-COAX Connector Pinout

Table A-6 describes each pin on the CAB-X75HD-COAX DB-44M connector and its connection type.

Table A-6. CAB-X75HD-COAX Pinout Description

Pin Number	Connection Type	Description
1 through 30	NC	N/A
31	BNC	Unbalanced AES5 out
32	BNC-Gnd	Unbalanced AES5 out Ground
33	BNC	Unbalanced AES4 out
34	BNC-Gnd	Unbalanced AES4 out ground
35	BNC-Gnd	Unbalanced AES3 out ground
36	BNC	Unbalanced AES3 out
37	NC	N/A
38	NC	N/A
39	BNC	Unbalanced AES5 in
40	BNC-Gnd	Unbalanced AES5 in ground
41	BNC	Unbalanced AES4 in
42	BNC-Gnd	Unbalanced AES4 in ground
43	BNC-Gnd	Unbalanced AES3 in ground
44	BNC	Unbalanced AES3 in

Audio BNC/XLR Cable (X75OPTCAB-8-XC)

Figure A-9 identifies the cable connectors available on the optional AES/EBU X75OPT-CAB-8-XC combination BNC/XLR audio cable, supporting both unbalanced and balanced audio signals.

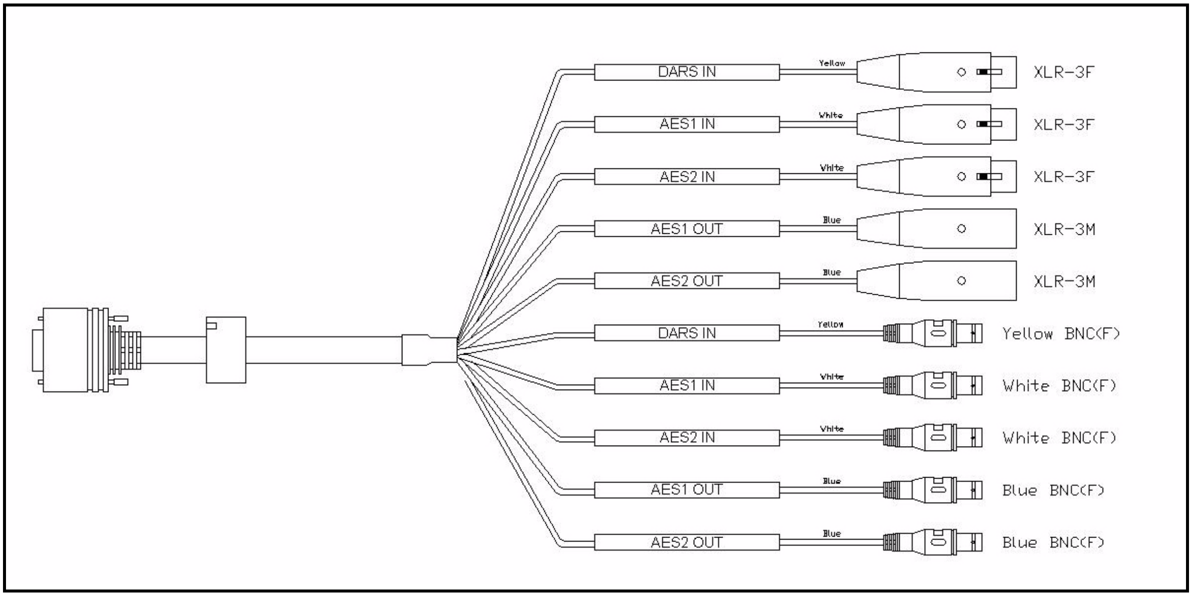


Figure A-9. X75OPTCAB-8-XC Cable Connectors

Figure A-10 shows the pinouts for the X75OPTCAB-8-XC DB-26M connector.

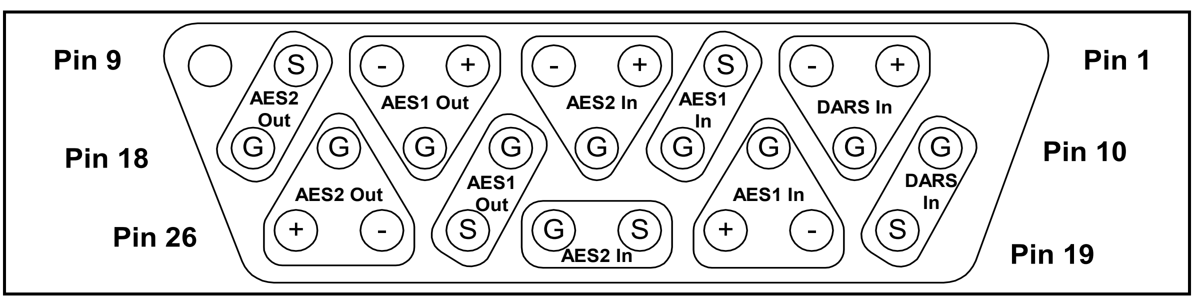


Figure A-10. X75OPTCAB-8-XC Connector Pinout

Table A-7 describes each pin on the X75OPTCAB-8-XC DB-26M connector and its connection type.

Table A-7. X75OPTCAB-8-XC Pinout Description

Pin Number	Connection Type	Description
1	XLR-2	Balanced DARS in (+)
2	XLR-3	Balanced DARS in (-)
3	BNC	Unbalanced AES1 in
4	XLR-2	Balanced AES2 in (+)
5	XLR-3	Balanced AES2 in (-)
6	XLR-2	Balanced AES1 out (+)
7	XLR-3	Balanced AES1 out (-)
8	BNC	Unbalanced AES2 out
9	NC	N/A
10	BNC-GND	Unbalanced DARS in ground
11	XLR-1-GND	Balanced DARS in ground
12	XLR-1-GND	Balanced AES1 in ground
13	BNC-GND	Unbalanced AES1 in ground
14	XLR-1-GND	Balanced AES2 in ground
15	BNC-GND	Unbalanced AES1 out ground
16	XLR-1-GND	Balanced AES1 out ground
17	XLR-1-GND	Balanced AES2 out ground
18	BNC-GND	Unbalanced AES2 out ground
19	BNC	Unbalanced DARS in
20	XLR-3	Balanced AES1 in (-)
21	XLR-2	Balanced AES1 in (+)
22	BNC	Unbalanced AES 2 in
23	BNC-GND	Unbalanced AES2 in ground

Table A-7. X75OPTCAB-8-XC Pinout Description *(Continued)*

Pin Number	Connection Type	Description
24	BNC	Unbalanced AES1 out
25	XLR-3	Balanced AES2 out (-)
26	XLR-2	Balanced AES2 out (+)

Audio BNC/XLR Cable (CAB-X75HD-COMBO)

Figure A-11 identifies the cable connectors available on the optional AES/EBU CAB-X75HD-COMBO combination BNC/XLR audio cable, which supports both unbalanced and balanced audio signals.

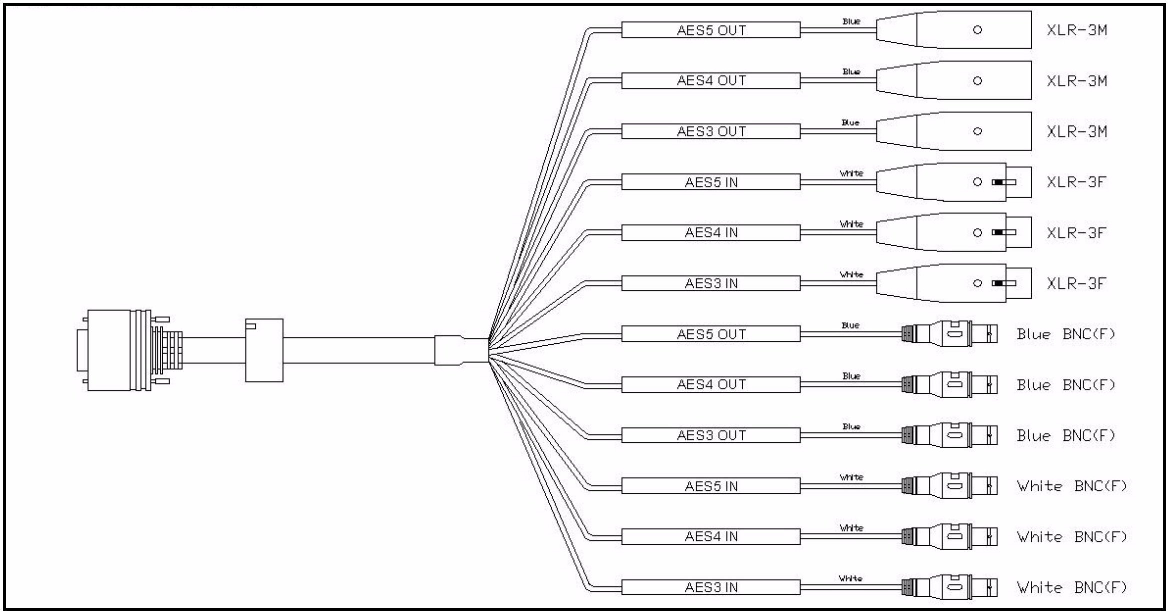


Figure A-11. CAB-X75HD-COMBO Cable Connectors

Figure A-12 shows the pinouts for the X75OPTCAB-16-CX DB-44M connector.

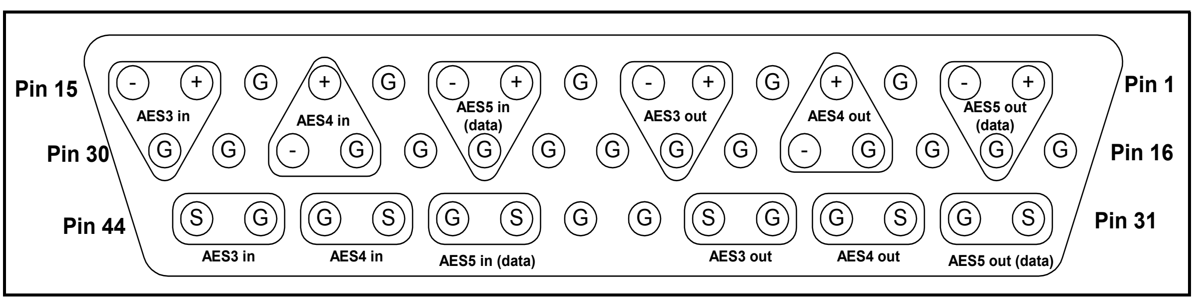


Figure A-12. CAB-X75HD-COMBO Connector Pinout

Table A-8 describes each pin on the CAB-X75HD-COMBO DB-44M connector and its connection type.

Table A-8. CAB-X75HD-COMBO Pinout Description

Pin Number	Connection Type	Description
1	XLR-2	Balanced AES5 out (+)
2	XLR-3	Balanced AES5 out (-)
3	NC	N/A
4	XLR-2	Balanced AES4 out (+)
5	NC	N/A
6	XLR-2	Balanced AES3 out (+)
7	XLR-3	Balanced AES3 out (-)
8	NC	N/A
9	XLR-2	Balanced AES5 in (+)
10	XLR-3	Balanced AES5 in (-)
11	NC	N/A
12	XLR-2	Balanced AES4 in (+)
13	NC	N/A
14	XLR-2	Balanced AES3 in (+)
15	XLR-3	Balanced AES3 in (-)
16	NC	N/A
17	XLR-1-Gnd	Balanced AES5 out ground
18	NC	N/A
19	XLR-1-Gnd	Balanced AES4 out ground
20	XLR-3	Balanced AES4 out (-)
21	NC	N/A
22	XLR-1-Gnd	Balanced AES3 out ground
23	NC	N/A
24	NC	N/A
25	XLR-1-Gnd	Balanced AES5 in ground
26	NC	N/A

Table A-8. CAB-X75HD-COMBO Pinout Description *(Continued)*

Pin Number	Connection Type	Description
27	XLR-1-Gnd	Balanced AES4 in ground
28	XLR-3	Balanced AES4 in (-)
29	NC	N/A
30	XLR-1-Gnd	Balanced AES3 in ground
31	BNC	Unbalanced AES5 out
32	BNC-Gnd	Unbalanced AES5 out ground
33	BNC	Unbalanced AES4 out
34	BNC-Gnd	Unbalanced AES4 out ground
35	BNC-Gnd	Unbalanced AES3 out ground
36	BNC	Unbalanced AES3 out
37	NC	N/A
38	NC	N/A
39	BNC	Unbalanced AES5 in
40	BNC-Gnd	Unbalanced AES5 in ground
41	BNC	Unbalanced AES4 in
42	BNC-Gnd	Unbalanced AES4 in ground
43	BNC-Gnd	Unbalanced AES3 in ground
44	BNC	Unbalanced AES3 in

Optional Audio XLR Cable (X75OPTCAB-8-X)

Figure A-13 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-8-X XLR audio cable, which supports balanced audio signals.

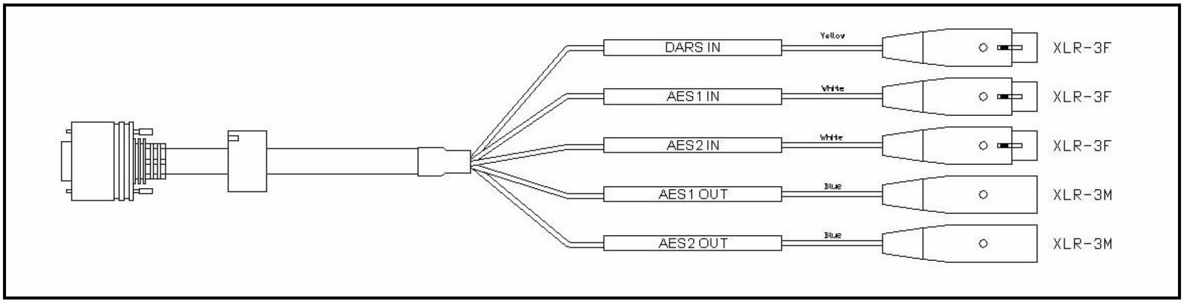


Figure A-13. X75OPTCAB-8-X Cable Connectors

Figure A-14 shows the pinouts for the X75OPTCAB-8-X DB-26M connector.

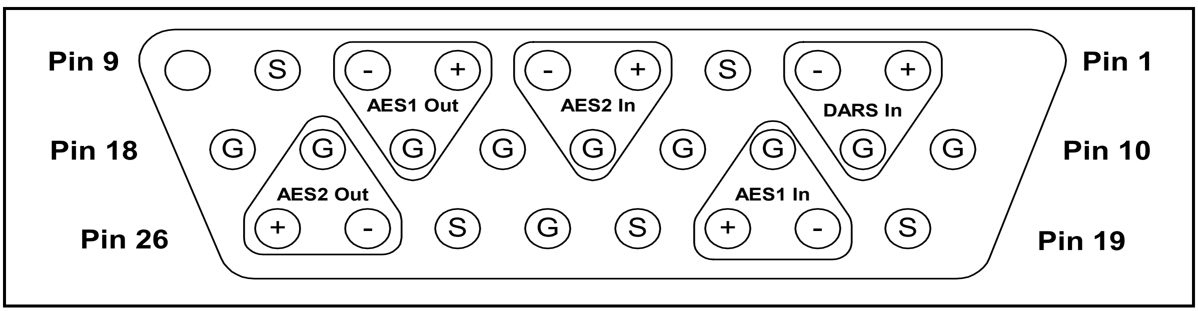


Figure A-14. X75OPTCAB-8-X Connector Pinout

Table A-9 describes each pin on the X75OPTCAB-8-X DB-26M connector and its connection type.

Table A-9. X75OPTCAB-8-X Pinout Description

Pin Number	Connection Type	Description
1	XLR-2	Balanced DARS in (+)
2	XLR-3	Balanced DARS in (-)
3	NC	N/A

Table A-9. X75OPTCAB-8-X Pinout Description *(Continued)*

Pin Number	Connection Type	Description
4	XLR-2	Balanced AES2 in (+)
5	XLR-3	Balanced AES2 in (-)
6	XLR-2	Balanced AES1 out (+)
7	XLR-3	Balanced AES1 out (-)
8	NC	N/A
9	NC	N/A
10	NC	N/A
11	XLR-1-GND	Balanced DARS in ground
12	XLR-1-GND	Balanced AES1 in ground
13	NC	N/A
14	XLR-1-GND	Balanced AES2 in ground
15	NC	N/A
16	XLR-1-GND	Balanced AES1 out ground
17	XLR-1-GND	Balanced AES2 out ground
18	NC	N/A
19	NC	N/A
20	XLR-3	Balanced AES1 in (-)
21	XLR-2	Balanced AES1 in (+)
22	NC	N/A
23	NC	N/A
24	NC	N/A
25	XLR-3	Balanced AES2 out (-)
26	XLR-2	Balanced AES2 out (+)

Optional Audio XLR Cable (X75OPTCAB-XLR)

Figure A-15 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-XLR audio cable, which is one of the cables in the X75OPTCAB-16-X set. This cable supports balanced audio signals.

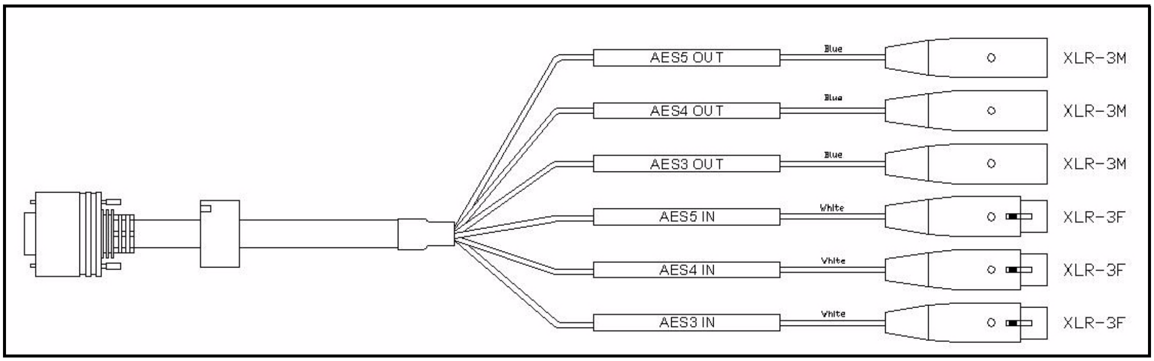


Figure A-15. X75OPTCAB-XLR Cable Connectors

Figure A-16 shows the pinouts for the X75OPTCAB-16-X DB-44M connector.

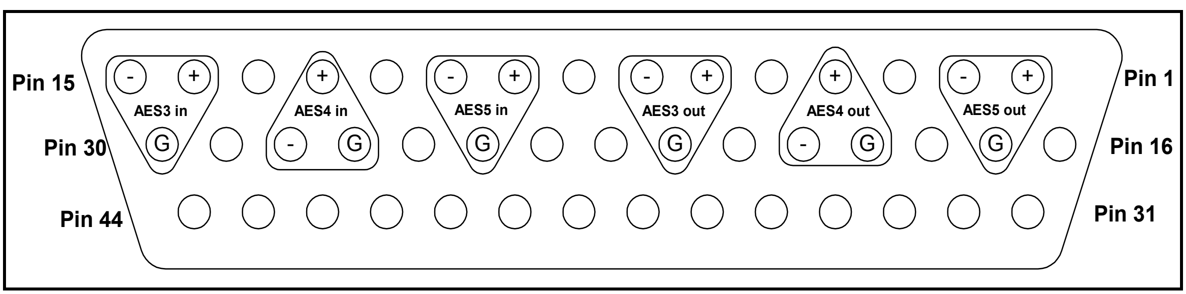


Figure A-16. X75OPTCAB-XLR Connector Pinout

Table A-10 describes each pin on the X75OPTCAB-XLR DB-44M connector and its connection type.

Table A-10. X75OPTCAB-XLR Pinout Description

Pin Number	Connection Type	Description
1	XLR-2	Balanced AES5 out (+)
2	XLR-3	Balanced AES5 out (-)
3	NC	N/A
4	XLR-2	Balanced AES4 out (+)
5	NC	N/A
6	XLR-2	Balanced AES3 out (+)
7	XLR-3	Balanced AES3 out (-)
8	NC	N/A
9	XLR-2	Balanced AES5 in (+)
10	XLR-3	Balanced AES5 in (-)
11	NC	N/A
12	XLR-2	Balanced AES4 in (+)
13	NC	N/A
14	XLR-2	Balanced AES3 in (+)
15	XLR-3	Balanced AES3 in (-)
16	NC	N/A
17	XLR-1-Gnd	Balanced AES5 out ground
18	NC	N/A
19	XLR-1-Gnd	Balanced AES4 out ground
20	XLR-3	Balanced AES4 out (-)
21	NC	N/A
22	XLR-1-Gnd	Balanced AES3 out ground
23	NC	N/A
24	NC	N/A
25	XLR-1-Gnd	Balanced AES5 in ground
26	NC	N/A

Table A-10. X75OPTCAB-XLR Pinout Description *(Continued)*

Pin Number	Connection Type	Description
27	XLR-1-Gnd	Balanced AES4 in ground
28	XLR-3	Balanced AES4 in (-)
29	NC	N/A
30	XLR-1-Gnd	Balanced AES3 in ground
31 through 44	NC	N/A

Appendix B

Troubleshooting

Overview

The following appendix describes some of the more common problems you might encounter while using the X75HD/X75SD, and it offers tips on how to correct these problems.

The following problems areas are covered:

- "Network Connectivity" on page 222
- "Front Panel Display" on page 225
- "Video Conversion" on page 231
- "Audio" on page 235
- "Alarms" on page 240
- "Softkey Installation" on page 242
- "Flash Memory" on page 244
- "Upgrading Firmware" on page 247

Network Connectivity

Forgotten IP address

Problem

You can’t remember the set IP address for a specific X75HD/SD unit and are having a problem communicating with it on the network.

Solution

Temporarily set the unit into the factory default IP Address. Follow these steps to set the default IP address:

1. Push the **Def IP** DIP switch on the back of the unit to the *down* position (see Figure B-1).

   This resets the unit to the following default network addresses:

   - Device IP: 192.168.100.250
   - Subnet mask: 255.255.255.0
   - Gateway: 192.168.100.250

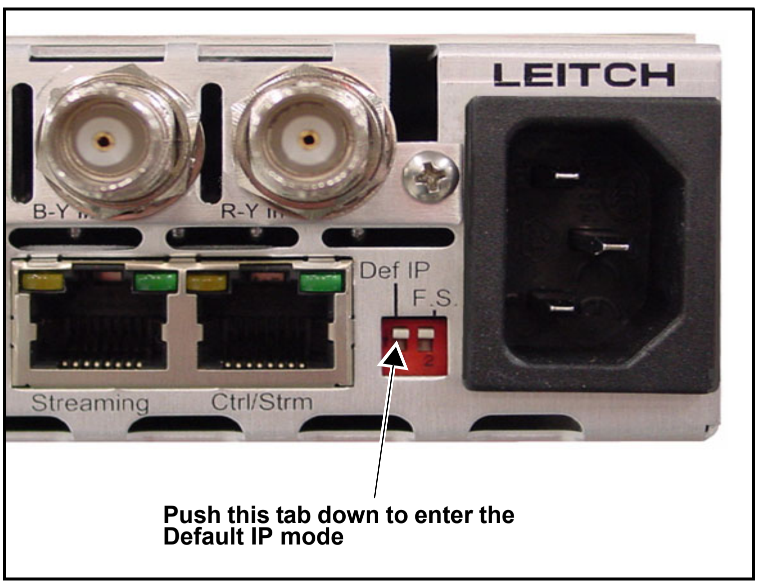


Figure B-1. Location of DEF IP DIP Switch

2. Launch the X75 Web browser software, and then navigate to the **System Config>Setup** menu.
3. Select the **Device IP** parameter to view the currently set IP address and then use this IP address to access the unit again.
4. Return the **Def IP DIP** switch to the up position.
5. Reboot the system.

No response to SNMP Walk command

Problem

After writing the SNMP configuration settings back to the X75HD/X75SD using the CCS CoPilot/Pilot/Navigator application, the unit does not respond to the **SNMPWalk** command.

Solution

Obtain and reinstall the latest version CCS application from Leitch and then rewrite the SNMP configuration back into the X75HD/X75SD unit. (CCS CoPilot/Pilot 2.99 and Navigator 2.1 do not write back the proper community strings within the x75agent.xnv file.)

To install the X75 agent configuration file work-around manually, follow these steps:

1. Start up a DOS box from the Windows application and then go to the C:\ directory.
2. Use the following ftp commands to read out the x75agent.xnv file from the X75:
   - ftp <**ip address of x75 frame**>
   - User: **leitch**
   - Password: **LeitchAdmin** (case sensitive)
   - Get **x75agent.xnv**
3. Edit the **x75agent.xnv** file with a Notepad application.
4. Go to the [**v1v2cCommunityTbl**] section and then edit the lines as shown below:

   (The public and private community names can be anything.)
   - 1=**public readOnly(2)**
   - 2=**private readCreate(4)**
5. Write the edited file back to X75 by issuing the command: **put x75agent.xnv**
6. Type **bye** to exit ftp session.
7. Reboot the X75 frame.

Front Panel Display

Control panel display is blank

Problem

Even though the unit has been powered up, no information appears on the VFD screen. However, the LEDs on the control panel seem to be functioning.

Solution 1

The **F.S.** (fail-safe) switch at the back of the X75 is in the down position (see Figure B-2); this is preventing the unit from booting up properly. When the switch is down, the runtime code is suspended, and only the FTP port is opened for the file transfer.

Restore the switch to the up position, and then re-power the unit to see if it reboots correctly.

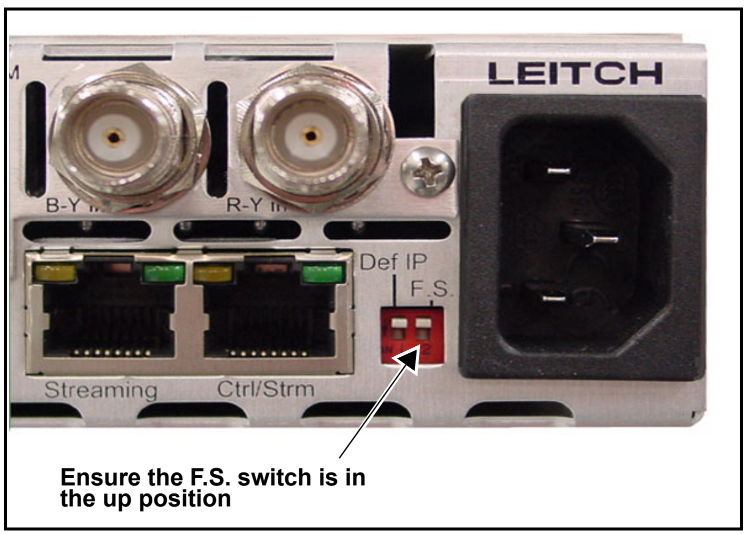


Figure B-2. Fail-safe Switch

Solution 2

Some of the early X75 and X75-RCP units have experienced premature failure of capacitor C38 (part # 101-000067-00; see Figure B-3 on page 227) made by Vishay (part # VJ1210Y334J(K)XBAT). This results in a blank VFD (Vacuum Florescent Display).

Obtain the serial number of the X75HD/X75SD unit and the original PO number. Then contact Leitch customer support. The front control panel assembly (part number 170-000483-00) will be exchanged free of charge. No special programming or configuration is required.

The failure nature of this C38 capacitor is that it slowly builds up the resistance in an inverse way that eventually shorts out the power line supplying the power to the VFD. The resistance across this capacitor should be more than several thousand ohms, but failed capacitors are measured below several hundred ohms.

The VFD will function without this DC filtering capacitor. If your situation is urgent, carefully remove or replace this capacitor. Follow these steps to remove and replace the capacitor:

1. Pull the frame 2 inches from the rack and then remove a total of 14 screws from the top and bottom of the front panel assembly.
2. Detach the front panel from the chassis by gently pulling the panel forward.

   (There is a mating connector on the left side of the chassis.)
3. Remove and replace the defective capacitor.

See “Installing a Frame-Mounted Local Control Panel” on page 263 for more details.

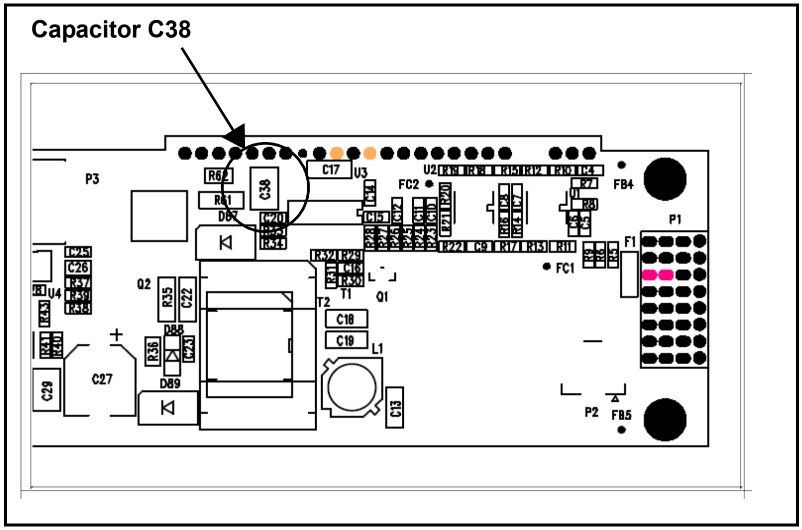


Figure B-3. Location of Failed Capacitor Behind VFD

Solution 3

If you have verified that capacitor C38 is good, but there is still no display on the VFD, it is most likely that the VFD (part number 123-000003-00) has failed.

Contact Leitch customer service for a Returned Merchandise Authorization (RMA) number. Then return or exchange the control panel assembly (part number 170-000483-00).

Analog input video control menu is not showing up

Problem

The menus on the VFD appear to be functioning normally, but the **Analog Input Video** control menu does *not* appear, or it seems to appear randomly.

Solution 1

If the appearance of the **Analog Input Video** menu is random, the software version of the unit is 1.4 and therefore, an upgrade to version 1.5 or greater is required.

Visit http://www.leitch.com/custserv/WebDL.nsf/FF?OpenForm&X75HD/X75SD and then download the latest version of the software. Open up the **Release Notes** file for the update instructions, and then proceed with the firmware upgrade.

Solution 2

The X75OPT-PQM or X75OPT-A3D module, or its interconnecting stacker pins are not installed correctly. To remove and reinstall the module, follow these steps:

1. Remove the X75HD/X75SD from the rack, and then open the lid.
2. Remove the X75OPT-A3D or X75OPT-PQM submodule from the mainboard.
3. Inspect the stacker pins for proper installation and connection.

   (See “Installing and Removing X75OPT-A3D or X75OPT-PQM Modules” on page 274 for more information.)
4. Re-install the submodule and lid.
5. Install the frame back into the rack and verify the presence of the **Analog Input Video** menu upon power up.

Solution 3

The X75OPT-A3D or X75OPT-PQM submodule may be defective. If another A3D or PQM submodule is available, swap the submodule to determine if the original is defective.

If the submodule is proven defective, contact Leitch customer service for an RMA number, and then return the module to Leitch.

Power LEDs are off and there is no display on the LCP

Problem

The local control panel appears to be "dead." There are no functioning LEDs, no buttons are lit, and the VFD is blank.

Solution 1

The unit is not receiving power. The AC cord(s) have become loose. Ensure the power cords are firmly pressed into the unit.

Solution 2

The internal power supply is defective. Open the lid of the X75HD/X75SD, and using a voltage meter, determine if the power supply is producing +24VDC on the main DC cable(s). See Figure B-4 for the location of the power supply and Table B-1 on page 230 for pinout information.

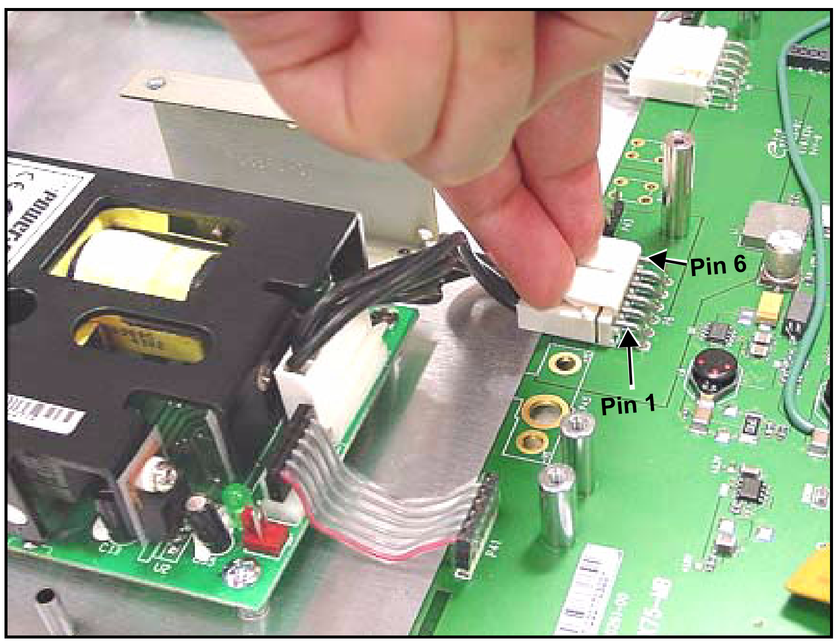


Figure B-4. Location of Power Supplies DC Cables

Table B-1. Main DC Cable Pinouts

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
+24V	+24V	+24V	Ground	Ground	Ground

Solution 3

The internal flash memory is corrupted or locked up. See page 244 for details on restarting the flash memory.

Video Conversion

Performing an HD cross-conversion but can't see the down-converted signal

Problem

The X75HD is taking 1080i input and forcing the output HD standard to 720p for cross-conversion, but the down-converted signal is not present at the SDTV outputs. There is no visible SDTV content.

1080i/59.94 → HD1 input // ==== Internal processing ==== // HD output → 720p/59.94

+ ==== // SD output → No visible HD content

Solution:

The unit does not have the softkey option that makes it possible to perform simultaneous crossconversion and downconversion. Purchase and install the X75OPT-HDDUOCON software key option.

Follow these steps to purchase and install the HDDUOCON option:

1. Confirm the option is *not* installed by following this path:
   System Config>Status/Version Info>S/W Options

   The word `HDDUOCON` will display if the option is installed.
2. If the option is not installed, follow this path to find and record the unit's serial number:
   System Config>Status/Version Info>Serial Number
3. Contact Leitch's sales department and then purchase the option.

Enter the softkey using either an X75HD/X75SD control panel, the X75HD/X75SD Web Browser, or a CCS software application. (The valid key character sets are numbers 2~9 and letters A~Z.)

To enter a softkey number using the control panel, follow these steps:

1. Select **System Config>Setup>License Key**.
2. Use the control knob and the **Enter** button to enter the characters.
3. Press the **Exit** button when completed.

To enter the softkey number using the Web Browser, follow these steps:

1. Type the IP address of the X75HD/X75SD unit you are upgrading into the **Address** field of your browser (Figure B-5).

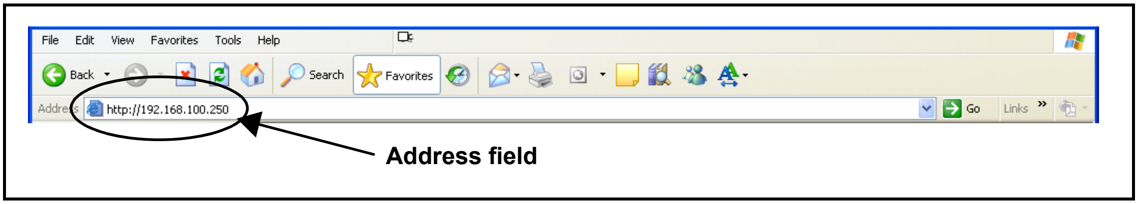


Figure B-5. IP Address Insertion to Add X75OPT-HDDUOCON Option

2. Navigate to **System Config>Setup>License Key**.
3. Type in the supplied softkey codes.

   The option should now function.

To enter the softkey number using a CCS software application, follow these steps:

1. With your X75HD/X75SD unit selected in CoPilot, click the **Device** tab in the **Configuration** window.
2. Type your license key in the **License Key** field.
3. Click the **Write and Reboot** button.

   The writing process includes a validation step to prevent you from writing an invalid license key.

Won't perform up and down conversions simultaneously

Problem:

The unit performs upconversions and it performs downconversions, but not both at the same time.

Solution:

The unit does not have the softkey option that makes it possible to perform simultaneous crossconversion and downconversion. Purchase and install the X75OPT-HDDUOCON software key option.

Follow these steps to purchase and install the HDDUOCON option:

1. Confirm the option is *not* installed by following this path:
   System Config>Status/Version Info>S/W Options

   The word `HDDUOCON` will display if the option is installed.
2. If the option is not installed, follow this path to find the unit's serial number:
   System Config>Status/Version Info>Serial Number
3. Contact Leitch's sales department and then purchase the option.

Enter the softkey using either an X75HD/X75SD control panel, the X75HD/X75SD Web Browser, or a CCS software application. (The valid key character sets are numbers 2~9 and letters A~Z.)

To enter a softkey number using the control panel, follow these steps:

1. Select **System Config>Setup>License Key**.
2. Use the control knob and the **Enter** button to enter the characters.
3. Press the **Exit** button when completed.

To enter the softkey number using the Web Browser, follow these steps:

1. Type the IP address of the X75HD/X75SD unit you are upgrading into the **Address** field of your browser (see Figure B-6 on page 234).

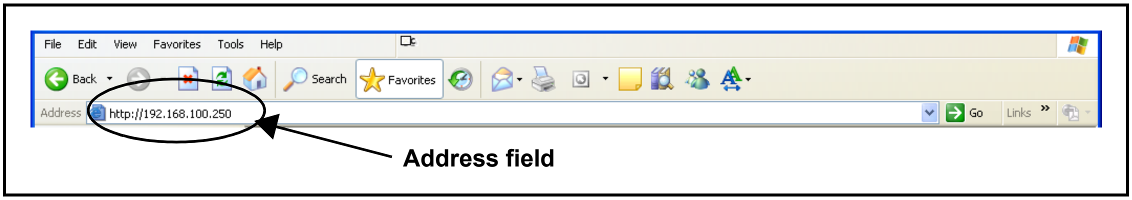


Figure B-6. IP Address Insertion to Add X75OPT-HDDUOCON Option

2. Navigate to **System Config>Setup>License Key**.
3. Type in the supplied softkey codes.

   The option should now function.

To enter the softkey number using a CCS software application, follow these steps:

1. With your X75HD/X75SD unit selected in CoPilot, click the **Device** tab in the **Configuration** window.
2. Type your license key in the **License Key** field.
3. Click the **Write and Reboot** button.

   The writing process includes a validation step to prevent you from writing an invalid license key.

Audio

Lip sync problems

Problem 1

During normal audio processing, the audio and video are out of sync.

Solution 1

Each audio sample rate converter (SRC) can be configured to automatically track the processing delay of one of the video outputs. To apply the internal audio tracking feature, follow this path: **Audio Setup>Global Audio Config>I/O Delay Config** and then select one of the four or eight **I/O Delay SRCx** parameters.

To synchronize the audio, assign the output video type to the associated audio SRC(s).

The **I/O Delay SRCx** parameters are responsible for compensating the internal video propagation delay such that the audio channels are delayed in correct amount with respect to the chosen video output. Depending on the enabled internal processing options and signal path, the processed video's delay may vary from a few microseconds to several frames. Therefore, the aggregation of video delay is derived at the output as the I/O delay signal to be passed to the audio synchronizer to match the audio-to-video delay automatically.

Figure B-7 on page 236 illustrates how the **I/O Delay** signal is derived in SDI-to-SDI signal processing when some of the processing block(s) are activated. Some of the processing blocks that can be applied to the signal include SD ARC, Noise Reduction, User Fixed Delay.

Due to the flexibility of the M-Path mode, the default setting for this parameter is **None** and this selection sets the X75 in **Delay Only** mode. When any one of the **I/O Delay SRCx** parameters is set to track certain output video, the **Autotrack LED** on the control panel is lit.

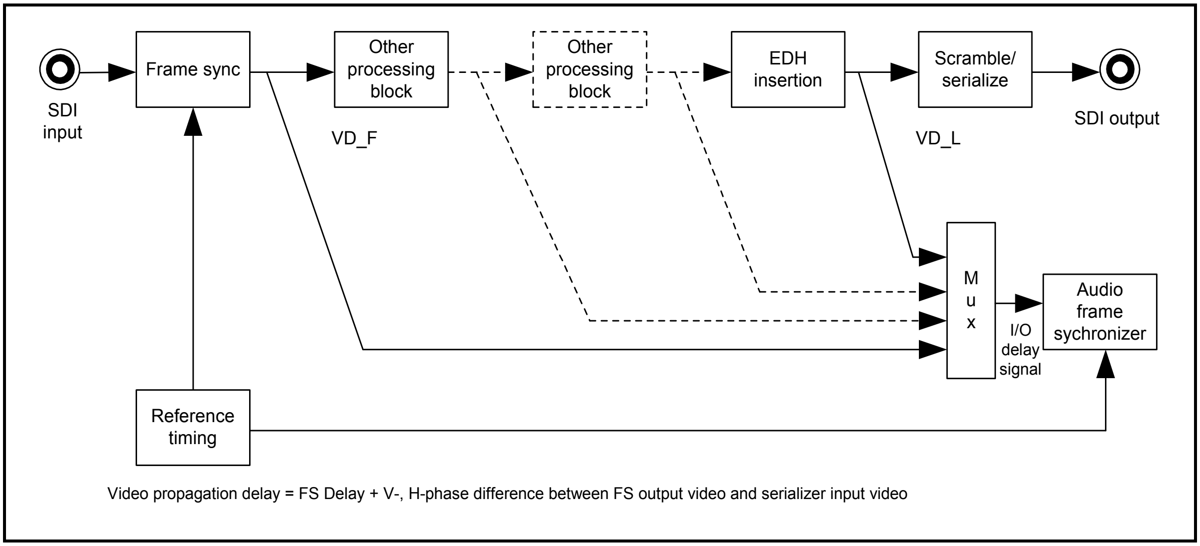


Figure B-7. I/O Delay Signal

Problem 2

When passing the compressed audio via the AES input or embedded paths, the audio and video are out of sync.

Solution

A proper system configuration must be created. If the X75HD/X75SD is set to run in **External Reference** lock mode and the reference signal is applied, the source signal (including the audio) also must be locked to the same reference. Otherwise, the X75's internal frame sync will repeat or drop the video frame as the input and output clocks drift from each other. This will affect the lip sync over periods of time. Also, if the source device driving the X75HD/X75SD has an internal frame sync, it may cause pops or clicks on the downstream device as it drops or repeat frames.

If the source cannot be locked, the X75 must run in delay mode. This is done by selecting **Genlock Lock Source** as the current video input.

Application Example

The application example below describes how to set the X75 for **Delay** mode operation.

The X75HD takes a 1080i or 720p HD signal with embedded audio that is compressed, and at the output, provides fixed 720p with embedded audio. It is assumed that the Dolby embedded audio is present in one of the AES channels in group1's audio space. The X75HD is set up in delay mode, locking to HD video input. Thus, the synchronization of video and audio is not possible. However, you *can* activate the video **ProcAmp** function, making it possible to adjust video levels, video delay, audio delay, and other parameters.

Make the following settings to the X75 unit:

Video Parameters

- **Video Setup>HD Input>HD Input Std Select = Auto**
- **Video Setup>Routing Setup>All Out Sel = HD1**
- **Video Setup>Digital Output>HD Out Std Select = 720p/59.94**

Reference Parameters

- **Reference Setup>Genlock Lock Source = HD**

Audio Parameters

- **Audio Setup>Routing>Audio In Src Select = HD**
- **Audio Setup>Global Audio Config>I/O Delay Config>I/O Delay SRC1 = HD Out**
- **Audio Setup>Global Audio Config>I/O Delay Config>I/O Delay SRC2 = HD Out**

If the lip sync problem still occurs, decode the compressed audio to the baseband using the internal plug-in Dolby decoder module in the X75 and then re-encode again.

Not passing the embedded audio

Without the optional audio submodule, the SD-SDI with embedded audio will pass through the SD-SDI output. The HD-SDI signal with the embedded audio will not pass through the HD-SDI output.

When the video frame sync repeats or drops a frame, or if there is a hot-switch, there will be a disturbance in the embedded audio data stream. This occurs with any video frame sync that passes embedded audio with no embedded audio processing.

When the X75SD unit has no audio submodule installed, the default factory setting will not allow the audio to pass. To change this setting, follow this path:

Video Setup>Processing>SD TSG & Slide>Keyer TSG Insert = None

Additionally, there is an implementation issue with X75 version 1.6.100 and below.

When the frame is rebooted or the **Video Input** source is switched, the **Keyer TSG Insert** parameter follows the selected input video source. In order to pass the embedded audio again, this parameter must be set to **None** again.

This issue will be addressed in the subsequent software release.

Analog input audio control menu not showing up

Problem

The menus on the VFD appear to be functioning normally, but the **Analog Input Audio** control menu does *not* appear, or it seems to appear randomly.

Solution 1

If the appearance of the **Analog Input Audio** menu is random, the software version of the unit is 1.4 and therefore, an upgrade to version 1.5 or greater is required.

Visit http://www.leitch.com/custserv/WebDL.nsf/FF?OpenForm&X75HD/X75SD and then download the latest version of the software. Open up the **Release Notes** file for the update instructions, and then proceed with the firmware upgrade.

Solution 2

The X75OPT-AS-8 or X75OPT-AS-16 audio submodule, and or its interconnecting stacker pins, are not installed correctly. Follow these steps to remove and reinstall the module:

1. Remove the X75HD/X75SD from the rack, and then open the lid.
2. Remove the X75OPT-AS-8 or X75OPT-AS-16 submodule from the mainboard.
3. Inspect the stacker pins for proper installation and connection.

   (See "Installing and Removing an Audio Synchronizer Module" on page 264 for more information.)
4. Re-install the submodule and lid.
5. Install the frame back into the rack and verify the presence of the **Analog Input Audio** menu upon power up.

Solution 3

The X75OPT-AS-8 or X75OPT-AS-16 submodule may be defective. If another module of the same type is available, swap the module. If the submodule is proven defective, contact Leitch customer service for an RMA number, and then return the module to Leitch.

Alarms

Major and Minor Alarms are on

Problem

When the unit is powered up, all or many of the **Alarm** LEDs and network alarms are activated.

Solution 1

The X75 monitors all video and audio inputs, fans, and power supplies. When it detects failure conditions, it activates alarms because the factory default is set to monitor *all* alarms. You can globally disable all of the alarms, or manually enable only those that you want to monitor.

To globally disable all of the alarms in the X75HD/X75SD control panel and in the Web browser, follow this path:

System Config>Alarm Assert Setup>Enable All Alarms and then select **Disable**.

Solution 2

You can choose to disable specific alarms, while leaving others activated.

To configure and activate only the alarms that you wish to monitor, using the X75HD/X75SD control panel, follow these steps:

1. Press the **Option** button and then select the **Configure Alarm** menu.
2. Select the desired alarm parameter by pressing the **Enter** button.
3. Within this parameter menu, configure the alarm appropriately.

To configure and activate only the alarms that you wish to monitor, using the Web Browser, follow these steps:

1. Open up your Internet browser.
2. Type the IP Address of the X75 frame on the Address field (see Figure B-8).

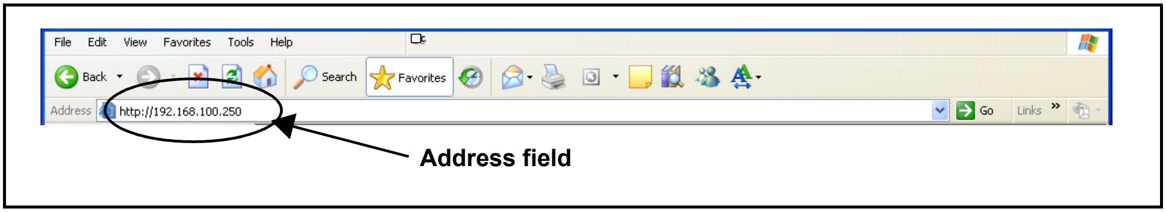


Figure B-8. IP Address Insertion to Access X75HD/X75SD Alarms

3. From the Main web page, select the **Monitoring** hyperlink.
4. Select the **Configure Alarms** hyperlink.
5. Press the **Edit** button corresponding to the alarm that you wish to enable and configure it.

Softkey Installation

Can’t activate softkeys

To activate software options that you have purchased (including Dolby decoding) you must enter a softkey code into the License Key menu. The code, consisting of fourteen hexadecimal digits, will be provided when you purchase the option. Enter the softkey using either an X75HD/X75SD control panel, the X75HD/X75SD Web Browser, or a CCS software application. (The valid key character sets are numbers 2~9 and letters A~Z.)

To enter a softkey number using the control panel, follow these steps:

1. Select **System Config>Setup>License Key**.
2. Use the control knob and the **Enter** button to enter the characters.
3. Press the **Exit** button when completed.

To enter the softkey number using the Web Browser, follow these steps:

1. Type the IP address of the X75HD/X75SD unit you are upgrading into the **Address** field of your browser (Figure B-9).

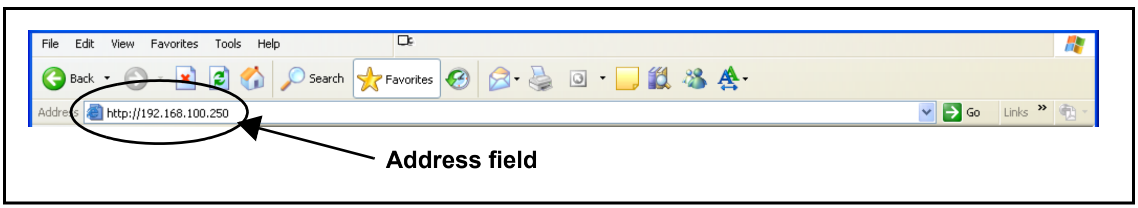


Figure B-9. IP Address Insertion to Add X75OPT-HDDUOCON Option

2. Navigate to **System Config>Setup>License Key**.
3. Type in the supplied softkey codes.

   The upgrade will now take effect.

To enter the softkey number using a CCS software application, follow these steps:

1. With your X75HD/X75SD unit selected in CoPilot, click the **Device** tab in the **Configuration** window.
2. Type your license key in the **License Key** field.

3. Click the **Write and Reboot** button.

   The writing process includes a validation step to prevent you from writing an invalid license key.

There is a different procedure for installing free firmware upgrades that appear on the Leitch Web site. See “Appendix D: Software” on page 303 for details.

Flash Memory

Flash memory is locked

Problem

The firmware update process was interrupted either by turning off the unit or breaking from the PC during the file transfer. The flash memory is now locked up.

Solution

A manual unlock procedure is required. Follow these steps to unlock the flash memory:

1. Push both **Def IP** and **F.S.** (Fail-safe) DIP switches at the back of the X75 unit to the down position, and then re-power the unit (see Figure B-10).

   (This action sets the unit with the default IP of `192.168.100.250` and opens the FTP port for the file transfer.)

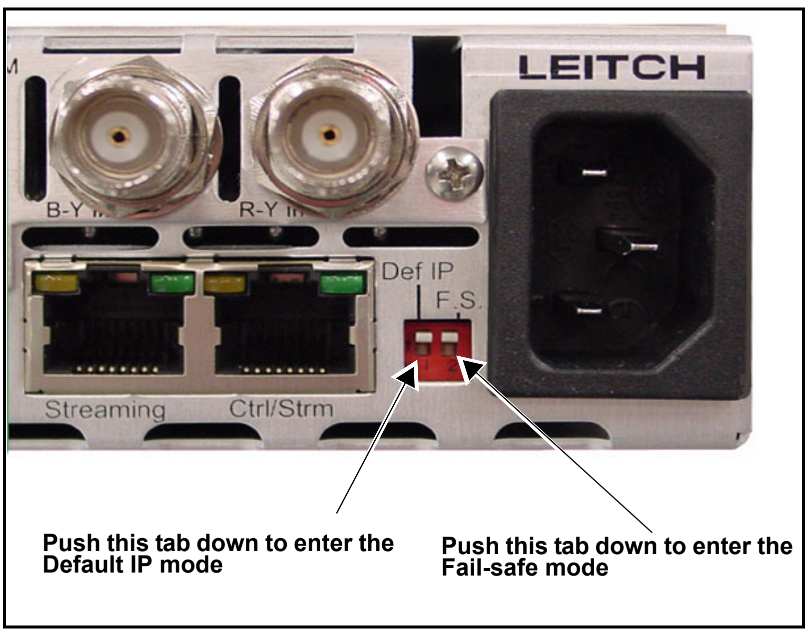


Figure B-10. Location of Def IP and FS DIP Switches

2. Configure your PC's network setting to be on the same static network, using the network addresses shown in Table B-2.

Table B-2. Network Addresses for Default IP and Fail-safe Modes

Network Settings	X75HD/X75SD Unit	PC
IP Address	192.168.100.250	192.168.100.2
Subnet	255.255.255.0	255.255.255.0
Gateway	192.168.100.1	192.168.100.1

3. Connect a cross-over Ethernet cable between the X75HD/X75SD and the PC directly, or a straight Ethernet cable when the PC and X75HD/X75SD are on a network hub or a switch.
4. Ping `192.168.100.250`, and then press the ENTER button on your keyboard.

   If the network connection is valid, the reply messages should be returned.
5. Type the following text: `TELNET 192.168.100.250`, and then press ENTER.
6. Type the following case sensitive login information into the Telnet session:
   a. login: `leitch` and then press ENTER
   b. Password: `LeitchAdmin` and then press ENTER
7. In the Telnet session, follow these steps:
   a. In the .vxWorks shell, type: `m 0x4000000,2`
   and then press ENTER (there is a single space after the letter m).

      You will be prompted with: 0x4000000: xxxx
   b. Type in: `6060`
   and then press ENTER

      You will be prompted with: 0x4000002: xxxx -
   c. Press ENTER.

      You will be prompted with: 0x4000004: xxxx -

d. Type in: `d0d0`
and then press ENTER (Note: These are numeric zeroes)

You will be prompted with: 0x4000006: xxxx -

e. Type in: q
and then press ENTER.

8. Close the **Command Prompt DOS Box** to quit the Telnet session.
9. Obtain the latest version of the release software from the Leitch Web site and then follow the instruction to upload the files.
10. When completed, put both the **Def IP** and **F.S.** DIP switches at the back of the X75 unit to the up position.
11. Reboot the X75HD/X75SD unit.

Upgrading Firmware

Software can't upload

Problem:

Many attempts were made to update the X75HD/X75SD software, but there are network problems interfering with the procedure.

Solution:

It's likely that the file system became corrupted. In this case, the frame can be updated by using both the Fail-safe and Default IP switches. Follow these steps to correct the problem:

1. Push both **Def IP** and **F.S.** (Fail-safe) DIP switches at the back of the X75 unit to the down position, and then re-power the unit (see Figure B-11).

   (This action sets the unit with the default IP of `192.168.100.250` and opens the FTP port for the file transfer.)

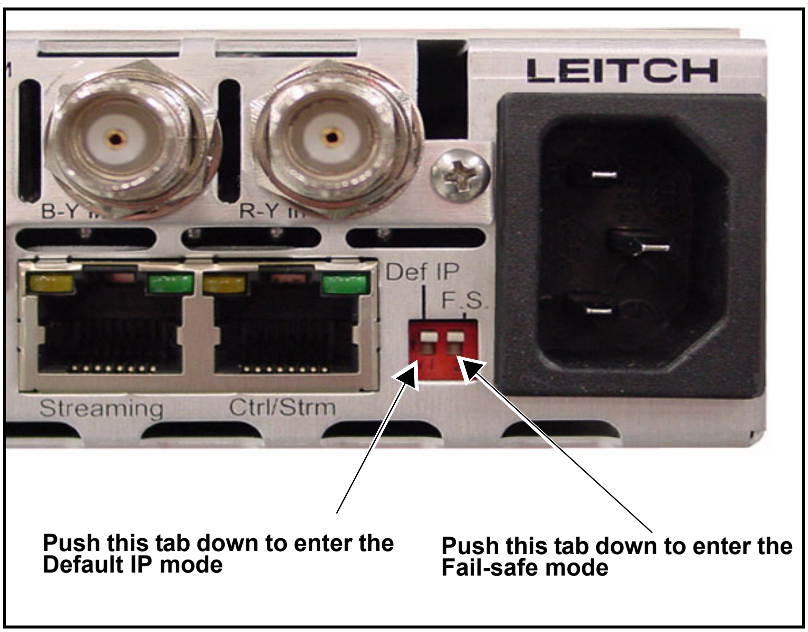


Figure B-11. Location of Def IP and FS DIP Switches

2. Configure your PC's network setting to be on the same static network, using the network addresses shown in Table B-3.

Table B-3. Network Addresses for Default IP and Fail-safe Modes

Network Settings	X75HD/X75SD Unit	PC
IP Address	192.168.100.250	192.168.100.2
Subnet	255.255.255.0	255.255.255.0
Gateway	192.168.100.1	192.168.100.1

3. Connect a cross-over Ethernet cable between the X75HD/X75SD and the PC directly, or a straight Ethernet cable when the PC and X75HD/X75SD are on a network hub or a switch.
4. Ping `192.168.100.250`, and then press the ENTER button on your keyboard.

   If the network connection is valid, the reply messages should be returned.
5. Type the following text: `TELNET 192.168.100.250`, and then press ENTER.
6. Type the following case sensitive login information into the Telnet session:
   a. login: `leitch` and then press ENTER
   b. Password: `LeitchAdmin` and then press ENTER
7. In the Telnet session, follow these steps:
   a. In the vxWorks shell, type: `m 0x4000000,2`
      and then press ENTER (there is a single space after the letter m).

      You will be prompted with: 0x4000000: xxxx
   b. Type in: `6060`
      and then press ENTER

      You will be prompted with: 0x4000002: xxxx -
   c. Press ENTER.

      You will be prompted with: 0x4000004: xxxx -

d. Type in: `d0d0`
   and then press ENTER (Note: These are numeric zeroes)

   You will be prompted with: 0x4000006: xxxx -

e. Type in: q
   and then press ENTER.

8. Close the **Command Prompt DOS Box** to quit the Telnet session.
9. Obtain the latest version of the release software from the Leitch Web site and then follow the instruction to upload the files.
10. When completed, put both the **Def IP** and **F.S.** DIP switches at the back of the X75 unit to the up position.
11. Reboot the X75HD/X75SD unit.

RCP is not booting up properly after upgrade

Problem:

An X75HD/X75SD batch file was accidently uploaded to an X75-RCP. Now the Remote Control Panel is not booting up properly. The VFD screen appears “dead” and none of the buttons and LEDs are lit.

Solution:

It is likely that the remote control panel is in fail-safe mode, with the factory default IP Address of 192.168.100.251. (Holding down the **Bypass** button for 3 seconds on power reboot forces the RCP into the manual fail-safe mode.)

Follow the instructions below to restart the RCP:

1. Configure your PC's network setting to be on the same static network, using the network addresses shown in Table B-4.

Table B-4. Network Addresses for Default IP and Fail-safe Modes

Network Settings	X75HD/X75SD Unit	PC
IP Address	192.168.100.250	192.168.100.2
Subnet	255.255.255.0	255.255.255.0
Gateway	192.168.100.1	192.168.100.1

2. Connect a cross-over Ethernet cable between the X75HD/X75SD and the PC directly, or a straight Ethernet cable when the PC and X75HD/X75SD are on a network hub or a switch.
3. Ping `192.169.100.250`, and then press the ENTER button on your keyboard.

   If the network connection is valid, the reply messages should be returned.
4. If you receive successful replies, continue with step 4; otherwise, troubleshoot the networking connectivity.
5. Download and unzip the latest X75-RCP files to a directory such as C:\X75RCP.

6. Go to the directory where the RCP files are extracted.

   Note: This assumes you had downloaded and unzipped the latest X75-RCP files to C:\X75RCP directory. For example:

   `CD \X75RCP <ENTER>`

7. Within this directory, type the following:

   `x75rcp 192.168.100.251`, and then press ENTER.

8. Reboot the panel.

(Note: When the RCP files are restored properly, the RCP's IP Address will go back to its original address.)

Software file updated incorrectly or became corrupted

During a firmware upgrade, if your files become corrupted, you can put the system into a fail-safe mode. To enter the fail-safe mode and upgrade your firmware, follow these steps:

Note

CCS CoPilot is a Windows-based software application provided with your X75HD/X75SD system that discovers devices on your network, and allows you to configure all system IP address settings (such as IP Address, Default Gateway, Subnet Mask, etc.). The current release of your X75HD/X75SD system only provides limited support for CoPilot. Contact your Leitch customer support representative for more information.

1. Ensure your X75HD/X75SD is either connected to the network using a 10/100Base-T straight-through Ethernet cable or is directly connected to a PC using a cross-over cable.
1. Push down the **F.S.** DIP switch on the back of the X75HD/X75SD unit (see Figure B-12).

   All programs and current activity will cease, except for the capability to upload new software via FTP.

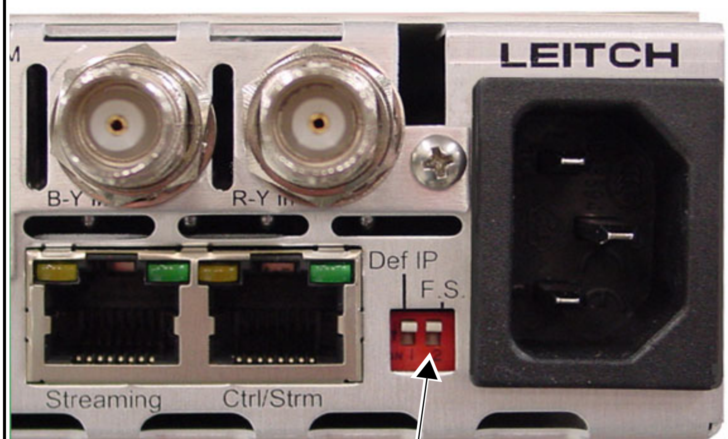


Figure B-12. Location of the F.S. (Fail-safe) DIP Switch

Note

After rebooting, the network address settings of the X75HD/X75SD should have been retained. If not, navigate to **System Config>Setup**, and then change or validate the settings. Ensure that you select **Save IP**.

2. Push down the **F.S.** DIP switch on the back of the unit to put the X75HD/X75SD system into Fail-Safe mode.
3. Launch CoPilot on the remotely or directly connected PC.
4. Follow the procedure in your CoPilot User Manual or online help system for “Updating the Software on a CCS Device.”
5. Return the **F.S.** DIP switch to the up position, and then reboot your system.

Troubleshooting the Software Installation

If you are not able to ping the X75HD/X75SD from your PC, the cause may be one of the following:

- The X75HD/X75SD is not powered up.
- The Ethernet cabling between your PC, the X75HD/X75SD, and any other network devices—such as hubs, switches, or routers—is not set up properly.
- You connected to the wrong Ethernet port on the back of your PC.
- During the “Correcting a Failed Upgrading Procedure”:
    - An improper network cable was used.
    - The network cable was connected to the **Streaming** port of the X75.
- The PC network settings and the X75HD/X75SD network settings don’t have matching subnets and/or belong to different subnets with no proper gateway linking the two networks together.
- The PC and the X75 have the same IP address.
- On the PC, you accidentally changed the network settings on the wrong LAN card.

6. If all of these causes have been investigated and the upgrade continues to fail, follow the instructions in “Correcting a Failed Upgrade Procedure” on page 310.

Appendix C

Servicing

Overview

This appendix includes the following information and procedures:

- "Safety Precautions" on page 256
- "Understanding and Working With Fiber Optics" on page 257
- "Preparing the X75HD/X75SD for Servicing" on page 261
- "Common Replacement Part Numbers" on page 262
- "Installing the X75OPT-HDDUOCON Software Key" on page 262
- "Installing a Frame-Mounted Local Control Panel" on page 263
- "Installing and Removing an Audio Synchronizer Module" on page 264
- "Installing and Removing HDTV Modules" on page 269
- "Installing and Removing X75OPT-A3D or X75OPT-PQM Modules" on page 274
- "Installing and Removing the Streaming Module" on page 279
- "Installing Noise Reduction, Auto Audio/Video Timing, and Audio Limiter Software Options" on page 285
- "Installing a Dolby Decoder Module" on page 288
- "Replacing a Power Supply" on page 290
- "Installing a Redundant Power Supply" on page 293
- "Installing Fans" on page 299

Safety Precautions

Only qualified personnel should perform service procedures. Refer to the *X75HD/X75SD Product Safety Instructions* booklet before servicing the X75HD/X75SD or its components.

Laser Caution

This product may contain lasers! Heed the following caution:

Laser Radiation When Open

CAUTION: To avoid damage from laser radiation, do not remove or displace any connections or protective panels.

CLASS 1 LASER PRODUCT

[Finland] LUOKAN 1 LASERLAITE.
[Sweden] KLASS 1 LASER APPARAT.

CLASS 1
LASER PRODUCT

ESD Caution

When servicing the X75HD/X75SD and its components, take the proper precautions to avoid electrostatic discharge (ESD).

Preventing Electrostatic Discharge
CAUTION: Electrostatic discharge (ESD) can damage components in the product. To prevent ESD, observe these precautions when directed:

- **Use a ground strap.** Wear a grounded wrist strap to discharge the static voltage from your body while installing or removing sensitive components.
- **Use a safe work area.** Do not use any devices capable of generating or holding a static charge in the work area where you install or remove sensitive components. Avoid handling sensitive components in areas that have a floor or benchtop surface capable of generating a static charge.
- **Handle components carefully.** Do not slide sensitive components over any surface. Do not touch exposed connector pins. Handle sensitive components as little as possible.
- **Transport and store carefully.** Transport and store sensitive components in a static-protected bag or container.

Understanding and Working With Fiber Optics

Input and output modules using optical fibre transmitters and receivers were developed in response to a growing demand for a flexible method of transporting very high speed digital video and audio over long distances.

Fiber optic technology offers many benefits over copper wire systems:

- Longer distance capability
- Higher bandwidth
- Better signal quality
- Immunity from EM radiation and lightning
- Advantage of being lightweight
- Ability to be easily upgraded

Basic Principles

Fiber optic technology can be explained using these two concepts:

- Light is transmitted over optical fiber by reflecting it within a long "cylindrical mirror."
- The mirrored surface occurs at the core cladding interface. By sending on/off bursts of light within the optical fiber, light can be guided along varying paths.

See Figure C-1 and Table C-1 on page 258 for further explanation.

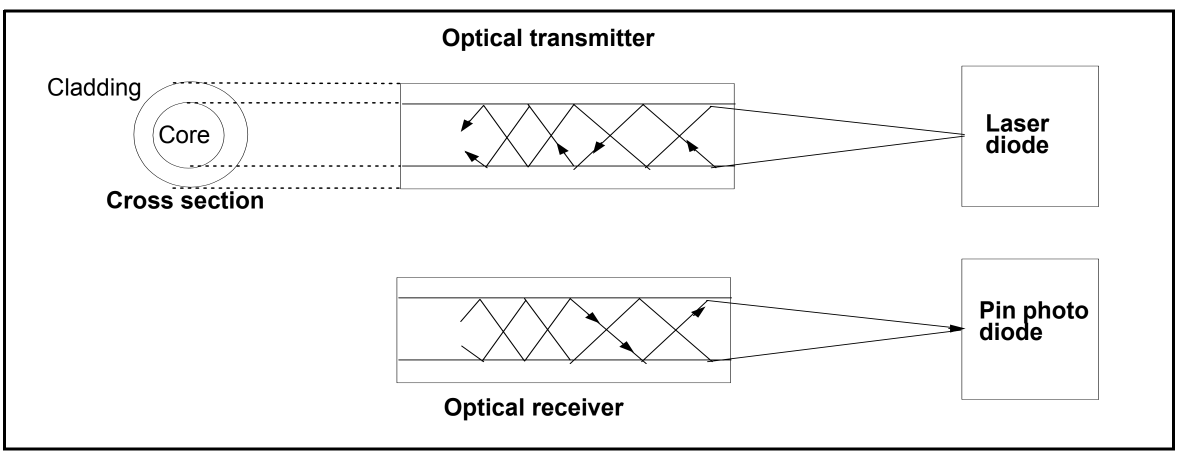


Figure C-1. Fiber Optic Transmitting and Receiving

Table C-1. Function and Description of Fiber Optic Components

Item	Function	Composition
Optical transmitter	Converts a data signal into an equivalent optical power waveform and couples it into an optical fiber.	• Laser diode • Laser diode driver The role of the driver is to bias the laser. Some laser drivers contain circuitry to control power and temperature.
Optical receiver	Converts the incoming optical power signal into an output data signal.	• PIN photo diode • Transimpedance amplifier • Decision circuitry The receiver circuitry provides standard ECL outputs based on the input voltage.

Handling and Connecting Fibers

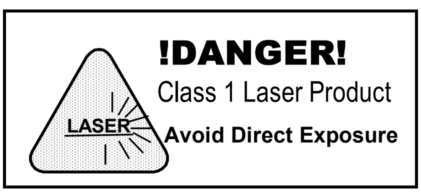
Class 1 Laser Products

Caution

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED IN THIS MANUAL MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

The X75OPT-HDUPG module with HDTV fiber input/output is a CLASS 1 laser product.

Avoid looking directly at a laser. Laser radiation is invisible and can cause serious eye damage.



General Precautions

Note

The X75SPR-HD is supplied with an SC interconnection housing built into the module. With this style of connector, the fiber assembly and the housing assembly can only be connected in one way and with very good repeatability. The optical fiber with SC connectors must be customer supplied.

Please take the following precautions when working with fiber optics:

- Never touch the end face of an optical fiber.
- Do not place optical fibers under heavy objects.
- Transmission characteristics of the fiber are dependent on the shape of the optical core; therefore, care must be taken to prevent fiber compression.
- Avoid abrupt fiber bending.

  A suggested minimum bending radius is 1.2 in. (3 cm). Bending radii smaller than this can lead to fiber bending loss which will decrease the maximum attainable link length by decreasing the available power budget.
- Make fiber interconnections very secure.
- Clean fiber *every time* that it is mated or unmated. (See “Cleaning Optical Fibers” below.)

  As dust particles on the ends of the optical fiber can add up to 1 dB of loss, it is important to clean them regularly. Larger dust particles can totally obscure light altogether.
- Cover a fiber *immediately* when unmated.

  Most fiber manufacturers provide a plastic boot that fits over the ferrule body for this purpose.
- Remove dust particles from the housing assembly with a blast of dry air when using interconnection housing to mate two optical fibres.

Cleaning Optical Fibers

Required Cleaning Equipment

Optical fibers must always be cleaned before mating and after unmating. You will need the following items:

- “Kimwipes” or a lens-grade, lint-free tissue
- Denatured alcohol
- Canned dry air

Cleaning Technique

Note

Dry air can be used to remove dust from the connector housing or the transmitter or receiver ports.

Use the following method to clean the fibers:

1. Fold the tissue twice so that it is four layers thick.
2. Saturate the tissue with alcohol.
3. Clean the sides of the connector ferrule.
   - i. Place the connector ferrule in the tissue and apply pressure to the sides of the ferrule.
   - ii. Rotate the ferrule several times to remove all contamination from the ferrule sides.
4. Clean the end of the connector ferrule.
   - i. Move to a clean part of the tissue.
   - ii. Be sure it is still saturated with alcohol and that it is still four layers thick.
   - iii. Put the tissue against the end of the connector ferrule.
   - iv. Place your finger against the tissue so that it is directly over the ferrule.
   - v. Rotate the end of the connector.
5. Mate the connector immediately. Do not let the connector lie unattended before mating.

Preparing the X75HD/X75SD for Servicing

> **Caution**
> With the power cord disconnected, the unit is no longer grounded. Be aware of potential damage from static electricity.

Some versions of X75HD/X75SD units use a two-part chassis cover, making it possible for you to perform maintenance on power supplies without removing the frame from the rack. Other versions use a full-size cover. Follow these steps to remove either version of the chassis cover:

1. Read and heed the safety precautions outlined in the X75 safety manual, and in the section “Safety Precautions” on page 256.
2. Confirm that the X75HD/X75SD unit is turned off and that the power cord is disconnected from the rear panel.
3. Use a Phillips screwdriver to remove the retaining screws on the full chassis cover or split chassis cover. Figure C-2 shows the location of the screws along the back edge, front edge, top, and each side of the frame.

   Keep the screws, as they will be needed to replace the top cover.

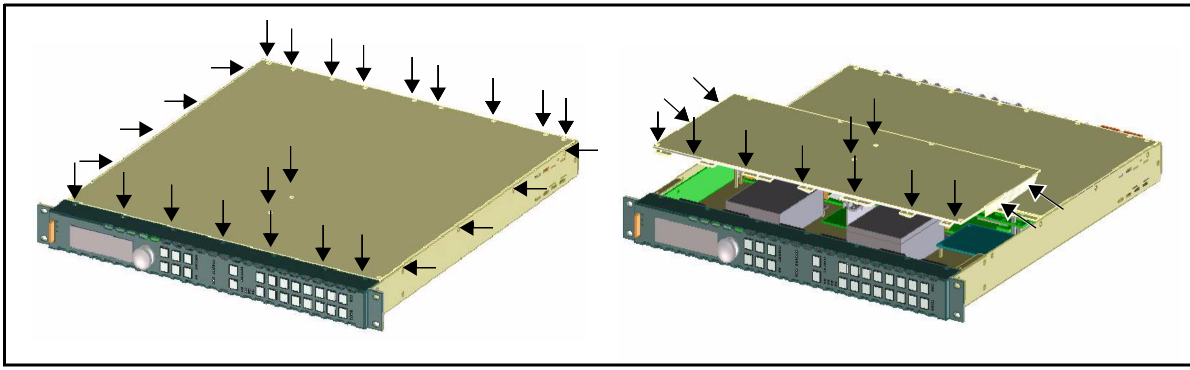


Figure C-2. Location of Chassis Cover Screws (Full Cover and Split Cover)

4. Lift off the chassis cover from the X75HD/X75SD.

To complete the installation of all hardware options:

1. Replace the top cover, and use the original screws to secure the top cover.
2. Plug the power cord back in.

Common Replacement Part Numbers

The following parts are the most commonly ordered as replacements.

Table C-2. Common Replacement Part Numbers

Part Number	Part Identification
122-000024-00	Power supply
131-000014-00	Fan
164-000262-00	Rubber keymat
134-000212-00	Board stacker 2x15 pin
134-000228-00	Single 2x7 analog audio connector
170-000483-00	X75 Whole local control panel assembly
X75SPR-KIT	Package that includes the following parts: • 2 fans • 4 stackers • 1 power supply with no connectors • 1 shaft encoder

Installing the X75OPT-HDDUOCON Software Key

If you have ordered the X75OPT-HDDUOCON software option separately, you will require a soft keycode. This unlock code, consisting of fourteen hexadecimal digits, will be provided when you purchase the option. Once you install the option, use a control panel or the web client server software to install the code.

Using the control panel or web server application, follow this thread to install the unlock code: **System Config>Setup>License Key**.

Installing a Frame-Mounted Local Control Panel

To remove a blank front panel and replace it with a frame-mounted local control panel, follow these steps:

1. Remove all power from the X75HD/X75SD unit, disconnect all cabling, and then remove the mounted unit from the rack.
2. Remove the two screws located at the back of each mounting ear that secure the blank front panel to the chassis.

   Retain the screws.
3. Remove the screws along the top and bottom of the blank front panel that hold it to the frame.

   Retain the screws.
4. Pull the blank front panel from the unit.
5. Replace the front panel with the new frame-mounted local control panel, and secure it to the unit using the screws removed in step 3. (See Figure C-3.)

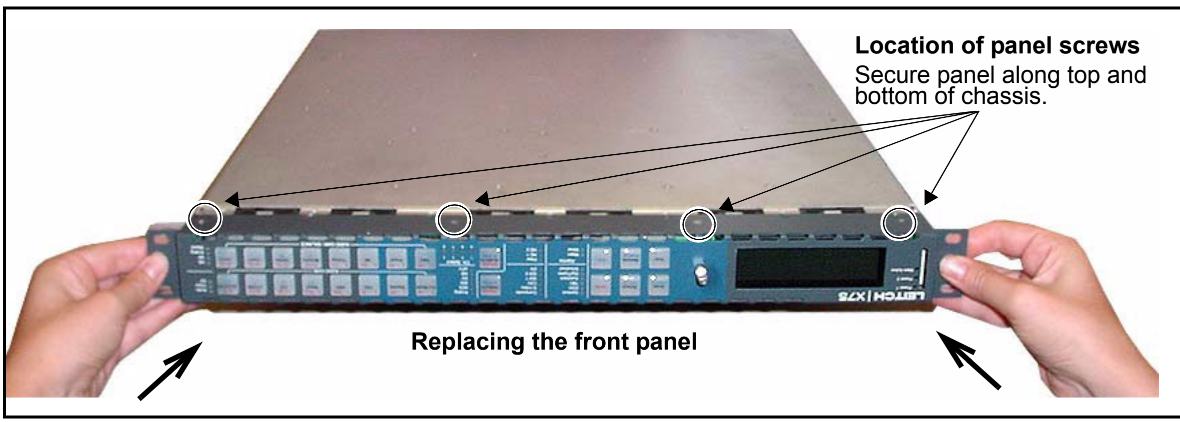


Figure C-3. Removing the Front Panel

6. Replace the mounting ear screws removed in step 2, and then return the unit to the rack.
7. Reconnect all cabling, and restore power.

Installing and Removing an Audio Synchronizer Module

Installing a New Module

Caution

This module is not hot-swappable. To prevent damage, ensure that the power to the X75 is off before inserting or removing the module.

If you have ordered an audio synchronizer module (X75OPT-AS-8, X75OPT-AS-8-L, X75OPT-AS-16, or X75OPT-AS-16-L) separately to upgrade your system, follow these installation steps:

1. Remove the chassis cover (see “Preparing the X75HD/X75SD for Servicing” on page 261).
2. Remove the screws from the blank filler plate on the rear panel where the new audio synchronizer module is to be installed, and then remove the plate.

   Retain the screws for later use.
3. Remove the packaging from the audio synchronizer module.

   The package includes one board, four stackers, and the required number of standoff screws.
4. Turn the module upside down and insert the four stackers into the corresponding connectors on the underside of the board.
   See Figure C-4.

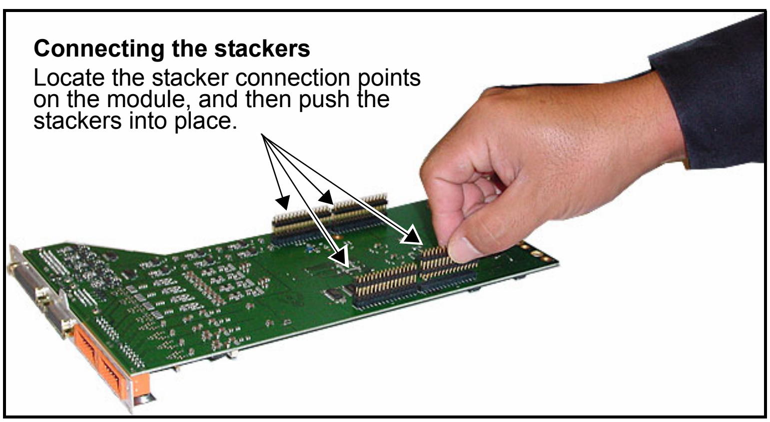


Figure C-4. Connecting Four Stackers to Module

5. Return the module to its upright position, and then align it with the installed standoffs on the main board.

   There are two standoffs on the back of the main board, and one in the middle. To assist with alignment, the standoff in the back left corner is higher than the others in order. See Figure C-5 and Figure C-6.

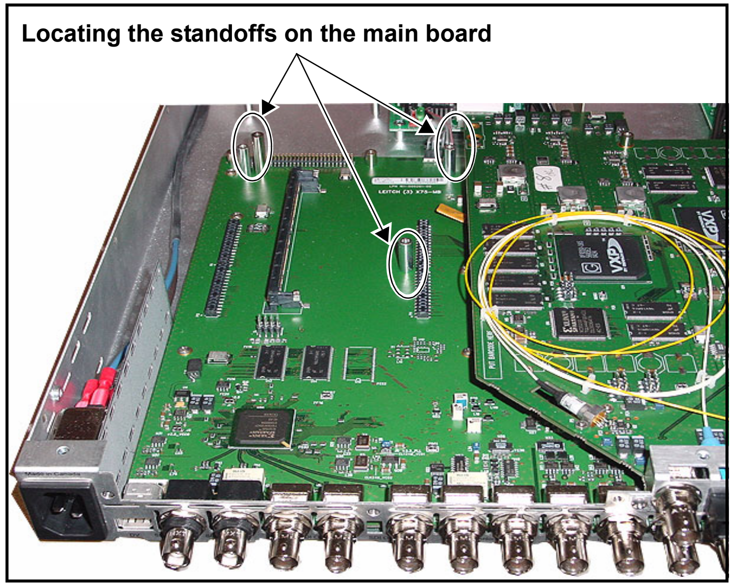


Figure C-5. Locating Main Board Standoffs

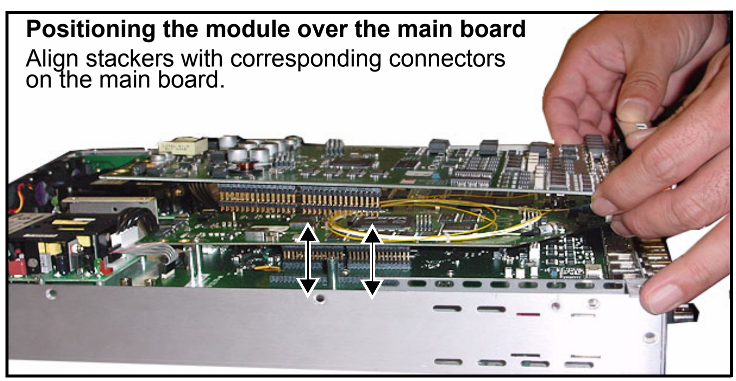


Figure C-6. Positioning Module over Standoffs

6. Inspect the connectors on both the module and the main board to ensure that all pins are straight, and then push the board gently over the main board stacker connection points until they lock into place.

   Figure C-7 illustrates the area of the module you should push so that the stackers lock firmly into place.

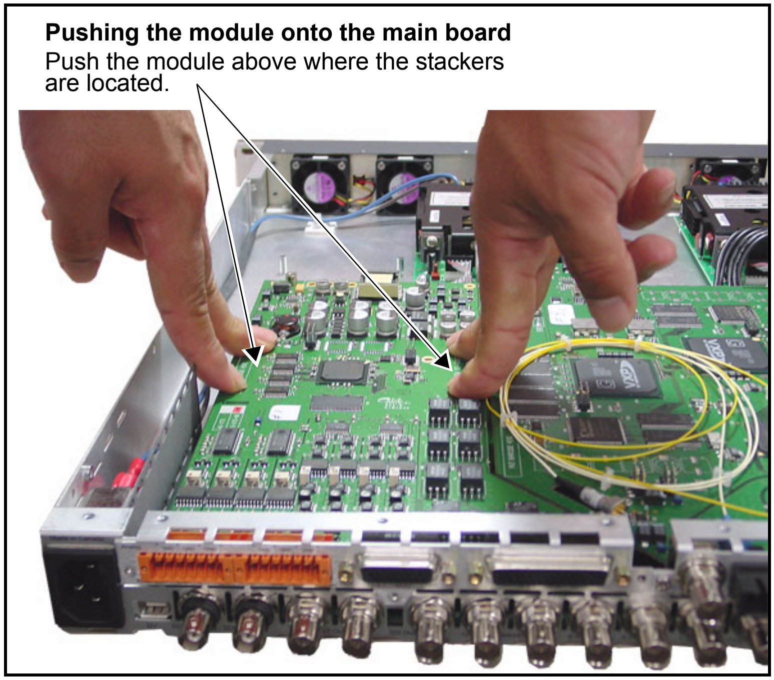


Figure C-7. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-8 on page 267 illustrates the location of the three module standoffs where you need to apply the screws.

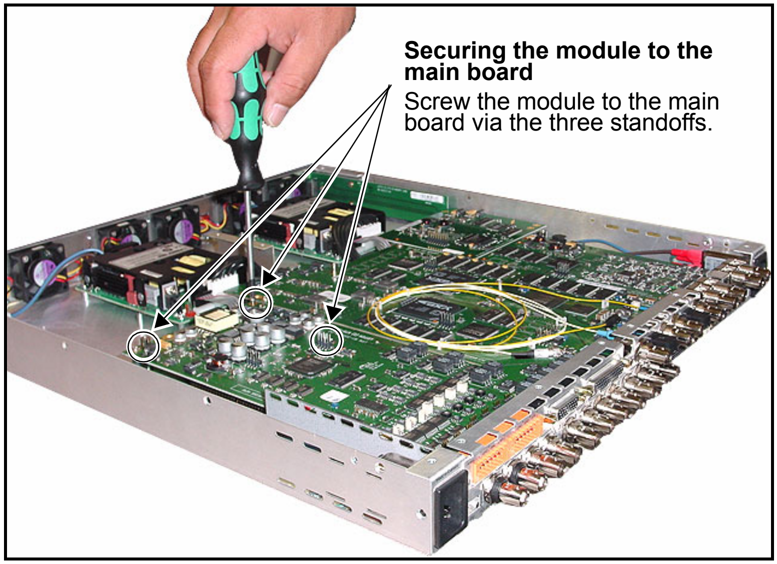


Figure C-8. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.

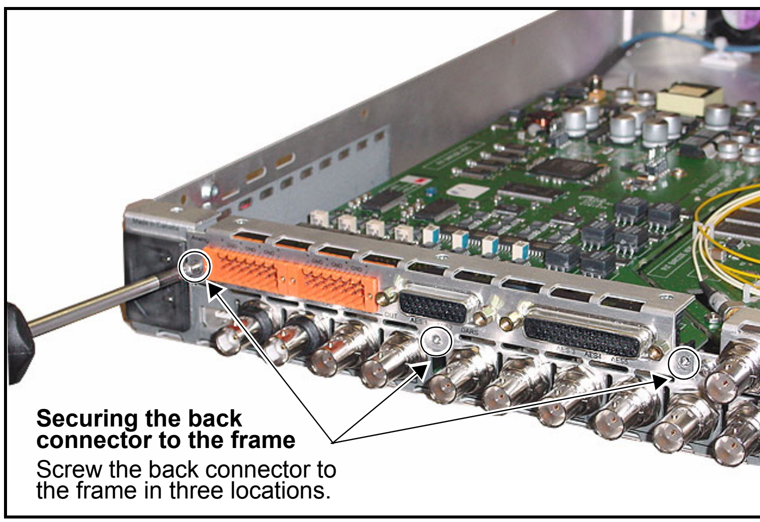


Figure C-9. Securing the Back Connector to the Frame

9. Replace the chassis cover using the original screws. See page 261 for more information on replacing the cover.

Removing an Existing Module

If you must remove an existing audio synchronizer module from a unit, follow these steps:

1. Remove the screws along the back edge and each side of the X75's chassis cover (see Figure C-2 on page 261), and then slide the cover off.

   Retain the screws for later use.

2. Remove the three rear connector screws that secure the module to the frame.

   See Figure C-9 on page 267 to locate these screws.

3. Remove the three screws that secure the module to the main board.

   See Figure C-8 on page 267 to locate these screws.

4. Gently lift the module off of the main board.

   Be sure to lift the module off evenly to prevent the stacker connector pins from bending or breaking.

5. Inspect the connectors on the module and main board to ensure that all pins are straight.

6. Store the board in a protective bag to protect it from damage or ESD.

Installing and Removing HDTV Modules

Installing a New Module

Caution

This module is not hot-swappable. To prevent damage, ensure that the power to the X75 is off before inserting or removing the module.

If you have ordered a replacement or spare HDTV module, follow these installation steps:

1. Remove the chassis cover (see “Preparing the X75HD/X75SD for Servicing” on page 261).
2. Remove the screws from the blank filler plate on the rear panel where the new fiber connector module is to be installed, and then remove the plate.

   Retain the screws for later use.
3. Remove the packaging from the connector module.
4. Turn the board upside down and insert the seven stackers into the corresponding connectors on the underside of the board. See Figure C-10.

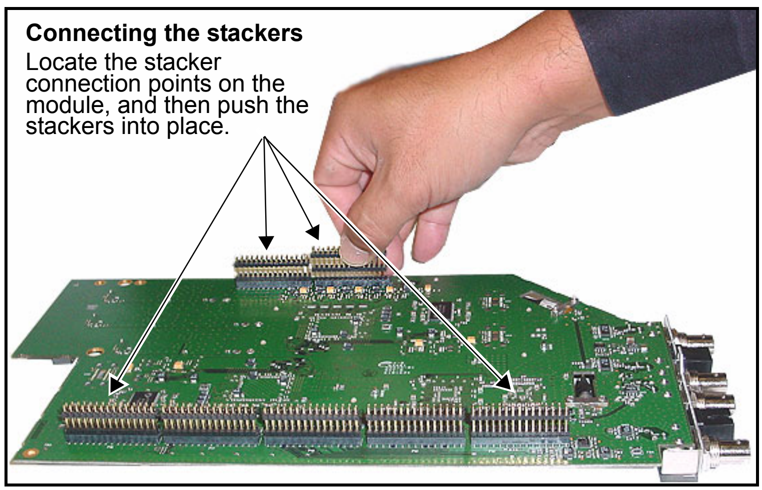


Figure C-10. Connecting Seven Stackers to Module

5. Return the module to its upright position, and then align it with the installed standoffs on the main board.

   There are three standoffs on the back edge of the main board, and one in the middle. The middle standoff along the back edge of the module is higher than the others in order to assist with alignment. See Figure C-11 and Figure C-12.

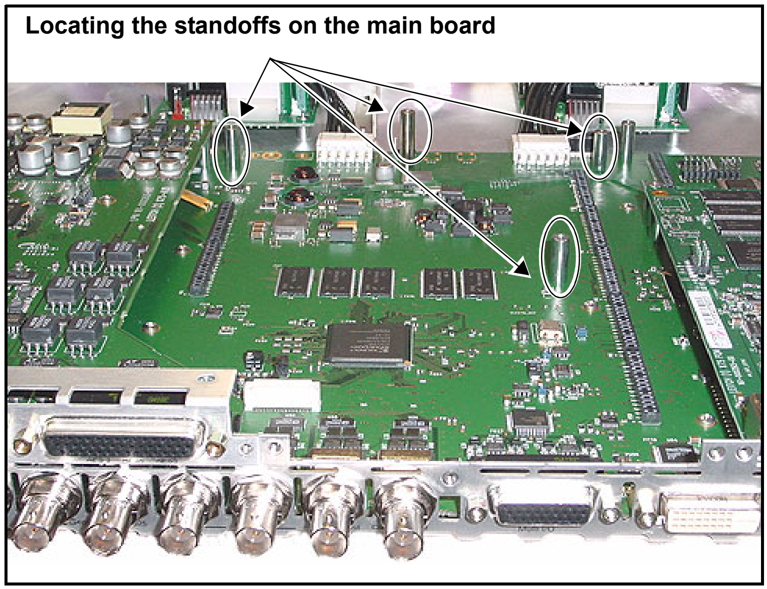


Figure C-11. Locating Main Board Standoffs

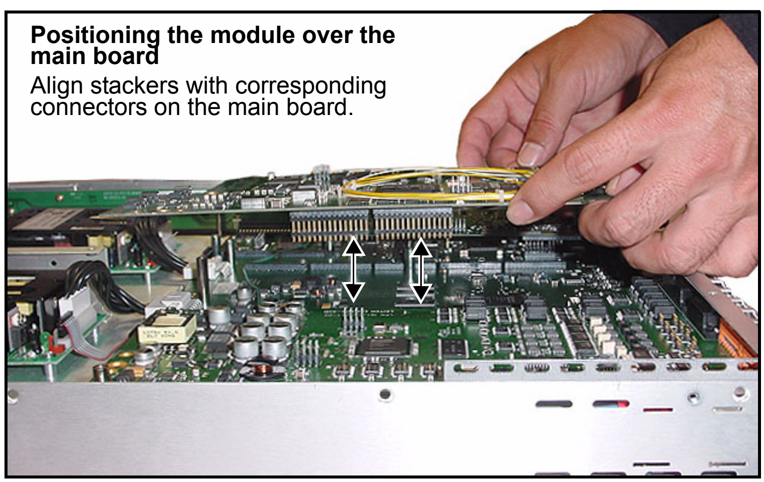


Figure C-12. Positioning Module over Standoffs

6. Inspect the connectors on both the module and the main board to ensure that all pins are straight, and then push the board gently over the main board stacker connection points until they lock into place.

   Figure C-13 illustrates the area of the module you should push so that the stackers lock firmly into place.

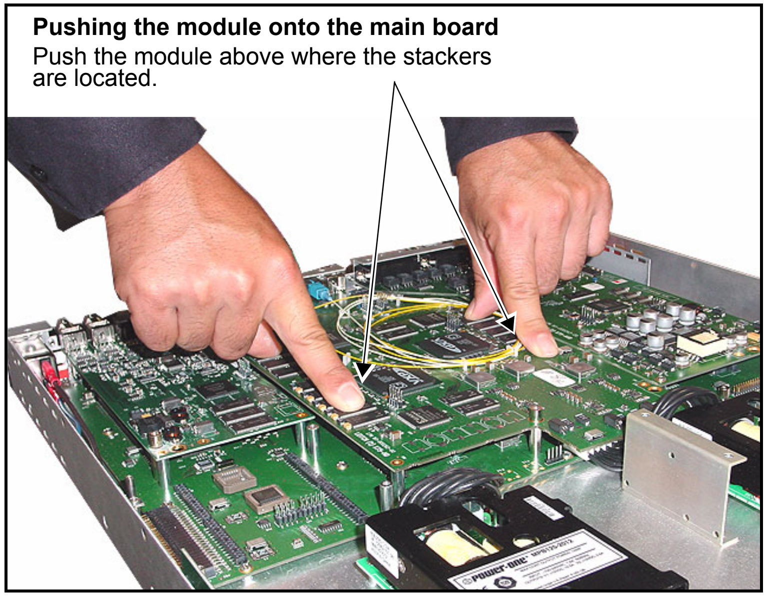


Figure C-13. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-14 on page 272 illustrates the location of the three module standoffs where you need to apply the screws.

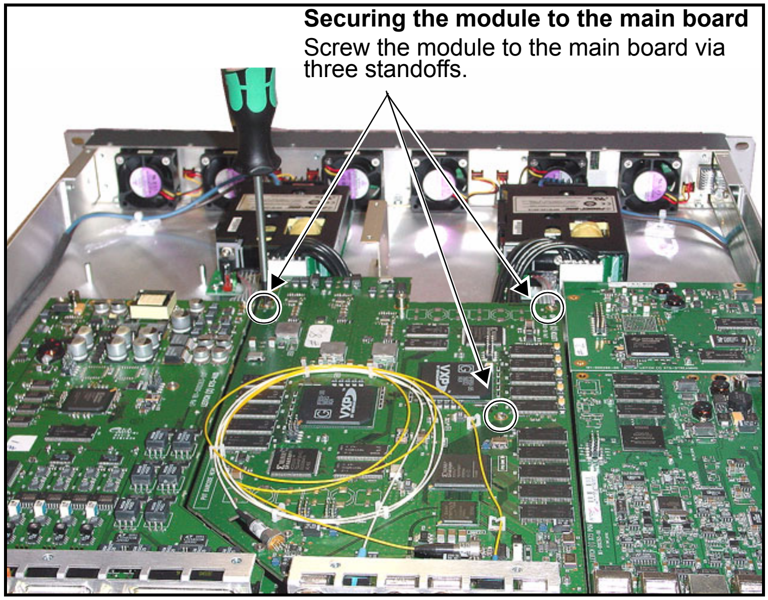


Figure C-14. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.

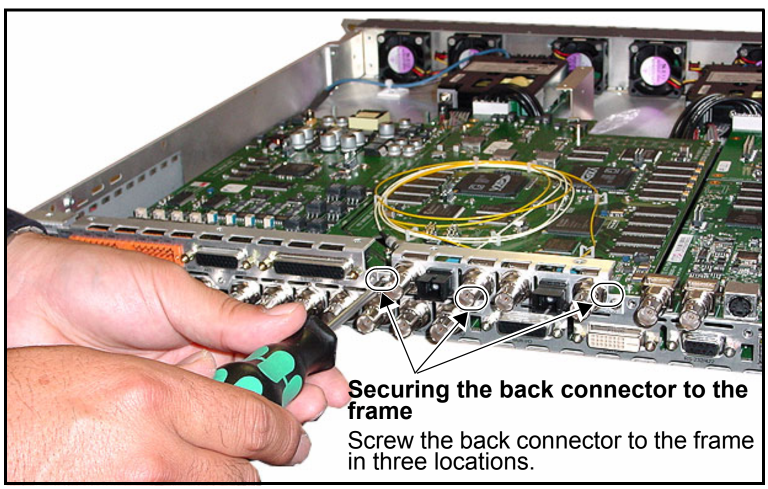


Figure C-15. Securing the Back Connector to the Frame

9. Replace the chassis cover using the original screws. See page 261 for more information on replacing the cover.

Removing an Existing Module

If you must remove an existing HDTV module from an X75, follow these steps:

1. Remove the screws along the back edge and each side of the X75's chassis cover (see Figure C-2 on page 261), and then slide off the cover.

   Retain the screws for later use.

2. Remove the three rear connector screws that secure the module to the frame.

   See Figure C-15 on page 272 to locate these screws.

3. Remove the three screws that secure the module to the main board.

   See Figure C-14 on page 272 to locate these screws.

4. Gently lift the module off the main board.

   Be sure to lift the module evenly to prevent the stacker connector pins from bending or breaking.

5. Inspect the connectors on the module and main board to ensure that all pins are straight.
6. Store the board in a protective bag to protect it from damage or ESD.

Installing and Removing X75OPT-A3D or X75OPT-PQM Modules

Installing a New Module

Caution

This module is not hot-swappable. To prevent damage, ensure that the power to the X75 is off before inserting or removing the module.

If you have ordered an optional X75OPT-A3D or X75OPT-PQM module separately, follow these installation steps:

1. Remove the chassis cover (see “Preparing the X75HD/X75SD for Servicing” on page 261).
2. Remove the screws from the blank filler plate on the rear panel where the new module is to be installed, and then remove the plate.

   Retain the screws for later use.
3. Remove the packaging from the module.

   The X75OPT-A3D and X75OPT-PQM packages include one board, three stackers, and the required number of standoff screws.
4. Turn the board upside down and insert the three stackers into the corresponding connectors on the underside of the board.
   See Figure C-16.

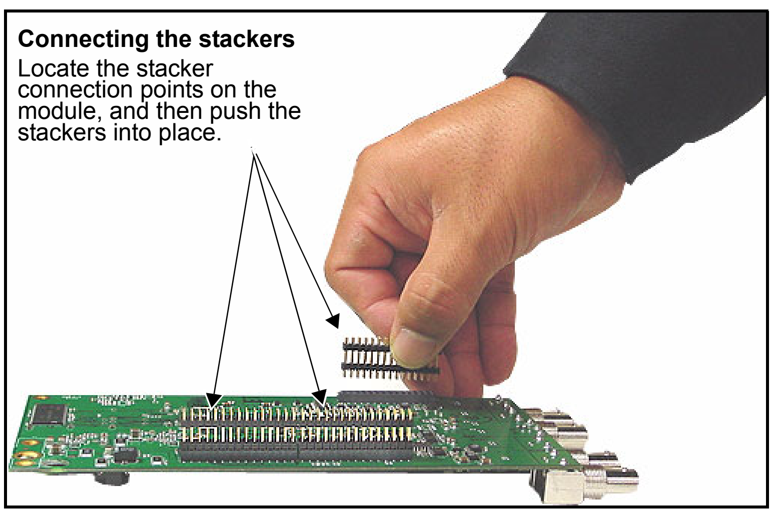


Figure C-16. Connecting Three Stackers to Module

5. Return the module to its upright position, and then align it with the installed standoffs on the main board.

   There are three standoffs on the back edge of the main board, and one in the middle. The middle standoff along the back edge of the module is higher than the others in order to assist with alignment. See Figure C-17 and Figure C-18.

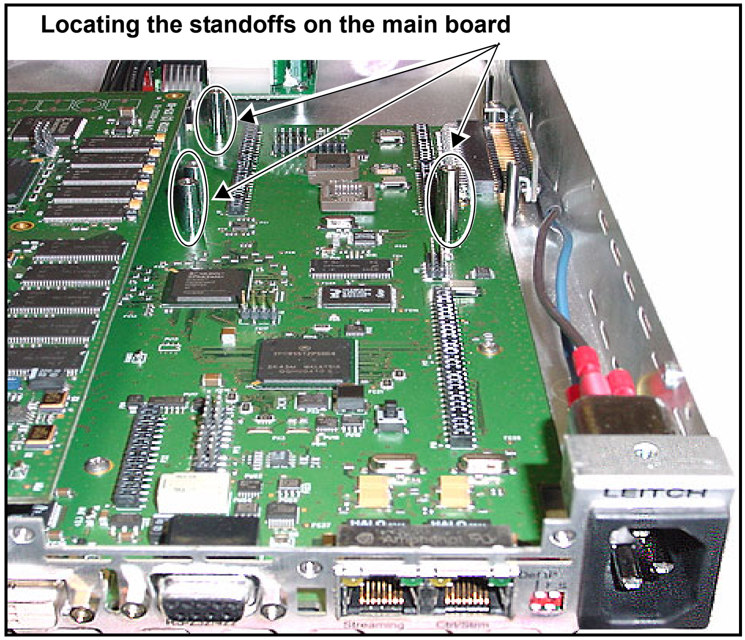


Figure C-17. Locating Main Board Standoffs

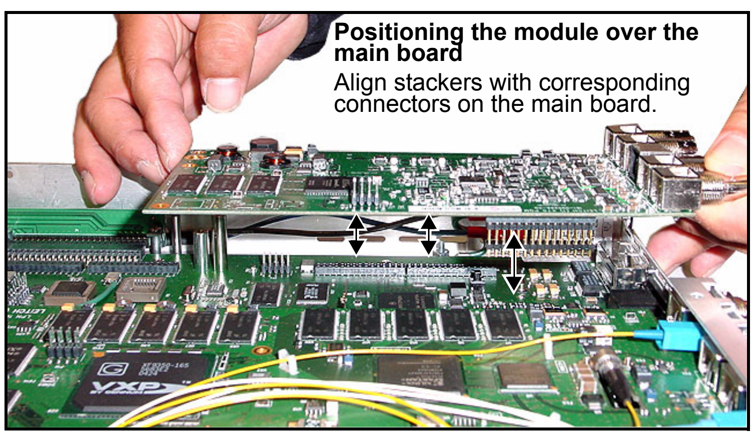


Figure C-18. Positioning Module over Standoffs

6. Inspect the connectors on both the module and the main board to ensure that all pins are straight, and then push the board gently over the main board stacker connection points until they lock into place.

   Figure C-19 illustrates the area of the module you should push so that the stackers lock firmly into place.

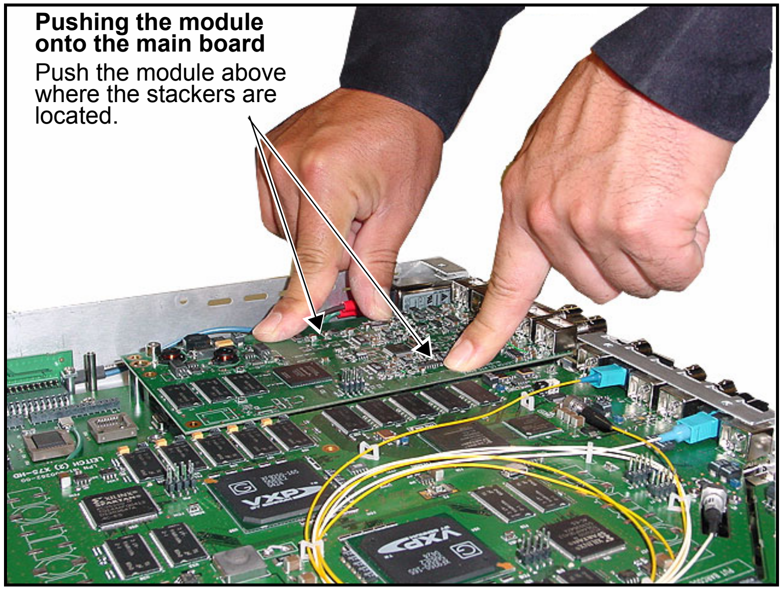


Figure C-19. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-20 on page 277 illustrates the location of the three module standoffs where you need to apply the screws.

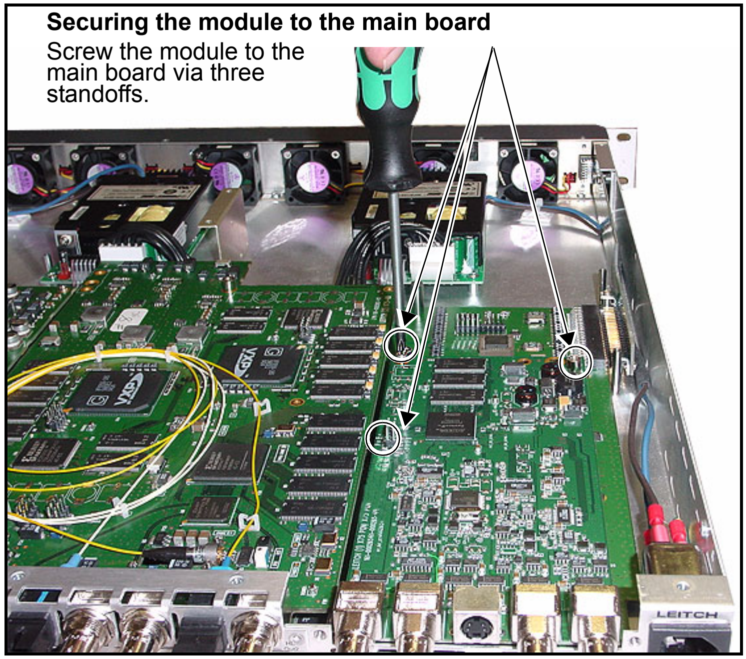


Figure C-20. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.
9. Replace the chassis cover using the original screws. See page 261 for more information on replacing the cover.

Removing an Existing Module

If you must remove an existing X75OPT-A3D or X75OPT-PQM module, follow these steps:

1. Remove the screws along the back edge and each side of the frame's chassis cover (see Figure C-2 on page 261), and then slide the cover off.

   Retain the screws for later use.
2. Remove the three rear connector screws that secure the module to the frame.
3. Remove the three screws that secure the module to the main board.

   See Figure C-20 on page 277 to locate these screws.
4. Gently lift the module off of the main board.

   Be sure to lift the module off evenly to prevent the stacker connector pins from bending or breaking.
5. Inspect the connectors on the module and main board to ensure that all pins are straight.
6. Store the board in a protective bag to protect it from damage or ESD.

Installing and Removing the Streaming Module

Installing a New Module

Caution

This module is not hot-swappable. To prevent damage, ensure that the power to the X75 is off before inserting or removing the module.

This module requires version 1.7 or later X75 firmware.

If you have ordered an X75OPT-STR streaming module separately, follow these installation steps:

1. Inspect the connectors on both the module and the main board to ensure that all pins are straight, and then push then board gently over the main board stacker connection points until they lock into place.

   Figure C-21 illustrates the area of the module you should push to lock the stackers into place.

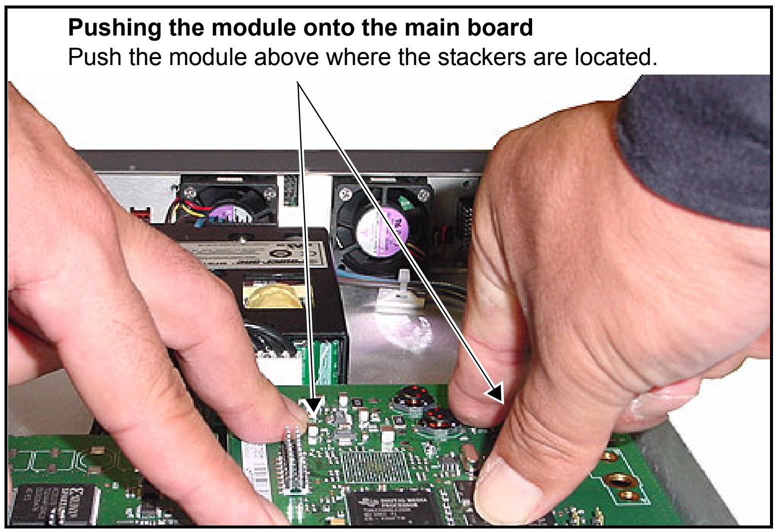


Figure C-21. Pushing the Module on to the Main Board

2. Secure the new module to the main board using the provided screws.

   Figure C-22 on page 280 illustrates the location of the three module standoffs where you must install the screws.

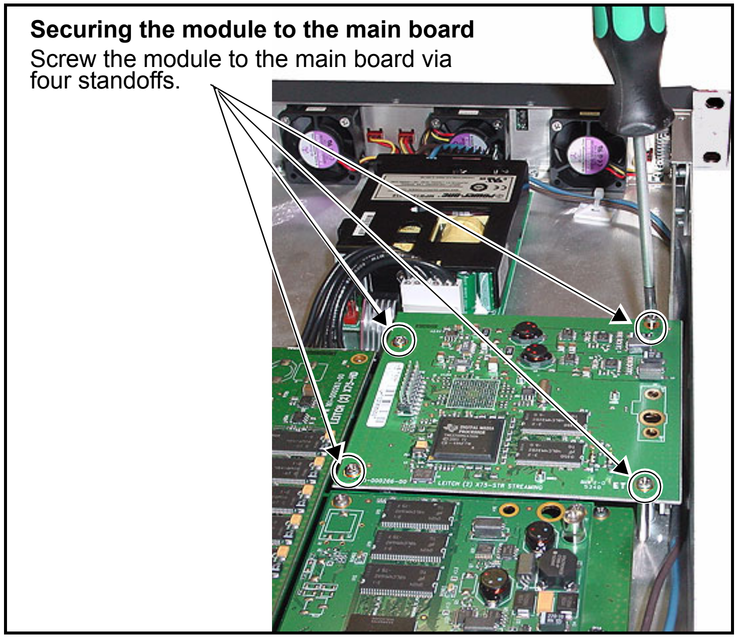


Figure C-22. Securing the Module to the Main Board

3. Replace the chassis cover using the original screws. See page 261 for more information on replacing the cover.
4. Using the control knob interface, follow this path to reach the streaming module's network address parameters:

   High End Streaming>Network Settings
5. Make the necessary **Gateway**, **Subnet Mask**, and **IP Address** settings in the **Network Settings** parameters, as shown in Table C-3 on page 281, and then select **Save IP>Yes**.

   The default settings are:
   - Gateway: (192.168.100.1)
   - Subnet Mask: (255.255.255.0)
   - IP Address: (192.168.100.252)
6. On a computer linked via Ethernet to theX75HD/X75SD, visit www.apple.com and then download the free QuickTime™ version 7 player.
7. Launch QuickTime Player, click **File**, and then click **Open URL**.

8. Type the following text into the **Open URL** field (where **ipaddr** represents the IP Address of the streaming module):

   `rtsp://ipaddr:554/X75streaming`

   The QuickTime player should begin receiving streaming media from the X75HD/X75SD after a delay of 4 seconds.

Table C-3. Streaming Module Settings

Main Menu	High End Streaming			VBR Quality (1 to 10)
		Bit Rate		
			Control Mode	
				Variable
				Fixed
				Fixed Bit Rate (200 Kbps to 1 Mbps)
		Network Settings		
			Streaming IP	(Enter number)
			Subnet Mask	(Enter number)
			Gateway	(Enter number)
			Save IP	Yes
				No
		Video Output	Enable	
			Disable	
		Audio Output		
			Enable	
			Disable	

Removing an Existing Module

If you must remove an existing streaming module from a unit, follow these steps:

1. Remove the screws along the back edge and each side of the frame's chassis cover (see Figure C-2 on page 261), and then slide the cover off.

   Retain the screws for later use.
2. Remove the three screws that secure the module to the main board.

   See Figure C-22 on page 280 to locate these screws.
3. Gently lift the module off of the main board.

   Be sure to lift the module off evenly to prevent the stacker connector pins from bending or breaking.
4. Inspect the connectors on the module and main board to ensure that all pins are straight.
5. Store the board in a protective bag to protect it from damage or ESD

Launching QuickTime in CCS Pilot and Navigator

The streaming video output is viewable using QuickTime Player directly, or via QuickTime in CCS Pilot and Navigator. (Version 7.0 of the player must be installed.)

In CCS Pilot and Navigator, you can add the streaming video module as a device icon in the **Navigation** window. In CCS Navigator only, you can view the streaming video either by adding a device icon in the **Navigation** window, or by installing a button on a Graphical Navigator page.

Adding Streaming as a Device Icon in the Navigation Window

To add a device icon to launch X75 streaming video, follow these steps:

1. With Pilot or Navigator in Build mode, right click in the **Network**, **Discovery**, or **Temporary** folder of the Navigation window, and then select **Create** > **Server**.

   This will create a **Server** icon in the **Navigation** window.
2. Right-click on the server icon and select **Properties...** from the menu that appears.

   The **Navigation Properties** dialog box opens.

3. Select the **Command** tab, and fill it in with the following information:

   Operation: `Control`

   Command: `c:\program files\quicktime\quicktimeplayer.exe`

   (Or the complete path to your QuickTime Player installation, if it differs from the above)

   Arguments: `rtsp://[IP address]:554/x75streaming`

   (Replace `[IP address]` with the IP address of the X75 streaming Ethernet port)

   You can leave the **Initial Directory** field blank.

4. Close the **Navigation Properties** dialog box by clicking the **Close** button in the top right corner.

When you enter Control mode, double-click on the server icon. This will open a QuickTime Player and play streaming video from the X75.

Adding Streaming via a Button in Navigator

To add a button to launch X75 streaming video, follow these steps:

1. With Navigator in Build mode, place a button on a Graphical Navigator page.

   For information on creating buttons, see “Adding Buttons” in the CCS Navigator online help.

2. Right-click on the button and select **Properties**... from the menu that appears.

   The **Object Properties** dialog box opens.

3. Select the **Rules** tab, and then click the **New Rule** button.

   A new line appears in the Rules table.

4. In the new rule’s Event list, select **OnMouseClick**.

The default Condition setting for this event is **Always**; you can leave that as it is, or you can change it by clicking the **Condition** button. See “Defining Condition” in the CCS Navigator online help for information on completing the Condition dialog box.

5. From the new rule’s Action list, select **Launch Application**.

6. Click the **Action Properties** button.

   The **Action Property** dialog box opens. Fill it in with the following information:

   - **Command**: `c:\program files\quicktime\quicktimeplayer.exe`
   - **Arguments**: `rtsp://[ip address]:554/ x75Streaming`

   You can leave the **Initial Directory** field blank.

7. Click OK to close the **Action Properties** dialog box.

8. Close the **Object Properties** window by clicking the X in the top right corner.

   When you enter Control mode, the new button will open a QuickTime Player and play streaming video from the X75.

Installing Noise Reduction, Auto Audio/Video Timing, and Audio Limiter Software Options

Installing a Software Option

If you have ordered the or X75OPT-ASL, X75OPT-DOLBY-1, X75OPT-NR, X75OPT-SNMP, or X75OPT-V2A software options separately, you will require a soft keycode. This unlock code, consisting of fourteen hexadecimal digits, will be provided when you purchase the option. Once you install the option, use a control panel or the web client server software to install the code.

Using the control panel or web server application, follow this thread to install the unlock code: **System Config>Setup>License Key**.

Operating the X75OPT-AS-16 /8-L Audio Limiters

Audio limiters are available on both the 16-channel and 8-channel versions of the X75OPT-AS-16 /8 audio synchronizers. The audio limiters have the following available options:

- Soft Limit Level
- Slope
- Attack Time
- Decay Time
- Noise Gate Level
- Noise Gate Time

Table C-4 describes the various options of the audio limiter.

Table C-4. Audio Limiter Options

Option	Description
Soft Limit Level	• Sets the threshold level for the input audio signal, measured in dB (decibels), where the audio signal limiter's attack and decaying function will be based • When a signal exceeds this level, compression will be applied
Slope	• The amount a signal is reduced by the compressor • When the slope is set to 0.25, the audio input signal exceeding the soft limit threshold level will be reduced by a factor of 4 at the output
Attack Time	• Limiter will be activated only after the input audio level remains over the Soft Limit Level for the duration specified in the Attack Time option • Audio that exceeds the specified Soft Limit Level for less than the specified Attack time will not activate the limiter • Attack Time indicates how long it takes for the compressor to act after a signal has exceeded the threshold level
Decay Time	• Once the input audio signal has exceeded the Soft Limit Level and the limiter has been activated, the limiter remains active until the audio signal has returned below the Soft Limit Level for the duration specified in the Decay Time option • If the input audio signal returns below the Soft Limit Level for less than the specified Decay Time, the limiter remains active
Noise Gate Level	• Sets the noise gate threshold level, measured in dB (decibels) • When an input signal has fallen below this level, the noise gate will be applied
Noise Gate Time	Indicates how long it takes for the noise gate to start or stop acting after the input signal has fallen below or risen above the threshold level

Figure C-23 shows the transfer function of the Audio Limiter:

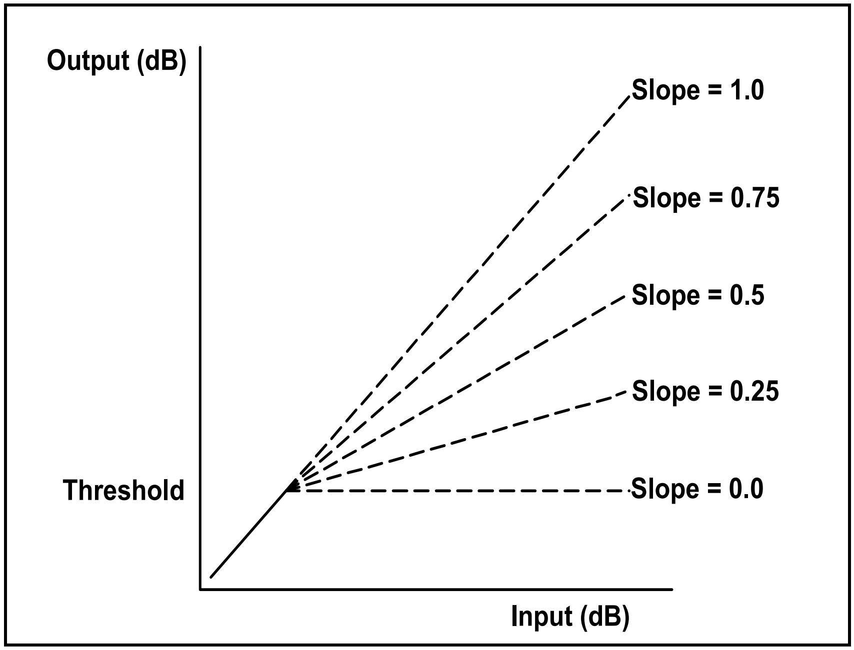


Figure C-23. Audio Limiter Transfer Function

Installing a Dolby Decoder Module

If you have ordered a Dolby decoder module (X75OPT-DOLBY-1) separately to add to your X75HD/X75SD system, you must first remove the existing audio submodule from the main board. There are two levels of installation for the Dolby decoder module: hardware and softkey.

To install the Dolby decoder module, follow these steps:

Hardware Installation

1. Remove the screws along the back edge and each side of the frame's chassis cover (see Figure C-2 on page 261), and then slide the cover off.

   Retain the screws for later use.
2. Remove the three rear connector screws that secure the audio submodule to the frame.

   See Figure C-9 on page 267 to locate these screws.
3. Remove the three screws that secure the audio submodule to the main board.

   See Figure C-8 on page 267 to locate these screws.
4. Gently lift the audio submodule off of the main board.

   Be sure to lift the module off evenly to prevent the stacker connector pins from bending or breaking.
5. Inspect the connectors on the module and main board to ensure that all pins are straight.
6. Install the Dolby decoder module in the socket. (See Figure C-24 on page 289.)
7. Press down the edges slowly until you hear the metal clips click.
8. Reinstall the audio module gently and install all screws.

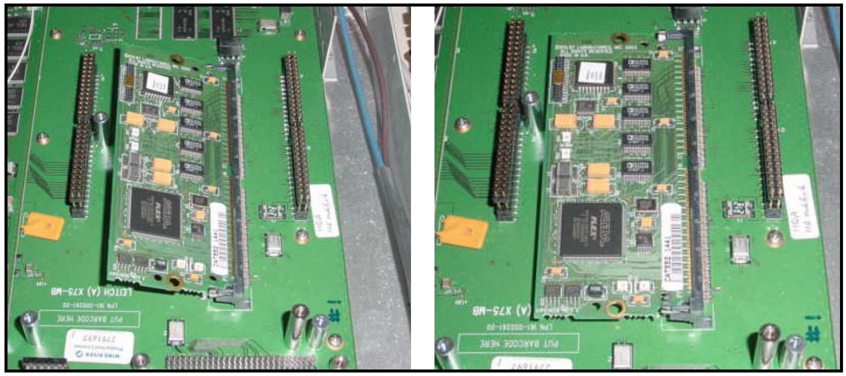


Figure C-24. Dolby Decoder Module Installation

Softkey Installation

The Dolby decoder requires a softkey code to operate. The softkey can be entered using the control panel or the Web Server software application. Follow these instructions to enable the softkey option:

1. Go to the **System Config>Setup** menu and select the **License Key** parameter**.**
2. Enter the fourteen license key characters and then press **Enter**.

Replacing a Power Supply

This section describes the replacement of a failed X75OPT-PS Power Supply. To install an additional, redundant power supply, see page 293.

Follow these steps to remove and replace an original power supply:

1. Remove all power from the frame, and then remove the chassis cover (see “Preparing the X75HD/X75SD for Servicing” on page 261 for more information).

Note

The default power supply shipped with every X75HD/X75SD system is located on the left side of the frame (as seen from the front). An installed redundant power supply is located on the right side of the frame.

2. Locate the failed power supply inside the system, at the front of the unit behind the fan board.

   Power supplies are secured to the chassis floor, and connected to the main board. See Figure C-25.

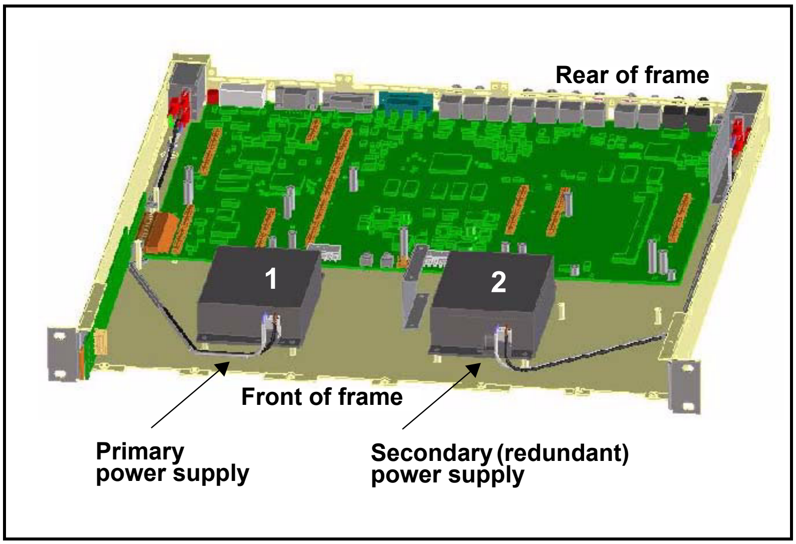


Figure C-25. Location of Connected Power Supply

3. Remove the main DC power cable and secondary DC ribbon cable that connect the power supply. (See Figure C-26.)

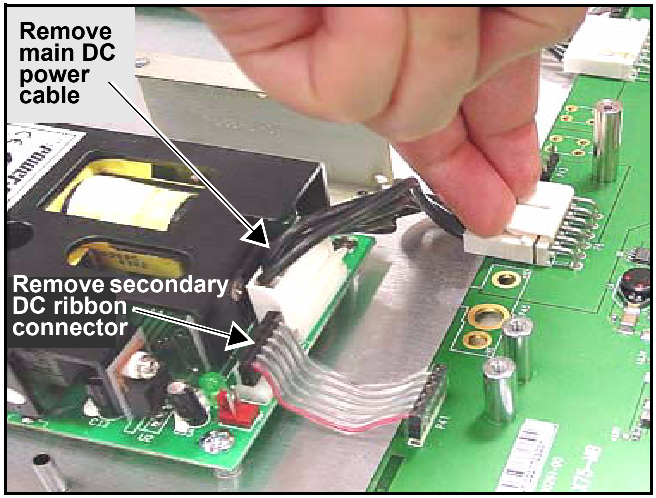


Figure C-26. Removing the DC and Ribbon Cables

4. Disconnect the polarized AC cables from the power supply. (See Figure C-27.)

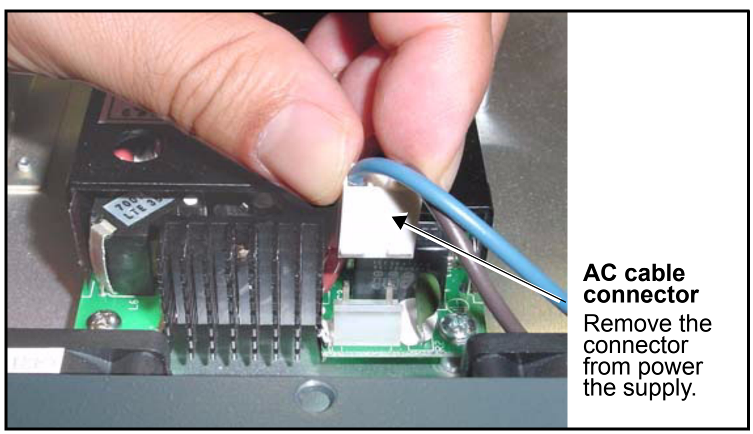


Figure C-27. Removing AC Cable from Power Supply

5. Unscrew the power supply from the chassis floor.

   Figure C-28 shows the location of the four screws you need to remove. Keep these screws for later reuse.

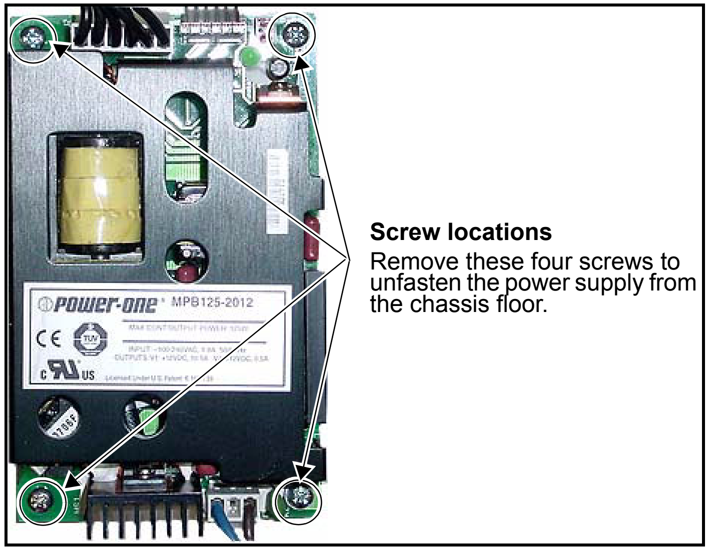


Figure C-28. Removing the Power Supply

6. Remove the power supply from the frame.
7. Replace the old power supply with a new one, following the previous steps in reverse.

Note

If you are removing a redundant power supply, replace the power supply prior to operation or install a cover plate over the AC inlet hole to maintain proper ventilation and avoid overheating.

Installing a Redundant Power Supply

Follow this procedure to install a new, redundant power supply when there is only one power supply currently in the frame:

1. Remove all power from the frame, and then remove the chassis cover. (See "Preparing the X75HD/X75SD for Servicing" on page 261).

   A redundant power supply is installed on the right side of the frame (labelled 2, below), as seen from the front. (See Figure C-29.)

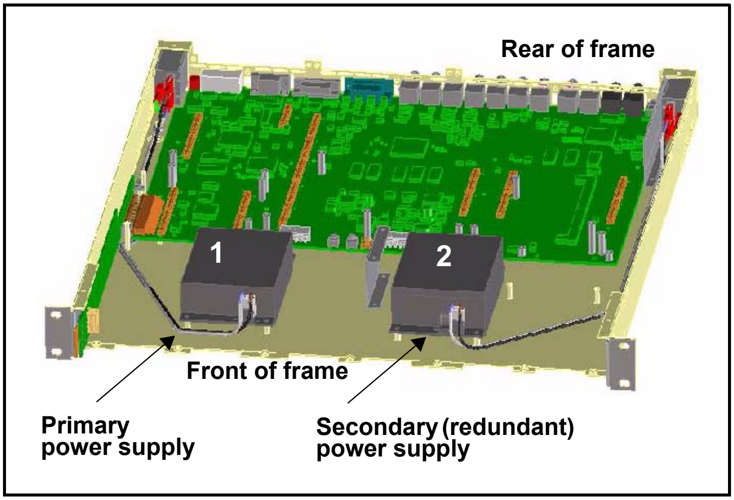


Figure C-29. Where to Install a Redundant Power Supply

> **Note**
> If the HD submodule is installed, you may need to remove it first before connecting the DC cables.

2. Install the power supply onto the four standoffs on the chassis floor, and then screw into place. (See Figure C-28 on page 292.)

   The two-pin AC cable connector faces the front of the chassis, while the six-pin DC cable connectors face the rear.

3. Connect one end of the main DC power cable and the secondary DC ribbon cable to the main board, and the other end of each cable to the power supply. (See Figure C-30.)

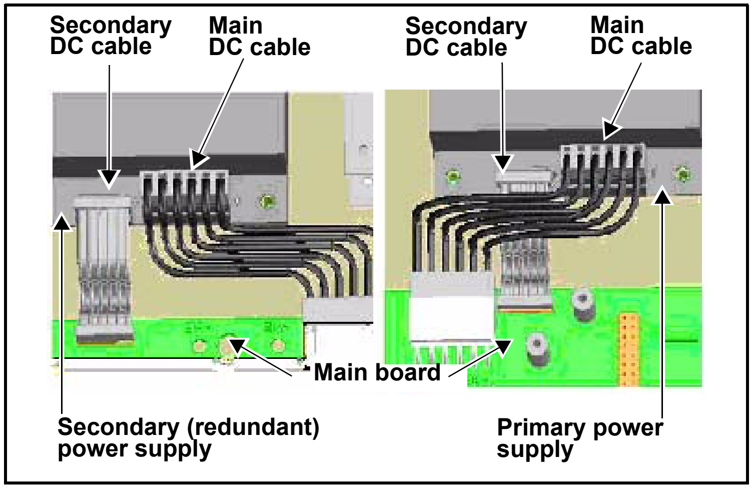


Figure C-30. Connecting DC and Ribbon Cables

4. Plug the end of the AC cable assembly with a two-pin connector into the power supply.

   The two-pin connector has polarized live and neutral wires feeding into it, color-coded as follows:

   - Black/Brown: Live wire
   - White/Blue: Neutral wire

   For primary and secondary power supplies, ensure that the neutral wire is on the left side and the live wire is on the right, as seen from the front. (See Figure C-31 on page 295).

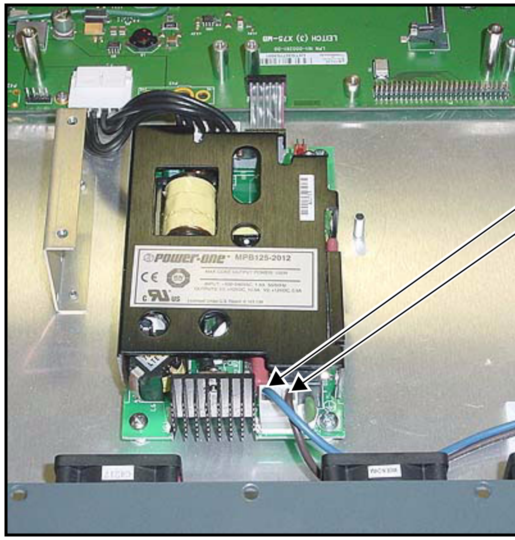


Figure C-31. Connecting AC Cables to Power Supply

5. Secure the AC cabling to the chassis. (See Figure C-32 on page 296.)

   To do this, follow these steps:

   a. Attach the self-stick tie holders to chassis floor (two places for each power supply's AC cabling).

   b. Feed the tie wraps through the holders.

   c. Wrap the tie wraps around the AC cabling.

   d. Clip any extra tie length.

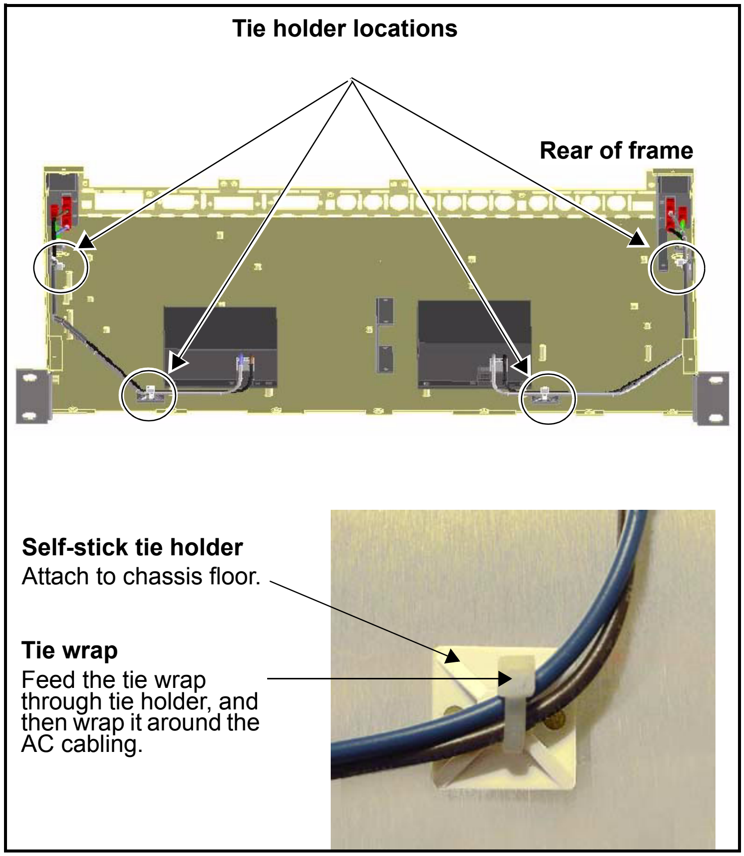
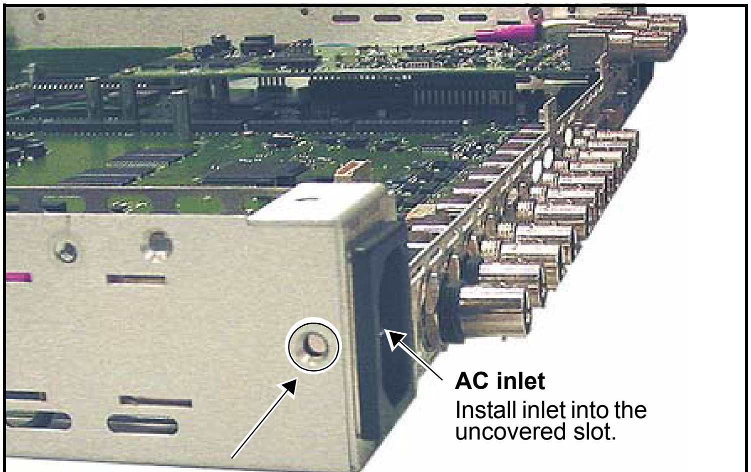


Figure C-32. Attaching Tie Wraps to AC Cabling

6. Take off the AC inlet cover plate by removing the inlet cover screw on the chassis side, and then install the new AC inlet into the slot. (See Figure C-33 on page 297.)

   Ensure the following during installation:

   - The ground plug on the inlet faces the outside chassis wall.
   - The AC inlet snaps securely into place.



AC inlet cover plate location
Remove this screw in order to take off the cover plate.

Figure C-33. Removing Cover Plate and Installing AC Inlet

7. Securely plug the AC wires into the appropriate AC inlet blade terminals.

   There are three wires: Live (black/brown), Neutral (white/blue), and Ground (green/yellow). The Live wire plugs on top of the Neutral wire, while the Ground wire always plugs into the single row slot that is closest to the chassis wall. (See Figure C-34.)

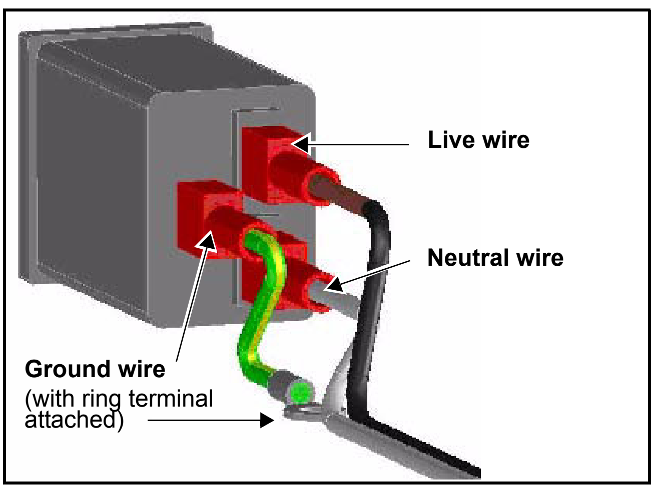


Figure C-34. Connecting AC Cables to Inlet

8. Place the attached ring terminal on the end of the ground wire over the stud on the chassis floor, and then secure it into place with the supplied nut to ground the unit.

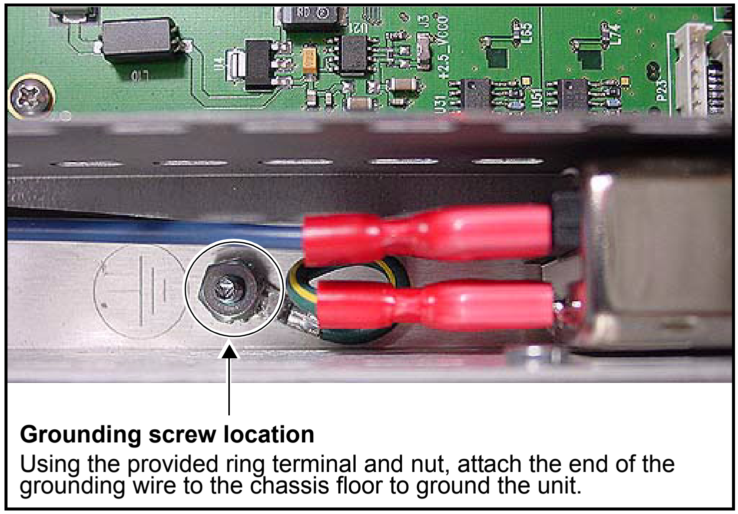


Figure C-35. Grounding AC Inlet

9. Replace the cover on the frame, and then return power to the unit.

   See "Preparing the X75HD/X75SD for Servicing" on page 261 for more information on replacing the cover.

Installing Fans

To replace a fan, or individual fans within the assembly, follow these steps:

1. Remove the four front mounting-ear screws, and then pull the frame out a few inches from the rack.

   Retain the screws.

2. Remove the screws along the top and bottom of the front panel that hold it to the frame. (See Figure C-36.)

   Retain the screws.

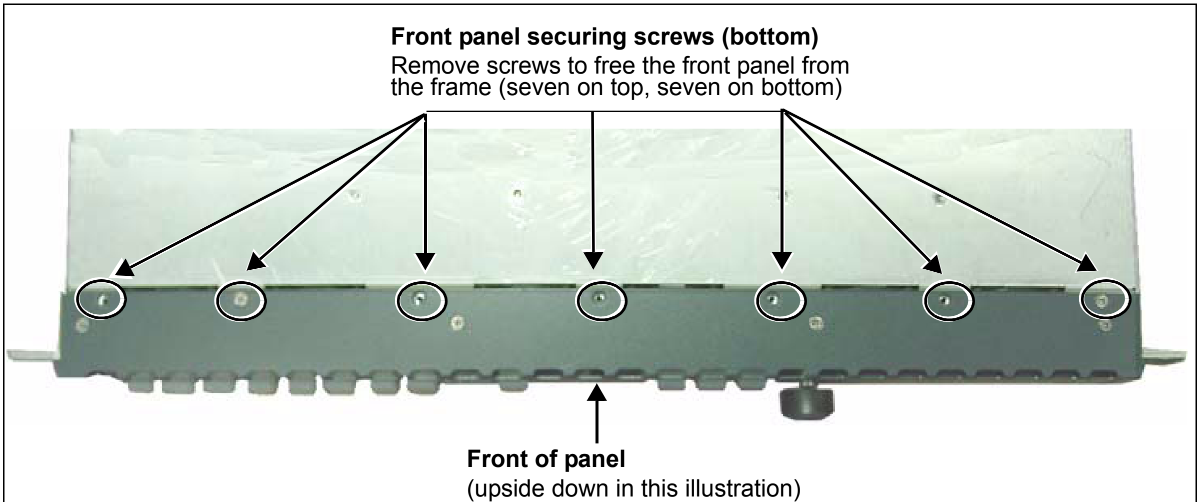


Figure C-36. Freeing the Front Panel from the Frame

3. Pull the front panel away from the frame. (See Figure C-37.)

   Although a frame-mounted local control panel is shown below, this procedure also applies to blank front panels.

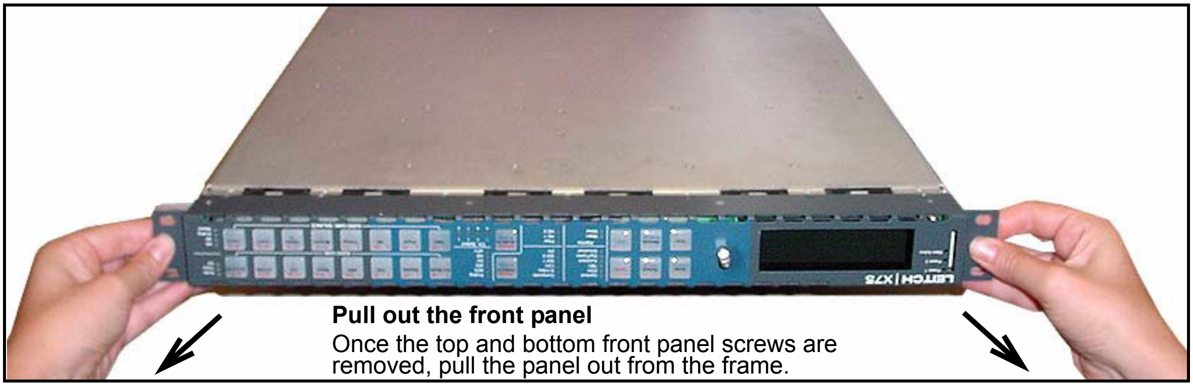


Figure C-37. Removing the Front Panel

4. Identify the fan you are replacing on the back side of the front panel, and then remove the corresponding header wires from the fan assembly connector. (See Figure C-38.)

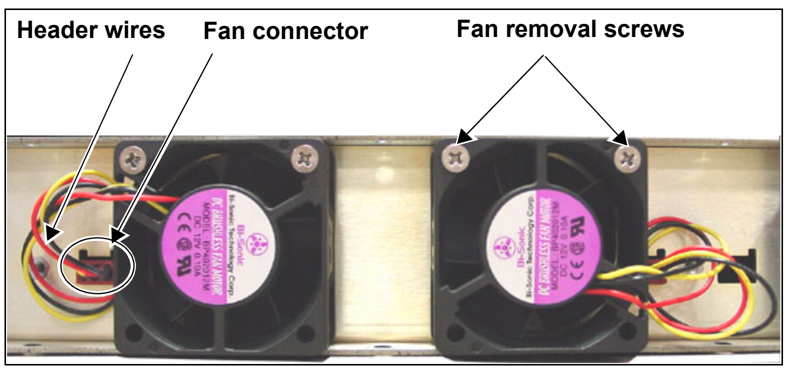


Figure C-38. Removing Header Wires from Fan Assembly Connector

5. Unscrew the fan, and then pull it away from the assembly to remove it.

6. Fasten a new fan into place on the assembly with the supplied screws. (See Figure C-39.)

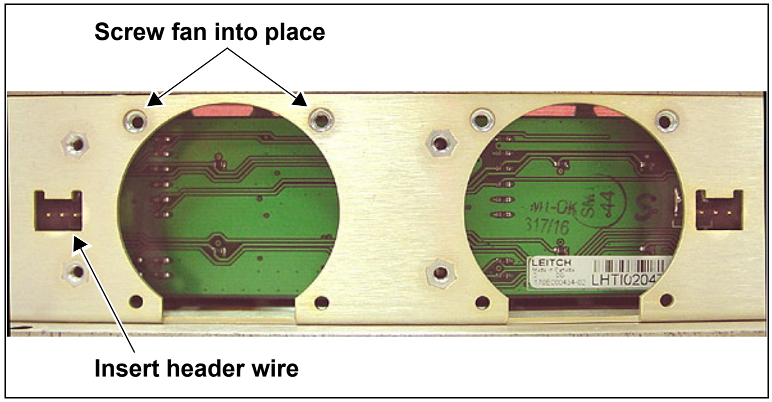


Figure C-39. Replacing a Fan within the Assembly

7. Connect the new fan’s header wires to the corresponding fan assembly connector.
8. Secure the front panel to the X75HD/X75SD frame using the original screws from step 2.
9. Close the front panel, re-establish any connections, and then reapply power to the frame.

Appendix D

Software

Overview

This appendix provides information about upgrading the software used in X75HD/X75SD units. The following topics are covered:

- "Upgrading Module Firmware" on page 304
- "Configuring SNMP Support" on page 311
- "Monitoring and Control Using Leitch MIBs" on page 317

Upgrading Module Firmware

Firmware upgrading is a routine procedure that you must perform to install newer versions of software on the X75HD/X75SD. Pilot, Co-Pilot, or Navigator software applications are required for this procedure. You can use either the Discovery or the drag-and-drop method. When performing the upgrading procedure, check the appropriate readme file to confirm which files are needed. Use care to ensure that you upload the correct files to the intended module.

If for some reason the upgrade fails, the module may not respond to controls and will appear to be non-functional. In that event, follow the steps described in "Correcting a Failed Upgrade Procedure" on page 310.

Upgrading the Firmware

Follow these steps to upgrade the firmware:

1. Download the most recent appropriate upgrade package from the Leitch Web site or from your CD-ROM.
2. If the affected module has not been discovered, perform the Discovery operation, as described in your CCS software application manual or online help.
3. From the **Tools** menu, select **Software Upgrade**.

The **Software Upgrade** window opens or is brought to the foreground.

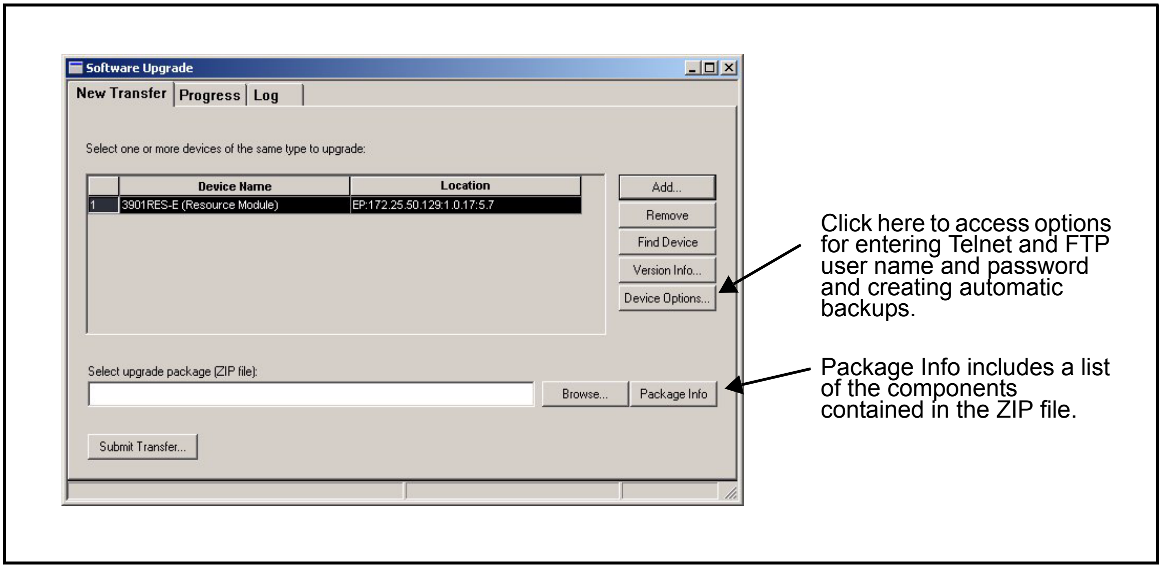


Figure D-1. Software Upgrade Tool's New Transfer Tab

4. On the **New Transfer** tab, click **Add**.

   The **Device Selection** dialog opens.

5. Select one or more X75s, and then click **OK** to close the **Add Device** dialog box.

   The selected devices appear in the table on the **New Transfer** tab of the **Software Upgrade** window. This table lists devices that are to receive the same upgrade package.

   For each device in this table, you can highlight its position in the Navigation Window by clicking **Find Device**. You can check the software revision numbers, etc., by clicking **Version Info**.

6. For each X75, click **Options**.

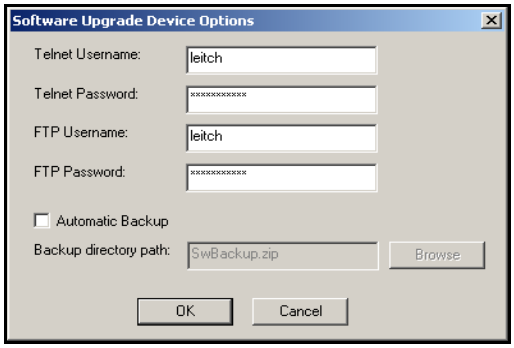


Figure D-2. Software Upgrade Options Box

7. If they are not already entered, fill out the **Telnet Username**, **Telnet Password, FTP Username**, and **FTP Password** fields.
8. Place a check beside **Automatic Backup**.

   This creates a backup of the current software installed on the X75. The backup is saved to the file name and location stated unless you click **Browse** to change it.

> **Note**
>
> Closing the **Software Upgrade** window does not effect any of the transfer processes that may be running in the background.

9. Click **OK** to close the **Software Upgrade Device Options** window.
10. On the **Software Upgrade** window's **New Transfer** tab, press **Browse...** to select the software upgrade package (ZIP file).

    A standard **Windows File Selection** dialog opens.
11. Choose the upgrade ZIP file on a local or network drive.

    The selected file's path name is displayed in the edit box to the left of the **Browse…** button.

    The extraction process on the ZIP file is handled as part of the upgrade process. You do not need to extract the files yourself.

12. Press **Submit Transfer...**

    A dialog box opens, requesting confirmation that you want to proceed with the request. If you have multiple devices selected, multiple transfer tasks are submitted—one per device.

    The transfer now progresses. You may close the **Software Upgrade** window, or continue with other tasks.

    Or you can switch to the **Progress** tab to view the status of the transfers.

13. Click on the **Log** tab and look at the **Progress** column to ensure that all files have correctly updated.

    The module is automatically rebooted following an upgrade procedure.

Note

If you try to log off or exit the CCS software while a transfer is underway, a notification window will alert you that processes are still active and will ask if you want to terminate these processes.

Stopping a Transfer Task

To stop a transfer task, select the task from the grid, and then click **Stop**. If the selected task is currently executing, it is placed into a an Aborted state. If the task has not yet started, it is placed into a “Waiting to Resume” state. A confirmation window appears to confirm that you want to stop as aborting the task will put the module into an inconsistent state the next time it is rebooted.

Note

The **Resume** button is not available in this release. Its functionality will be implemented in a future release.

Using the Software Upgrade Progress Tab

Note

The **Resume** button is always unavailable in this release. Its functionality will be implemented in a future release.

Use the **Progress** tab to monitor the status of all the transfer requests in the queue. The grid displays the status of each transfer task, with each row in the grid representing a single device-package combination (transfer task).

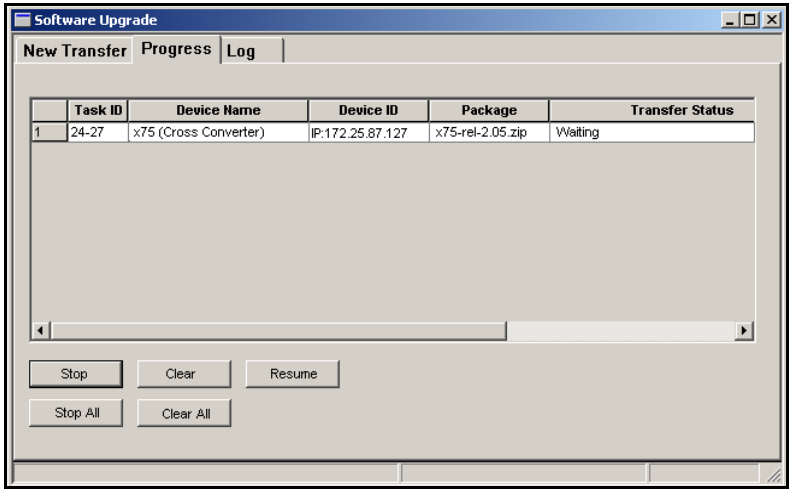


Figure D-3. Progress Tab of the Software Upgrade Window

Table 1-2 below describes the five buttons on the **Progress** tab.

Table D-1. Progress Tab Buttons

Button	Description
Stop	Aborts a selected transfer task
Clear	Removes a selected transfer task from the grid; the task must be in a Waiting to Resume, Aborted, Failed, or Completed state in order for this button to be enabled
Stop All	Aborts all tasks in the queue; you will be asked to confirm
Clear All	Removes all stopped tasks from the queue; these tasks must be either Waiting to Resume, Aborted, Failed, or Completed
Resume	Restarts a task that is in the “Waiting to Resume” state

Using the Log Tab

The **Log** tab displays a running log of all the transfer operations completed since application startup. It contains information such as the package filename, versions being transferred, start times, errors during transfer, and so on. The log text is selectable, allowing you to copy and paste log information to another application.

Software Upgrade Options

Right click in the Software Upgrade window to open an **Options** window.

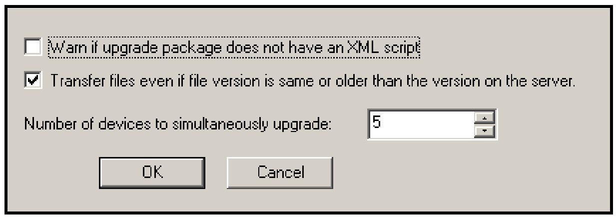


Figure D-4. Software Upgrade Options Window

Table D-2. Software Upgrade Options

Option	Result
Warn if upgrade package does not have an XML script	File transfer is not supported without an XML script, so this will warn you before aborting.
Transfer files even if file version is same or older than the version on the server	When this is checked, you can potentially upgrade the software to an older revision. However, this may be useful for returning to your backed up version.
Number of devices to simultaneously upgrade	Limits the number of files that can be added to the table on the New Transfer tab to the number in the window, which you can change.

Correcting a Failed Upgrade Procedure

A firmware upgrade may fail in the event of a network interruption or power failure. If one of these events occurs, you will be able to ping the device, but Multiple Path Converters and Frame Synchronizers will not be able to discover it.

See the documentation for the specific CCS device whose upgrade has failed for information on fail-safe mode, and if there are instructions for putting the device into fail-safe mode, follow them.

After a failed upgrade, some CCS devices will automatically go into a fail-safe mode where new software can be loaded but other functions are not enabled. If an upgrade fails, remove and then reapply power to the CCS device. You can then try the upgrade procedure again.

When you are performing the fail-safe upgrading procedure, check the readme file to confirm which files are needed. Use care to ensure that you transfer the correct files to the intended device.

1. Ensure that the CCS device is in fail-safe mode.
2. Change the network addresses on your Multiple Path Converters and Frame Synchronizers PC to match the default network addresses.
3. In Multiple Path Converters and Frame Synchronizers's Build mode, drag or copy and paste the device's icon from the **Catalog** folder to the **Network** or **Discovery** folder.
4. Right click on the device icon and then select **Properties**.
5. On the **Device** tab of the **Navigation Properties** box, press the **Set Default** button, and then click **Yes**.

Note

Do not make changes in the third field (located above and to the right of the **Set Default** button).

6. Follow the software upgrade procedure for the device as described in "Upgrading Module Firmware" on page 304.
7. Return the upgraded device to its normal operating mode, including returning the fail-safe and Default IP switches to their up position. For information on doing this, please refer to the device's installation and operation manual.
8. Return the PC network settings to their original states. See "Changing the PC Network Settings" on page 92.

Configuring SNMP Support

With SNMP support, you can use a standard MIB browser to monitor parameters and alarms.

You must set SNMP options using Pilot, CoPilot or Navigator. Before you can configure SNMP support, you must discover the X75HD/X75SD. For instructions on discovering this module, see the CCS Pilot/Navigator online help.

Activating Your SNMP License Key

A license key may have been included in your purchase of an SNMP-enabled system. Contact Leitch customer service to purchase one at a later date.

1. While your CCS Software is in Build mode, right click on the discovered X75HD/X75SD and choose **Configuration**.

   The **Configuration** window opens.
2. Click on the Device tab.
3. Enter your device key in the **License Key** field, and then click **Write and Reboot**.
4. Close the **Configuration** window.

Setting SNMP Options

Devices that support SNMP will have an **SNMP** tab in the **Configuration** window. To configure an X75HD/X75SD that supports SNMP, follow these instructions.

1. While your CCS Software is in Build mode, right click on the X75HD/X75SD and choose **Configuration**.

   The **Configuration** window opens.

2. Click the **SNMP** tab, and then click the **Read** button.

   The CCS network polls the module and retrieves its current settings. It fills in all the fields on the **SNMP** tab of the **Configuration** window with the settings that are on the device.

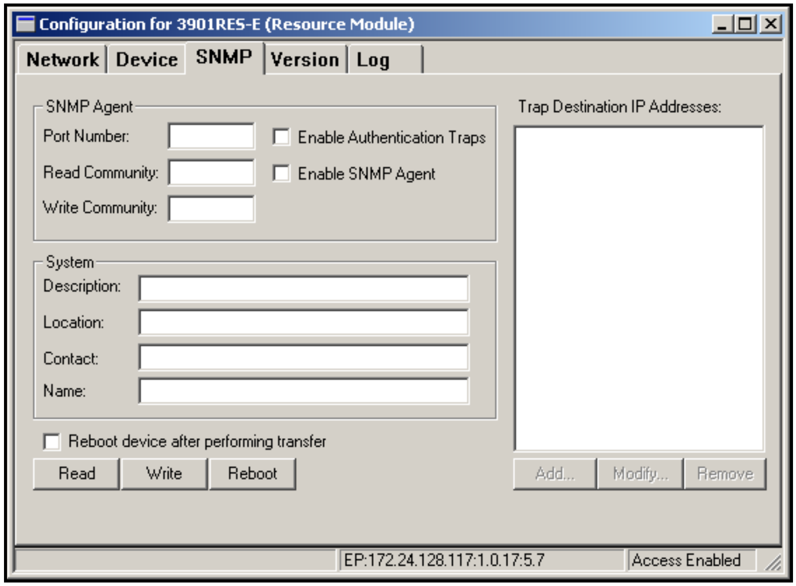


Figure D-5. SNMP Tab on device Configuration Window

If the Read function fails, your license key may not be entered correctly. See “Activating Your SNMP License Key” on page 311.

In the top left portion of the window are SNMP Agent settings.

Table D-3. SNMP Agent Fields of SNMP Tab

Field	Function
Port Number	(Can be from 0 to 65535) The network port used by the SNMP agent; port 161 is the default for X75HD/X75SD
Read Community	Has to match the “read community” setting in your MIB browser
Write Community	Has to match the “write community” setting in your MIB browser
Enable Authentication Traps	When checked, authentication traps are sent if the read or write community doesn’t match between the SNMP agent and MIB browser
Enable SNMP Agent	When checked, SNMP support is available; if not checked, SNMP support is disabled

Below the **SNMP Agent** settings are **System** settings. The information in these fields describes the device that is currently selected in the **Navigation** window. This is user-defined information that, once provided by an administrator, is available on the device when it is retrieved by a MIB browser.

Table D-4. System Fields of SNMP Tab - MIB-2 System Information

Field	Explanation
Description	The default is “Leitch SNMP Agent”
Location	The physical location of the device
Contact	The contact person for this device
Name	Name of the device

The **Trap Destination IP Addresses** field contains a list of IP addresses that will receive SNMP traps. It is in the format IP Address:Port Address:SNMP version.

3. To add new Trap Destination IP Addresses, see “Adding New Addresses for SNMP Traps” on page 314. To modify them, see “Modifying an SNMP Trap Destination” on page 315.

Note

The device must be rebooted before changes will take effect.

4. (Optional) If you wish the device to reboot automatically when you send the new configuration to it, place a check beside **Reboot device after performing transfer**.
5. Click **Write** to send the new configuration to the device.
6. If you did not place a check beside **Reboot device after performing transfer** in step 6, click **Reboot** now and your changes to the configuration will take effect.

Adding New Addresses for SNMP Traps

To add a new SNMP trap destination, follow this procedure:

1. Click **Add** beneath the **Trap Destination IP Addresses** field. The **Add Trap Destination** window opens.

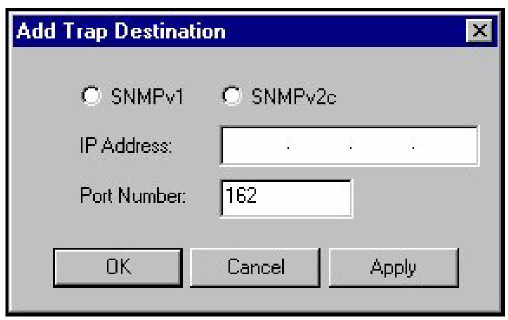


Figure D-6. Add Trap Destination Window

2. Choose the SNMP version that you would like to use for traps.
3. Choose the IP address of that trap destination.
4. Choose the port number. The default is 162, but an administrator can set this to any number between 0 and 65535.
5. Click **Apply**. A new line is added in the **Trap Destination IP Addresses** field.
6. Repeat steps 2 through 5 to add more rows to the window.
7. Click **OK** to return to the **SNMP** tab of the **Configuration** window.

Modifying an SNMP Trap Destination

To modify a trap destination, follow this procedure:

1. In the **Trap Destinations IP Addresses** list, click on the item you would like to modify.
2. Click the **Modify** button. The **Modify Trap Destination** window opens.

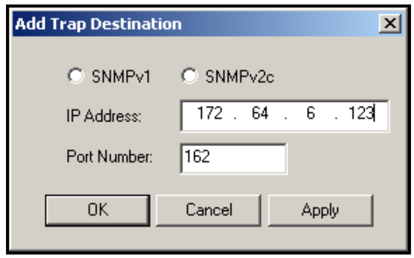


Figure D-7. Modify Trap Destination Window

3. Choose the SNMP version of the traps using the radio buttons at the top of the window.
4. Enter the IP address of that trap destination in the **IP Address** field.
5. Enter the port number in the **Port Number** field.

   The default value is 162.
6. Click **Apply**. The selected entry in the **Trap Destination IP Addresses** field is updated.
7. Repeat steps 2 through 6 to further update the row.
8. Click **OK** to close the **Modify Trap Destination** window.

Configuring Third-Party SNMP Software Control

SNMP is an industry-standard protocol that allows other (non Leitch) control software to remotely monitor and control the X75HD/X75SD.

Leitch provides MIB files that can be downloaded from the Leitch Web site. Two general Leitch MIB files (**leitch.mib** and **ccsAlarm.mib**) set up the structure to define parameters and alarms. Once these two MIBs are installed, you will want to install a MIB for each distinct module for which you wish to set up third-party software control.

You can use any standard MIB browsing software with your X75HD/X75SD.

1. Make the required network connections between the X75HD/X75SD unit(s) and your PC with installed SNMP browser/control software.

   The SNMP configuration process for the X75HD/X75SD directs the SNMP agent where to send alarms (SNMP traps). This file must be modified before it is loaded back to the X75HD/X75SD. For information on configuring SNMP, see page 311.

2. Load the leitch.mib file into your SNMP browser/control software.

   This MIB sets up the basic structure for product specific Leitch MIBs. It can be found under the Private > Enterprise branch, and sets up the leitchProducts and leitchCommon sub-branches.

   The leitchCommon branch is initially empty. The leitchProducts branch contains folders for different families of Leitch devices—for example, LeitchX75, NEO and fam6800plus.

3. Load the ccsAlarm.mib file into your SNMP browser/control software.

   This MIB adds a ccsAlarms sub-branch to the leitchCommon folder. When it is installed, you will be able to receive traps with proper information as to where the alarms are triggered from.

4. Load product-specific X75HD/X75SD Leitch MIB files into your SNMP browser/control software.

   A product-specific MIB provides a clear path to the parameters and alarms on the device. Leitch MIBs can be downloaded from the Leitch Web site at www.leitch.com.

   X75HD/X75SD MIBs will appear in the X75 folder under the leitchProducts folder. See Figure D-8 on page 317.

5. Configure your MIB browser to connect to the X75HD/X75SD by entering the IP address, Port (if you have changed the Port from its default in the configuration), and other standard configuration settings.

Your browser should now be able to connect to the SNMP agent running on the X75HD/X75SD unit. If you wish to receive traps, start up the trap receiver in your MIB browser software.

For SNMP troubleshooting information, see page 224.

Note

To verify that your configurations are correct, you can walk MIB2.

Monitoring and Control Using Leitch MIBs

Each X75HD/X75SD unit's MIB can be fully expanded. When you expand an X75 MIB node in the tree view, there are three sub-folders (see Table D-5).

Table D-5. MIB Sub-Folders

Tree View Item	Contents
Objects	Lists the parameters for the device; all configurable and read-only parameters appear here (see Figure D-8)
Identities	Lists the alarms information for the device which is used by the MIB browser to make trap messages more meaningful (see Figure D-9 on page 318.)
Conformities	A group of standard MIB information that guarantees that the MIB conforms to standard SNMP format

To view a complete list of the parameter settings on the X75, walk the MIB for that X75, walk the X75 at an IP address, or walk the X75 type.

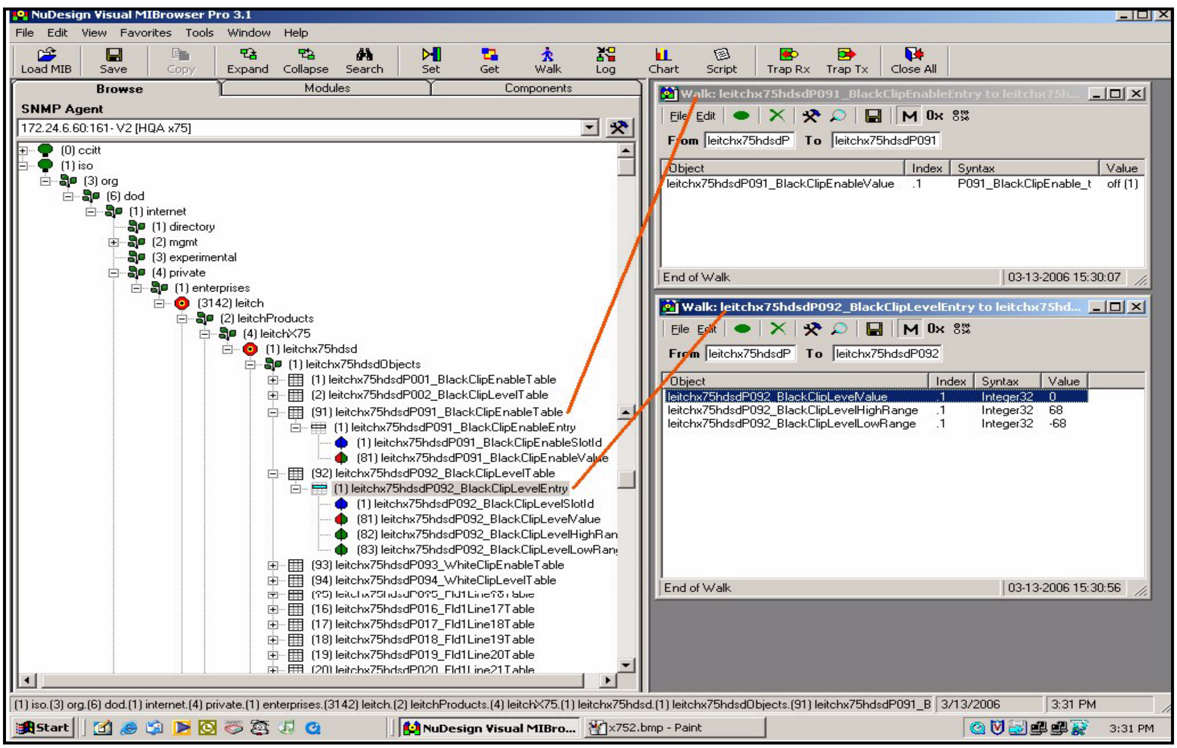


Figure D-8. Typical MIB Loaded into NuDesign MIB Browser

Navigating Parameters in a Leitch MIB

Leitch product MIBs contain functionality so that you can view a parameter's range, walk a device or a frame, or receive alarm traps for a device. See Figure D-9 for an example of alarms shown in a MIB browser.

How you can access these standard features will depend on the MIB Browsing software you use. See the documentation that accompanies your third-party control software for more details.

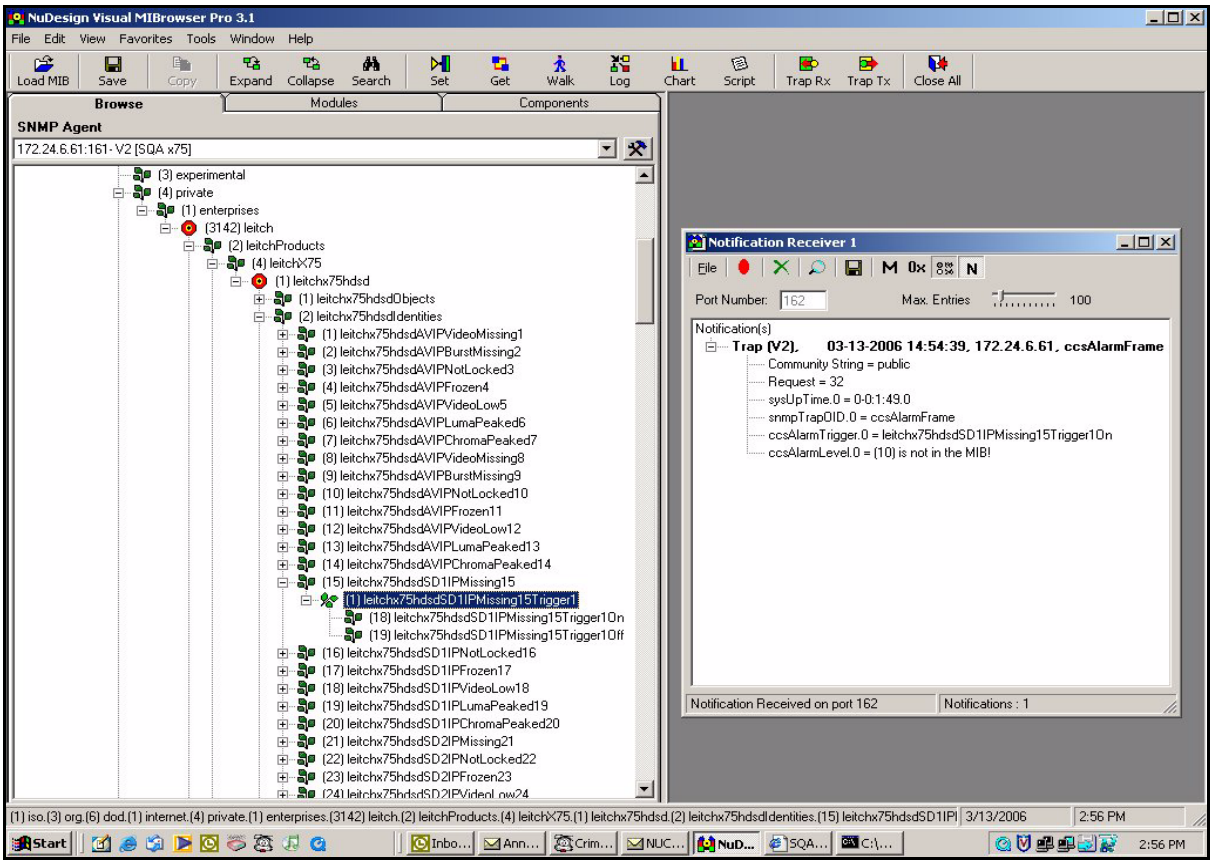


Figure D-9. Alarms in MIB Browser

Parameters that have a limited list of options have two listings under the Entry branch of the tree. Parameters that have a range (as in a slider) of options have four listings under the Entry branch of the tree.

The sub-branches described in Table D-6 are shown inFigure D-8 on page 317.

Table D-6. Sub-Branches Under a Parameter in a Leitch MIB

Sub-Branch	Contains
Slot ID	(Does not apply to the X75.)
Value	The current setting of this parameter
High Range (slider ranges only)	The top value of this parameter
Low Range (slider ranges only)	The bottom value of this parameter

For information on the parameters for each individual device, see that device's documentation. Leitch device manuals are available on the Leitch Web site at www.leitch.com. In addition, some Leitch products have HTML forms that display their parameters. These HTML forms are available on the Leitch Web site as well.

Appendix E

Alarms

Overview

This appendix lists the alarms as they are shown in the **Configure Alarms** menu. Alarms on X75HD/X75SD units are divided into Major and Minor categories, and this list shows the default category. You can change the priority of the individual alarms by assigning them a number between 1 and 10. Minor alarms are those between 1 and 5; Major alarms are between 6 and 10.

The **Configure Alarms** menu includes the following items:

- Trigger Time
- Clear Time
- Priority
- Alarms Disabled
- Alarm Mute
- Acknowledged

More information about these menu items and the alarms themselves is provided in the following pages.

Configure Alarms Options

Table E-1 lists the options available in the **Configure Alarms** menu and their meanings. To reach the individual alarms, press the **Option** button, and then select **Configure Alarms**.

Table E-1. Configure Alarms Menu

Menu Item	Description
Trigger Time	A filter that sets the duration (in seconds) between the time an alarm is detected, and the time an alarm is reported to the Web Server, CCS application, or Alarms LED
Clear Time	A filter that sets the length of time the alarm continues to be reported after the alarm condition is no longer detected (default values are set at 0 seconds)
Priority	The numerical value given to the priority of the alarm (1 = low priority and 10 = high priority; any alarm above 5 is designated Major)
Alarms Disabled	An option that silences the alarm, even though the alarm condition may continue to exist (If the alarm is re-enabled and the condition is not corrected, the alarm is reactivated immediately.)
Alarm Mute	An option that suppresses alarm messages when the state of the alarm changes (The control panel is affected when the mute is enabled. However, the Web Server application will display the alarm message in its next polling cycle, or when the user refreshes the screen. The Alarm Mute is not displayed in CCS applications.)
Acknowledged	A “flag” that indicates someone is attempting to correct the source of the alarm (In X75 control panels, an asterisk appears beside the alarm in the Active Alarms List.)

Alarms List

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
AV I/P video missing	Major	0	0
AV I/P burst missing	Major	0	0
AV I/P not locked	Major	0	0
AV I/P frozen	Minor	5	0
AV I/P video low	Major	5	0
AV I/P luma peaked	Major	5	0
AV I/P chroma peaked	Major	5	0
SD1 I/P missing	Major	0	0
SD1 I/P not locked	Major	0	0
SD1 I/P frozen	Minor	5	0
SD1 I/P video low	Major	5	0
SD1 I/P luma peaked	Major	5	0
SD1 I/P chroma peaked	Major	5	0
SD2 I/P missing	Major	0	0
SD2 I/P not locked	Major	0	0
SD2 I/P frozen	Minor	5	0
SD2 I/P video low	Major	5	0
SD2 I/P luma peaked	Major	5	0
SD2 I/P chroma peaked	Major	5	0
HD I/P missing	Major	0	0
HDFS I/P frozen	Minor	0	0
HD I/P video low	Major	0	0
HD I/P luma peaked	Major	0	0
HD I/P chroma peaked	Major	0	0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
Ref video missing	Major	0	0
Ref burst missing	Major	0	0
Ref not locked	Major	0	0
Ref SC/H error	Major	0	0
AA1 peaked	Major	3	0
AA1 silent	Minor	30.0	0
AA2 peaked	Major	0	0
AA2 silent	Minor	30.0	0
AA3 peaked	Major	0	0
AA3 silent	Minor	30.0	0
AA4 peaked	Major	0	0
AA4 silent	Minor	30.0	0
DV audio missing	Major	0	0
DV_a audio peaked	Major	0	0
DV_a audio silent	Minor	30.0	0
DV_b audio peaked	Major	0	0
DV_b audio silent	Minor	30.0	0
AES1 In missing	Major	0	0
AES1a peaked	Major	0	0
AES1a silent	Minor	30.0	0
AES1b peaked	Major	0	0
AES1b silent	Minor	30.0	0
AES2 In missing	Major	0	0
AES2a peaked	Major		0
AES2a silent	Minor	30.0	0
AES2b peaked	Major		0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
AES2b silent	Minor	30.0	0
HDX Ch1/2 missing	Major		0
HDX Ch1 peaked	Major		0
HDX Ch1 silent	Minor	30.0	0
HDX Ch2 peaked	Major		0
HDX Ch2 silent	Minor	30.0	0
HDX Ch3/4 missing	Major		0
HDX Ch3 peaked	Major		0
HDX Ch3 silent	Minor	30.0	0
HDX Ch4 peaked	Major		0
HDX Ch4 silent	Minor	30.0	0
HDX Ch5/6 missing	Major		0
HDX Ch5 peaked	Major		0
HDX Ch5 silent	Minor	30.0	0
HDX Ch6 peaked	Major		0
HDX Ch6 silent	Minor	30.0	0
HDX Ch7/8 missing	Major		0
HDX Ch7 peaked	Major		0
HDX Ch7 silent	Minor	30.0	0
HDX Ch8 peaked	Major		0
HDX Ch8 silent	Minor	30.0	0
HDX Ch9/10 missing	Major		0
HDX Ch9 peaked	Major		0
HDX Ch9 silent	Minor	30.0	0
HDX Ch10 peaked	Major		0
HDX Ch10 silent	Minor	30.0	0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
HDX Ch11/12 missing	Major		0
HDX Ch11 peaked	Major		0
HDX Ch11 silent	Minor	30.0	0
HDX Ch12 peaked	Major		0
HDX Ch12 silent	Minor	30.0	0
HDX Ch13/14 missing	Major		0
HDX Ch13 peaked	Major		0
HDX Ch13 silent	Minor	30.0	0
HDX Ch14 peaked	Major		0
HDX Ch14 silent	Minor	30.0	0
HDX Ch15/16 missing	Major		0
HDX Ch15 peaked	Major		0
HDX Ch15 silent	Minor	30.0	0
HDX Ch16 peaked	Major		0
HDX Ch16 silent	Minor	30.0	0
SDX Ch1/2 missing	Major		0
SDX Ch1 peaked	Major		0
SDX Ch1 silent	Minor	30.0	0
SDX Ch2 peaked	Major		0
SDX Ch2 silent	Minor	30.0	0
SDX Ch3/4 missing	Major		0
SDX Ch3 peaked	Major		0
SDX Ch3 silent	Minor	30.0	0
SDX Ch4 peaked	Major		0
SDX Ch4 silent	Minor	30.0	0
SDX Ch5/6 missing	Major		0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
SDX Ch5 peaked	Major		0
SDX Ch5 silent	Minor	30.0	0
SDX Ch6 peaked	Major		0
SDX Ch6 silent	Minor	30.0	0
SDX Ch7/8 missing	Major		0
SDX Ch7 peaked	Major		0
SDX Ch7 silent	Minor	30.0	0
SDX Ch8 peaked	Major		0
SDX Ch8 silent	Minor	30.0	0
SDX Ch9/10 missing	Major		0
SDX Ch9 peaked	Major		0
SDX Ch9 silent	Minor	30.0	0
SDX Ch10 peaked	Major		0
SDX Ch10 silent	Minor	30.0	0
SDX Ch11/12 missing	Major		0
SDX Ch11 peaked	Major		0
SDX Ch11 silent	Minor	30.0	0
SDX Ch12 peaked	Major		0
SDX Ch12 silent	Minor	30.0	0
SDX Ch13/14 missing	Major		0
SDX Ch13 peaked	Major		0
SDX Ch13 silent	Minor	30.0	0
SDX Ch14 peaked	Major		0
SDX Ch14 silent	Minor	30.0	0
SDX Ch15/16 missing	Major		0
SDX Ch15 peaked	Major		0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
SDX Ch15 silent	Minor	30.0	0
SDX Ch16 peaked	Major		0
SDX Ch16 silent	Minor	30.0	0
Power Supply failed	Major		0
Fan failed	Major		0
Frozen Video Detected	Minor		0
Dolby Decoder Ch1/2 missing	Major		0
Dolby Decoder Ch1 peaked	Major		0
Dolby Decoder Ch1 silent	Minor	30.0	0
Dolby Decoder Ch2 peaked	Major		0
Dolby Decoder Ch2 silent	Minor	30.0	0
Dolby Decoder Ch3/4 missing	Major		0
Dolby Decoder Ch3 peaked	Major		0
Dolby Decoder Ch3 silent	Minor	30.0	0
Dolby Decoder Ch4 peaked	Major		0
Dolby Decoder Ch4 silent	Minor	30.0	0
Dolby Decoder Ch5/6 missing	Major		0
Dolby Decoder Ch5 peaked	Major		0
Dolby Decoder Ch5 silent	Minor	30.0	0
Dolby Decoder Ch6 peaked	Major		0
Dolby Decoder Ch6 silent	Minor	30.0	0
Dolby Decoder Ch7/8 missing	Major		0
Dolby Decoder Ch7 peaked	Major		0

Table E-2. X75HD/X75SD Alarms List

Alarm Name	Priority	Trigger Time Default Setting (seconds)	Clear Time Default Setting (seconds)
Dolby Decoder Ch7 silent	Minor	30.0	0
Dolby Decoder Ch8 peaked	Major		0
Dolby Decoder Ch8 silent	Minor	30.0	0
Dolby Decoder Aux missing	Major		0
Dolby Decoder AuxL peaked	Major		0
Dolby Decoder AuxL silent	Minor	30.0	0
Dolby Decoder AuxR peaked	Major		0
Dolby Decoder AuxR silent	Minor	30.0	0

Appendix F

Specifications

Overview

This chapter describes all X75HD/X75SD video, audio, and other miscellaneous performance and hardware specifications.

The following specifications are included:

- "Video Specifications" on page 332
- "Audio Specifications" on page 340
- "I/O Specifications" on page 343
- "Communication Specifications" on page 344
- "Hardware Specifications" on page 345
- "Power Consumption" on page 346
- "HD Conversion Capabilities" on page 349
- "Video Propagation Delay" on page 349

Video Specifications

Input

Table F-1. HD-SDI Video Input Specifications

Item	Specification
Standard	SMPTE292M (See "HD Conversion Capabilities" on page 349 for more information.)
Connector	BNC (IEC169-8)
Impedance	75Ω
Return loss	>18 dB, typical, from 5 MHz to 1485 MHz
Equalization	Adaptive cable equalization for up to— • 328 ft (100 m), typical, of Belden 8281 co-axial cable or • 492 ft (150 m), typical, of Belden 1694A co-axial cable

Table F-2. HDTV Fiber Video Input

Item	Specification
Standard	SMPTE 292M, Mode B Operation (See "HD Conversion Capabilities" on page 349 for more information.)
Number of inputs	1
Connector	Single mode fiber, SC connector standard (FC or ST type optional)
Input wavelength	1200 to 1600 nm
Max. input power	0 dBm, typical
Sensitivity	Better than -20 dBm

Table F-3. SD-SDI Video Input Specifications

Item	Specification
Standard	SMPTE259M-C, 270 Mbps, 525/625 component
Connector	BNC (IEC169-8)
Impedance	75Ω
Return loss	>18 dB from 5 MHz to 270 MHz
Equalization	>23 dB Belden 8281 cable

Table F-4. S-Video Input Specifications

Item	Specification
Standard	• NTSC • PAL-M • PAL-B
Connector	4-pin DIN

Table F-5. X75OPT-A3D and X75OPT-PQM Analog Composite Video Input Specifications

Item	Specification
Standard	• NTSC (SMPTE170M) • PAL-B (ITU624-2) • SECAM • PAL-M
Connector	BNC (IEC 169-8)
Quantization	Normal mode, non-TBC: • 12 bits (NTSC, PAL-B, PAL-M) • 8 bits (SECAM) TBC mode • 8 bits (all standards)

Table F-5. X75OPT-A3D and X75OPT-PQM Analog Composite Video Input Specifications *(Continued)*

Item	Specification
Input level	1.0 V pk-to-pk
Impedance	75Ω
Return loss	>40 dB, 0.1 MHz to 6 MHz
Common mode range	5.0 V
CMRR	60 dB @ 50/60 Hz, 5 V pk-to-pk
Setup level range	±7.5 IRE
Frequency response	±0.1 dB, 0.1 MHz to 6 MHz
SNR	62 dB, typical (X75OPT-A3D); 58 dB, typical (X75OPT-PQM)
Y/C gain error	<0.1 dB
Y/C delay error	<10 ns

Table F-6. Component Input Specifications

Item	Specification
Format	Betacam
Connector	BNC (IEC169-8)
Input level	1.0 V pk-to-pk
Quantization	Normal mode, non-TBC mode CAV • Y: 12 bits • Cb: 10 bits • Cr: 10 bits Normal mode, non-TBC mode S-Video • Luma: 12 bits • Chroma: 10 bits
	TBC mode • CAV: Not supported • S-Video: 8 bits all
Impedance	75Ω

Table F-6. Component Input Specifications *(Continued)*

Item	Specification
Return loss	>40 dB, 1 kHz to 6 MHz
Frequency response	• Y: ±0.15 dB to 5.5 MHz • Pb/Pr: ±0.10 dB to 3.0 MHz
SNR	>60 dB

Table F-7. Genlock Input Specifications

Item	Specification
Connector	BNC (IEC169-8)
Impedance	75Ω
Return loss	>40 dB, 0.1 MHz to 6 MHz
Input level	• 1 V pk-to-pk, -5.0 dB to +6.0 dB for NTSC/PAL-B • 1 Vpk-to-pk, -3.5 dB to +6.0 dB for Tri-level sync (1080i/720p)
Signal type	NTSC/PAL-B analog composite ±300 mV Tri-level sync (1080i/720p)

Output

Table F-8. HD-SDI Video Output Specifications

Item	Specification
Standard	SMPTE292M (See “HD Conversion Capabilities” on page 349 for more information.)
Connector	BNC (IEC169-8)
Impedance	75 Ω
Return loss	>18 dB, typical, from 5 MHz to 1485 MHz
Signal level	800 mV ± 10%
DC offset	0.0 V ± 0.5 V
Rise/fall time	<270 ps
Overshoot	<10% of amplitude
Jitter	<135 ps pk-to-pk

Table F-9. HDTV Fiber Video Output Specifications

Item	Specification
Standard	SMPTE 292M, Mode B Operation (See “HD Conversion Capabilities” on page 349 for more information.)
Number of outputs	1
Connector	Single mode fiber, SC-type standard; FC- or ST-type optional
Output wavelength	1310 ± 40 nm
Output power	-7 dBm
Rise/fall time	<270 ps
Jitter	<135 ps pk-to-pk
Laser safety level	Class 1

Table F-10. SD-SDI Video Output Specifications

Item	Specification
Standard	SMPTE259M-C, 270 Mbps, 525/625 component
Quantization	10 bits
Connector	BNC (IEC169-8)
Impedance	75Ω
Return loss	>18 dB from 5 MHz to 270 MHz
Signal level	800 mV ± 10%
DC offset	0.0 ± 0.5 V
Rise/fall time	400 ps to 1500 ps (20% to 80%)
Overshoot	<10%
Jitter	<0.2 UI (pk-to-pk)

Table F-11. Composite Video Output Specifications

Item	Specification
Standard	• NTSC • PAL-B • PAL-M
Connector	BNC (IEC169-8)
Quantization	12 bits
Impedance	75Ω
Return loss	>40 dB (0.1 MHz to 6 MHz)
Frequency response	±0.1 dB (0.1 MHz to 6 MHz)
DC offset	<0.0 ± 0.005 V
Differential gain	<0.5%
Differential phase	<0.5°
Y/C delay	<10 ns
Transient response	<0.5% K Factor
SNR	>63 dB (0.1 MHz to 6 MHz)

Table F-12. Component Output Specifications

Item	Specification
Format	Betacam
Connector	BNC (IEC169-8)
Quantization	• Y: 12 bits • Cb: 10 bits • Cr: 10 bits
Impedance	75Ω
Return loss	>40 dB (1 kHz to 6 MHz)
Frequency response	• Y: ±0.1 dB to 5.5 MHz • Pb/Pr: ±0.10 dB to 3.0 MHz
DC offset	<0.0 ± 5 mV
Relative delay	<±10 ns
SNR	>63 dB

Table F-13. Streaming Output Specifications

Item	Specification
Video compression type	MPEG4
Profile	Simple Profile
Modes	Fixed Bit Rate Mode, VBR (Variable Bit Rate) Mode
Bit rate range control	User-settable 200 Kb/s - 1 Mb/s
Frame rate (VBR)	30 fps / 25 fps
Frame rate (fixed)	As bit rate is lowered, frame rate is lowered
Audio compression type	AAC (Advanced Audio Coding) format
Profile	LC (Low Complexity)
Sample rate	48 K
Stereo bit rate (two channels)	64 Kbps

Table F-14. DVI Output Specifications

Item	Specification
Standard	• 1080i/59.94 • 1080i/50 • 720p/59.94 • 720p/50
Connector	DVI-D
Rise/fall times	75 ps to 0.4 UI (20% to 80%)
Level	1.0 V ± 0.2 V (differential, pk-to-pk)
Jitter	0.25 UI

Audio Specifications

Input

Table F-15. AES/DARS Input Specifications

Item	Specification
Balanced	
Standard	AES3
Type	Balanced, transformer coupled
Connector	2 female DB-26/DB-44 connector with breakout cable
Sensitivity	<200 mV
Impedance	110Ω ± 20% (0.1 MHz to 6 MHz)
Common mode rejection	0 V to 7 V (0 kHz to 20 kHz)
Input audio rate	32 kHz to 108 kHz
Unbalanced	
Standard	AES3, SMPTE276M
Type	Unbalanced, AC coupled
Connector	BNC (IEC169-8)
Sensitivity	<100 mV
Impedance	75Ω
Return loss	>25 dB, 0.1MHz to 6 MHz
Input audio rate	32 kHz to 108 kHz

Table F-16. Analog Audio Input Specifications

Item	Specification
Connector	Removable barrier strip
Input impedance	Jumper selectable with J5~J8 • Pin 2-3: 100 kΩ • Pin 1-2: 600 Ω
Input analog level	28 dBu to 16 dBu (adjustable by 2 dB increments)
CMRR	>80 dB @ 60 Hz, typical
Linearity	<±0.5 dB (to -100 dBFS)
Frequency response	<±0.05 dB (20 Hz to 20 kHz), typical
THD	>100 dB (@ -1 dBFS, 20 Hz to 20 KHz)
SNR	>100 dB

Output

Table F-17. AES Output Specifications

Item	Specification
Balanced	
Standard	AES3
Type	Balanced, transformer coupled
Connector	2 female DB-26/DB-44 connector with breakout cable
Signal level	4.0 V (pk-to-pk)
Impedance	110Ω ± 20% (0.1 MHz to 6 MHz)
Jitter	<± 4 ns, peak value
DC offset	0.0 ± 50 mV
Rise/fall time	5 ns to 30 ns (10% to 90%)
Unbalanced	
Standard	AES3, SMPTE276M
Type	Unbalanced, AC coupled

Table F-17. AES Output Specifications *(Continued)*

Item	Specification
Connector	BNC (IEC169-8)
Signal level	1.0 V ± 10% (pk-to-pk)
Impedance	75Ω
Return loss	>25 dB, 0.1 MHz to 6 MHz
Jitter	<± 4 ns, peak value
DC offset	0.0 ± 50 mV
Rise/fall time	30 ns to 44 ns (10% to 90%)

Table F-18. Analog Audio Output Specifications

Item	Specification
Connector	Removable barrier strip
Output impedance	Jumper selectable with J1~J4, J9~J12 • Pin 2-3: 66Ω • Pin 1-2: 600Ω
Output analog level	28 dBu to 16 dBu (adjustable by 2 dB increments)
Linearity	<±0.5 dB (to -100 dBFS)
Frequency response	<±0.1dB (20 Hz to 20 kHz)
THD	<-87dB typical (@ -1 dBFS, 20 Hz to 20 KHz)
SNR	>100 dB

I/O Specifications

Table F-19. Multi-I/O Specifications

Item	Specification
Composite output	• NTSC • PAL-B • SECAM • Sync
Component output	GBR
Quantization	8 bits all
Time code	Input
GPI inputs	• Number: 2 • Internally pulled HIGH • External contact closure to ground to trigger
GPI outputs	• Number: 2 • TTL-compatible • 75Ω impedance • Sink 64 mA, source 32 mA
Connector	DB-26

Table F-20. DV I/O Specifications (Future Use)

Item	Specification
Standard	IEEE-1394
Connector	IEEE-1394, 6 pin molex connector

Table F-21. Thumbnail Streaming Specifications

Item	Specification
Connector	RJ-45
Protocols	• CCS • SNMP • HTTP

Note

The measurement result has 1.64 - 1.66ms delay for HD de-embedded audio and 1.28 - 1.3ms for SD de-embedded audio.

Table F-22. V2A Specifications

Item	Specification
Measurement window	± 1.2 seconds between video and audio
Time to provide measurement	5 seconds
Measurement resolution	±2 video lines

Communication Specifications

Table F-23. RS-232/RS-422 Specifications

Item	Specification
Standard	Electrical specification EIA-232C
Connector	• DB-9 • 232/422 switchable • 422 termination can be selected from the menu

Hardware Specifications

Table F-24. Weight and Dimension Measurements

Item	Specification
Weight	• Fully loaded unit, no power cords: 11 lbs (4.9 kg) • Breakout cables (each): 2.5 lbs (1.1 kg)
Height	1RU, 1.75 in. (4.5 cm)
Width	19 in. (48.3 cm)
Depth (includes extruding knobs and BNCs)	21.5 in. (54.6 cm)

Power Consumption

Table F-25. Power Consumption by Individual Component

Component	Description	Power Consumption @ 115V AC
1	X75HD/X75SD frame with mainboard	17.19 W
2	Local control panel	6.96 W
3	Blank front panel	5.25 W
4	HDTV submodule	28.35 W
5	8- or 16-channel audio submodule	19.69 W
6	Analog video in submodule (A3D or PQM)	7.88 W
7	Streaming submodule (future use)	3.95 W
8	Second power supply	Adds extra 5% to single power supply system configuration

Table F-26. Power Consumption of Complete Packages

Systems Configuration	Individual Components	Description	Power Consumption @115VAC
X75HD Models			
X75HD	1+2+4	X75HD frame with mainboard, local control panel, and HDTV submodule	53 W
X75HD-2PS	1+2+4+8	X75HD frame with mainboard, local control panel, HDTV submodule, and second power supply	55 W
X75HD-AV	1+2+4+5	X75HD frame with mainboard, local control panel, HDTV submodule, and 16-channel audio submodule	72 W
X75HD-AV-2PS	1+2+4+5+8	X75HD frame with mainboard, local control panel, HDTV submodule, 16-channel audio submodule, and second power supply	76 W
X75HD-LC	1+3+4	X75HD frame with mainboard, blank front panel, and HDTV submodule	51 W

Table F-26. Power Consumption of Complete Packages

Systems Configuration	Individual Components	Description	Power Consumption @115VAC
X75HD-LC-2PS	1+3+4+8	X75HD frame with mainboard, blank front panel, HDTV submodule, and second power supply	53 W
X75HD-LCAV	1+3+4+5	X75HD frame with mainboard, blank front panel, HDTV submodule and 16-channel audio submodule	70 W
X75HD-LCAV-2PS	1+3+4+5+8	X75HD frame with mainboard, blank front panel, HDTV submodule, 16-channel audio submodule, and second power supply	74 W
X75SD Models			
X75SD	1+2	X75SD frame with mainboard, local control panel	24 W
X75SD-2PS	1+2+8	X75SD frame with mainboard, local control panel and second power supply	25 W
X75SD-AV	1+2+5	X75SD frame with mainboard, local control panel and 8-channel audio submodule	44 W
X75SD-AV-2PS	1+2+5+8	X75SD frame with mainboard, local control panel, 8-channel audio submodule and second power supply	46 W
X75SD-LC	1+3	X75SD frame with mainboard, blank front panel	22 W
X75SD-LC-2PS	1+3+8	X75SD frame with mainboard, blank front panel and second power supply	24 W
X75SD-LCAV	1+3+5	X75SD frame with mainboard, blank front panel and 8-channel audio submodule	42 W
X75SD-LCAV-2PS	1+3+5+8	X75SD frame with mainboard, blank front panel, 8-channel audio submodule and second power supply	44 W
X75-DPS-575 Models			
X75-DPS-575	1+2+6	X75SD equivalent frame to DPS-575 with mainboard, local control panel and PQM analog video in submodule.	32 W

Table F-26. Power Consumption of Complete Packages

Systems Configuration	Individual Components	Description	Power Consumption @115VAC
X75-DPS-575AV	1+2+5+6	X75SD equivalent frame to DPS-575AV with mainboard, local control panel, PQM analog video in and 8-channel audio submodule.	52 W
X75-DPS-575LC	1+3+6	X75SD equivalent frame to DPS-575LC with mainboard, blank front panel, and PQM analog video in submodule.	30 W
X75-DPS-575LCAV	1+3+5+6	X75SD equivalent frame to DPS-575LCAV with mainboard, blank front panel, PQM analog video in and 8-channel audio submodule.	50 W

HD Conversion Capabilities

Note

"Y" indicates that this format conversion is supported.

The X75HD model can convert any of the input signals and formats listed in Table F-27 to any of the specified output signals and formats.

Table F-27. X75HD Supported Conversion Formats

		Outputs							
		486i/ 59.94	720p/ 59.94	1080i/ 59.94	1080p/ 23.98*	576i/ 50	720p/ 50	1080i/ 50	1080p/ 25
Input	486i/59.94	Y	Y	Y	Y2				
	720p/59.94	Y	Y	Y	Y2				
	1080i/59.94	Y	Y	Y	Y2				
	1080p/23.98	Y1	Y1	Y1	Y				
	1080psf/23.98	Y1	Y1	Y1	Y				
	576i/50					Y	Y	Y	Y
	720p/50					Y	Y	Y	Y
	1080i/50					Y	Y	Y	Y
	1080p/25					Y	Y	Y	Y

Y1 indicates that 2:3 cadence is used; Y2 indicates material with 3:2 cadence converted with no motion artifacts

Video Propagation Delay

Table F-28 on page 350 shows the video propagation delays encountered in the X75HD/X75SD when processing CVBS, S-Video/ CAV; SD1/SD2/DV, 1080i/59.94, and 720p/59.94 signals.

Table F-29 on page 352 shows the video propagation delays encountered in the X75HD/X75SD when processing 1080i/50, 1080p/ 25, and 720p/50 signals.

See "Video Path" on page 352 for important information about the propagation delays.

Table F-28. Propagation Delay For CVBS, S-Video/CAV;SD1/SD2/DV, 1080i/59.94, and 720p/59.94

Input	Decoding	FrameSync	HD User Video Delay	Up/Dn/Cross	SD NR	SD User Video Delay
CVBS	1 line	0~1 I-frame	N/A	N/A	1 line ~ 1 I-field	0 ~ 4 I-frames
CVBS	1 line	0~1 I-frame	N/A	N/A	1 line ~ 1 I-field	0 ~ 4 I-frames
CVBS	1 line	0~1 I-frame	N/A	Up: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
S-Video/CAV;SD1/SD2/DV	N/A	0~1 I-frame	N/A	N/A	1 line ~ 1 I-field	0 ~ 4 I-frames
S-Video/CAV;SD1/SD2/DV	N/A	0~1 I-frame	N/A	N/A	1 line ~ 1 I-field	0 ~ 4 I-frames
S-Video/CAV;SD1/SD2/DV	N/A	0~1 I-frame	N/A	Up: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080i/59.94	N/A	0~1 I-frame	0~7 I-frames	Dn: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080i/59.94	N/A	0~1 I-frame	0~7 I-frames	Dn: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080i/59.94	N/A	0~1 I-frame	0~7 I-frames	1 I-field to 3 I-fields. By default 1 I-frame	N/A	N/A
1080i/59.94	N/A	0~1 I-frame	0~7 I-frames	Cross: 1 I-field to 3 I-fields. By default 1 I-frame	N/A	N/A
720p/59.94	N/A	0~1 P-frame	0~15 P-frames	Dn: several lines to 2 P-frames. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
720p/59.94	N/A	0~1 P-frame	0~15 P-frames	Dn: several lines to 2 P-frames. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
720p/59.94	N/A	0~1 P-frame	0~15 P-frames	Cross: several lines to 2 P-frames. By default 1 P-frame	N/A	N/A
720p/59.94	N/A	0~1 P-frame	0~15 P-frames	several lines to 1 P-frame. By default 1 P-frame	N/A	N/A

		Output	Minimum/Maximum Delays			
SD ARC	**Encoding**		**Min. Total Delay**	**Min. Total Delay (ms)**	**Max. Total Delay**	**Max. Total Delay (ms)**
1 ~ 3 I-field	6.28uS	CVBS, CAV, S-Vid	< 3 lines	<0.192 (PAL), <0.191(NTSC)	Up to: 7 I-frames	<280 (PAL), <234(NTSC)
1 ~ 3 I-field	N/A	SD-SDI	< 3 lines	<0.192 (PAL), <0.191(NTSC)	Up to: 7 I-frames	<280 (PAL), <234(NTSC)
N/A	N/A	HD-SDI	1 I-field	<20(PAL), <16.7(NTSC)	Up to: 6 I-frames	<240 (PAL), <200(NTSC)
1 ~ 3 I-field	6.28uS	CVBS, CAV, S-Vid	< 2 lines	<0.128 (PAL), <0.127(NTSC)	Up to: 7 I-frames	<280 (PAL), <234(NTSC)
1 ~ 3 I-field	N/A	SD-SDI	< 2 lines	<0.128 (PAL), <0.127(NTSC)	Up to: 7 I-frames	<280 (PAL), <234(NTSC)
N/A	N/A	HD-SDI	1 I-field	<20(PAL), <16.7(NTSC)	Up to: 6 I-frames	<240 (PAL), <200(NTSC)
N/A	6.28uS	CVBS, CAV, S-Vid	1 I-field	<16.7	Up to: 14 I-frames	<467
N/A	N/A	SD-SDI	1 I-field	<16.7	Up to: 14 I-frames	<467
N/A	N/A	1080i/59.94	1 I-field	<16.7	Up to: 9.5 I-frames	<317
N/A	N/A	720p/59.94	1 I-field	<16.7	Up to: 9.5 I-frames	<317
N/A	6.28uS	CVBS, CAV, S-Vid	< 50 lines	<1.11	Up to: 18 P-frames + 4.5 I-frames	<450
N/A	N/A	SD-SDI	< 50 lines	<1.11	Up to: 18 P-frames + 4.5 I-frames	<450
N/A	N/A	1080i/59.94	< 50 lines	<1.11	Up to: 18 P-frames	<300
N/A	N/A	720p/59.94	< 50 lines	<1.11	Up to: 17 P-frames	<284

Table F-29. Propagation Delay For 1080i/50, 1080p/25, and 720p/50

Input	Decod-ing	Frame Sync	HD User Video Delay	Up/Dn/Cross	SD NR	SD User Video Delay
1080i/50	N/A	0~1 I-frame	0~7 I-frames	Dn: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080i/50	N/A	0~1 I-frame	0~7 I-frames	Dn: 1 I-field to 3 I-fields. By default 1 I-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080i/50	N/A	0~1 I-frame	0~7 I-frames	1 I-field to 3 I-fields. By default 1 I-frame	N/A	N/A
1080i/50	N/A	0~1 I-frame	0~7 I-frames	Cross: 1 I-field to 3 I-fields. By default 1 I-frame	N/A	N/A
1080i/50	N/A	0~1 I-frame	0~7 I-frames	Cross: 1 I-field to 3 I-fields. By default 1 I-frame	N/A	N/A
1080p/25	N/A	0~1 P-frame	0~7 P-frames	Dn: 0.5 P-frame to 1 P-frame. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080p/25	N/A	0~1 P-frame	0~7 P-frames	Dn: 0.5 P-frame to 1 P-frame. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
1080p/25	N/A	0~1 P-frame	0~7 P-frames	Cross: 0.5 P-frame to 1 P-frame. By default 1 P-frame	N/A	N/A
1080p/25	N/A	0~1 P-frame	0~7 P-frames	0.8 P-frame to 1.8 P-frame. By default 1 P-frame	N/A	N/A
1080p/25	N/A	0~1 P-frame	0~7 P-frames	Cross: 0.5 1080P-frame to 1 1080P-frame. By default: 1 P-frame	N/A	N/A
720p/50	N/A	0~1 P-frame	0~15 P-frames	Dn: several lines to 2 P-frames. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
720p/50	N/A	0~1 P-frame	0~15 P-frames	Dn: several lines to 2 P-frames. By default 1 P-frame	1 line ~ 1 I-field	0 ~ 4 I-frames
720p/50	N/A	0~1 P-frame	0~15 P-frames	Cross: several lines to 2 P-frames. By default 1 P-frame	N/A	N/A
720p/50	N/A	0~1 P-frame	0~15 P-frames	Cross: several lines to 3 720P-frames. By default 2 720P-frame	N/A	N/A
720p/50	N/A	0~1 P-frame	0~15 P-frames	several lines to 1 P-frame. By default 1 P-frame	N/A	N/A

Video Path

When a block is inserted, the FS phase or SD-ARC will be compensated to maintain output, and the H/V phases won't change. If the SDNR is inserted, the propagation delay may not change or may add one extra I-frame, depending upon the FS phasing. The total FS+SDNR delay will be less than 1.5 I-frames.

If the SD-ARC is inserted, the propagation delay will add an extra 0.5 to 1.5 I-frames, depending upon FS phases and SD-ARC/HD-Dn phase settings.

If the strobe is inserted, the propagation delay most likely will not change; if a delay-line is inserted, the propagation delay will add an extra 0 to 4 I-frames, depending upon the delay line settings.

If a keyer is inserted, the propagation delay most likely will not change.

		Output	Minimum/Maximum Delays			
SD ARC	Encoding		Min. Total Delay	Min. Total Delay (ms)	Max. Total Delay	Max. Total Delay (ms)
N/A	6.28uS	CVBS, CAV, S-Vid	1 I-field	<20	Up to: 14 I-frames	<560
N/A	N/A	SD-SDI	1 I-field	<20	Up to: 14 I-frames	<560
N/A	N/A	1080i/50	1 I-field	<20	Up to: 9.5 I-frames	<380
N/A	N/A	1080p/25	1 I-field	<20	Up to: 9.5 I-frames	<380
N/A	N/A	720p/50	1 I-field	<20	Up to: 9.5 I-frames	<380
N/A	6.28uS	CVBS, CAV, S-Vid	0.5 P-frame	<20	Up to: 9 P-frames + 4.5 I-frames	<540
N/A	N/A	SD-SDI	0.5 P-frame	<20	Up to: 9 P-frames + 4.5 I-frames	<540
N/A	N/A	1080i/50	0.5 P-frame	<20	Up to: 9 P-frames	<360
N/A	N/A	1080p/25	0.8 P-frame	<32	Up to: 10 P-frames	<400
N/A	N/A	720p/50	0.5 P-frame	<20	Up to: 9 P-frames	<360
N/A	6.28uS	CVBS, CAV, S-Vid	< 50 lines	<1.33	Up to: 18 P-frames + 4.5 I-frames	<540
N/A	N/A	SD-SDI	< 50 lines	<1.33	Up to: 18 P-frames + 4.5 I-frames	<540
N/A	N/A	1080i/50	< 50 lines	<1.33	Up to: 18 P-frames	<360
N/A	N/A	1080p/25	< 50 lines	<1.33	Up to: 19 P-frames	<380
N/A	N/A	720p/50	< 50 lines	<1.33	Up to: 17 P-frames	<340

Based on the current software (version 1.5), the SD video path could be as shown in Figure F-1.

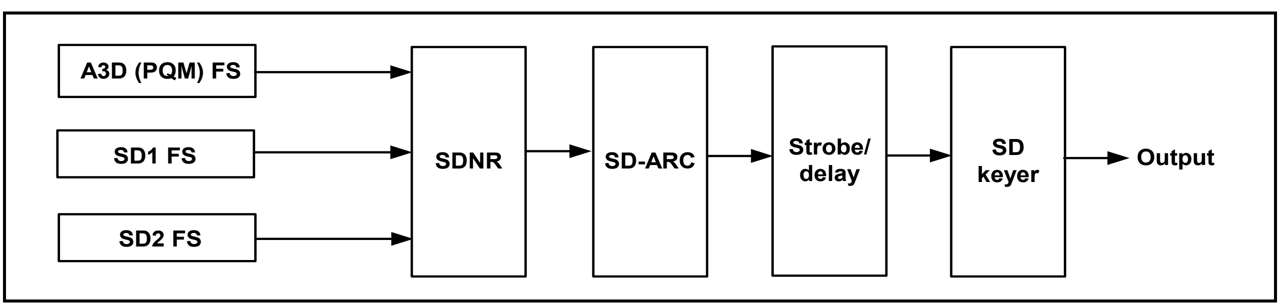


Figure F-1. SD Video Path

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[WORLDWIDE SUPPORT]

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