X75HD/X75SD

Multiple Path Converters and Frame Synchronizers

Installation and Operation Manual

Enabling Your
Integrated Content Environment

Edition B
175-000243-00

Integrated Content Environment

Experience an Integrated Content Environment

Leitch Technology is uniquely capable of meeting the needs of customers with a full range of products that provide the experience of an Integrated Content Environment — a streamlined workflow for the production, processing, transmission and management of content.

The area of content production has seen increases in source and output formats, effects, layers and volume of material to be edited. As a result, editors need tools that enable increased productivity to offset these additional time demands, while increasing performance and enhancing creativity.

VelocityQ™ running on Quattrus™ hardware, including a new interface style featuring the unique EyeCon View, has received glowing reviews for its "real-time full-quality" playback speed of four video streams, up to six graphic layers and four 3D DVEs.

Leitch's new NEXIO™ server system, a modular, scalable and highly cost-effective storage infrastructure for news and transmission environments, includes gigabit Ethernet for easy integration with IP networks for movement of content. NEXIO features industry-leading productivity — with the introduction of Ingest Control Manager,™ NewsFlash™ server-based NLE, and BrowseCutter™ II low-resolution editing system — to provide the fastest and most effective workflow today.

The advent of fully Integrated Content Environments has led to significant efficiency improvements in workflow, with processing and monitoring now integrated and transparent.

NEO,™ Leitch's advanced processing platform, not only hosts single-function modules, but also consolidates multiple functions on a single "Simplicity" card. New award-winning modules have been added with the NEO VR™ digital video recorder, LogoMotion™ II branding tool and the NEO SuiteView multi-source display processor. More functionality can be achieved by customers' infrastructure environments with the high-density 6800+.™

Leitch's industry-leading routing offerings allow customers to connect high-quality signals of all formats from analog to HD. Panacea™ provides affordable, compact, modular routing in sizes up to 32x32. The new wideband Integrator® Gold provides scalable routing of almost any digital signal up to 128x128 in a single frame. All processing and routing platforms are fully integrated with Leitch's advanced Command Control System (CCS™).

Advancements in digital technologies have enabled more channels, in different content formats, over multiple distribution systems. Customers now seek to achieve their vision of a fully Integrated Content Environment to supply multiple distribution channels with high-quality content and branding.

Leitch's NEXIO transmission server, which supports multiple compression formats in both standard and high-definition resolution, will also support ASI interface and has the ability to record, process and playback MPEG transport streams.

Leitch's Opus™ master control switcher offers an array of effects and has the ability to control up to 16 on-air channels. Opus meets multi-channel digital integration challenges for both high-definition and standard-definition formats.

Integrated Content Environments offer the greatest opportunity for productivity and performance gains when employing content management and control applications that place content, operations or remote locations under common software controls.

A major workflow enhancement is Leitch's Ingest Control Manager,™ which places control of up to 16 server channels with associated proc amps (DPS-575), eight VTRs and eight separate routers under one control station.

Leitch's CCS Navigator,™ winner of NAB 2003's highest awards for control and monitoring of content quality, and the CCS™ soft real-time system provide open access through standard protocols to components of a networked system.

X75HD/X75SD

Multiple Path Converters and Frame Synchronizers

Installation and Operation Manual

Edition B
April 2005

LEITCH

Contents

Chapter 2: Applications

Chapter 3: Module and Back Panel Descriptions

Chapter 4: System Installation and Connections

Chapter 5: Initial Configuration

Chapter 6: Specifications

Section II—Operation

Chapter 7: Operation via Front Panel Controls

Chapter 8: Web Server Software Control

Chapter 9: Video Configuration

Chapter 10: Audio Configuration

Chapter 11: Special Function Buttons

Section III—Appendixes

Appendix A: Cables and Pinouts

Appendix B: Troubleshooting

Appendix C: Servicing

Index

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

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

Important Safety Instructions

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions.

Servicing

Only qualified personnel should perform service procedures. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Do Not Use This Apparatus Near Water

Clean Only With a Dry Cloth

Do Not Block Any Ventilation Openings
Do not block any of the ventilation openings. Install in accordance with the manufacturer's instructions.

Keep Product Away from Heat Sources
Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

Ground the Product
Do not defeat the safety purpose of the polarized and grounding-type plugs. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the Power Cord
Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

Use With Proper Equipment
Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

Do Not Operate With Suspected Failures
Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, or the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Use Proper Power Source
Do not operate this product from a power source that supplies more than the specified voltage.

Install Near Socket Outlet
The equipment shall be installed near the socket outlet, and a disconnect device shall be easily accessible.

ATTENTION:
Observe precautions for handling electrostatic-sensitive devices.

Fuse Replacement
CAUTION: For continued protection against risk of fire, replace only with the same type of fuse.

ATTENTION: Remplacer uniquement par un fusible de même type et calibre.

Injury Precautions

WARNING!
To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

AVIS! Risque de choc électrique. Ne pas ouvrir.

WARNING!
Potentially lethal voltages are present within this product's frame during normal operation. The AC power cord must be disconnected from the frame before the top panel is removed. (In frames with multiple power supplies, remove ALL power cords.) Power should not be applied to the frame while the top is open, unless properly trained personnel are servicing the unit.

Poland:
Przod zdjeciem pokrywy wyciagnac wtyczke z gniazda sieciowego.

Use Proper Power Cord
To avoid fire hazard, use only the power cord specified for this product.

Connect to an Earthed Mains Socket-Outlet
The apparatus must be connected to an earthed socket-outlet.

United Kingdom:
WARNING: This appliance must be earthed.

Norway:
Apparaten må tilkoples jordat stikkontakt.

Finland:
Laite on liitettää suojamaadoitus-koskettimilla varustettuun pistorasiaan.

Sweden:
Apparaten skall anslutas till jordat uttag.

Do Not Operate Without Covers
To avoid electrical shock or fire hazard, do not operate this product with covers or panels removed.

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

Do Not Operate in Wet/Damp Conditions
To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture

Do Not Operate in an Explosive Atmosphere
To avoid injury or fire hazard, do not opeate this product in an explosive atmosphere.

Avoid Exposed Circuitry
To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

Isolate IT Power System Connection
CAUTION: IT power system shall be isolated from earth, except that one point may be connected to earth through an impedance or a voltage limiter. The parts of the equipment required to be earthed shall be connected to earth electrodes at the user's premises. Protective earthing shall be provided either directly to the equipment or into the mains supply building installation.

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.

For Products with Multiple Power Cords:
WARNING: To reduce the risk of electric shock, plug each power cord into separate branch circuits employing separate service grounds.

CAUTION: This unit can have more than one power supply cord. To de-energize the internal circuitry, disconnect all power cords before servicing.

Norway:
ADVARSEL: Utstyret kan ha mere ennn en tilførselsledning. For å gjore interne deler spennigsløse må alle tilførselsledningene trekkes ut.

Sweden:
VARNING: Denna apparat har mer än en nätanslutning. Samtliga nätkablar måste bortkopplas för att göra de interna kretsarna spänningsfria.

CAUTION: To completely disconnect this equipment from the AC Mains, disconnect the power supply cord plug from the AC receptacle.

CAUTION: Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.

Certifications and Compliances

This product has been tested and found to comply with the following EN, IEC, FCC, UL, ICES, and CSA standards, per the provision of the Electromagnetic Compatibility Directive 89/336/EEC of 3 May 1989 as amended by 92/31EEC of 28 April 1992 and 93/68/EEC, *Article 5* of 22 July 1993, and the Low Voltage Directive 73/23/EEC of 19 February 1973 as amended by 93/68/EEC.

EMC Standards

Table P-3. EMC Standards and Descriptions

EMC Standard	Description
EN55014	Limits and methods of measurement of radio disturbance characteristics of electric motor-operated and thermal appliances for household and similar purposes, electric tools and similar electric apparatus.
EN55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Class A.
EN55103-1	Electromagnetic compatibility—Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use, Part 1: Emission, Environment E4.
EN55103-2	Electromagnetic compatibility—Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use, Part 2: Immunity, Environment E4.
EN61000-3-2	Limits for harmonic current emissions (equipment input current less than or equal to 16 A per phase).
EN61000-3-3	Limitations of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current less than 16 A.
EN61000-4-2	Electrostatic discharge requirements “ESD” 2 kV CD, 4 kV AD.
EN61000-4-3	Radiated radio-frequency electromagnetic field immunity test 1V/m {1 kHz 80% AM, 80-1000 MHz}.

Table P-3. EMC Standards and Descriptions *(Continued)*

EMC Standard	Description
EN61000-4-4	Electrical Fast transient requirements “Burst”, 0.5 kV Sig. & Ctrl. Lines 0.5 kV a.c. & d.c. Power line, 0.5 kV functional earth.
EN61000-4-5	Surge Immunity test 0.5 kV a.c. Power line.
EN61000-4-6	Immunity to conducted disturbances induced by radio frequency fields 1 V rms 0.15-80 MHz Sig. & Ctrl. Lines, 3 V rms 0.15-80 MHz d.c. Power line, 1V rms 0.15-80 MHz a.c. Power line, 1V rms 0.15-80 MHz functional earth.
EN61000-4-11	Voltage dips, short interruptions and voltage variations-immunity tests.

Per the provision of the Electromagnetic Compatibility Directive 89/336/EEC of 3 May 1989, as amended by 92/31EEC of 28 April 1992 and 93/68/EEC, *Article 5* of 22 July 1993, these devices are for professional use only and comply with Part 15 of FCC rules. Operation is subject to the following two conditions:

1. These devices may cause interference to Radio and TV receivers in residential areas.
2. These devices will accept any interference received, including interference that may cause undesired operations.

Changes or modifications not expressly approved by Leitch Technology, the party responsible for compliance to the FCC Part 15 Rule, could void the user’s authority to operate this equipment legally in the United States.

These devices do not exceed the class A limits for radio noise emissions from digital apparatus as set out in the interference standard entitled “Digital apparatus”, ICES-003 of the Canadian Department of Communications.

Working Environment E4 and Class A

This product is intended for professional use in a controlled EMC environment such as a purposely-built broadcast studio.

Additional EMC Information

This device is for professional use in a controlled EMC environment, such as purpose-built broadcast studios.

EMC regulations require that the radiation emitted from this unit does not exceed certain limits. These limits are only met when the front panel is closed and the two thumb screws are secured.

Compliance to the EMC regulations is also dependent on the use of suitably shielded (screened) cables. Coax cables should be of the double-shielded (screened) variety. Unused BNCs should be fitted with 75Ω terminations.

All audio cables should be screened with the shield (screen) making good contact with the metallic parts of the cable connectors.

D-type connectors used with this unit should always have metallic shells with the shield (screen) of the cable mechanically bonded to the metal shell. It is further recommended that the D-type cable connectors be of the “dimple” variety. These connectors make a better contact and consequently improve EMC performance.

Safety Standards

Table P-4. Safety Standards and Descriptions

Harmonized Standard	Reference IEC Standard	Description
EN 60950-1:2002	IEC 60950-1:2001 Ed. 1.0	Information Technology Equipment-Safety Part 1: General Requirements
UL 60950-1:2003	IEC 60950-1:2001 Ed.1.0	Information Technology Equipment - Safety Part 1: General requirements
CAN/CSA C22.2 No. 60950-1-03	IEC 60950-1:2001Ed.1.0	Information Technology Equipment-Safety Part 1: General Requirements

Section I—Startup

This section contains the following topics:

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 up-convert, down-convert, and cross-convert from most common input and output video formats.

X75HD/X75SD models are available in HD-SDI, SD-SDI, and DPS-575-compatible versions, and they are equally suited for analog, digital, or hybrid facilities—the ideal choice for broadcasters making the transition to digital television (DTV and HDTV). Available in video-only and audio/video configurations, these converter/synchronizers provide a bridge between analog and 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

Note

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

The X75HD/X75SD models offer unparalleled I/O flexibility. Up to nine video inputs and ten video output formats are provided, dependant 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
- 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 "Chapter 2: Applications" for a description of the various X75HD/X75SD applications that are available.

Inputs

Inputs are auto-detected 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 and 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 models 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

Operating Modes

There are two main operational modes: M-Path (multiple path) processing, and Simulcast processing.

- M-Path operation processes any analog, digital, and HDTV inputs to any analog, digital and HDTV outputs, provides multi-channel processing, and allows the wrapping around of an SDTV transport device (for example, a VTR). It also provides up to 8 or 16-channels (4 or 8 AES) of audio processing.
- Simulcast operation allows the selection of any two inputs to switch to the selected outputs (for example, SDTV and HDTV).

See "Overview of Operating Modes" on page 24 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, or a supported Web browser. Along with the applications described on “Chapter 2: Applications”, the X75HD/X75SD includes the following features:

General Functionality

- Upgradeability from SDTV to HDTV
- Frame syncs for analog, SDTV and HDTV
- Up-converter,down-converter, cross-converter, and aspect ratio converter
- Analog-to-digital converter
- Digital-to-analog converter
- Proc amps for analog, SDTV and HDTV
- Video test generator
- Optional 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™, AC-3™)
- Audio (and embedded) test generator
- Audio limiter option
- Built-in Web server with thumbnail monitoring
- Redundant power supply

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 all outputs, including composite, component, SD-SDI, HD-SDI, HDTV fiber, digital video interface (DVI-D) with digital-only output, and S-video
- SC and optional FC/ST fiber interface for HDTV
- Two or five AES inputs and outputs, 75/110Ω
- Four analog audio inputs and outputs
- GPI inputs and outputs

Operation, Control, and Monitoring

- Two operating modes: 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/or monitoring using CCS Pilot, Navigator, or CoPilot (monitoring only)
- SNMP and third-party interfaces
- SMART alarms (a ‘global’ set of parameters for all inputs allow custom-definitions for how/when alarms are activated, including a priority setting for each main/backup input)

Hardware Features

- SD (Secure Digital) removable media; 64 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 the available X75HD/X75SD front panels, including blank panels and control panels, respectively.

For X75HD/X75SD units with a blank front panel, all configuration and control must be done 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
- Web server application using a common Web browser such as Internet Explorer™ (IE) or Netscape™
- SNMP (Simple Network Management Protocol) and third-party control software through Leitch CCS Protocol

Blank front panels only provide a certain number of LEDs for alarm and status monitoring, including major and minor alarm LEDs, and status LEDs for power and memory access.

For X75HD/X75SD units with an installed frame-mounted local control panel (LCP), you can configure and control units locally. The panel contains 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*.

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.

Figure 1-1. X75HD/X75SD Front Panel (Blank)

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 4: System Installation and Connections" on page 71.

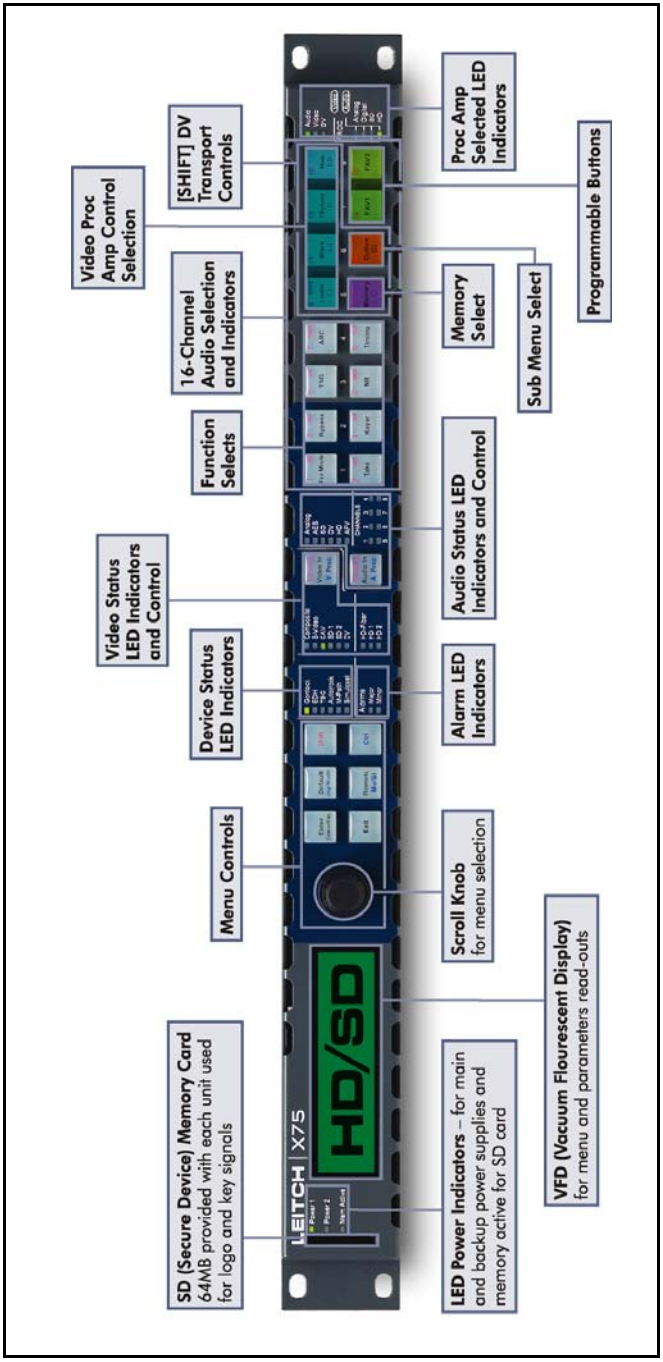


Figure 1-2. Front View of X75HD/X75SD with Local Control Panel

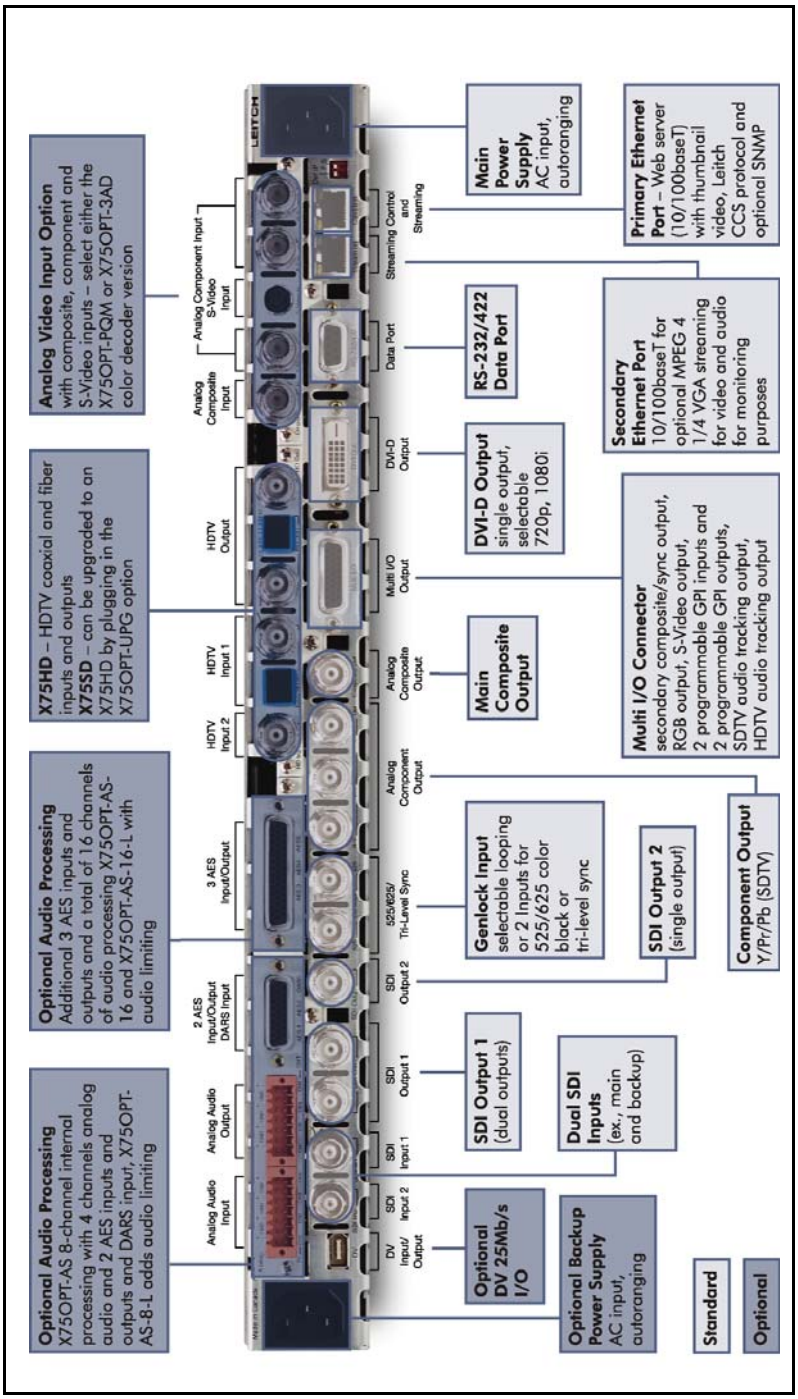


Figure 1-3. Rear View of X75HD/X75SD With All Available Options

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. See the following tables for more information:

- Table 1-1: "X75HD/X75SD Module and System Packages" below
- Table 1-2: "X75HD/X75SD System Options" on page 17

Available Packages

Table 1-1 describes the various X75HD/X75SD product packages that can be ordered.

Table 1-1. X75HD/X75SD 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 future-use 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 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 included
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 included
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 included

Table 1-1. X75HD/X75SD 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 included
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 capability • Acceptance of optional X75OPT-AS-8 internal 8-channel digital audio synchronizer module)
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 included

Table 1-1. X75HD/X75SD 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 included
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 included
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 included
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 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.

For further cable and cable pinout information, see "Appendix A: Cables and Pinouts".

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-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 • Includes coax breakout cables set
X75OPT-AS-8-L	Hardware and audio limiting software keyable option	Same as X75OPT-AS-8, but with optional audio signal 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 • Includes coax breakout cables set
X75OPT-AS-16-L	Hardware and audio limiting software keyable option	Same as X75OPT-AS-16, but with optional audio signal limiter soft key option
X75OPT-DOLBY-1	Internal Dolby-E decoder submodule	Dolby-E and Digital (AC3) integrated decompression
X75OPTFIBER-FC	Optional FC-type fiber connectors	FC-type fiber connectors (factory installed)
X75OPTFIBER-ST	Optional ST-type fiber connectors	ST-type fiber connectors (factory installed)
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
X75-RCP	Remote control panel for X75HD/X75SD	Can control DPS-475/575

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

Product Code	Description	Major Features
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-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
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-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)
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-DVI	Cable for DVI-D single-link output	DVI-D to DVI-D (digital-single link) cable
Software Options		
X75OPT-ASL	Audio limiter for X75OPT-AS-16 or X75OPT-AS-8 digital audio synchronizers	Software keyable, field-upgradable
X75OPT-NR	Optional SDTV noise reducer	3-Dimensional SDTV Digital Noise Reduction with impulse noise reduction, Gaussian random noise reduction, compression blocky-ness and mosquito artifact reduction, and directional softening/sharpening filter
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 100 or "Chapter 8: Web Server Software Control" for details)
- SNMP (Simple Network Management Protocol) and third-party control software through Leitch CCS Protocol (see "Configuring for SNMP and Third-Party Software Control" on page 101 for details)

All remote methods of operation are done via an RJ-45 Ethernet connection to an X75HD/X75SD frame. See Figure 1-4 on page 23 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).

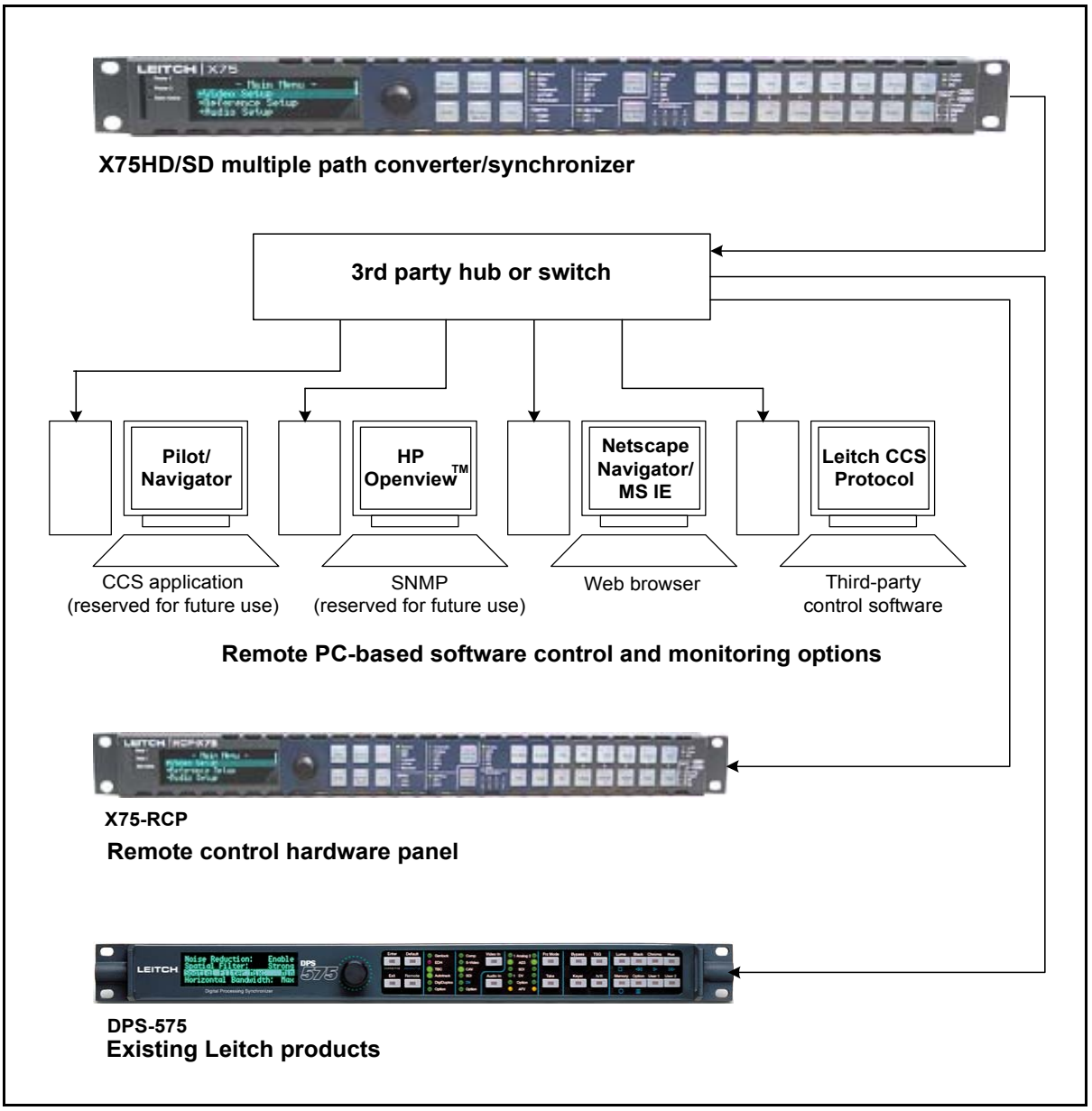


Figure 1-4. Typical Configuration, Control, and Monitoring Methods

Overview of Operating Modes

Video Functional Block Diagram

Fully loaded X75HD/SD frames are the aggregate of discrete modular solutions as indicated in Table 1-5. The X75HD/SD 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.

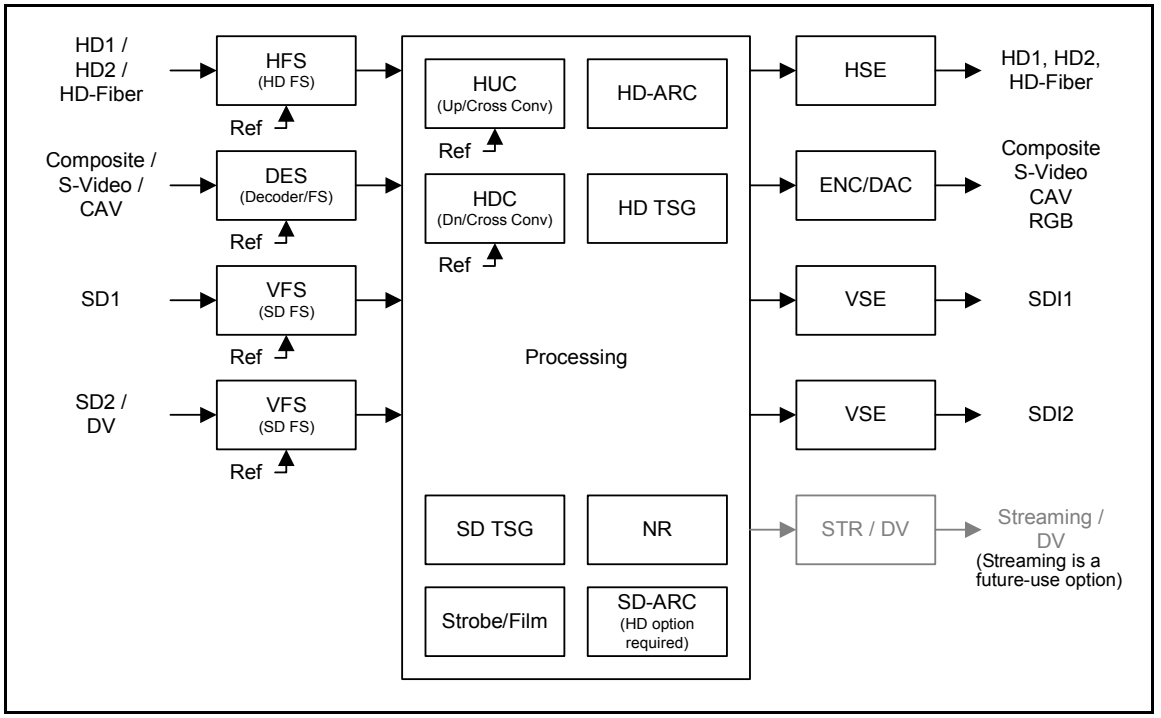


Figure 1-5. Video Functional Block Diagram

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. M-Path 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.

X75HD/X75SD models can also select a specific single or multiple source for signal processing. Depending on your input source selections, the single-source or multi-source operating mode is automatically set, and the required processing carried out. See “M-Path Operation” on page 26 for more information.

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 31.

For more information on the conversion capabilities and options provided by the X75HD/X75SD, see “Power Consumption” on page 124.

M-Path Operation

Video Processing

Note

For some conversion processes, the optional analog video input module is required.

During processing, the X75HD/X75SD up-converts, down-converts, or cross-converts, as required. Several examples of video processing are illustrated in Figure 1-6 on page 27 and Figure 1-7 on page 28. The Video M-Path menu is found in **Video Setup>Routing Setup** menu.

When a single input video source is 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 and X75OPT-A3 module.

The four front end frame synchronizers and proc amp adjustments are divided into these four submenus in the **Video Setup** menu.

- Analog Input (A3D or PQM; depending on the option installed)
- SD1 Input
- SD 2/DV Input (DV is a future release feature)
- HD Input

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 with 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 via the parameters under the **Audio Setup>Routing>Input** and **Audio Setup>Routing>Output** menus. 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

Some video and audio processing shown in Figures 1-6 and 1-7 (for example, DV input and output) is reserved for future use.

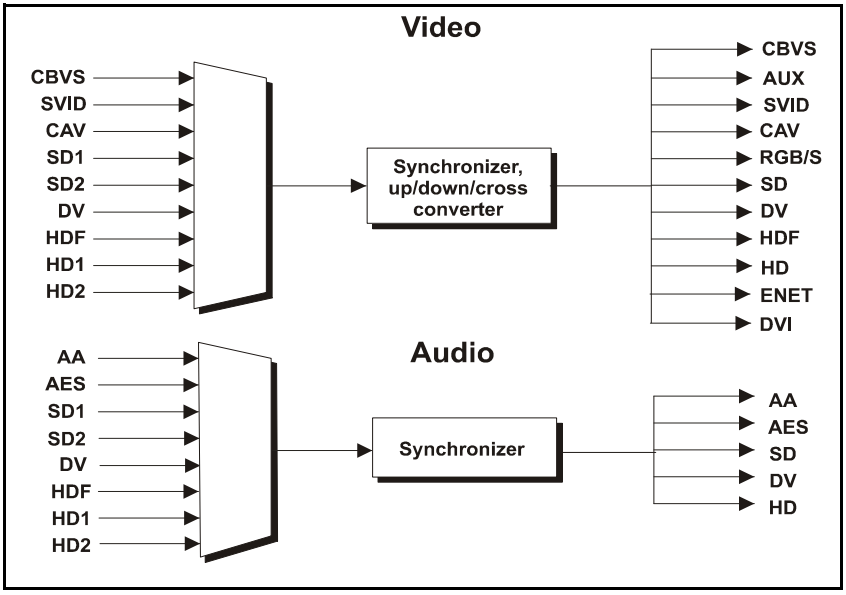


Figure 1-6. M-Path Single-Source Video and Audio Processing

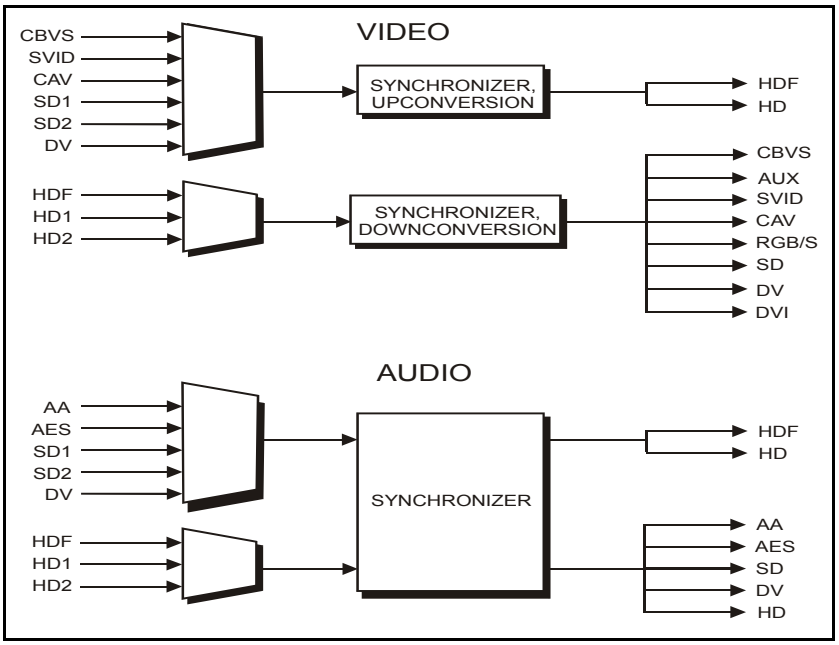


Figure 1-7. M-Path (Dual Source Video and Audio) Processing

Audio Processing

X75HD/X75SD models can process up to 16/8 channels (8/4 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, these 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 29 illustrates the audio processing flow in a 16-channel X75HD frame; Figure 1-9 on page 30 illustrates the audio processing flow in an 8-channel X75SD frame.

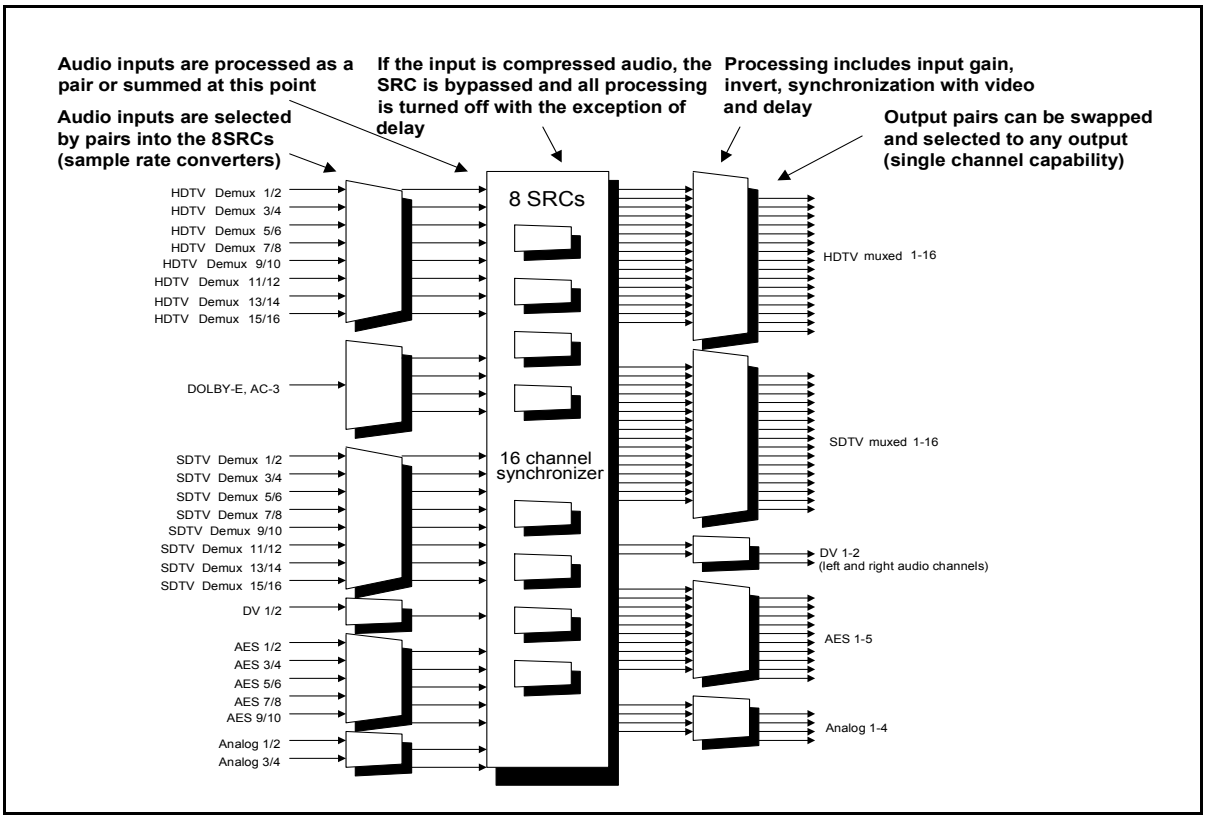


Figure 1-8. Audio Functional Block Diagram-16 Channel

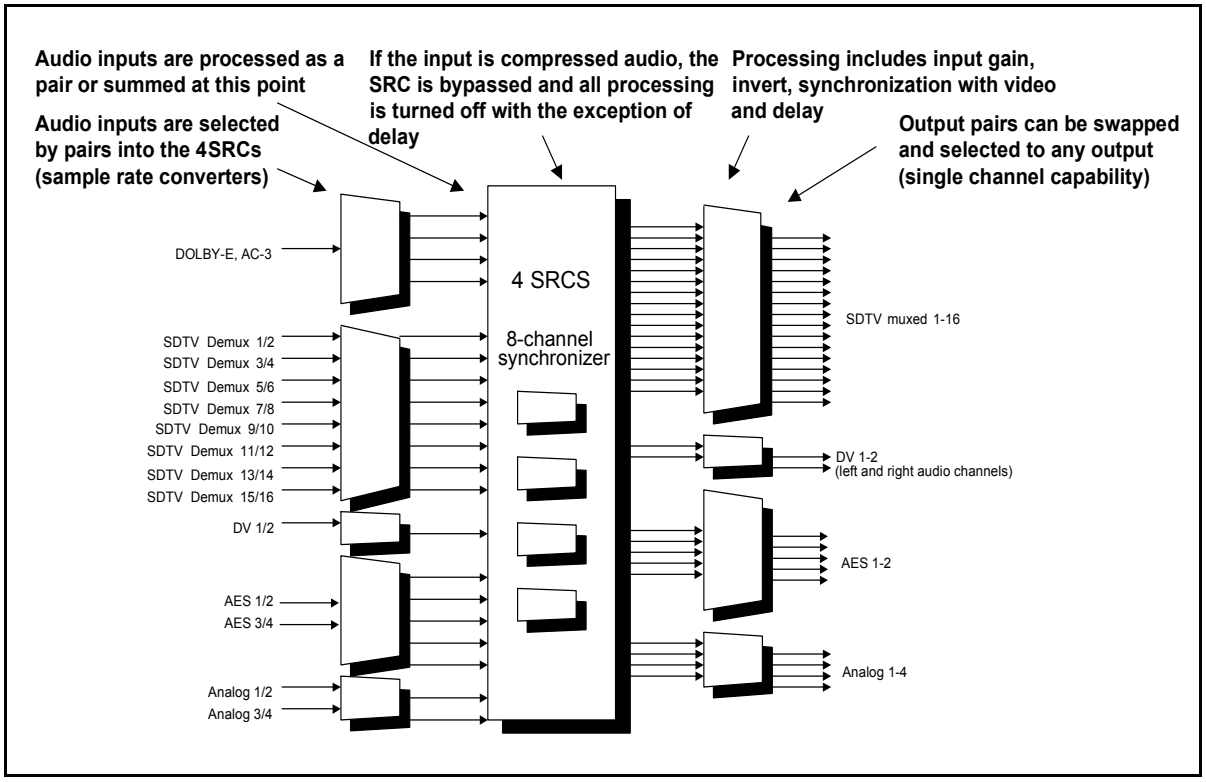


Figure 1-9. Audio Functional Block Diagram-8 Channel

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 102.

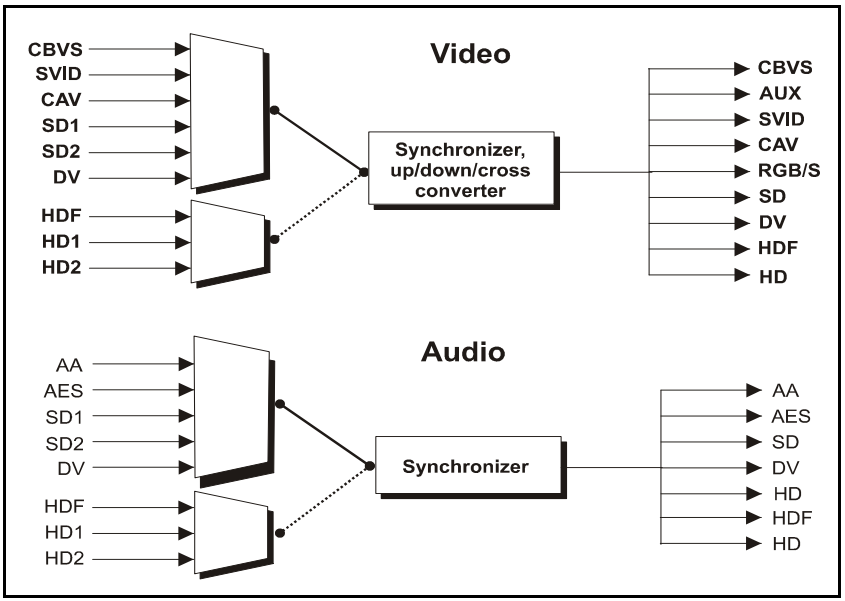


Figure 1-10. Simulcast Processing

Switcher Application

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

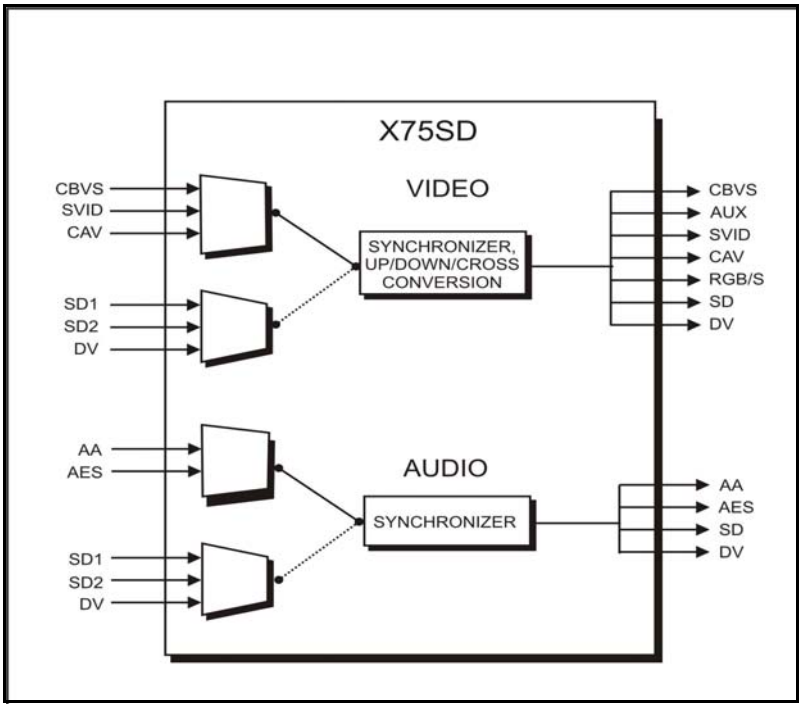


Figure 1-11. Simulcast Switcher Application

Chapter 2

Applications

Overview

The X75HD/X75SD models function in many different ways and fill a variety of broadcasting roles. This chapter includes some common applications that may apply in your facility. The following applications involve the HDTV module:

- Input video processing (proc amp, frame sync/TBC, up/down/cross-conversion) for mobile, outside broadcast vehicles (see Table 2-1 on page 36)
- Critical input video processing (proc amp, frame sync/TBC, up/down/cross-conversion) for satellite/microwave reception (see Table 2-2 on page 38)
- Input video processing (proc amp, frame sync/TBC, up/down/cross-conversion) for news production (see Table 2-3 on page 41)
- Ingest input video processing (proc amp, frame sync/TBC, up/down/cross-conversion) with audio decompressing and processing (see Table 2-4 on page 43)
- Ingest input video processing (proc amp, frame sync/TBC, up/down/cross-conversion) with internal audio decompression and processing (see Table 2-5 on page 45)
- Output video processing (proc amp, frame sync/TBC, up/down/cross-conversion) with audio compression and processing (see Table 2-6 on page 47)

- Input video, embedded audio, and compressed audio processing (proc amp, frame sync/TBC, up/down/cross-conversion) with external audio compression and decompression (see Table 2-7 on page 49)
- Input video, embedded audio, and compressed audio processing (proc amp, frame sync/TBC, up/down/cross-conversion) with external audio compression and *internal* audio decompression (see Table 2-8 on page 51)
- Wrap-around for tape transports (see Table 2-9 on page 54)
- Bridging between routing switchers with different formats (see Table 2-10 on page 56)
- Simulcast switching of standard and high definition signals (see Table 2-11 on page 57)

The multi-conversion and frame synchronization abilities of the X75HD/X75SD models 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.

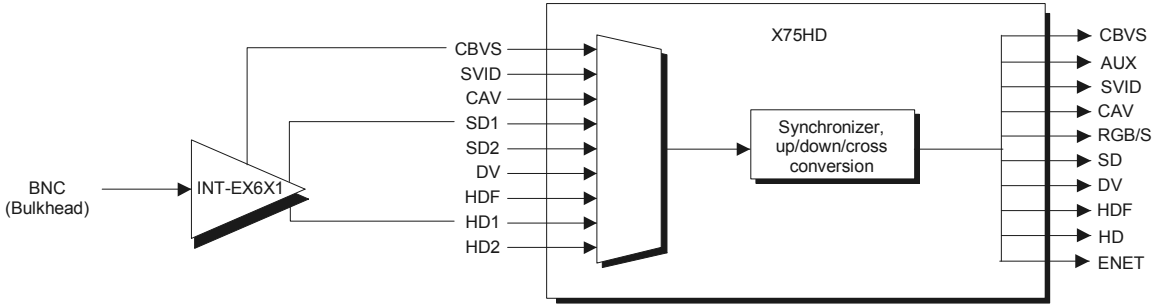
Input Video Processing

A variety of common input video processing applications are described in this section, including the following:

Input Video Processing for Mobile or Outside Broadcast Vehicles

Table 2-1. Input Video Processing for Mobile, 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 X75OPT-A3D analog video input option and INT-EX6X1 (16 channel video wideband distribution amplifier)



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: Auto Detect

Analog Video Source

- Navigation Path: /Video Setup/Analog Input (A3D or PQM)
- Setting: Composite

Analog In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: Normal

SD 1 In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: Normal

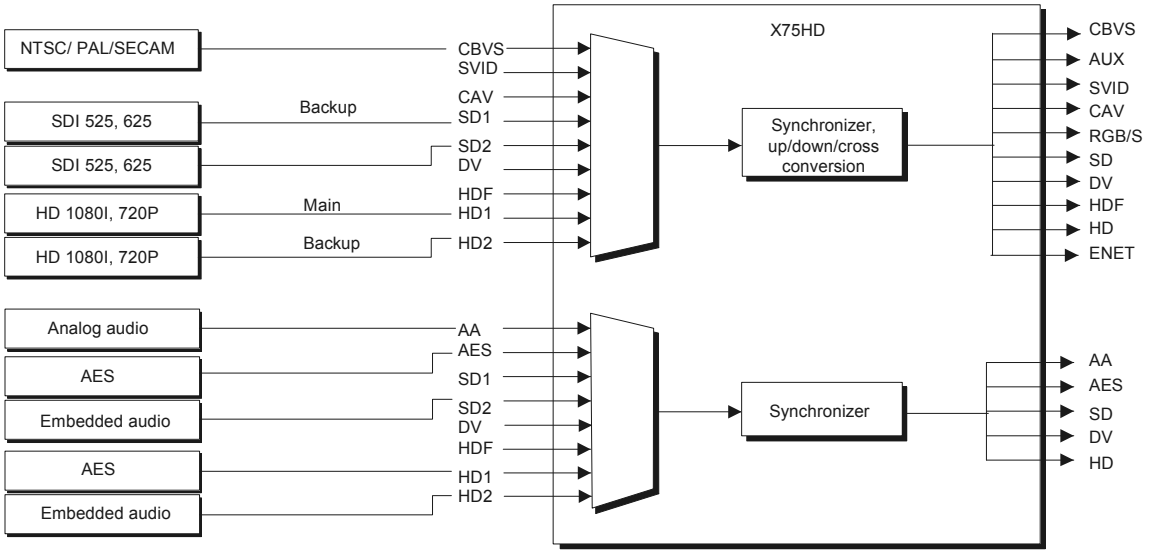
HD 1/HD-Fiber In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: Normal

Critical Input Video Processing for Satellite/Microwave Reception

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

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: Auto Detect

HD 1/HD-Fiber In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: Highest

HD 2 In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: High

SD 1 In

- Navigation Path: /Video Setup/Routing Setup/Auto Detect Setup
- Setting: Normal

Ch1-Aud Follows Vid

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: On

Ch1-AFV-HD1

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: AES1a/1b

Ch1-AFV-HD2

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: AES2a/2b

Ch1-AFV-SD 1

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: AES3a/3b

The following factory default settings can also be used to configure the frame:

AA Out1

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1a

AA Out2

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1b

AES1 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1a

AES1 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1b

SD 1/HD1 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1a

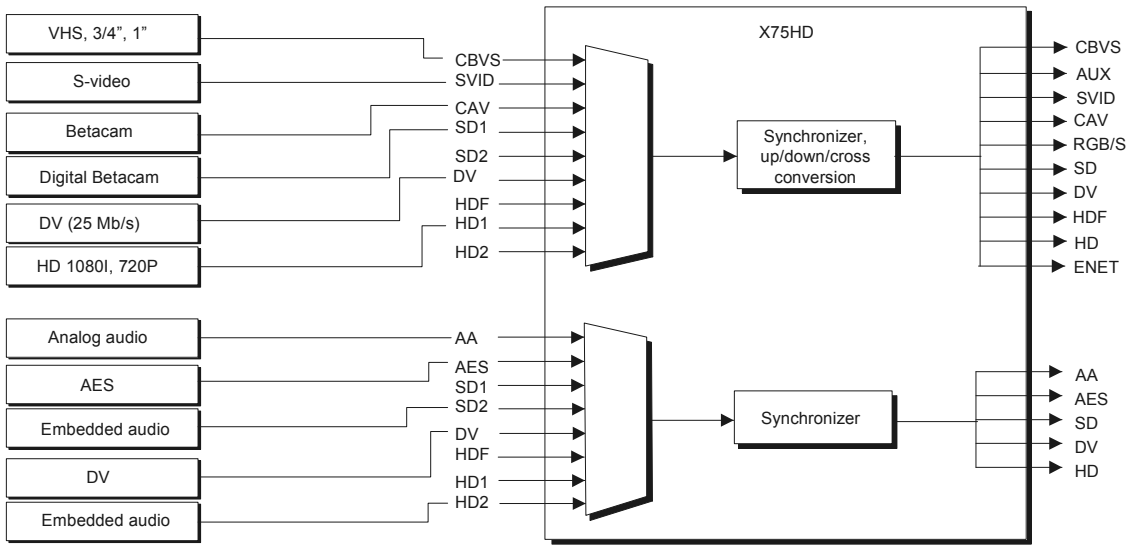
SD 1/HD1 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1b

Input Video Processing for News Production

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 and X75OPT-A3D analog video input option



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup//Routing Setup
- Setting: Composite/S-Video/CAV/SD 1/HD 1 (Select one)

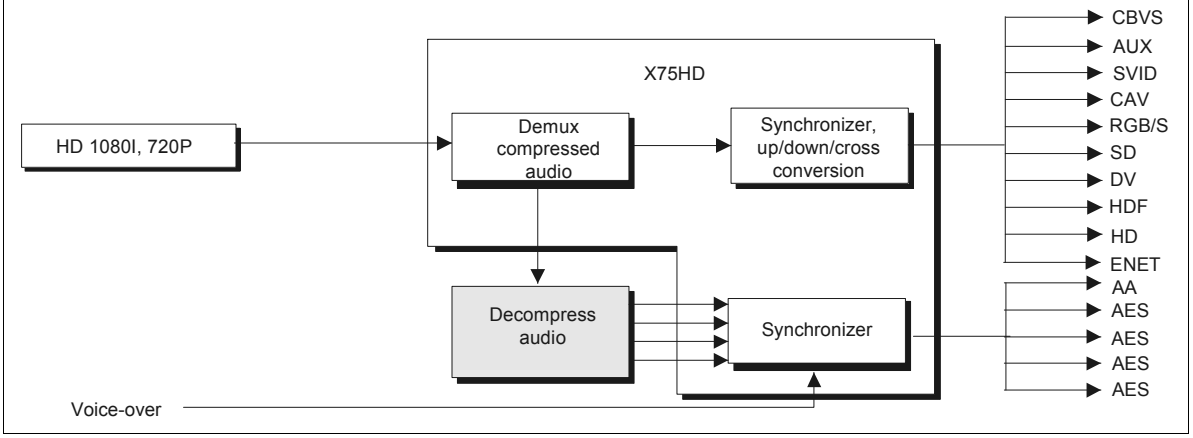
Audio In Src Select

- Button Shortcut: Audio In
- Navigation Path: /Audio Setup/Routing
- Setting: Analog, AES, SD, HD (Select one)

Ingest Input Video Processing with Audio Decompressing and Processing

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

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup//Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup/Routing Setup
- Setting: HD1

SRC1 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES1a/1b

SRC2 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES2a/2b

SRC3 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES3a/3b

SRC4 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES4a/4b

SRC5 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: HDX1/2

AES5 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC5a

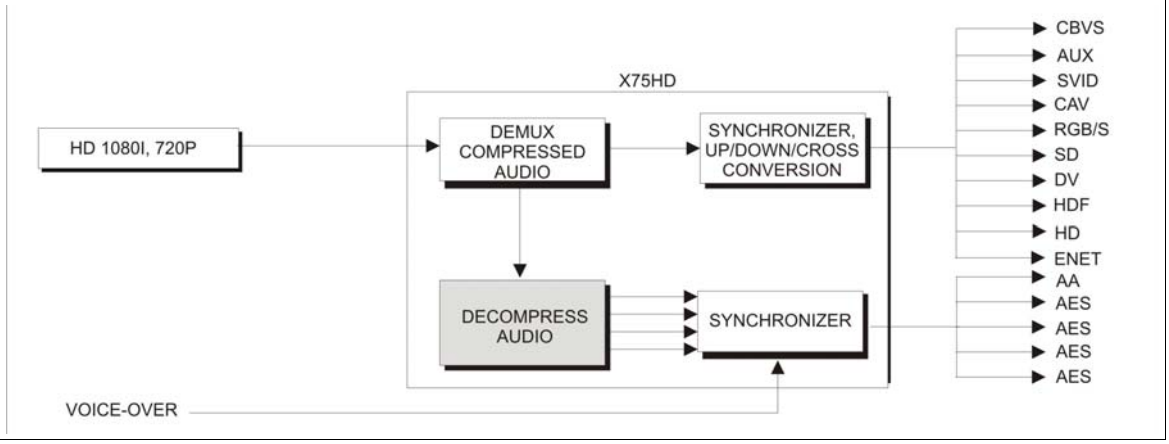
AES5 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC5b

Ingest Input Video Processing with *Internal* Audio Decompression and Processing

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 and optional Dolby-X75 internal audio decompressor



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup/Routing Setup
- Setting: HD1

Dolby Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: HDX1/2 (Note: Assuming the compressed audio is in Group 1: channels 1 and 2)

SRC1 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby1/2

SRC2 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby3/4

SRC3 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby5/6

SRC4 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby7/8

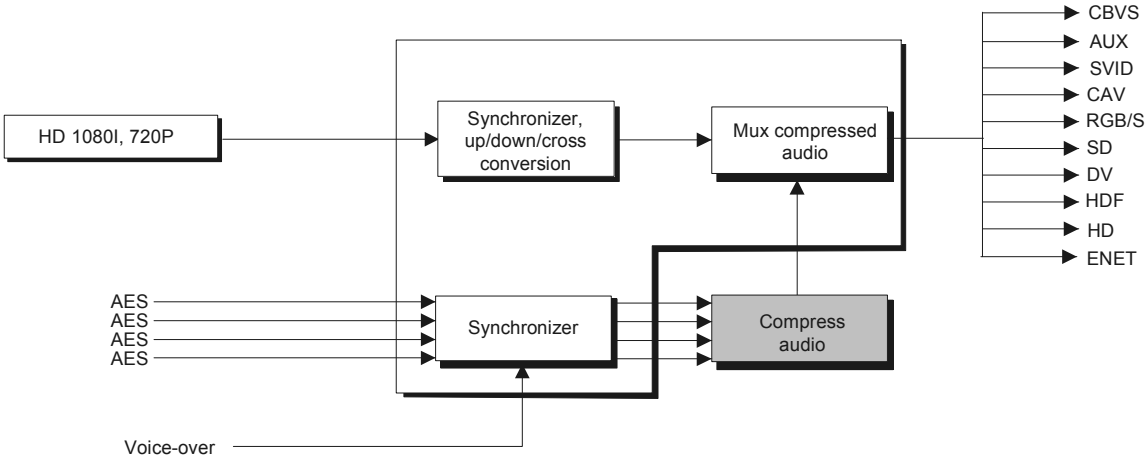
Output Video Processing

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

Output Video Processing 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 and external audio compressor (for example, DOLBY™ DIGITAL AC-3™, or E™).



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup/Routing Setup
- Setting: HD1

Audio In Src Select

- Button Shortcut: Audio In
- Navigation Path: /Audio Setup/Routing
- Setting: AES

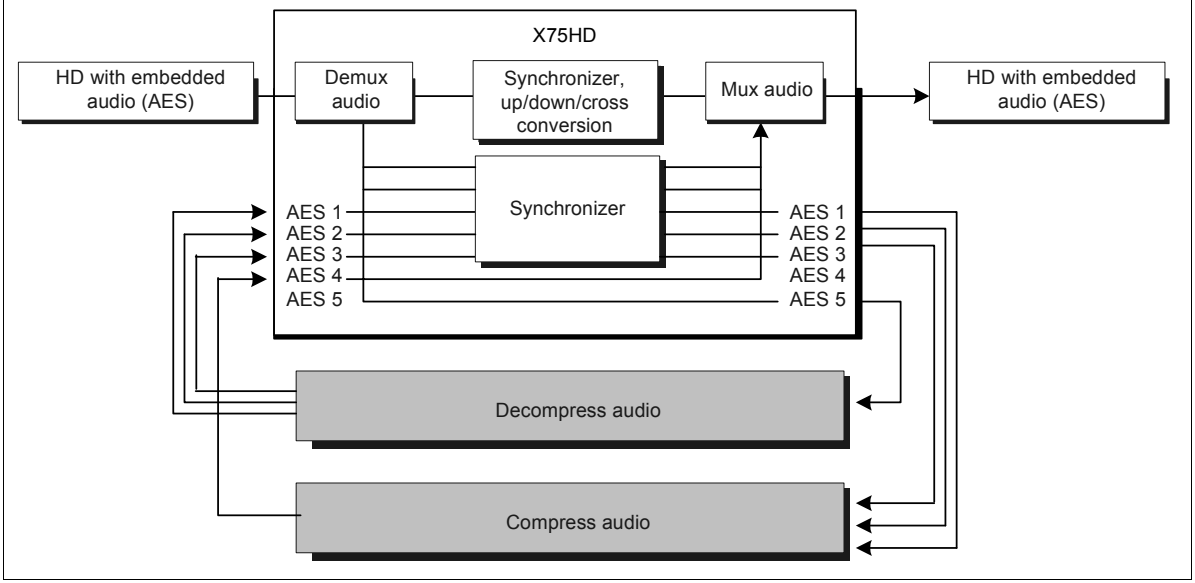
Input Video and Audio Processing

Table 2-7 (below) and Table 2-8 on page 51 describes common input video and audio processing applications.

Input Video, Embedded Audio, and Compressed Audio Processing with External Audio Compression/ Decompression

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

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup/Routing Setup
- Setting: HD1

Audio In Src Select

- Button Shortcut: Audio In
- Navigation Path: /Audio Setup/Routing
- Setting: AES

SRC6 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: HDX1/2

AES5 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC6a

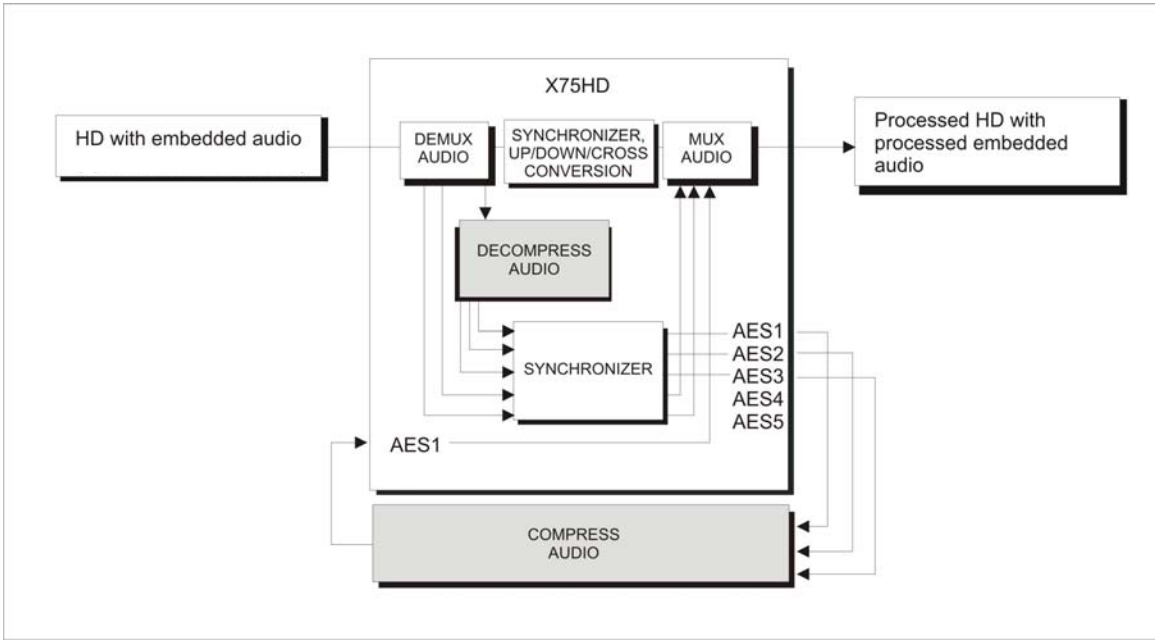
AES5 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC6b

Input Video, Embedded Audio, and Compressed Audio Processing with External Audio Compression & Internal Audio Decompression

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

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup//Routing Setup
- Setting: User Select

All Out Sel

- Button Shortcut: Video In
- Navigation Path: /Video Setup/Routing Setup
- Setting: HD1

Dolby Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: HDX1/2 (Note: Assuming the compressed audio is in Group 1: channels 1 and 2)

SRC1 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby1/2

SRC2 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby3/4

SRC3 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby5/6

SRC4 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: Dolby7/8

AES1 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1a

AES1 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC1b

AES2 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC2a

AES2 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC2b

AES3 OutA

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC3a

AES3 OutB

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC3b

SRC5 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES1a/1b

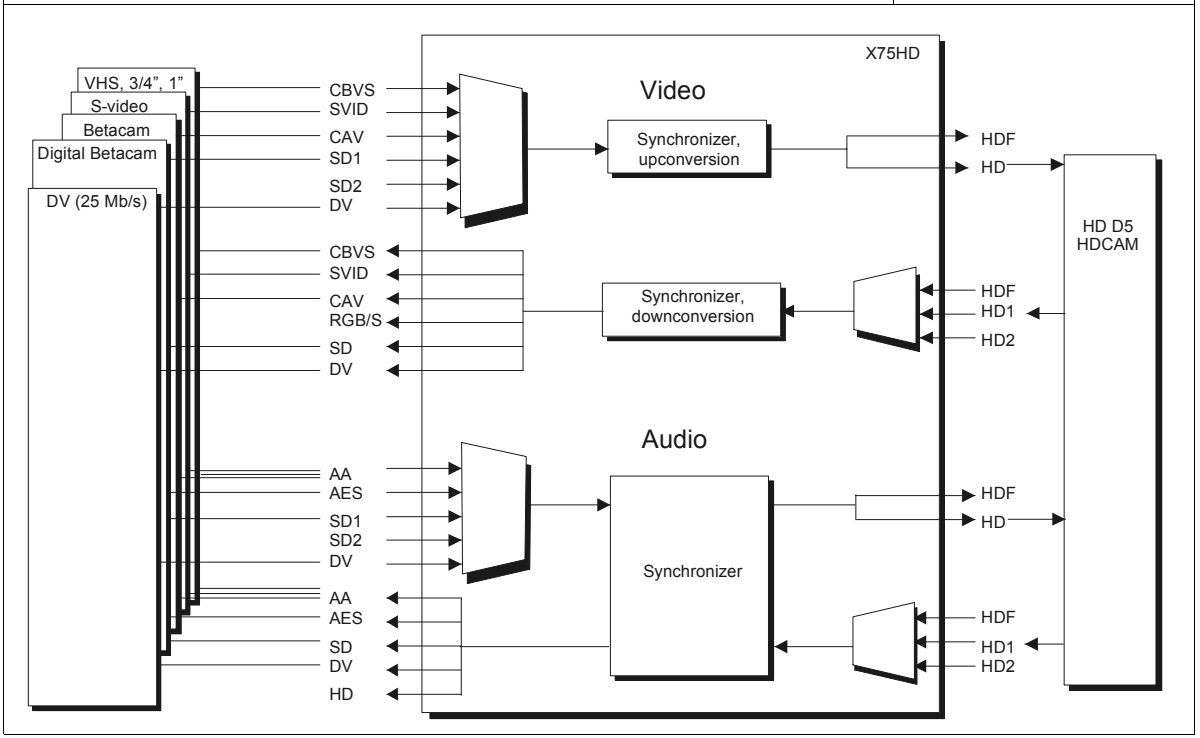
Video and Audio Converting

Table 2-9 describes a common video and audio converting application.

Wrap-Around for Tape Transports

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



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: User Select

HD Out Sel

- Navigation Path: /Video Setup/Routing Setup/Video M-Path
- Setting: SD 1

Analog Out Sel

- Navigation Path: /Video Setup/Routing Setup/Video M-Path
- Setting: HD 1

SRC1 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES1a/1b

SRC2 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: AES1a/1b

SRC3 Input Select

- Navigation Path: /Audio Setup/Routing/Input
- Setting: HDX1/2

AA Out1

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC3a

AA Out2

- Navigation Path: /Audio Setup/Routing/Output
- Setting: SRC3b

Note

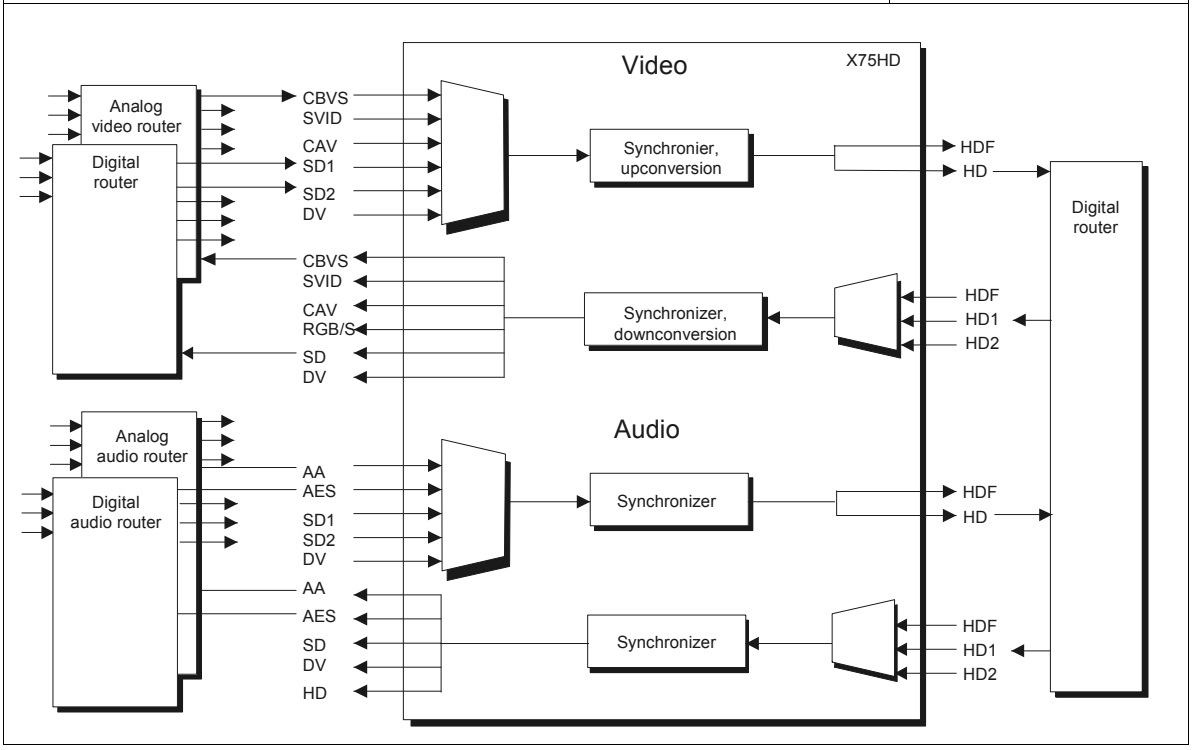
Many input and output choices are possible. This example is based on SD 1+AES1 inputs for up-conversion and CVBS+AA (analog audio) outputs for down-conversion.

Bridging Router Switchers

Table 2-10 describes a common application for bridging router switchers.

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



Required Settings

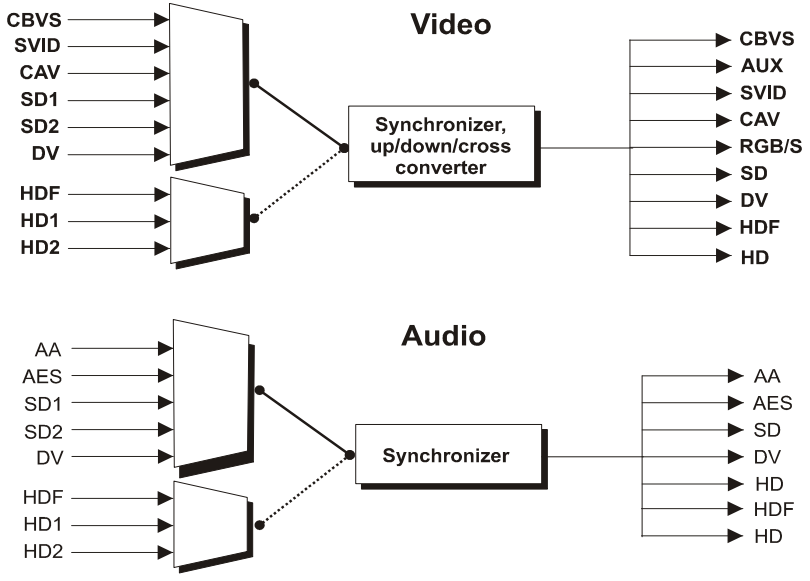
To configure the X75HD for this application, use the parameter settings shown for "Wrap-Around for Tape Transports" on page 54.

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
The X75HD provides SDTV to HDTV switching with SDTV and HDTV simultaneous outputs. A high definition signal is switched to and from a standard definition signal. Simultaneous outputs of high and standard definition are provided.	X75HD-AV



Required Settings

To configure the X75HD for this application, make the following parameter settings:

I/P Video Mode

- Navigation Path: /Video Setup/Routing Setup
- Setting: Simulcast

Input A

- Navigation Path: /Video Setup/Routing Setup/Simulcast
- Setting: HD1

Input B

- Navigation Path: /Video Setup/Routing Setup/Simulcast
- Setting: SD1

Simulcast Sel

- Navigation Path: /Video Setup/Routing Setup/Simulcast
- Setting: Input A

Ch1-Aud Follows Vid

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: On

Ch1-AFV-HD1

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: HDX1/2

Ch1-AFV-SD 1

- Navigation Path: /Audio Setup/Routing/Audio Follow Video/SRC 1
- Setting: AES1a/1b

Note

Consider an A/B switch where: A input = HD1 (with demuxed audio from the HD stream) and B input = SD 1 (with AES).

The A/B switch can be also performed via GPI.

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:

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

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.

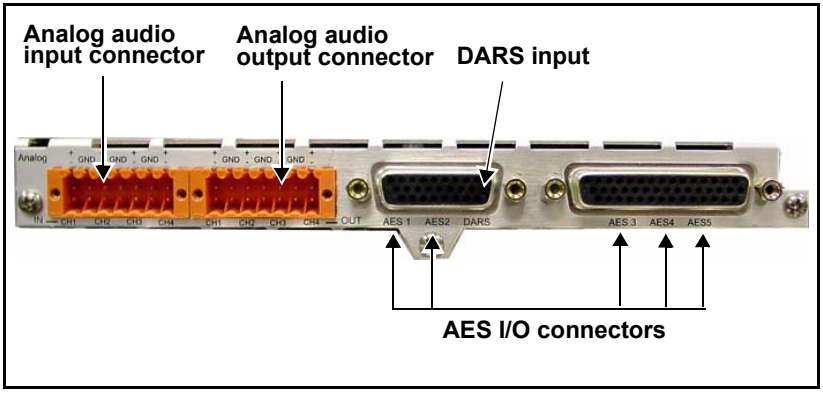


Figure 3-1. X75OPT-AS-16/X75OPT-AS-8 Back Panel

Note

You can access the **Audio Setup** submenu from the **Main** menu.

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 properly configure both the analog audio input and output impedance, you must configure several jumpers prior to operation.

- Set jumpers J5 through J8 to configure the analog audio input impedance. To do this, place a jumper on pins 1 and 2 to set the input impedance to 600Ω, or on pins 2 and 3 to set the input impedance to 100 kΩ. Make the same impedance setting to all required jumpers (J5, J6, J7, J8).
- Set jumpers J1 through J4, and J9 through J12 to configure the analog audio output impedance. To do this, place a jumper on pins 1 and 2 to set the output impedance to 600Ω, or on pins 2 and 3 to set the output impedance to 66Ω. Make the same impedance setting to all required jumpers (J1, J2, J3, J4, J9, J10, J11, J12).

Jumpers 1 through 12 can all be found at the rear of the board, located directly behind the back panel. Figure 3-2 shows their general location.

Note

Beside each jumper described in this section, there is a white triangle screened on the board. This triangle points to pin 1.

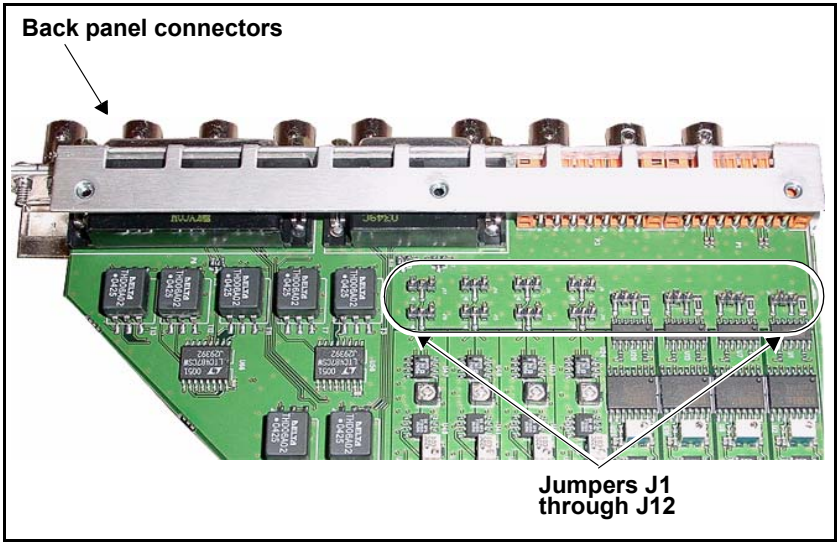


Figure 3-2. AS-X75HD/X75SD Jumper Locations

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. The following procedure describes this process:

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).
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.

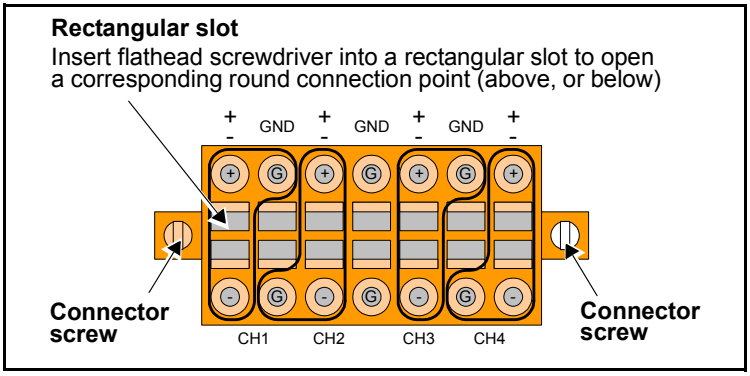


Figure 3-3. Installing Analog Audio Receptacles

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 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 /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 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 3-1 on page 64 describes the various options of the audio limiter.

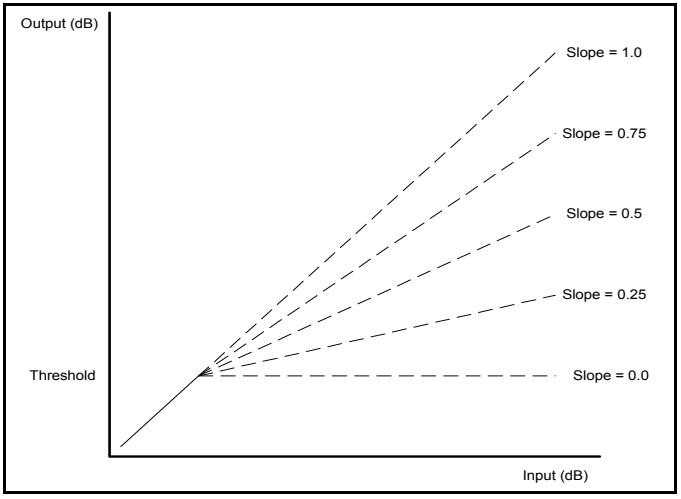


Figure 3-4. Audio Limiter Transfer Function

Table 3-1. 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 the factor of 4 at the output.
Attack Rate	Controls the rate of attack soft limiting
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 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 (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.

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 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.

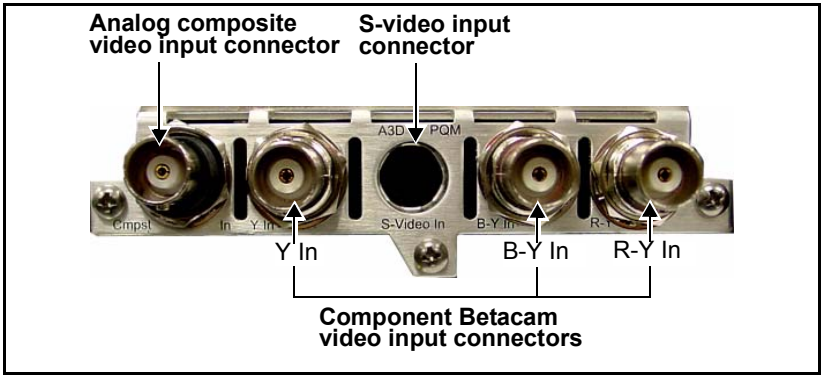


Figure 3-5. X75OPT-A3D Module Back Panel

This module provides analog video processing for the X75HD/X75SD and X75-DPS-575 models. The module is required to input the analog video types shown in Figure 3-5 above (including analog composite, S-video, and component Betacam). Using this module, you can access, configure, and enable the analog video parameters found within the **Video Setup** submenu (accessed from the **Main** menu).

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) first 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: **Main Menu>Video Setup>Analog Input>Analog Video Source**.

In order for the **Video In Precedence** settings to have any affect, you must set the **I/P Video Mode** parameter to **Auto Detect** instead of factory default of **User Select**.

For more information, see "Input Video Modes" on page 103.

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).

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.

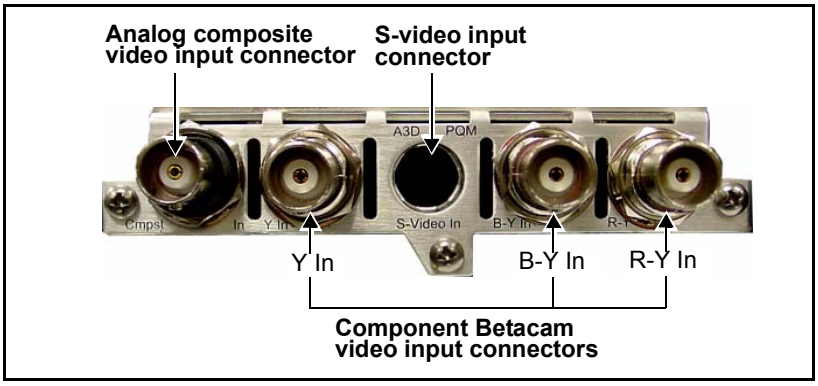


Figure 3-6. PQM-X75 Back Panel

This module provides analog video processing for the X75HD/X75SD and is included in the X75-DPS-575 versions. The module accepts inputs of the analog video types shown in Figure 3-6 above (including analog composite, S-video, and component Betacam). Using this module, you can access, configure, and enable the analog video parameters found within the **Video Setup** submenu (accessed from the **Main** menu).

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) first 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: **Main Menu**>**Video Setup**>**Analog Input**>**Analog Video Source**. For more information, see “Input Video Modes” on page 103.

X75HD Module and Back Panel

General Information

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 (rear-view), 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.

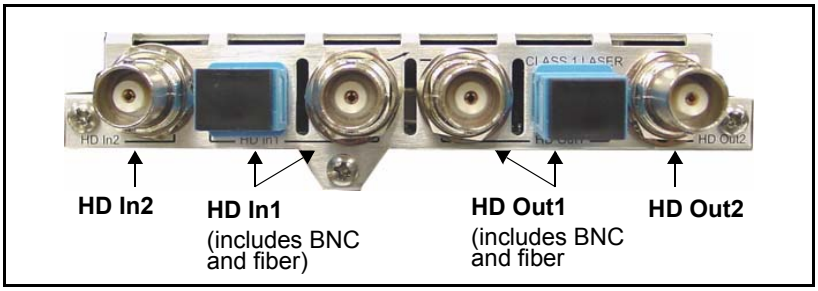


Figure 3-7. HD-X75 Back Panel

This module provides high-definition processing for the X75HD/X75SD, inputs/outputs both coaxial and fiber signals. This module is required to input and output HDTV and fiber signals, and to access, configure, and enable the HDTV input and output parameters found within HDTV submenus within the **Video Setup** submenu (accessed from the **Main** menu).

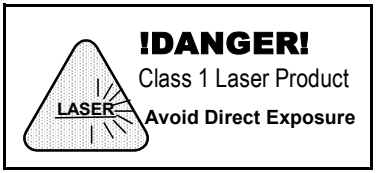
Caution

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 227.

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: **Main Menu>Video Setup>HD Input>HD1/HDF Input Select**. For more information, see "Input Video Modes" on page 103.

Chapter 4

System Installation and Connections

Overview

This chapter contains the following information:

Checking the Packing List

Before unpacking your product, read the "Unpacking/Shipping Information" on page xiii.

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)

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

- Two 2x7 analog audio terminal blocks (134-000228-00) (this item may be pre-installed on your unit)
- 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:

- X75OPTCAB-MULTI breakout cable
- X75OPTCAB-DVI DVI-D digital video cable
- X75OPTCAB-8-CX combination BNC/XLR audio breakout cable
- X75OPTCAB-16-CX combination BNC/XLR audio breakout cable
- X75OPTCAB-8-X XLR audio breakout cable
- X75OPTCAB-16-X XLR audio breakout cable
- X75OPT-ASL audio limiter software key for X75OPT-AS-8/16 digital audio synchronizers

- X75OPT-A3D high performance 3D-adaptive decoder, composite, component Betacam, and S-video input
- X75OPT-PQM video module
- X75OPT-NR digital noise reduction and digital bandwidth filtering software key
- X75-RCP remote control panel
- X75OPT-PS power supply kit for optional, redundant power supply (typically factory installed, although can be field-upgraded)
- 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, and that frame support brackets are installed on the chassis. This section covers the following topics:

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 6-24 and Table 6-25 on page 124 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 75 for more information.

Meeting Environmental Requirements

Caution

To ensure proper ventilation and to prevent the frame from overheating, keep the front panel of an X75HD/X75SD frame closed.

X75HD/X75SD models 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.

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

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. X75HD/X75SD models require an ambient temperature of between 41° to 113°F (5° to 45°C), with a relative humidity of 10-90% (non condensing). The frame can only maintain proper operating temperatures when the front panel is properly installed.

Installing a Redundant Power Supply

Optional redundant power supplies purchased prior to product shipment will be pre-installed in the X75HD/X75SD frame. Redundant power supplies purchased after product shipment will need to be customer-installed. See “Appendix C: Servicing” for more information on installing X75HD/X75SD power supplies.

Removing and Replacing Fans

For information on removing and replacing fan boards and individual fans, see “Appendix C: Servicing”.

Upgrading to a Local Control Panel

For information on upgrading an X75HD/X75SD frame with a blank front panel to one with a local control panel, see “Appendix C: Servicing”.

Installing Options and Replacements

Hardware Options

A wide variety of optional and replacement modules and power supplies is available for X75HD/X75SD models. See “Appendix C: Servicing” on page 225 for more information.

Software Options

You can purchase and install keyable software options separately from the factory (such as a noise reducer, SNMP, or audio limiter option) which you will need to install yourself. See “Installing Noise Reducer and Audio Limiter Software Options” on page 248 for more information.

Installing Rack Support Brackets and Cable Relief Bar

Although the front-mounting ears provide the main support for the frame 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 frame 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.)

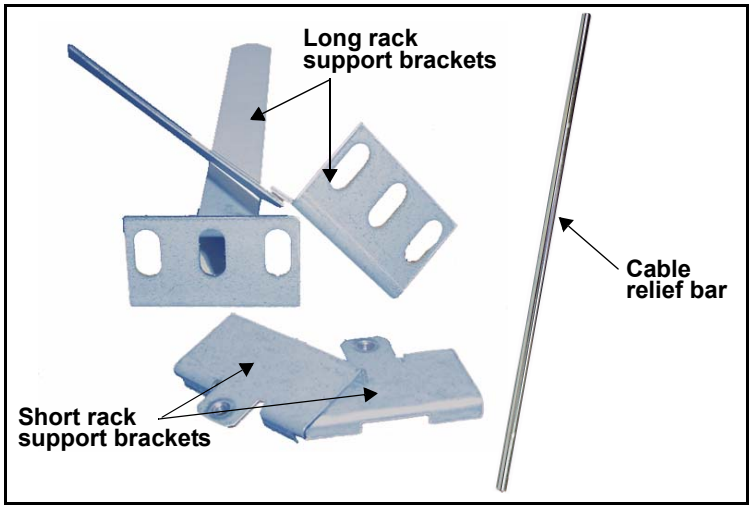


Figure 4-1. Rack Support Brackets

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 78.)

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.

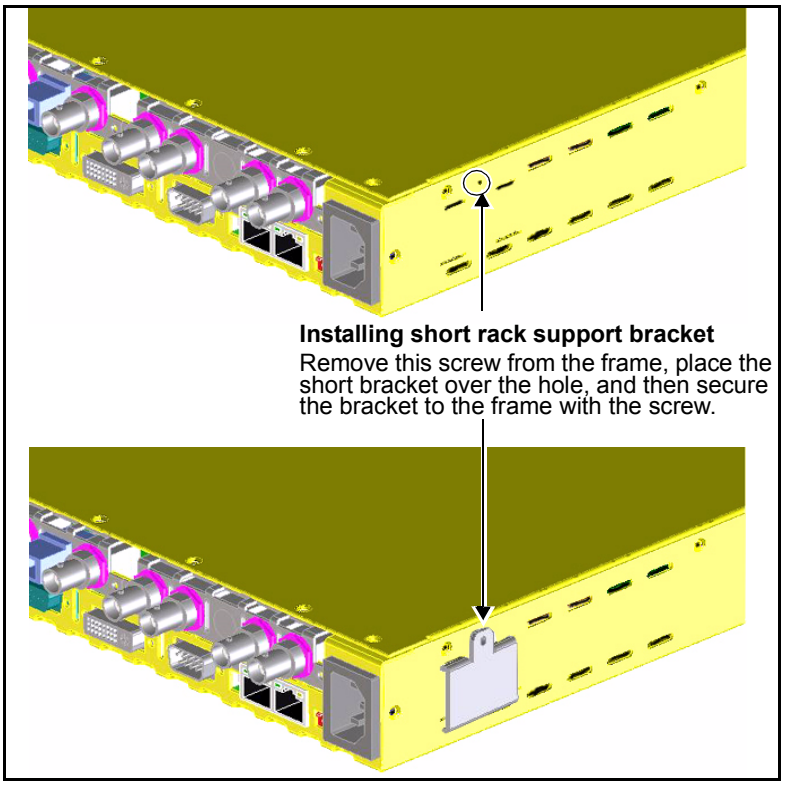


Figure 4-2. Location of Short Bracket Support Screw

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.)

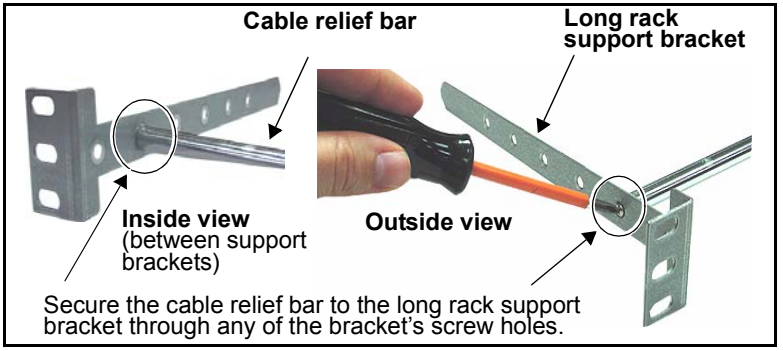


Figure 4-3. Installed Cable Relief Bar

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.)

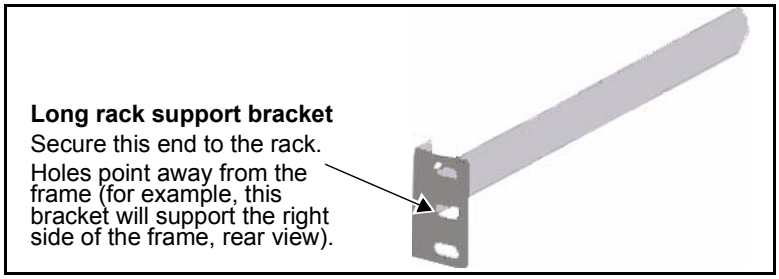


Figure 4-4. Long Rack Support Bracket

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.)

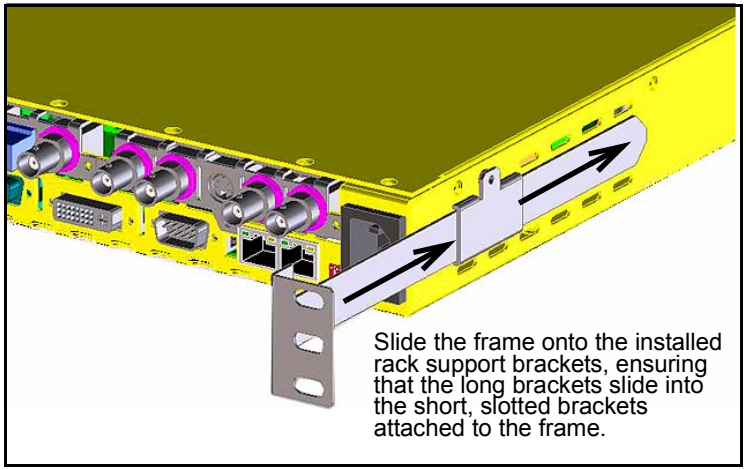


Figure 4-5. Installed Long and Short Rack Support Brackets

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:

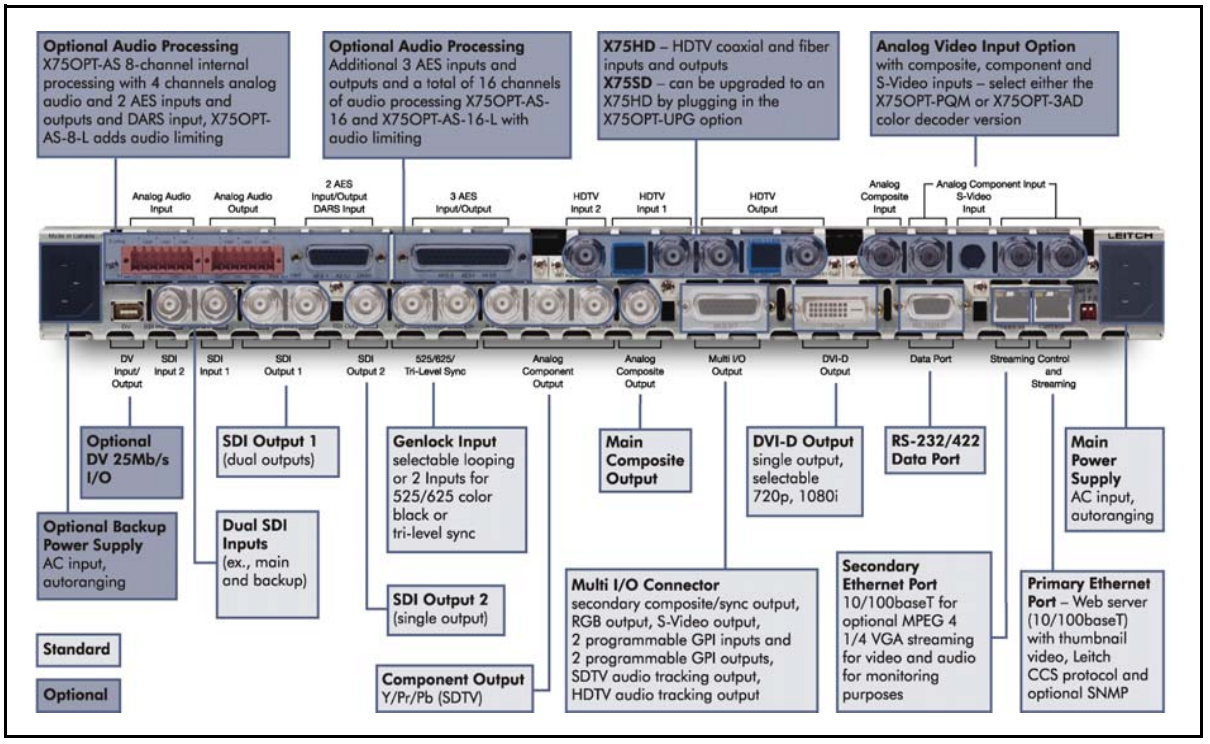


Figure 4-6. X75HD/X75SD Back Panel

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 page 201.

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 InputGenlock 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 in 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**, which is 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's 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 9: Video Configuration” on page 155).

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 x 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 CH1 Out 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 AS-X75HD/X75SD module) must be plugged into these connectors before configuration. See "X75OPT-AS-16/X75OPT-AS-8 Modules and Back Panels" on page 60 for more information.

Remote Control Ports

Remote control methods that are supported include the following:

- 10Base-T or 100/Base-T Ethernet (used for control through a TCP/IP-based network) 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 (this method of remote control is reserved for future use)
- 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 100 for details about controlling the unit from your Web browser.

When using Ethernet, you must configure the IP Address, Netmask, and 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 reserved for future use.

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:

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, navigating the menus, and changing parameter options, see the *Control Panels for X75 Systems Installation and Operation Manual*.

Initial Power-Up and Control Steps

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 60 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 "System Installation and Connections" on page 71 for details).

3. Plug the unit into a grounded electrical source to turn it on.

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

   - IP address of X75HD/X75SD system: 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. A request for factory configuration of network settings must be placed at the time of order. Please contact your Leitch customer service representative for more details.)

4. If desired, you can change the direction of the control panel knob by pressing the **Option** button, opening the **Setup** menu, and selecting the **Shaft Direction** parameter. Set the direction of the knob to either **Clockwise = Up** or **Clockwise = Down**.

5. Using a frame-mounted local control panel, configure the network settings for each system: assign a unique IP address to each unit, configure the subnet mask to be the same for all units on a shared network, and change the gateway if required (see "Configuring Network Settings" on page 92 for details).

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 "Recalling the Unique IP Address for a System" on page 222 for more information.

6. If you are controlling the unit remotely via remote control panel, make the required Ethernet connections (see "Remotely Controlling X75HD/X75SD Systems" on page 97 for details).
7. 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 100 for details).
8. 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 for SNMP and Third-Party Software Control" on page 101 for details).
9. Configure your video (and audio) input settings prior to operation (see "Configuring Video" on page 106 and "Configuring Audio" on page 108 for details).

Configuring Network Settings

When shipped, the X75HD/X75SD is configured with a default IP address along with other network settings. 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 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 97 for details.

- HTTP (for example, using a Microsoft Internet Explorer 6.0).

  See "Configuring for HTTP Control (via Web Browser)" for details.

- SNMP (for example, using NuDesign Visual MIBrowser Pro 3.1).

  SNMP protocol-compliant devices, such as the X75HD/X75SD, can be browsed by third-party independent browsers.

  See "Configuring for SNMP and Third-Party Software Control" on page 101 for details.

Making Required Hardware Connections

Note

The RJ-45 connector labelled Streaming on the back of each X75HD/X75SD frame is reserved for future use.

If you are connecting an X75HD/X75SD directly to a PC (no network connection), connect one end of a cross-over 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. See Figure 5-1.

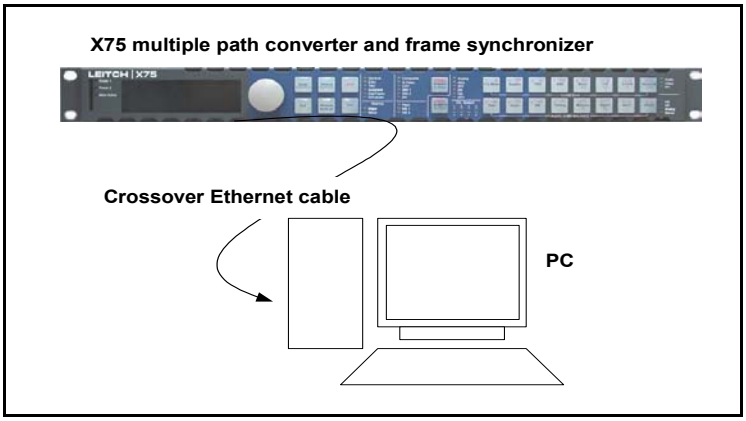


Figure 5-1. Direct-to-PC Connection

If you are establishing a network connection, connect a 10/100Base-T Ethernet cable between the X75HD Ctrl/Strm port and the network hub/switch (see Figure 5-2.)

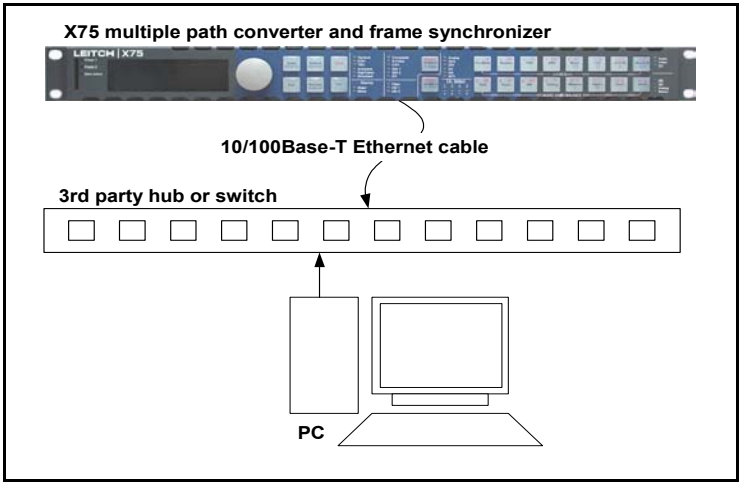


Figure 5-2. Network Connection

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

Follow these steps to configure X75HD/X75SD IP and subnet mask addresses:

1. Pplug in the X75HD/X75SD unit with a frame-mounted local control panel (LCP).

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

2. Go to the **System Config**>**Setup** menu.
3. Locate and 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.
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.
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. Plug in 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 94.
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 (such as the IP address, subnet mask, and gateway address) in the same way as you would for an X75HD system.

   See "Remotely Controlling X75HD/X75SD Systems" on page 97 for more information on remote panel configuration.

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.

Remotely Controlling X75HD/X75SD Systems

This section provides the following general configuration procedures:

- "Preparing for Remote Control via Control Panel" on page 97
- "Selecting a Remote Unit to Control" on page 98

See your *Control Panels for X75 Systems Installation and Operation Manual* for more information on 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 99 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 yourX75HD/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 94 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. See "Making Required Hardware Connections" on page 93 for more information.
4. Discover all units found on the network, and then select the one you wish to control. See "Selecting a Remote Unit to Control" below for details.

Selecting a Remote Unit to Control

All X75HD/X75SD systems that share the same subnet can be remotely controlled by 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

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

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.

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.

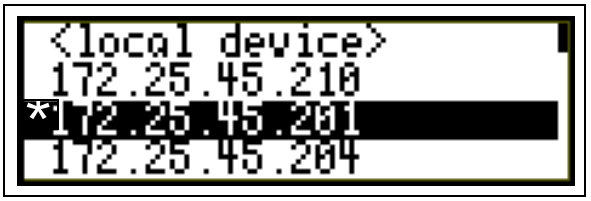


Figure 5-3. List of Systems Available for Remote Control

The **<local device>** option 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 an IP address 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, and the menu of the selected X75HD/X75SD unit appears along with all of that unit’s settings.

Note

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

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

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 local control panel as for the X75-RCP.

See "Using an X75-RCP for Remote Operation" on page 98 for details.

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 8: Web Server Software Control" for more information.

Note

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

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 an MIB file that can be downloaded off of the Leitch Web site. This file defines the parameters of the X75HD/X75SD, and is required for third-party software control.

The general steps you will need to follow for SNMP control include the following:

1. Make the required network connections between the X75HD/X75SD unit(s) and your PC with installed SNMP browser/control software.
2. Load the Leitch X75HD/X75SD MIB file.
3. If your browser does not automatically detect the X75HD/X75SD unit(s), define the X75HD/X75SD agent IP (SNMP agent) on the X75HD/X75SD firmware (server software).

   A configure file for each X75HD/X75SD directs the SNMP agent to the alarms (an SNMP trap). This file must be modified before it is loaded back to the X75HD/X75SD. Use a text editor to perform this task. To access the configuration file, download the file from an X75HD/X75SD unit via FTP connection. Type FTP in the MS DOS window of a locally connected PC, and then use the text editor to modify the browser/PC address.
4. Replace the IP address with the browser/PC address, and then load it back to X75HD/X75SD unit.

   The X75HD/X75SD now directs all alarm signals to your PC for monitoring.

See the documentation that accompanies your third-party control software for more 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

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 Ouptput 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 DV (future use)	• 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 **User Select** 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 106 for more information.

The **Input Video Mode** for manual configuration is **User Select**. 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
- 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 main board to HD board for SD ARCing. 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 special 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, 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 104.

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 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 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 5-4 graphically illustrates a single-source signal process, where one selected video input is fed to all outputs.

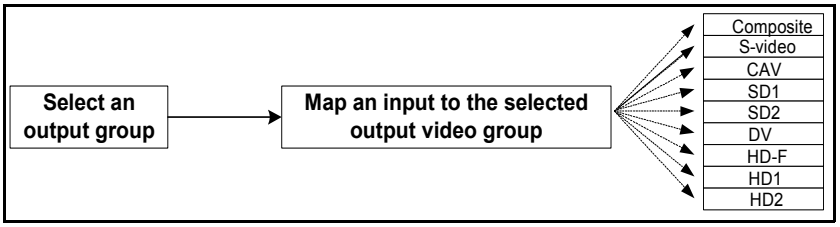


Figure 5-4. Single Source Processing

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 "Chapter 9: Video Configuration".

For more information on using a local or remote control panel, see "Chapter 7: Operation via Front Panel Controls" 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 "Chapter 10: Audio Configuration".

For more information on using a local or remote control panel, see "Chapter 7: Operation via Front Panel Controls" 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.

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 Synchonizers 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 Favourite list 1.
- Fav2:—Activates the GPI set parameter in the Favourite list 2.

For instructions on how to add a parameter and assign it as a GPI input in Favourite list, see “Using the FAV1 and FAV2 Function” on page 180.

Chapter 6

Specifications

Overview

This chapter describes all X75HD/X75SD video, audio, and other miscellaneous performance and hardware specifications.

The following specifications are included:

Video Specifications

Input

Table 6-1. HD-SDI Video Input Specifications

Item	Specification
Standard	SMPTE292M (See "HD Conversion Capabilities" on page 126 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 6-2. HDTV Fiber Video Input

Item	Specification
Standard	SMPTE 292M, Mode B Operation (See "HD Conversion Capabilities" on page 126 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 6-3. 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 6-4. S-Video Input Specifications

Item	Specification
Standard	• NTSC • PAL-M • PAL-B
Connector	4-pin DIN

Table 6-5. 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 6-5. 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 6-6. 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 6-6. 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 6-7. 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 6-8. HD-SDI Video Output Specifications

Item	Specification
Standard	SMPTE292M (See "HD Conversion Capabilities" on page 126 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 6-9. HDTV Fiber Video Output Specifications

Item	Specification
Standard	SMPTE 292M, Mode B Operation (See "HD Conversion Capabilities" on page 126 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 6-10. 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 6-11. 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	<1 ns
Transient response	<0.5% K Factor
SNR	>63 dB (0.1 MHz to 6 MHz)

Table 6-12. 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	<±1 ns
SNR	>63 dB

Table 6-14. 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 6-15. 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 6-16. 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 6-17. 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%)

Table 6-17. AES Output Specifications *(Continued)*

Item	Specification
Unbalanced	
Standard	AES3, SMPTE276M
Type	Unbalanced, AC coupled
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 6-18. 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 6-19. 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 6-20. DV I/O Specifications (Future Use)

Item	Specification
Standard	IEEE-1394
Connector	IEEE-1394, 6 pin molex connector

Table 6-21. Control/Streaming I/O Specifications (Future Use)

Item	Specification
Connector	RJ-45
Protocols	• CCS • SNMP • HTTP

Communication Specifications

Table 6-22. 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 6-23. 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 6-24. 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 6-25. 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 6-25. 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 6-25. 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 6-26 table to any of the specified output signals and formats.

Table 6-26. X75HD Supported Conversion Formats

		Outputs						
		486i/29.97	720p/59.94	1080i/59.94	576i/25	720p/50	1080i/50	1080p/25
Input	486i/29.97	Y	Y	Y				
	720p/59.94	Y	Y	Y				
	1080i/59.94	Y	Y	Y				
	576i/25				Y	Y	Y	Y
	720p/50				Y	Y	Y	Y
	1080i/50				Y	Y	Y	Y
	1080p/25				Y	Y	Y	Y

Section II—Operation

This section contains the following topics:

Chapter 7

Operation via Front Panel Controls

Overview

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

This chapter does *not* give specific descriptions about available menus, submenus, parameters, or options. For this information, see the *X75HD Control Options* PDF document available from the Leitch Web site at www.leitch.com or on the accompanying 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:

Front Panel Description

The front panel (Figure 7-1) 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 done 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.

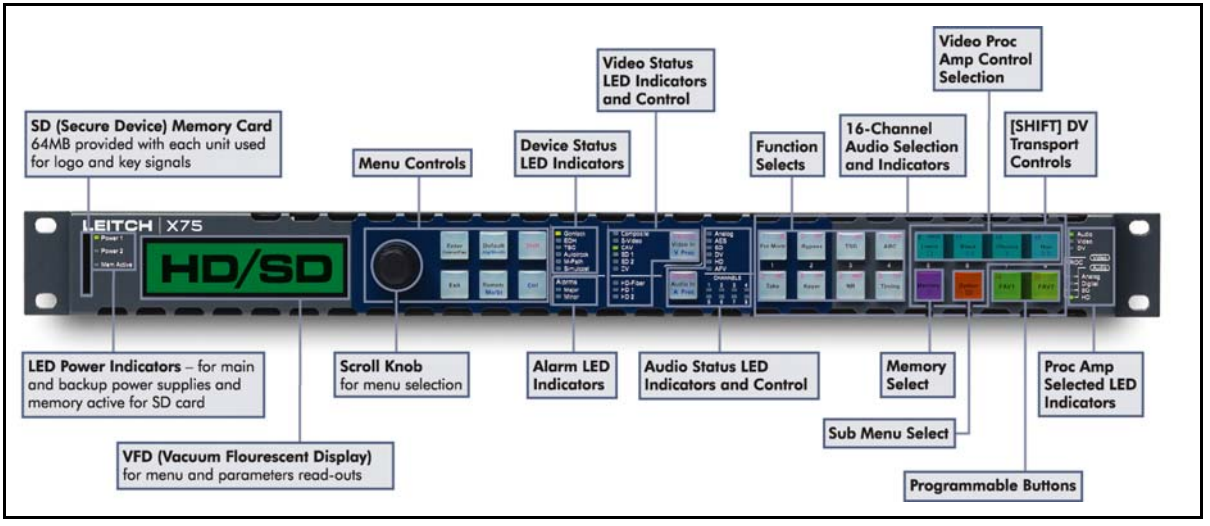


Figure 7-1. X75HD/X75SD Front Panel

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 7-2 shows the location of the control knob and various menu control buttons on the device. Use these items to open and navigate menus, to scroll through and select options, and to adjust various parameters and settings.

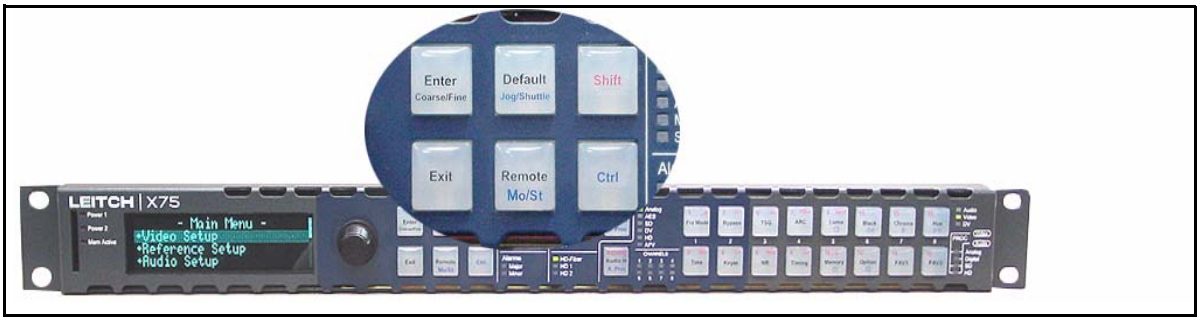


Figure 7-2. Control Knob and Menu Control Area

Setting the Direction of the Control Knob

If desired, you can change the direction of the control knob by pressing the **Option** button, opening the **Setup** menu, and then selecting 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*.

Note

Function names are color-coded and written in red, black, and blue text on the button face to aid in proper selection.

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 7-1 briefly describes each of the eight main menu items.

Table 7-1. 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 134 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 following the methods described below.

Alternatively, you can use the X75-RCP to remotely control the X75HD/X75SD. See "Configuring Network Settings" on page 92 and "Remotely Controlling X75HD/X75SD Systems" on page 97 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 effect 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 7-3 shows this representation.

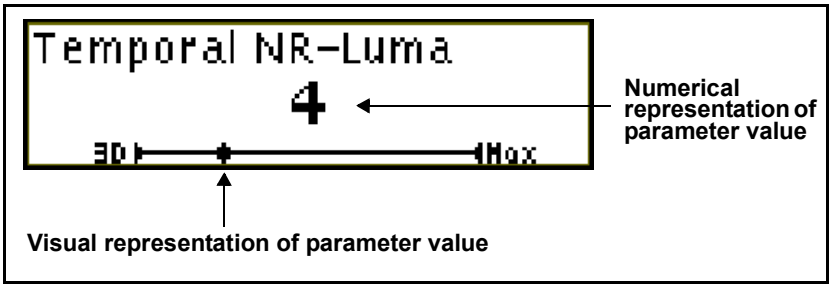


Figure 7-3. VFD Showing Numerical Range of Values

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

1. Navigate to the required menu or submenu, and 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 effect 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 7-4.

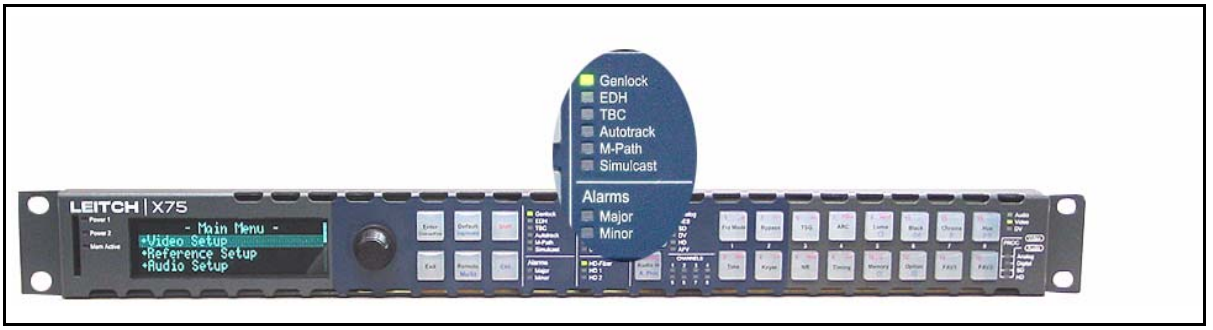


Figure 7-4. Status LED Area

Genlock Status LED

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

Table 7-2. 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 7-3. 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 thread: **Main Menu>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 7-4. 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 7-5. 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 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 7-6. 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 7-7. 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.

Table 7-8. Major and Minor Alarm LEDs

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

Mem Active LED

This LED is reserved for future use.

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 "Chapter 9: Video Configuration" for more information.

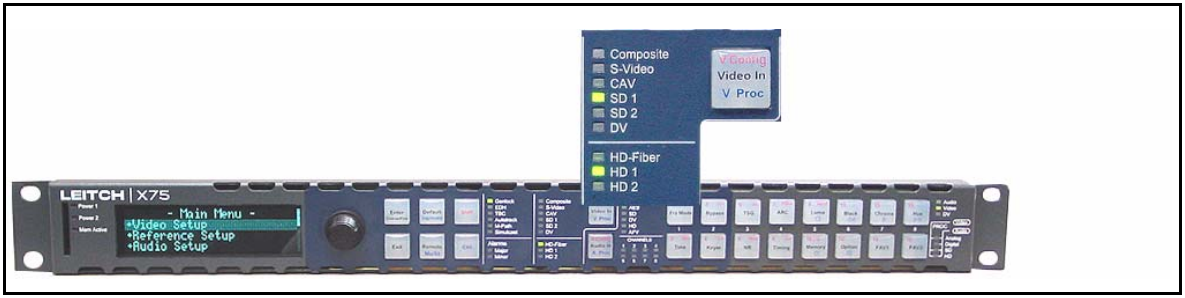


Figure 7-5. Video Input LED Area

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 "Chapter 10: Audio Configuration" for more information.

Figure 7-6. Audio Input LED Area

Control Mode Status LEDs

The Audio and Video 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.

Figure 7-7. Control Mode Status LED Area

Chapter 8

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 100 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

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 8-1.

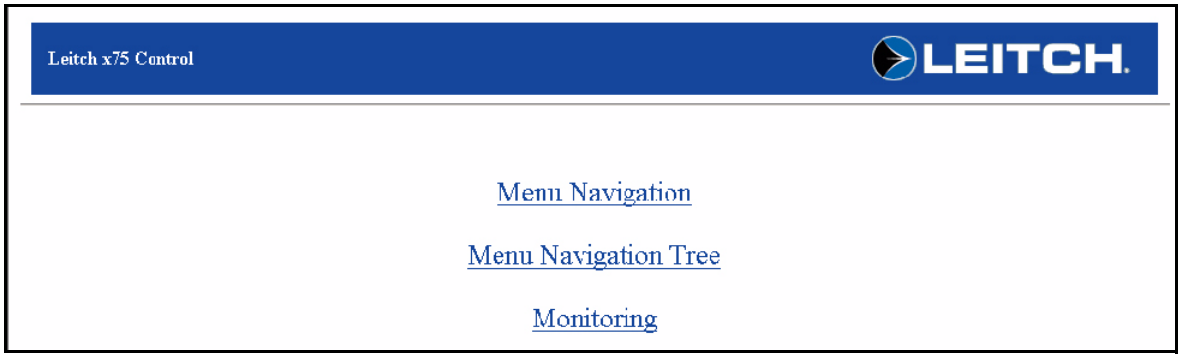


Figure 8-1. X75HD/X75SD Control Home Page for Web Server

The Home page provides three options:

- **Menu Navigation Tree** (see page 143)
- **Menu Navigation** (see page 149)
- **Monitoring** (see page 150)

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 the menus that are accessible through the local and remote control panels of the unit.

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 8-2 on page 144 describes the **Main** menu page interface. Figure 8-3 on page 145 illustrates the sequence of pages that results during navigation.

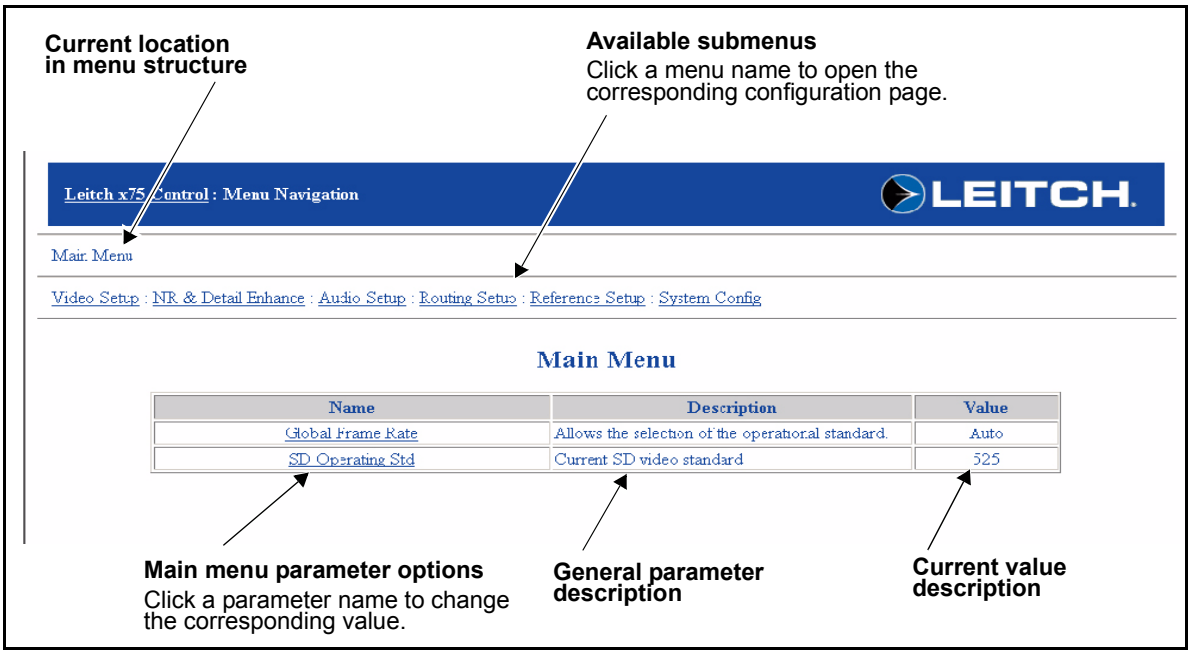


Figure 8-2. Main Menu Page

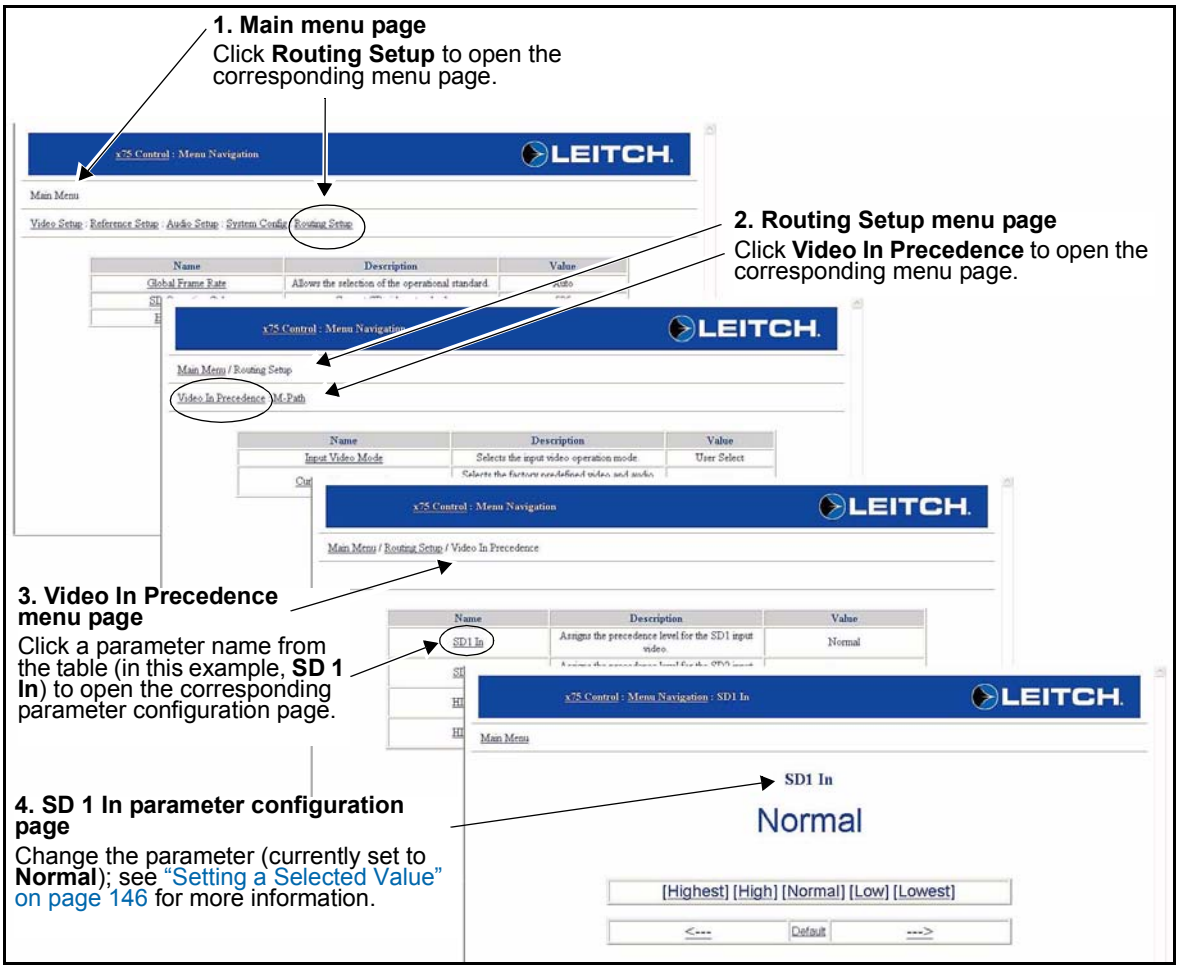


Figure 8-3. Sequence of Pages that Result During Navigation (Example)

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 8-4.)

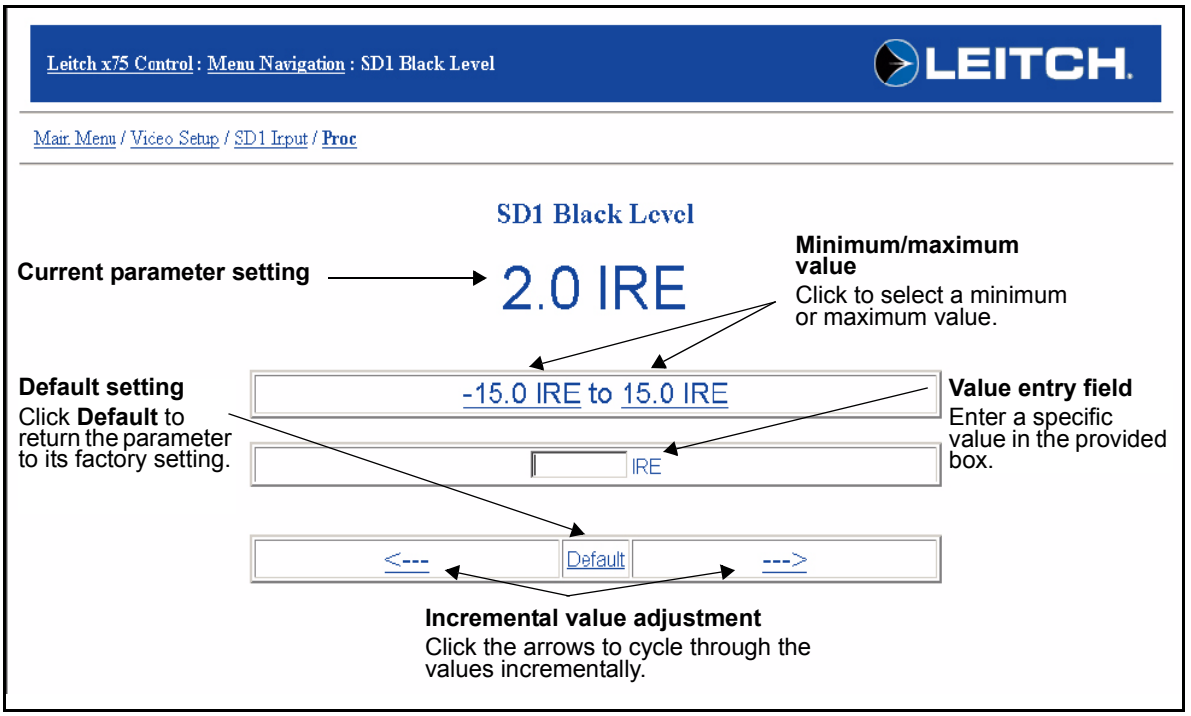


Figure 8-4. Setting a Parameter Value (Range)

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 8-5).

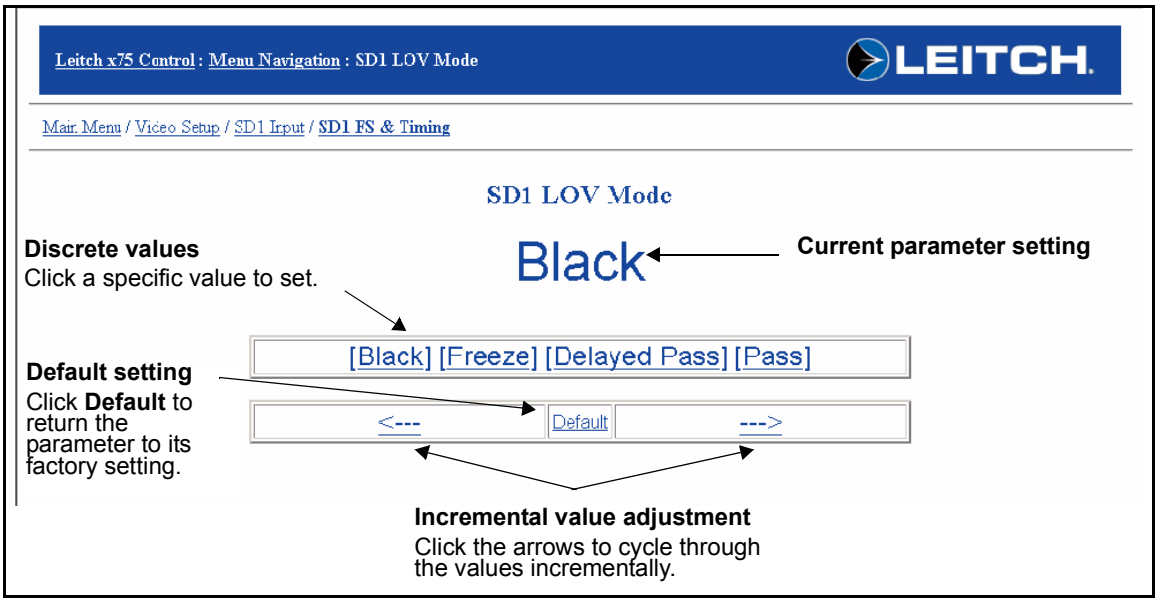


Figure 8-5. Setting a Parameter Value (Discrete)

Note

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

Some parameters are read-only, or status reporting, options that cannot be changed. Others may be disabled and unavailable for configuration. (See Figure 8-6 on page 148.) 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 153 for more information.

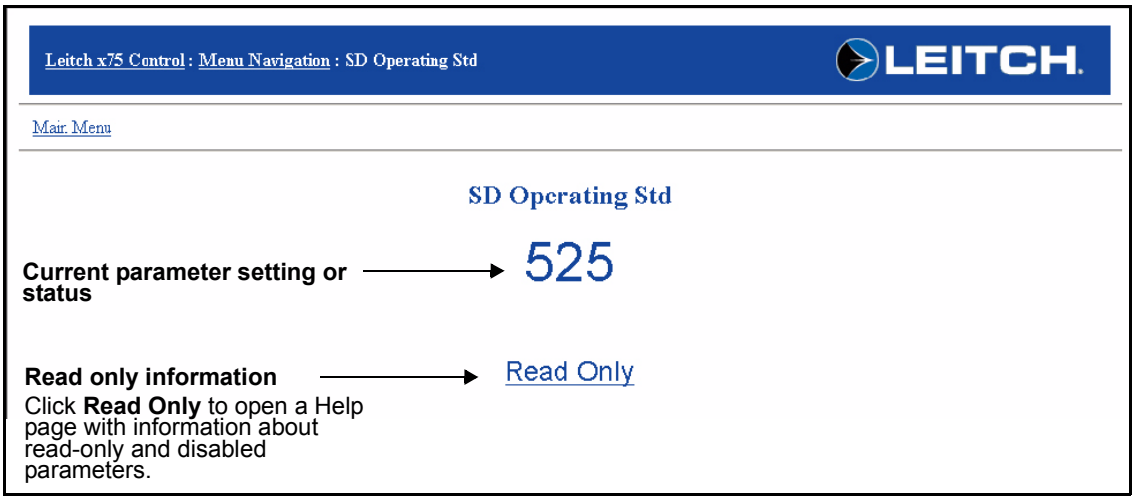


Figure 8-6. Viewing a Read Only Parameter

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 8-7 shows a sample of the **Menu Navigation Tree** page and a resulting configuration page that opens when you click a submenu.

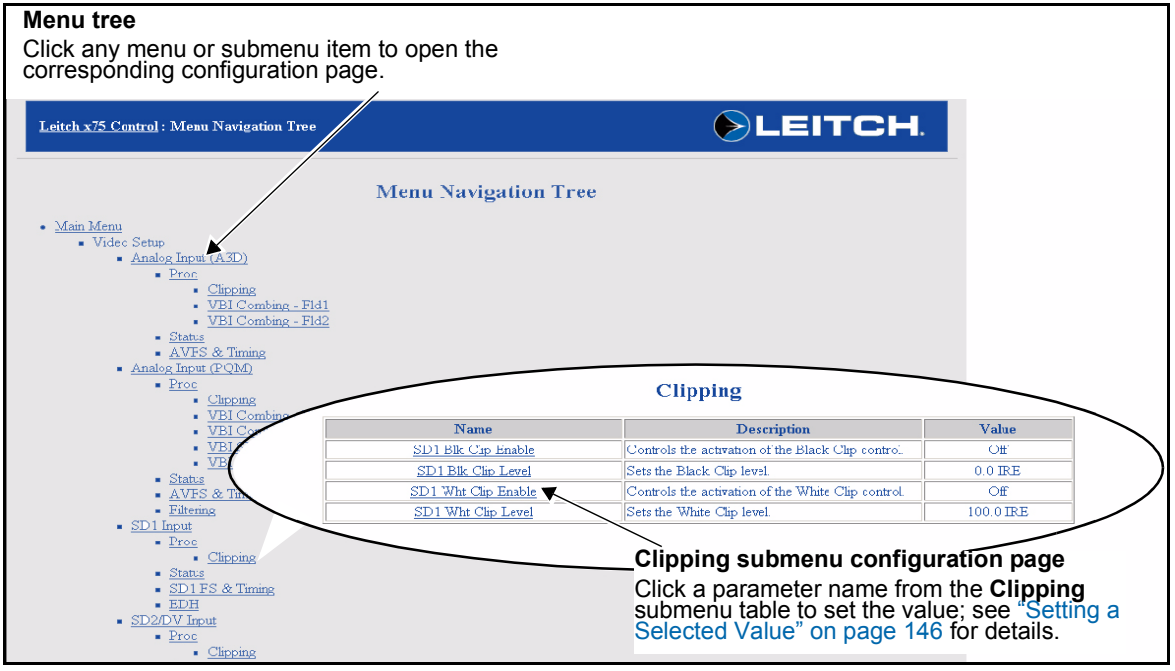


Figure 8-7. Menu Navigation Tree Control Page

Monitoring Alarms

Click **Monitoring** from the Home page to open the **Leitch X75 Alarms** page and view or change the status of the active and disabled alarms. (See Figure 8-8 on page 151.)

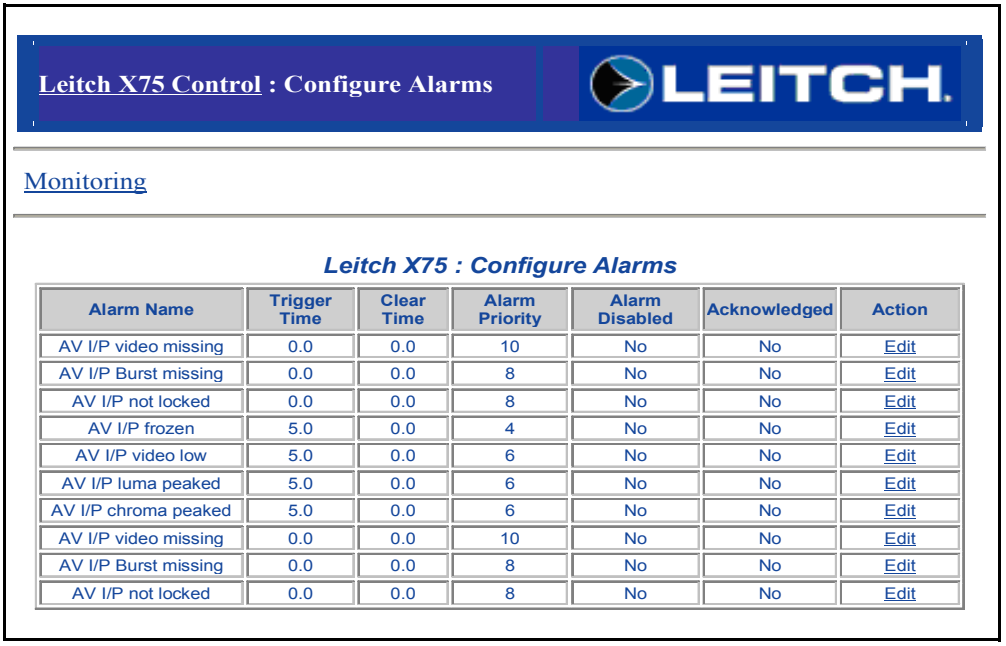
The thumbnail size video streaming above the Alarms table can also be displayed when **Enable Streaming** is activated.

The **Refresh Rate** at the bottom of the page defines how often the screen is refreshed and the range is 0 ~ 300 seconds. When you set the rate to 0, the refreshing is disabled.

Figure 8-8. Alarm Monitoring Page

Click **Configure Alarms** from the Monitoring page to open up the alarm configuration page (see Figure 8-9 on page 152). 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 8-10 on page 152).



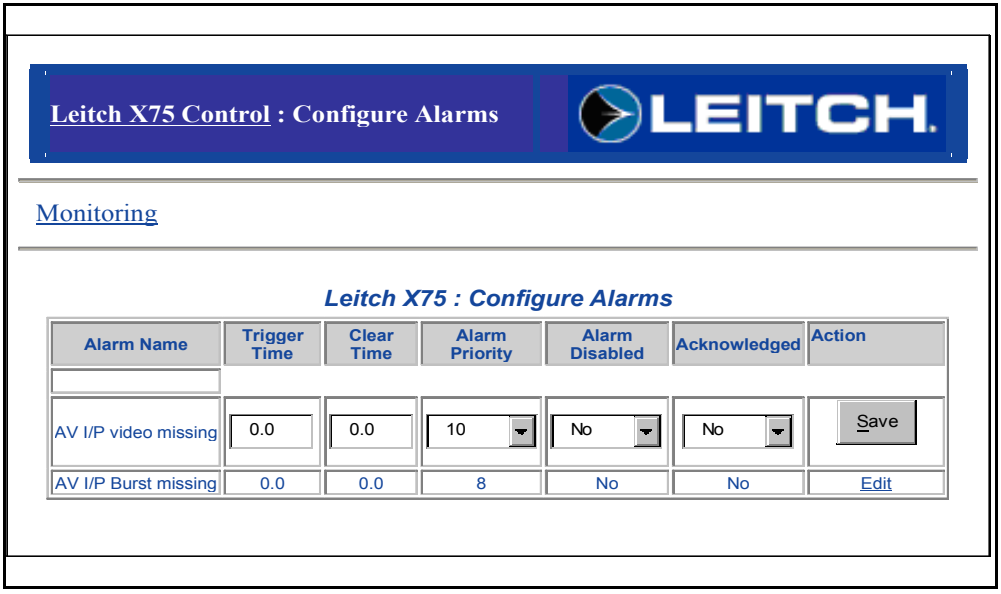
Leitch X75 Control : Configure Alarms

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 8-9. Configure Alarms Page



Leitch X75 Control : Configure Alarms

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 8-10. 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 8-11.

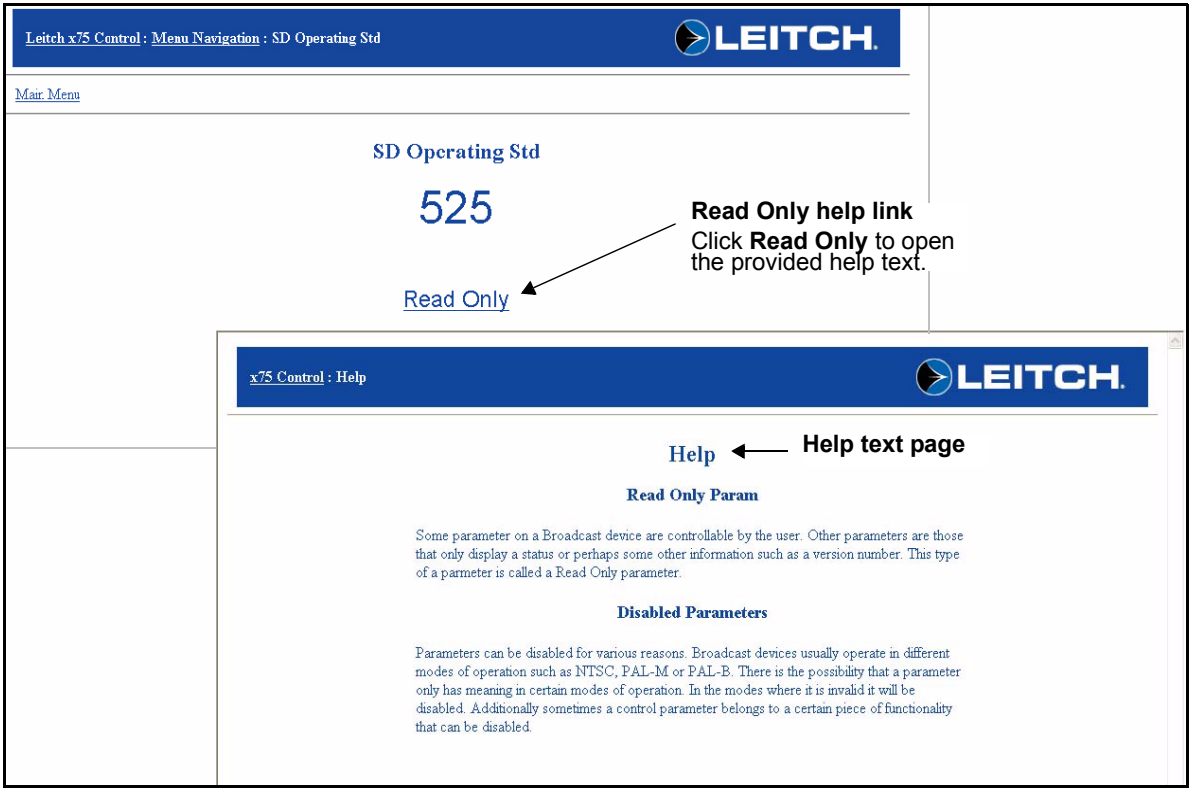


Figure 8-11. Read Only Parameter Sample

Chapter 9

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:

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
- 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 **User-Select** 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, HD-SDI F, 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 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 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 input
4. HD1/HD-fiber input
5. HD2 input

Figure 9-1 graphically illustrates a single-source signal process, where one selected video input is fed to all outputs.

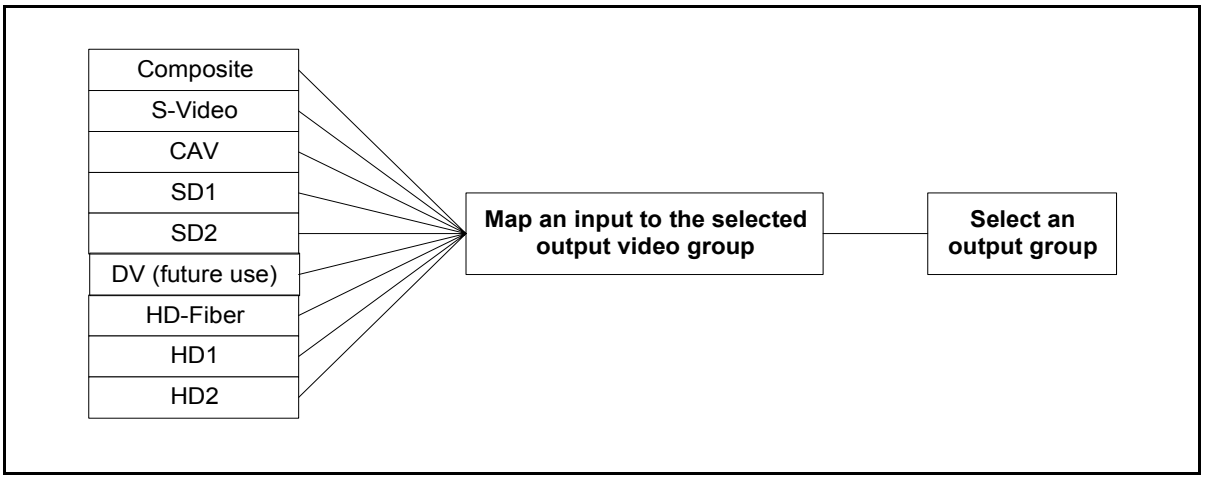


Figure 9-1. Single-Source Processing

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 172.

Chapter 10

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:

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
- 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 10-1. 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 10-1. 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.

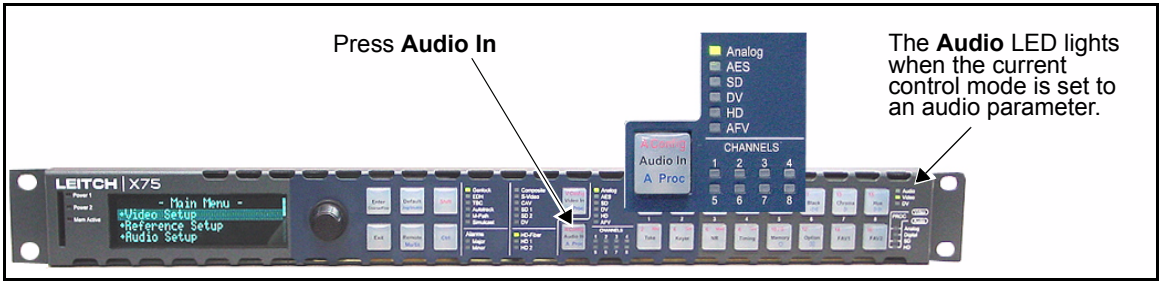


Figure 10-1. Audio Input Control Area

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 11-1 through 11-6 in "Chapter 11: 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 10-2 on page 165 for their locations):

- The Audio Mode LED on the far right side of the front panel (top) indicate the current mode of operation.
- The Audio Proc LED(s) 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 Controls" on page 173 for information on LED and channel mappings on a frame-mounted local control panel or X75-RCP remote control panel.

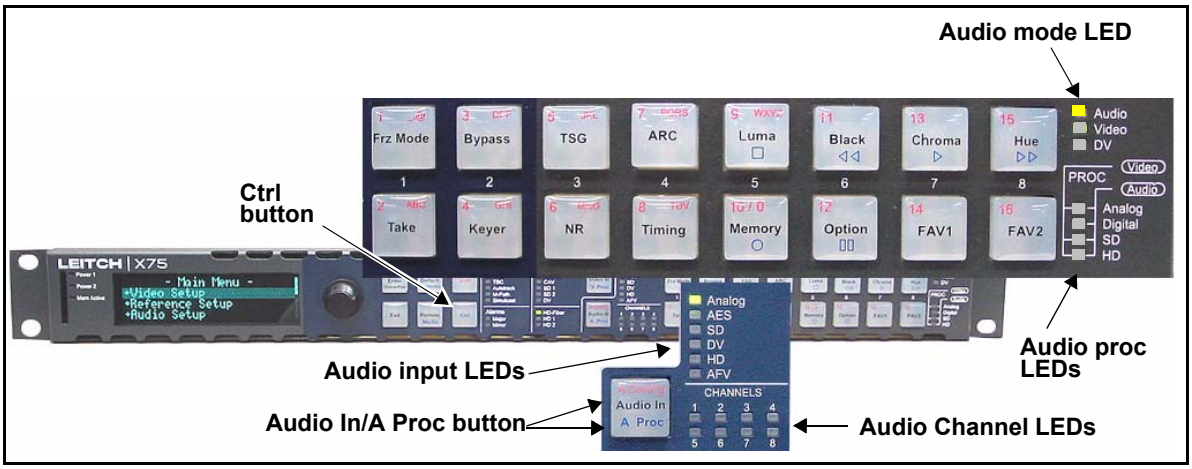


Figure 10-2. Location of Audio LEDs

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 Controls" on page 173 for information on LED and channel mappings on a frame-mounted local control panel or X75-RCP remote control panel.

AFV (Audio Follows Video) Mode

Note

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

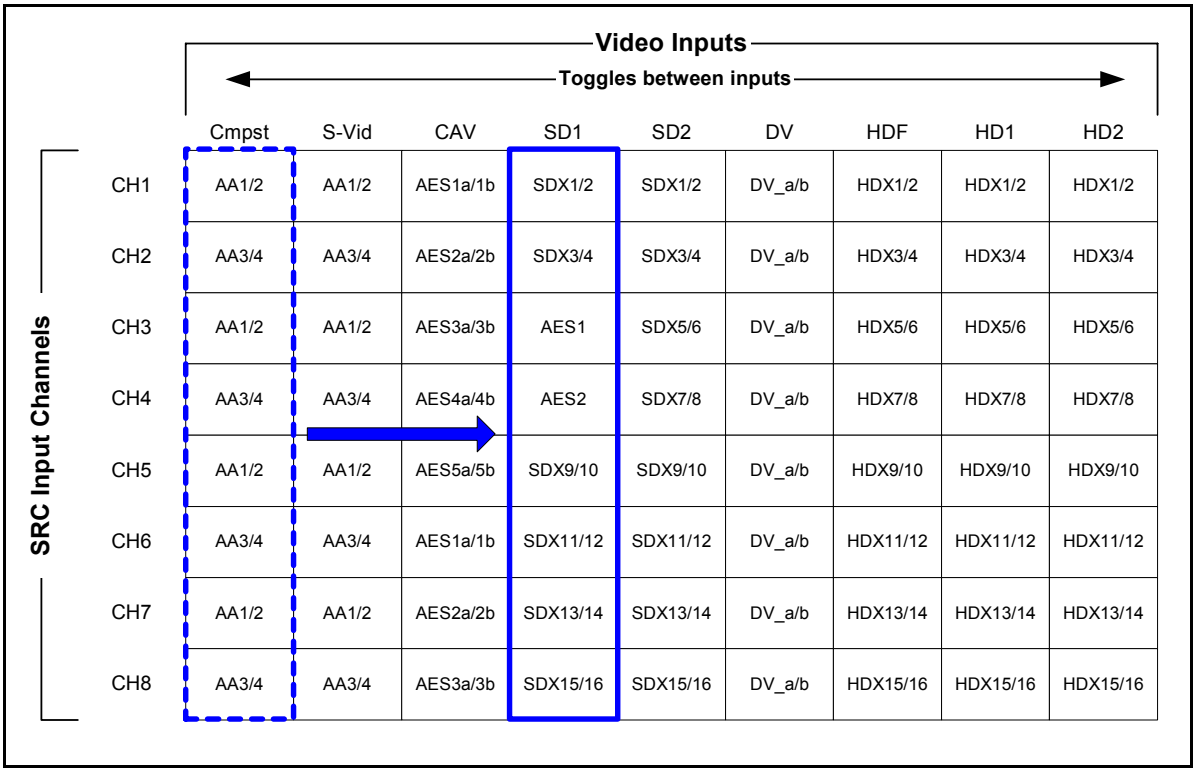
In AFV mode, each of the selectable video inputs has an audio input selection linked to it. With this feature enabled, the audio input selection for the channel automatically changes when the video input is changed.

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 10-3 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.



	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	AES1	SDX5/6	DV_a/b	HDX5/6	HDX5/6	HDX5/6
CH4	AA3/4	AA3/4	AES4a/4b	AES2	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 10-3. Default AFV Channel Assignment

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.

Advanced Audio Inputs and Outputs Selection

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 10-4 on page 168). This advanced routing can only be done through the **Audio** menu (not using a front panel shortcut button). Each SRC can be assigned to any stereo input sources. Mono-based audio outputs can select any SRC outputs, including the summation and tones and mutes.

More than one audio input LED will light when multiple audio input sources are selected (for example, **Analog** and **AES**).

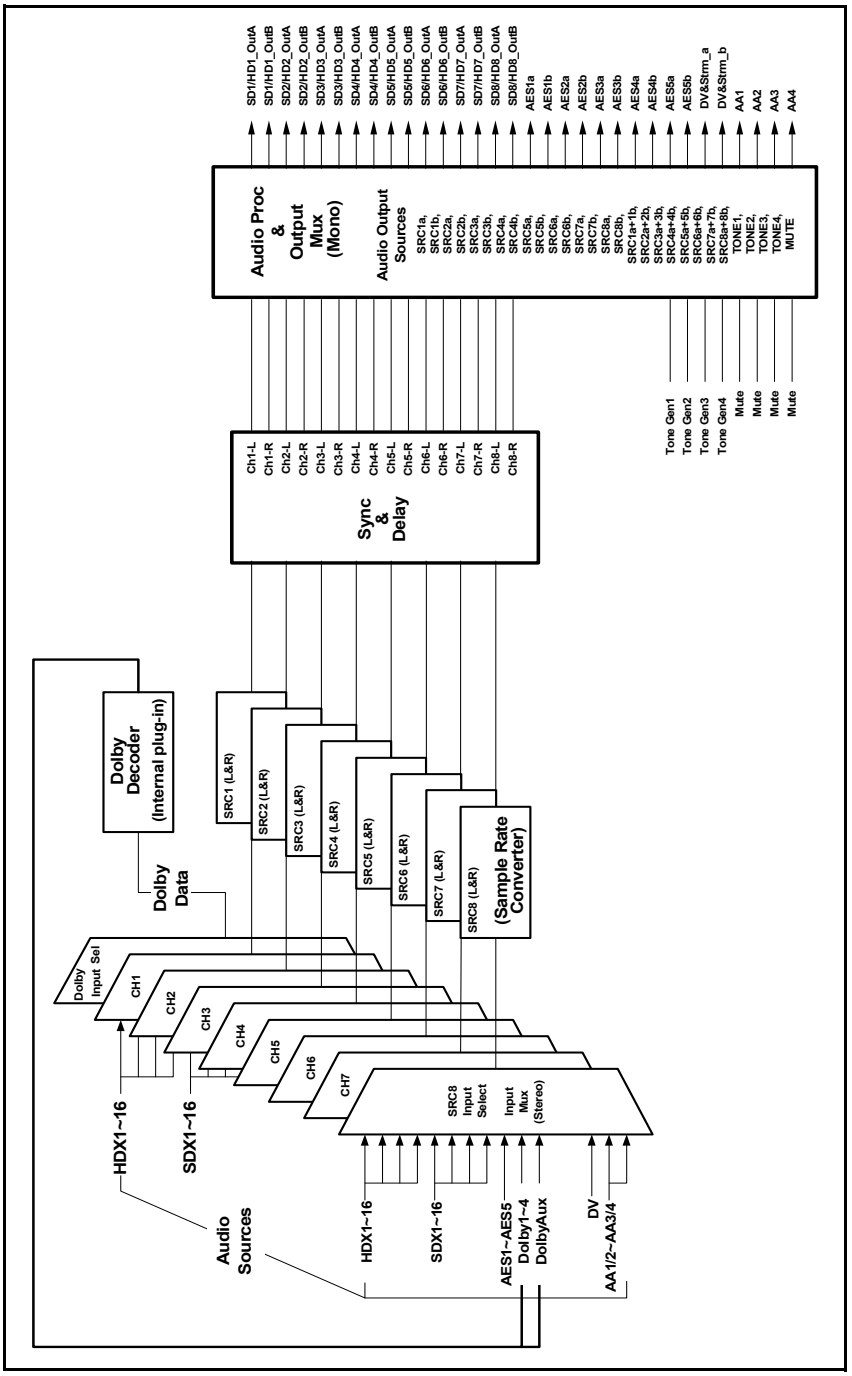


Figure 10-4. Advanced Audio Signal Routing

Chapter 11

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:

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 DV inputs (future use) 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 Controls

An X75HD/X75SD unit equipped with the X75OPT-AS-16 module can synchronize, delay, and process up to 8/16 mono channels. 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)
- 16 channels from the SD-SDI demultiplexer
- 16 channels from the HD-SDI demultiplexer

Tables 11-1 through 11-6 in the pages below describe the button mappings for single and multiple audio source configurations.

Single Source Configuration

Tables 11-1, 11-2, 11-3, and 11-4 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.

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 176.

Table 11-1. 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 11-2. 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 11-3. 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 11-4. 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 11-5 and 11-6 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 11-5. 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 11-6. 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 11-1 through 11-6 describe the various channels, LEDS, gain controls, and control panel buttons that are affected/activated by the selection of certain inputs. Table 11-7, below, provides some general information and definitions about each of these items.

Table 11-7. 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 11-7. 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 channel audio gain adjustments
- SD-SDI: Lit during SD*X* (SD-SDI demuxed) channel audio gain adjustments
- HD-SDI: Lit during HD*X* (HD-SDI demuxed) channel audio gain adjustments.

Using the Memory Function

Press the **Memory** button to quickly access user presets. These controls allow you to store and recall user settings for up to 10 presets. Various procedures for saving, recalling, renaming, and deleting presets are outlined below.

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

2. Select **Save Preset**.

   A confirmation box appears stating that the preset was saved and is named **Preset *x*** ("*x*" represents a number from **1** to **10**).

Recalling a Preset

To recall a preset, follow these steps:

1. Press **Memory**.

   A menu opens with the following options:

   - Save Preset
   - List Presets

2. Select **List Presets**.
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 and select **Recall Preset**, and then press **Enter**.

   Your preset is recalled.

Note

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

Renaming a Preset

To rename a preset, follow these steps:

1. Press **Memory**.

   A menu opens with the following options:

   - Save Preset
   - List Presets

2. Select **List Presets**.
3. Scroll to the preset you would like to rename.
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 and select **Rename Preset**, and then press **Enter**.

   You will be prompted to enter a new name.

6. Enter a new name.

Deleting a Preseet

To delete preset, follow these steps:

1. Press **Memory**.

   A menu opens with the following options:

   - Save Preset
   - List Presets

2. Select **List Presets**.
3. Scroll to the preset you would like to delete.
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 and select **Delete Preset**, and then press **Enter**.

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.

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.

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 buttons are 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

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 (TSG)

The X75HD/SD unit provides HDTV(8-bits) and SDTV(10-bits) internal test signals. Table 11-8 on page 185 and Table 11-9 on page 186 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 11-8. HDTV Test Signals

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

Table 11-9. 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	Pluge
Shallow Ramp	SIN(X)/X
Multiburst-60IRE	Timing Bowtie
Luma Sweep 5.5MHz	Matrix 1
Chroma Sweep	SDI EQ Test
Pulse and Bar	SDI PLL Test
NTC7 Composite	Bars/Red 100%
NTC7 Combination	EBU Bars
FCC Composite	EBU Bars/Red
VIRS	Multiburst 5.0MHz
Pluge	Multiburst 5.8MHz
SIN(X)/X	Multiburst 420mV
Red Field	Pulse & Bar 2410t
Timing Bowtie	Pulse & Bar 248t
Matrix 1	Pulse & Bar 2t

Table 11-9. SDTV Test Signals *(Continued)*

SD-SDI 525	SD-SDI 625
Matrix 2	Luma 10-Step
SDI EQ Test	Valid Ramp
SDI PLL Test	Multipulse 5.8MHz
	Shallow Ramps
	VITS 17
	VITS 18
	VITS 19
	VITS 20
	VITS 330
	VITS 331
	Red Field 75%
	Red Field 100%
	Ramp 100
	Ramp 120
	UBM Ramps

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 11-1 on page 190 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 11-2 on page 191 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

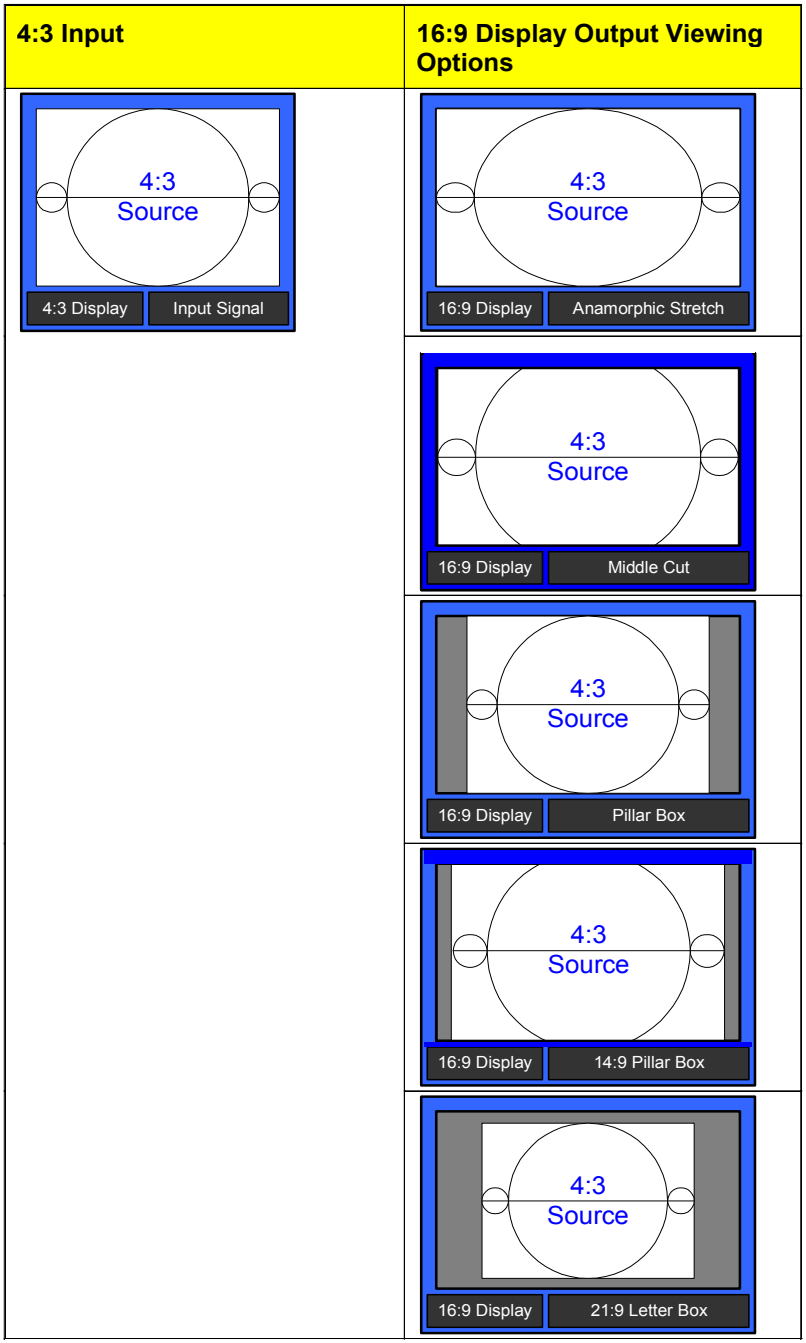


Figure 11-1. ARC (HD Out) View Modes

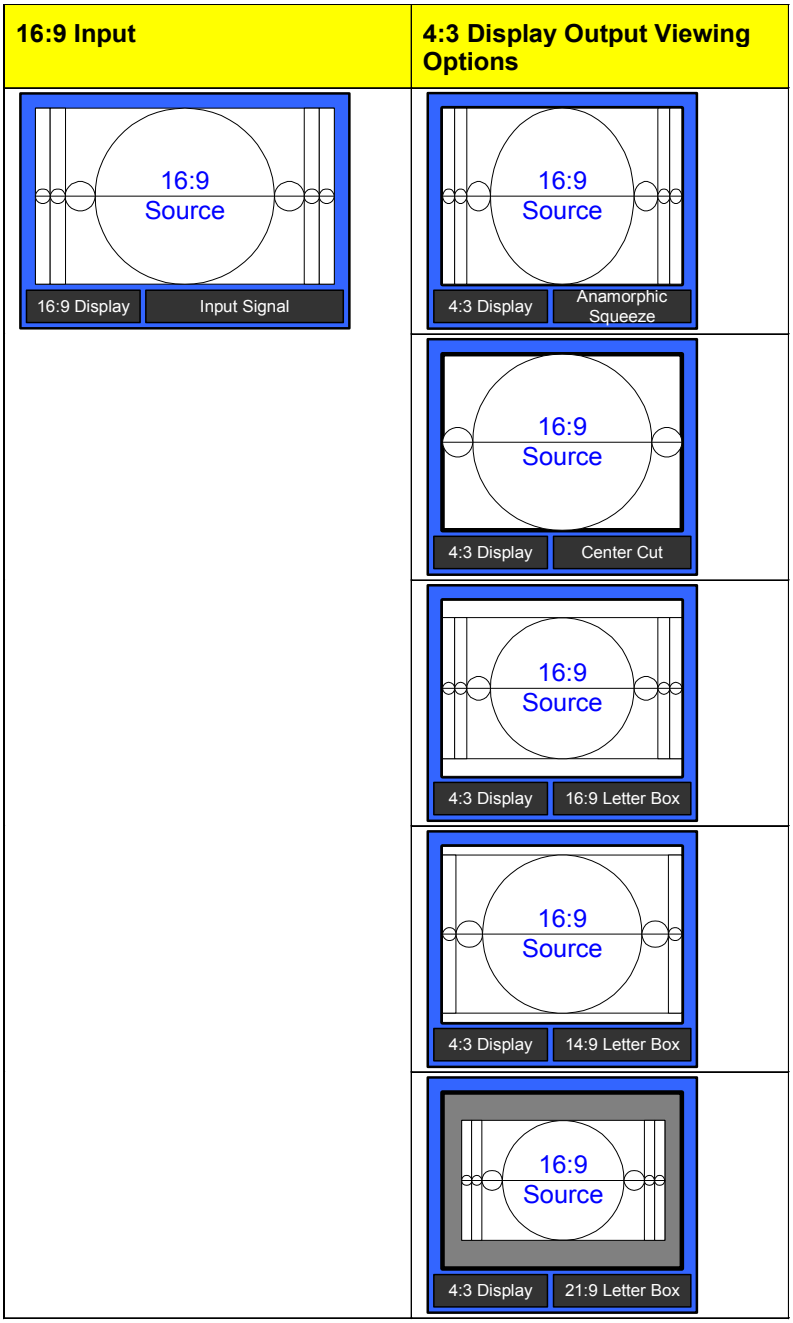


Figure 11-2. ARC (SD-SDI Out) Viewing Modes

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 S**D-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
- **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 180 for more information.
- **Preset**
- **MuteKeepAlive:** The X75HD/X75SD unit sends out a "keepalive" message every 15 seconds (approximately). The keepalive checks to determine if the device is still active and resides on the control network. The following options are available:
  - **No**: The keepalive message is broadcast every 15 seconds by the X75 unit to be discovered by the client control systems.
  - **Yes**: Suppresses the keepalive 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.
- **Backlight**: To accommodate different lighting environments, the buttons on the front of the frame can be backlit for better visibility.

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

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.

Section III—Appendixes

This section contains the following topics:

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, including the following:

Analog Audio Connections

Figure A-1 shows the analog audio input and output terminal blocks.

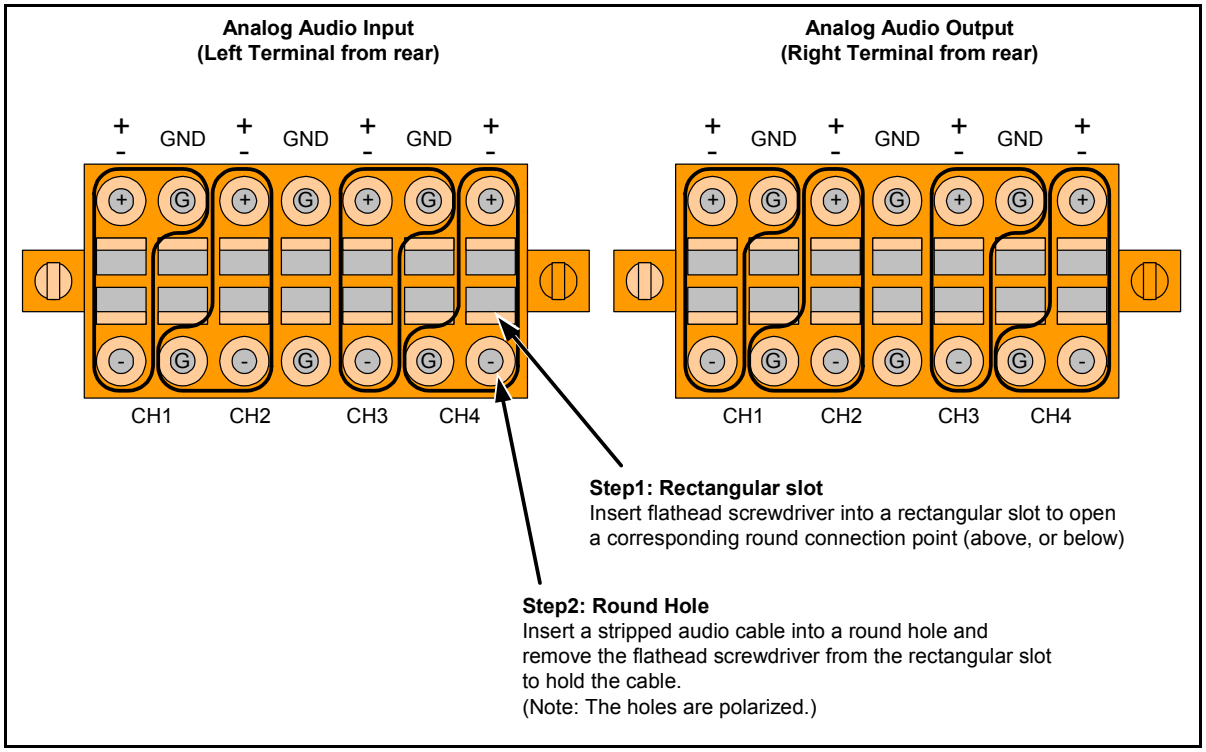


Figure A-1. Analog Audio Input and Output Terminal Blocks

Multi I/O Cable (X75OPTCAB-MULTI)

Figure A-2 identifies the cable connectors available on the optional multiple input/output X75OPTCAB-MULTI cable.

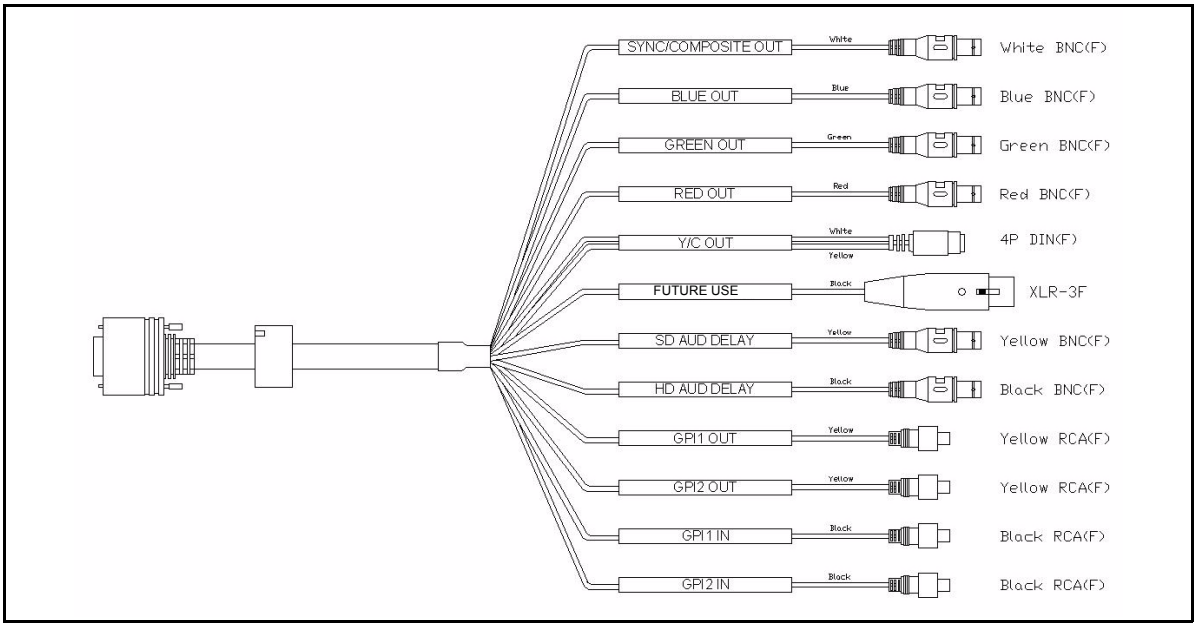


Figure A-2. X75OPTCAB-MULTI Cable Connectors

Figure A-3 shows the pinouts for the X75OPTCAB-MULTI DB-26M connector.

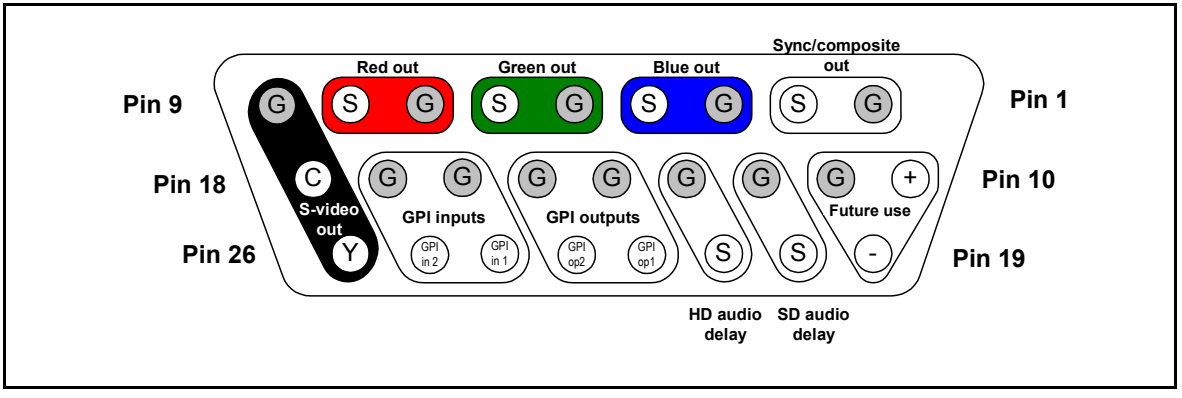


Figure A-3. X75OPTCAB-MULTI I/O Connector Pinout

Table A-1 describes each pin on the X75OPTCAB-MULTI DB-26M connector and its connection type.

Table A-1. 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

Table A-1. X75OPTCAB-MULTI Pinout Descriptions *(Continued)*

Pin Number	Connection Type	Description
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.

Standard Audio Coax Cable (X75OPTCAB-8-C)

Figure A-4 identifies the cable connectors available on the standard AES/EBU audio X75OPTCAB-8-C coax cable, which supports only the unbalanced audio signal.

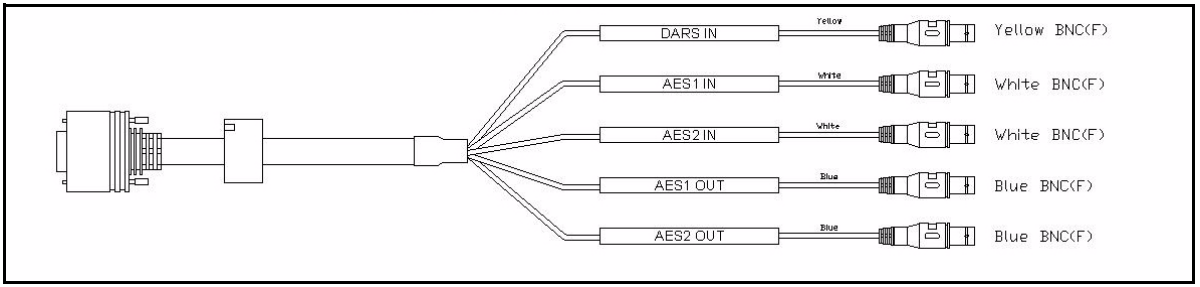


Figure A-4. X75OPTCAB-8-C Cable Connectors

Figure A-5 shows the pinouts for the X75OPTCAB-8-C DB-26M connector.

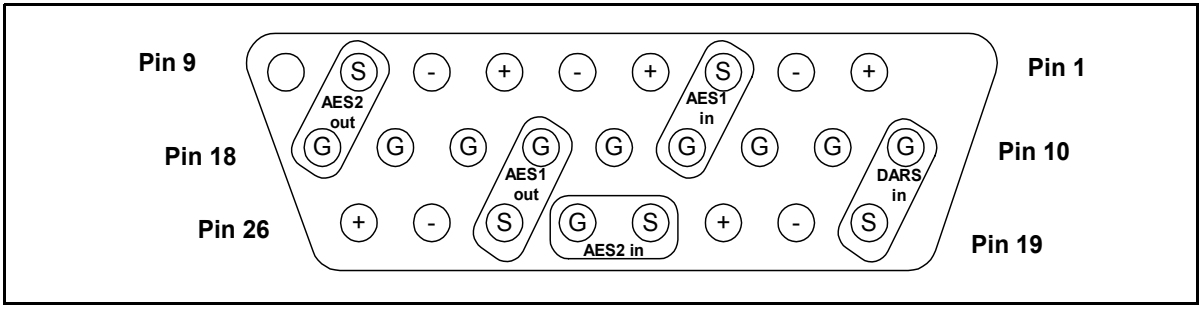


Figure A-5. X75OPTCAB-8-C Connector Pinout

Table A-2 describes each pin on the X75OPTCAB-8-C DB-26M connector and its connection type.

Table A-2. 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-2. 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

Standard Audio Coax Cable (X75OPTCAB-16-C)

Figure A-6 identifies the cable connectors available on the standard AES/EBU X75OPTCAB-16-C coax audio cable, which supports unbalanced audio signals.

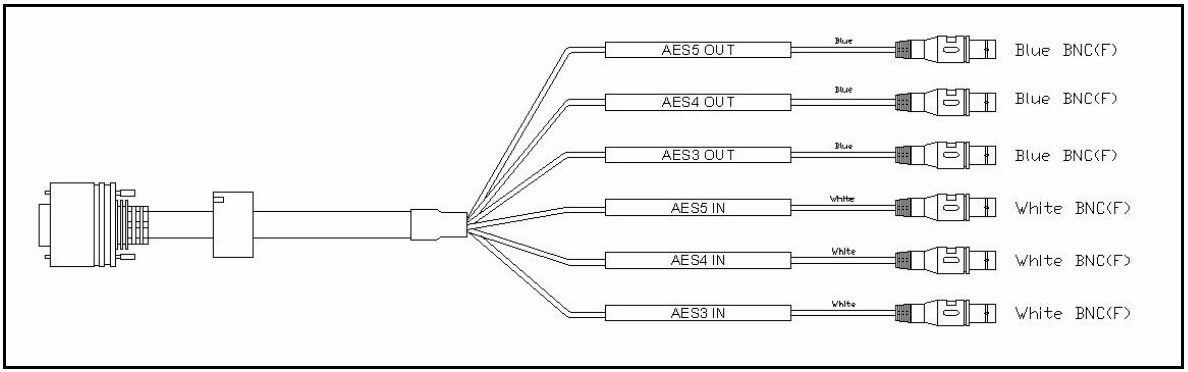


Figure A-6. X75OPTCAB-16-C Cable Connectors

Figure A-7 shows the pinouts for the X75OPTCAB-16-C DB-44M connector.

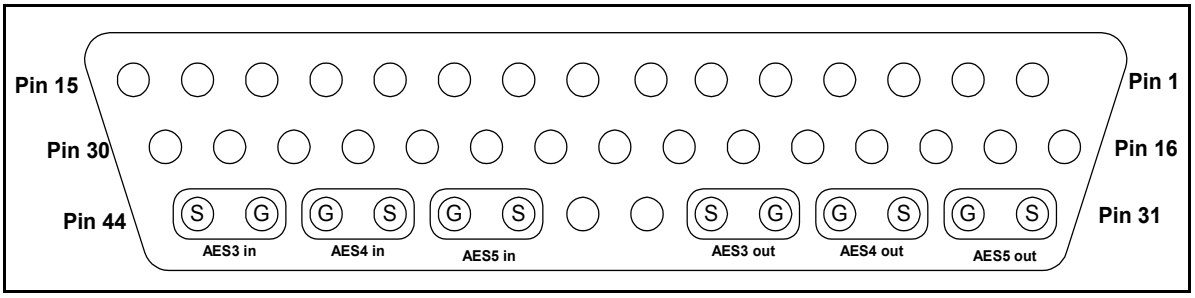


Figure A-7. X75OPTCAB-16-C Connector Pinout

Table A-3 describes each pin on the X75OPTCAB-16-C DB-44M connector and its connection type.

Table A-3. X75OPTCAB-16-C 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

Optional Audio BNC/XLR Cable (X75OPT-CAB-8-CX)

Figure A-8 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-8-CX combination BNC/XLR audio cable, which supports both unbalanced and balanced audio signals.

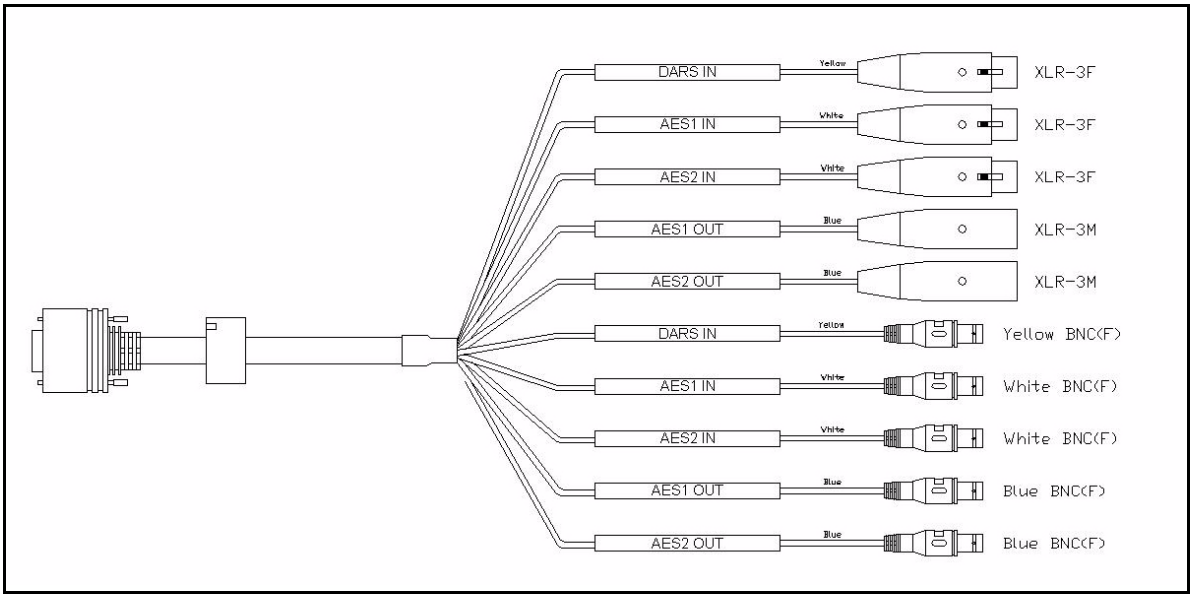


Figure A-8. X75OPTCAB-8-CX Cable Connectors

Figure A-9 shows the pinouts for the X75OPTCAB-8-CX DB-26M connector.

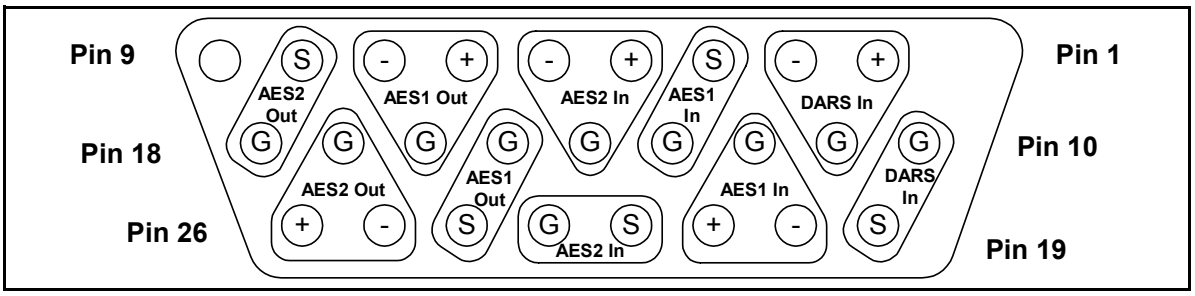


Figure A-9. X75OPTCAB-8-CX Connector Pinout

Table A-4 describes each pin on the X75OPTCAB-8-CX DB-26M connector and its connection type.

Table A-4. X75OPTCAB-8-CX 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-4. X75OPTCAB-8-CX 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 (+)

Optional Audio BNC/XLR Cable (X75OPTCAB-16-CX)

Figure A-10 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-16-CX combination BNC/XLR audio cable, which supports both unbalanced and balanced audio signals.

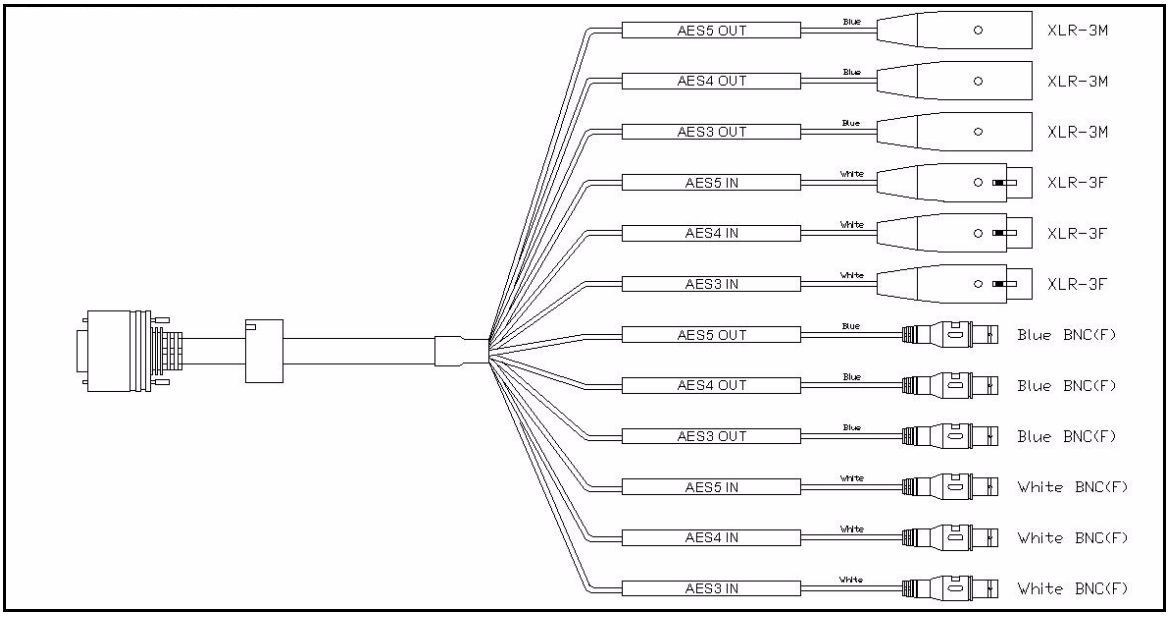


Figure A-10. X75OPTCAB-16-CX Cable Connectors

Figure A-11 shows the pinouts for the X75OPTCAB-16-CX DB-44M connector.

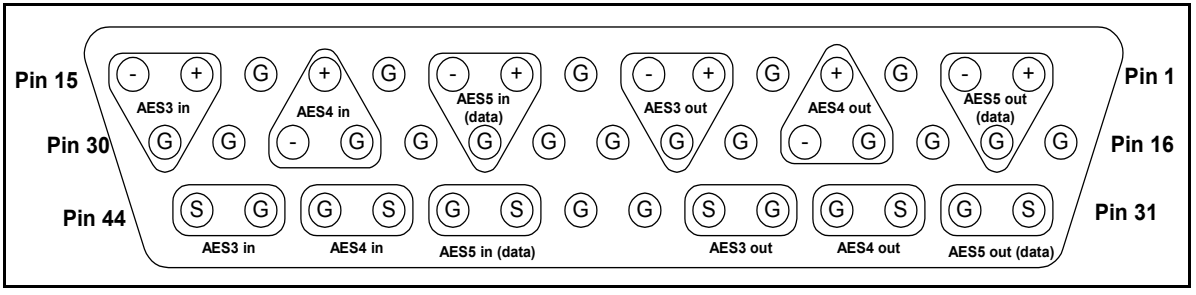


Figure A-11. X75OPTCAB-16-CX Connector Pinout

Table A-5 describes each pin on the X75OPTCAB-16-CX DB-44M connector and its connection type.

Table A-5. X75OPTCAB-16-CX 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-5. X75OPTCAB-16-CX 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-12 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-8-X XLR audio cable, which supports balanced audio signals.

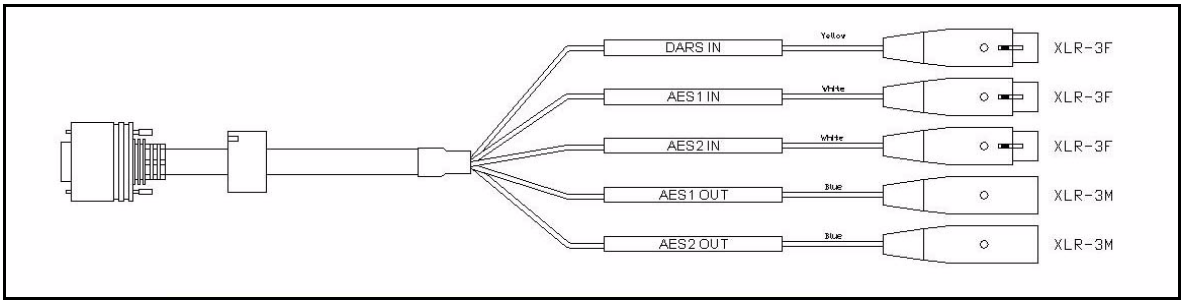


Figure A-12. X75OPTCAB-8-X Cable Connectors

Figure A-13 shows the pinouts for the X75OPTCAB-8-X DB-26M connector.

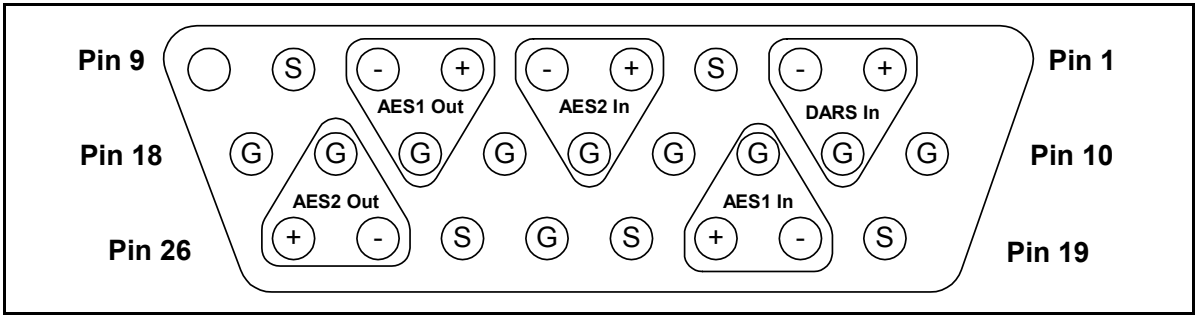


Figure A-13. X75OPTCAB-8-X Connector Pinout

Table A-6 describes each pin on the X75OPTCAB-8-X DB-26M connector and its connection type.

Table A-6. 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-6. 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-16-X)

Figure A-14 identifies the cable connectors available on the optional AES/EBU X75OPTCAB-16-X XLR audio cable, which supports balanced audio signals.

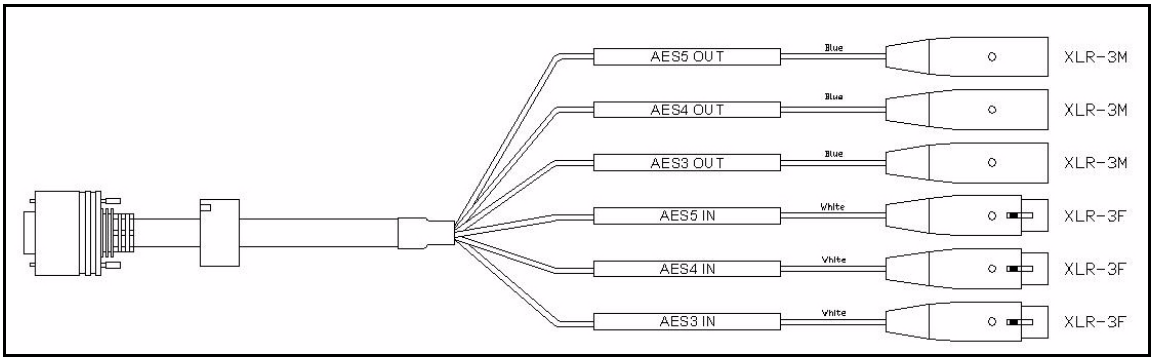


Figure A-14. X75OPTCAB-16-X Cable Connectors

Figure A-15 shows the pinouts for the X75OPTCAB-16-X DB-44M connector.

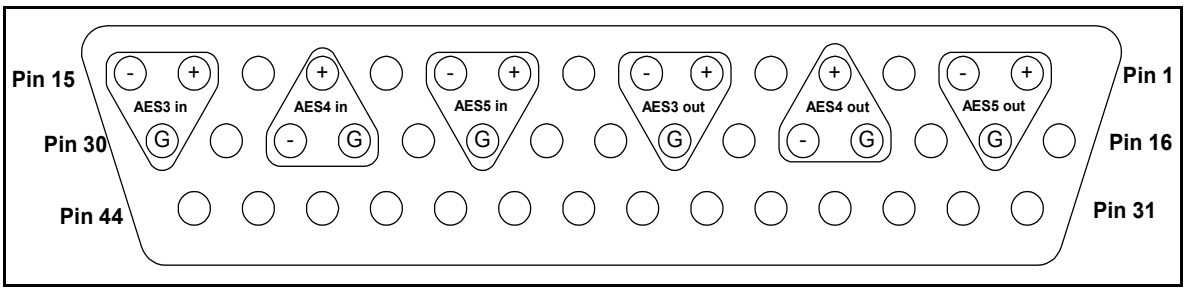


Figure A-15. X75OPTCAB-16-X Connector Pinout

Table A-7 describes each pin on the X75OPTCAB-16-X DB-44M connector and its connection type.

Table A-7. X75OPTCAB-16-X 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-7. X75OPTCAB-16-X 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 troubleshooting tips can be found in this appendix:

Recalling the Unique IP Address for a System

If you cannot remember the set IP address for a specific X75HD/SD unit and are having a problem communicating with it, you can temporarily set the unit into the factory default IP Address.

To set the default IP address, follow these steps:

1. Push the DEF IP DIP switch on the back of the unit to the down position.

   This resets the IP address of the unit to its default address.

   (Device IP: 192.168.100.250; Subnet mask: 255.255.255.0; Gateway: 192.168.100.250.)
2. Launch the X75 Web browser software, and navigate to the **System Config>Setup** menu.
3. Select the **Device IP** parameter to view the currently set IP address and use this IP address to access the unit again.
4. Return the DEF IP DIP switch to the up position, and then reboot the system.

Utilizing the Default IP Address

If you are unable to remember the set IP address for a specific X75HD/SD unit and are having a problem connecting to it, you can temporarily set the unit into the factory default IP Address. To do this, follow these steps:

1. Push the DEF IP DIP switch on the back on the unit to the down position.

   This resets the IP address of the unit to its default address.

   (Device IP: 192.168.100.250; Subnet mask: 255.255.255.0; Gateway: 192.168.100.250.)
2. Launch the X75 Web browser software, and navigate to the **System Config>Setup** menu.
3. Select the **Device IP** parameter to view the currently set IP address and use this IP address to access the unit again.
4. Return the DEF IP DIP switch to the up position, and then reboot the system.

Installing a Softkey Option

To enable purchased software options and the Dolby decoder module, you need the soft keycode. The code, consisting of fourteen hexadecimal digits, will be provided to you when you purchase the option. Once the option is installed into the unit, this unlock code must be entered through the control panels or with the web client software such as Internet Explorer.

The entry is made in **System Config>Setup** menu with the **License Key** parameter.

Appendix C

Servicing

Overview

This appendix includes the following information and procedures:

Safety Precautions

Only qualified personnel should perform service procedures. Contact your Leitch Customer Service representative for servicing information. Refer to the "Important Safety Instructions" on page xv 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.

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
- Use a safe work area
- Handle components carefully
- Transport and store sensitive components carefully

See "Injury Precautions" on page xvii for more details on preventing ESD.

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 228 for further explanation.

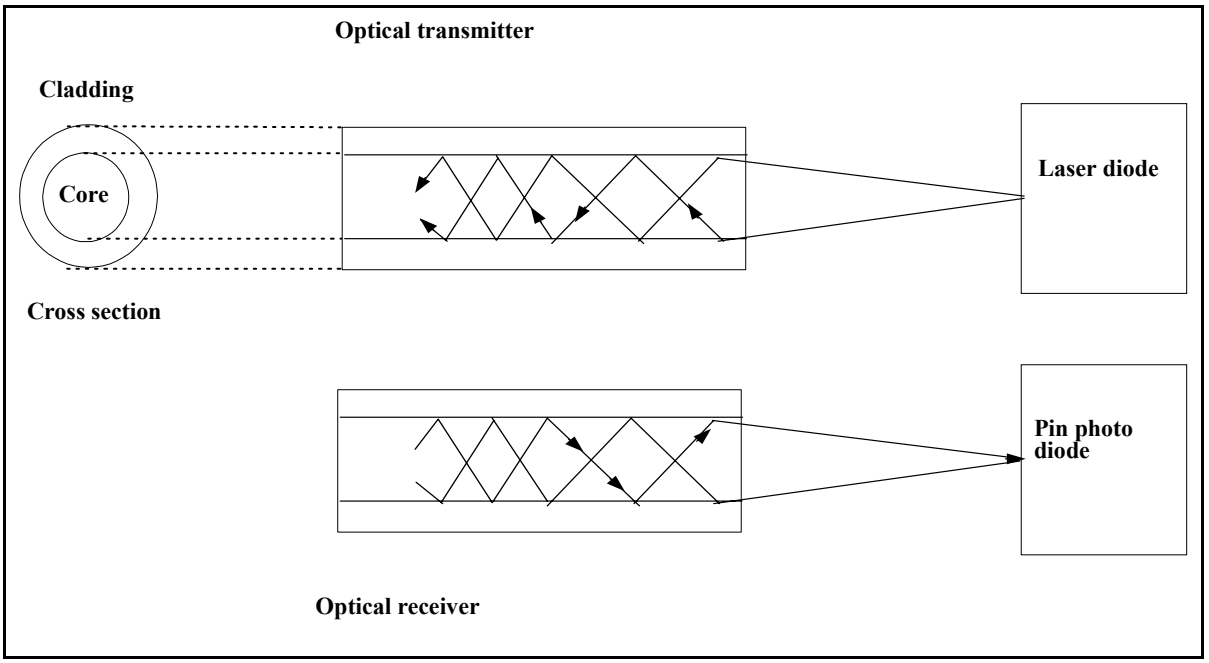


Figure C-1. Fiber Optics Transmitting and Receiving

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 role of the receiver circuitry is to provide standard ECL outputs based on the input voltage.

Handling and Connecting Fibers

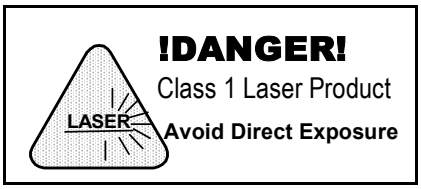
Class 1 Laser Products

Caution

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

The X75SPR-HD 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.



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” on page 230.)

  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 any lens-grade, lint-free tissue
- Denatured alcohol
- Canned dry air

Cleaning Technique

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 annatended before mating.

Note

Dry air can be used to remove dust from the connector housing or the transmitter or receiver ports.

Preparing the X75HD/X75SD for Servicing

Some versions of X75HD/X75SD models 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 "Preface" on page xi and in the section "Safety Precautions" on page 226.
2. Confirm that the X75HD/X75SD frame 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.

Caution

With the power cord disconnected, the unit is no longer grounded. Be aware of potential damage from static electricity.

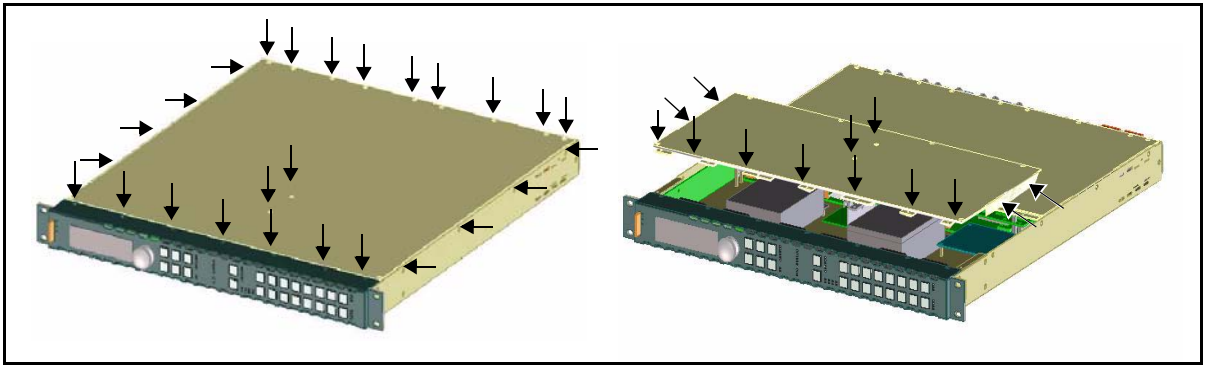


Figure C-2. Location of Chassis Cover Screws (Full Cover and Split Cover)

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.

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 frame, disconnect all cabling, and then remove the mounted frame 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 frame.
5. Replace the front panel with the new frame-mounted local control panel, and secure it to the frame using the screws removed in step 3. (See Figure C-3.)

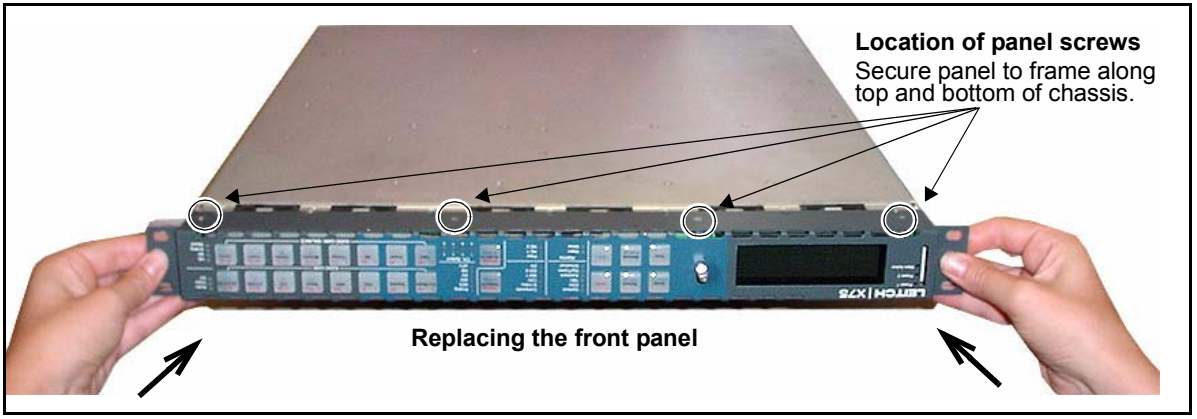


Figure C-3. Removing the Front Panel

6. Replace the mounting ear screws removed in step 2, and then return the frame to the rack.
7. Reconnect all cabling, and restore power to the frame.

Installing and Removing an Audio Synchronizer Module

Installing a New 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 X75HD/X75SD system, follow these installation steps:

1. Remove the chassis cover (see "Preparing the X75HD/X75SD for Servicing" on page 231).
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.

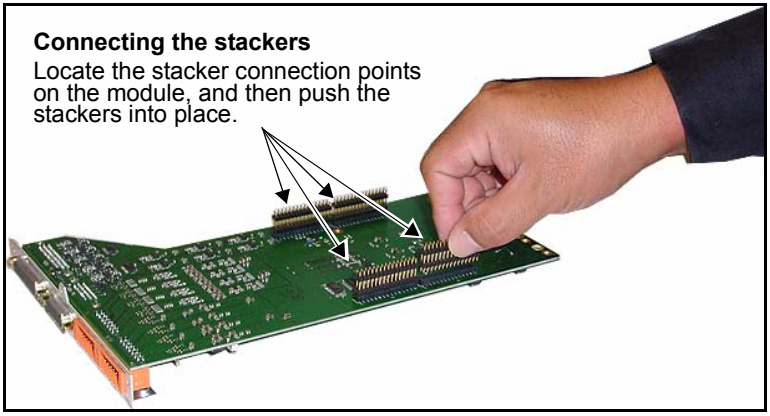


Figure C-4. Connecting Four Stackers to Module

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. The standoff in the back left corner is higher than the others in order to assist with alignment. See Figure C-5 and Figure C-6.

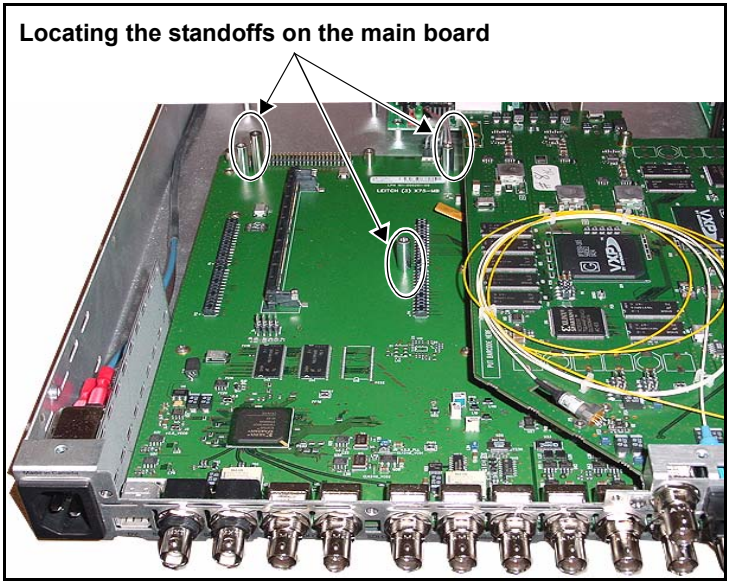


Figure C-5. Locating Main Board Standoffs

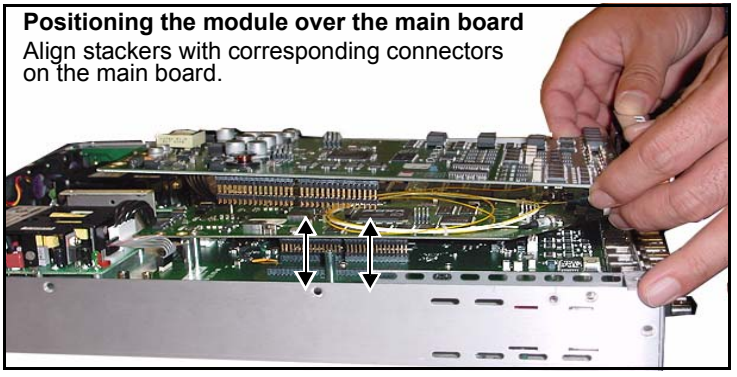


Figure C-6. Positioning Module over Standoffs

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.

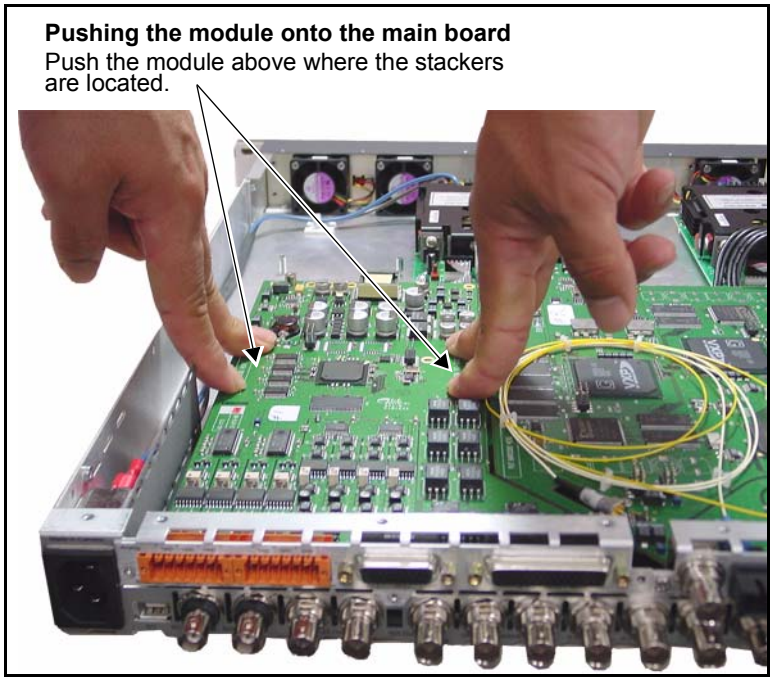


Figure C-7. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-8 on page 236 illustrates the location of the three module standoffs where you need to apply the screws.

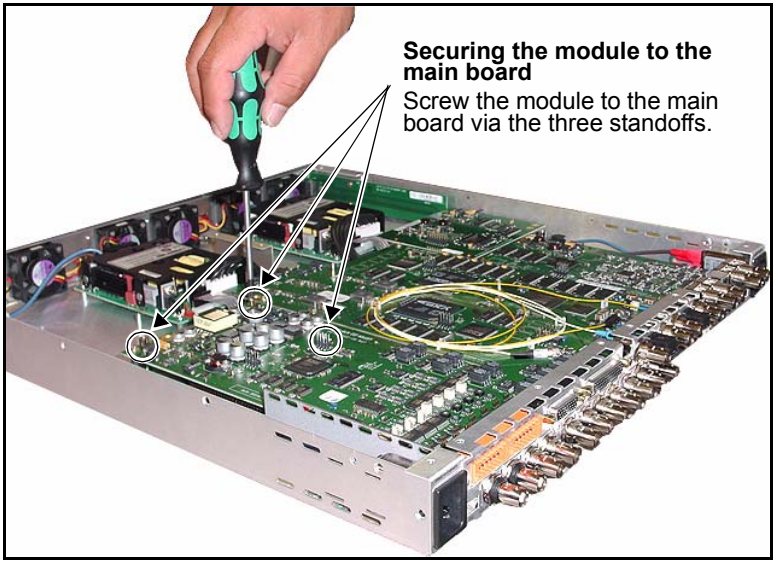


Figure C-8. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.

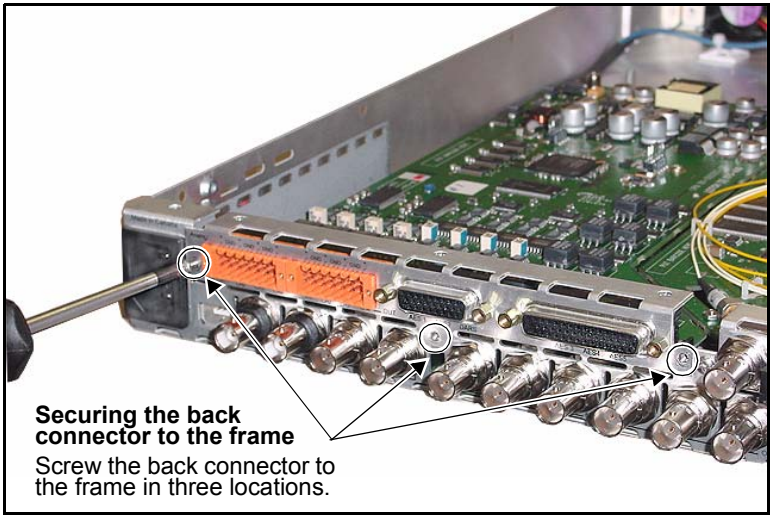


Figure C-9. Securing the Back Connector to the Frame

9. Replace the chassis cover using the original screws. See "Preparing the X75HD/X75SD for Servicing" on page 231 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 frame's chassis cover (see Figure C-2 on page 231), 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 236 to locate these screws.

3. Remove the three screws that secure the module to the main board.

   See Figure C-8 on page 236 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. 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.

Installing and Removing HDTV Modules

Installing a New 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 231).
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.

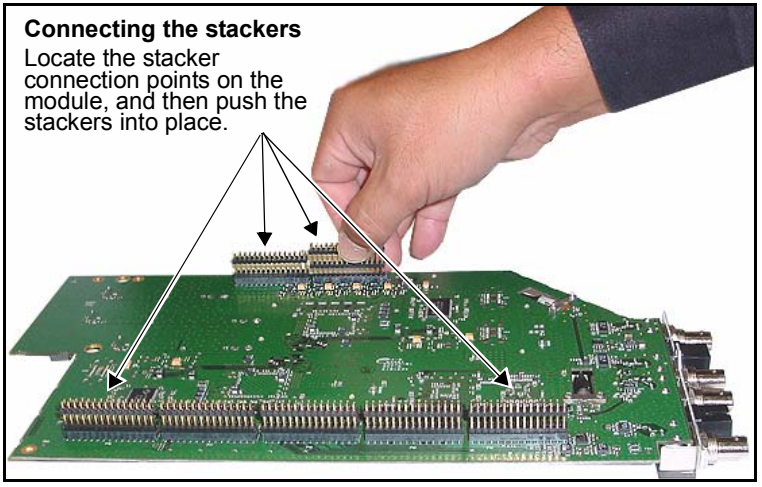


Figure C-10. Connecting Seven Stackers to Module

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.

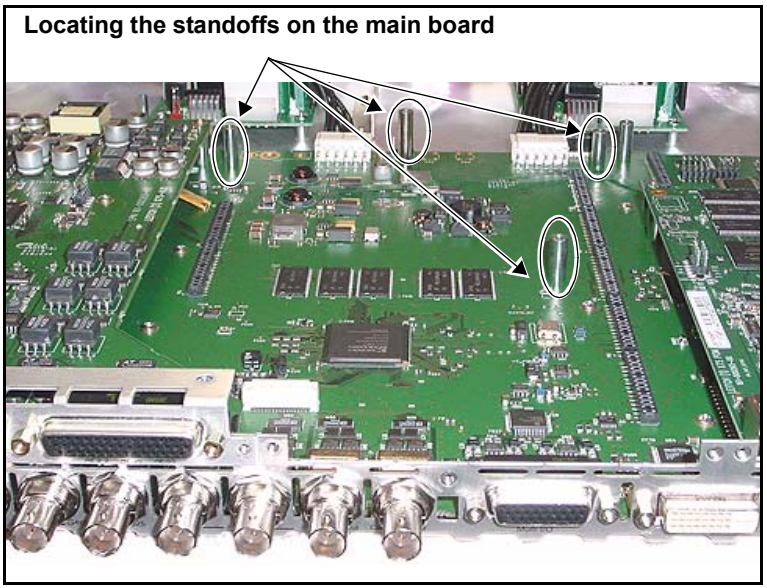


Figure C-11. Locating Main Board Standoffs

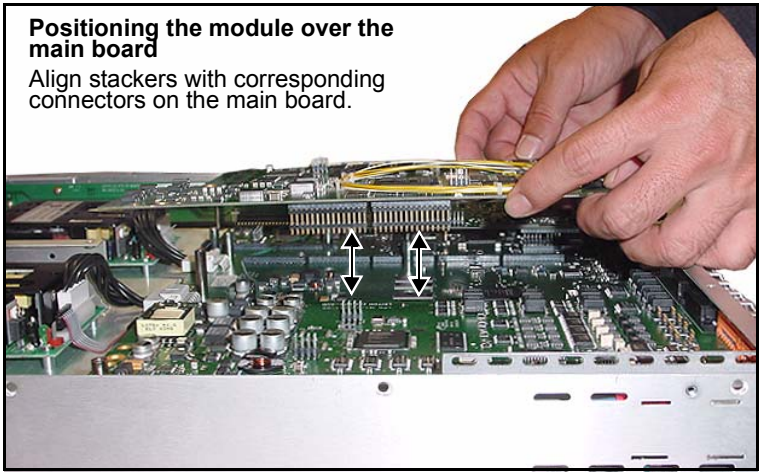


Figure C-12. Positioning Module over Standoffs

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.

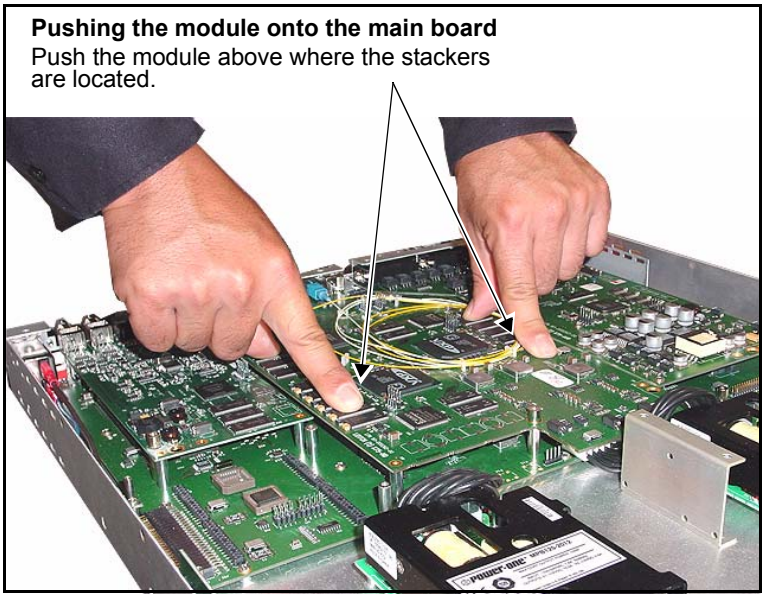


Figure C-13. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-14 on page 241 illustrates the location of the three module standoffs where you need to apply the screws.

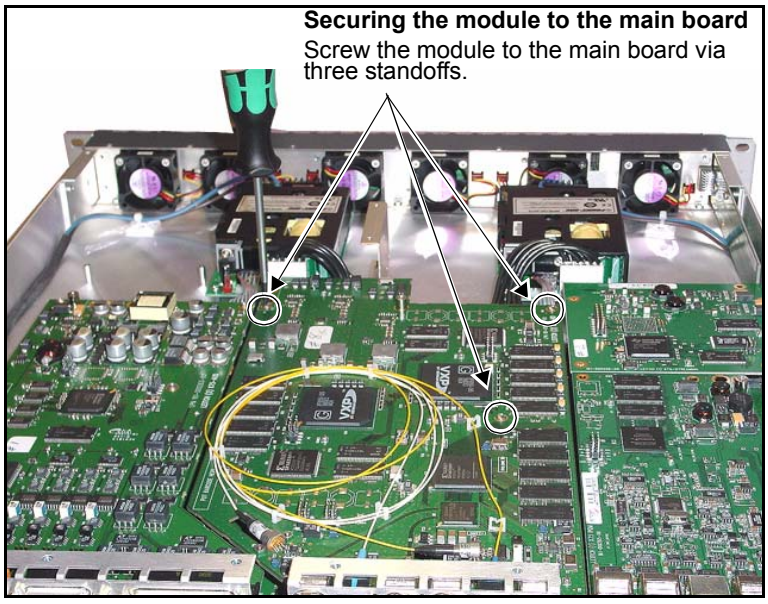


Figure C-14. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.

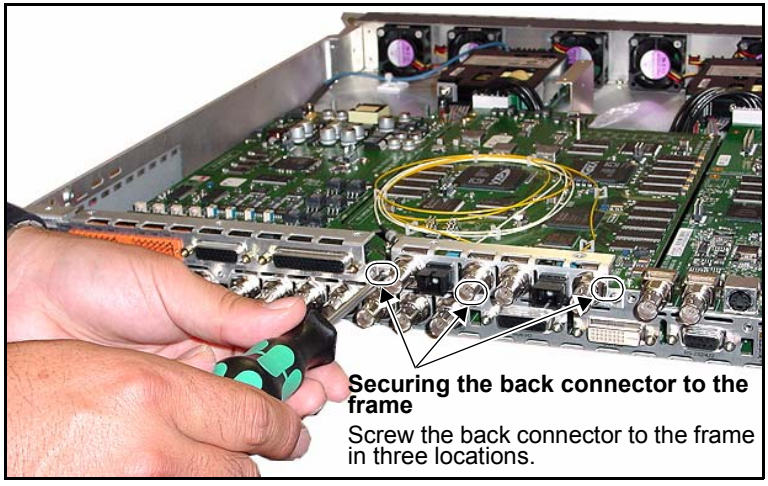


Figure C-15. Securing the Back Connector to the Frame

9. Replace the chassis cover using the original screws. See "Preparing the X75HD/X75SD for Servicing" on page 231 for more information on replacing the cover.

Removing an Existing Module

If you must remove an existing HDTV module from a frame, 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 231), 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 241 to locate these screws.

3. Remove the three screws that secure the module to the main board.

   See Figure C-14 on page 241 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. 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.

Installing and Removing X75OPT-A3D or X75OPT-PQM Modules

Installing a New Module

If you have ordered an optional X75OPT-A3D or X75OPT-PQM decoder module separately, follow these installation steps:

1. Remove the chassis cover (see "Preparing the X75HD/X75SD for Servicing" on page 231).
2. Remove the screws from the blank filler plate on the rear panel where the new decoder module is to be installed, and then remove the plate.

   Retain the screws for later use.
3. Remove the packaging from the decoder 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.

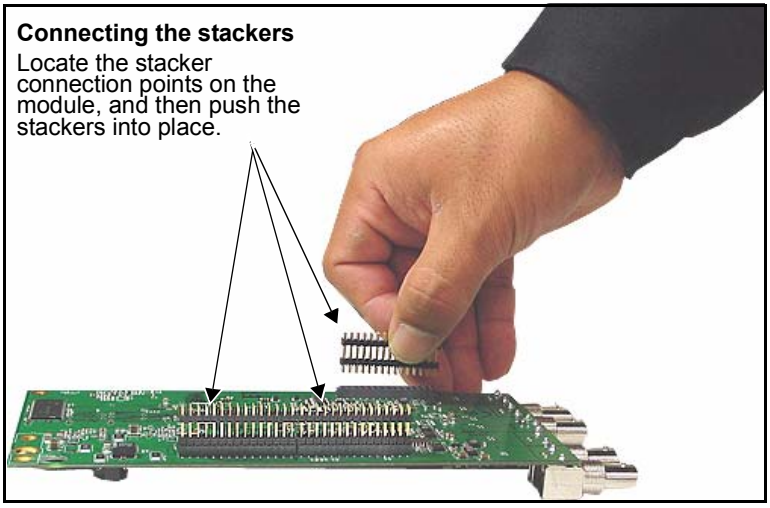


Figure C-16. Connecting Three Stackers to Module

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.

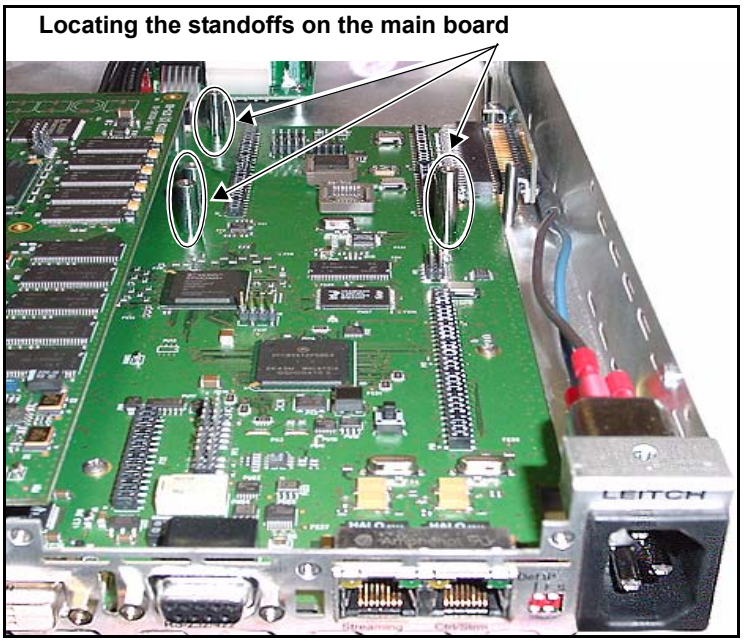


Figure C-17. Locating Main Board Standoffs

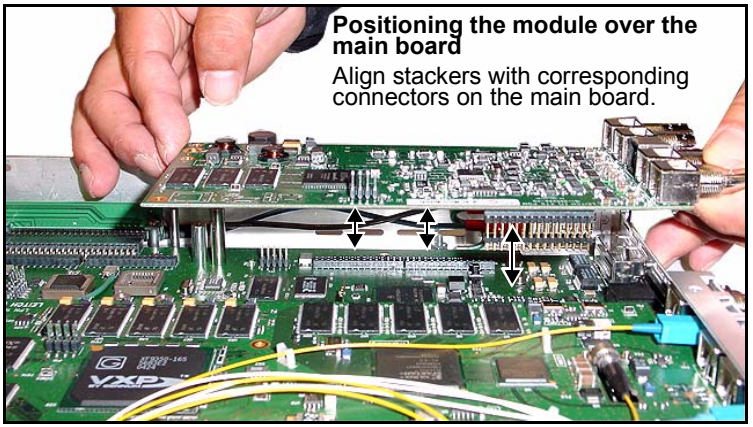


Figure C-18. Positioning Module over Standoffs

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.

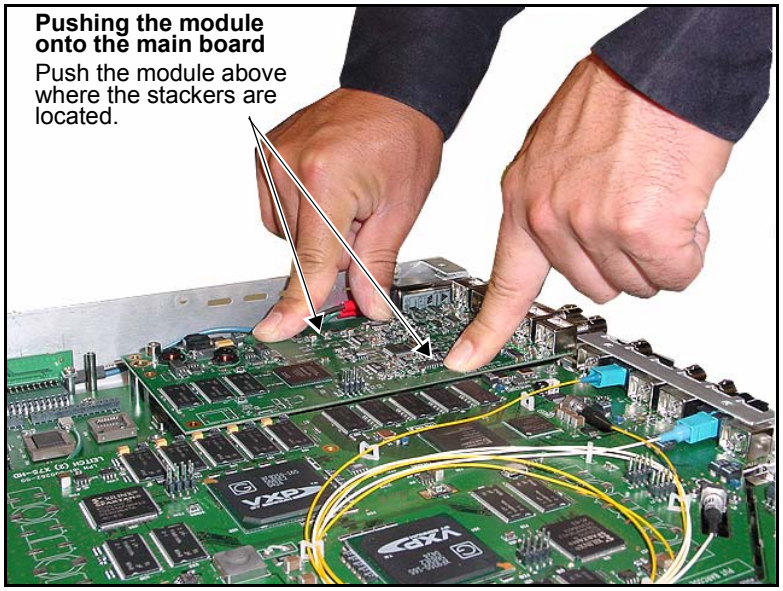


Figure C-19. Pushing the Module on to the Main Board

7. Secure the new module to the main board using the provided screws.

   Figure C-20 on page 246 illustrates the location of the three module standoffs where you need to apply the screws.

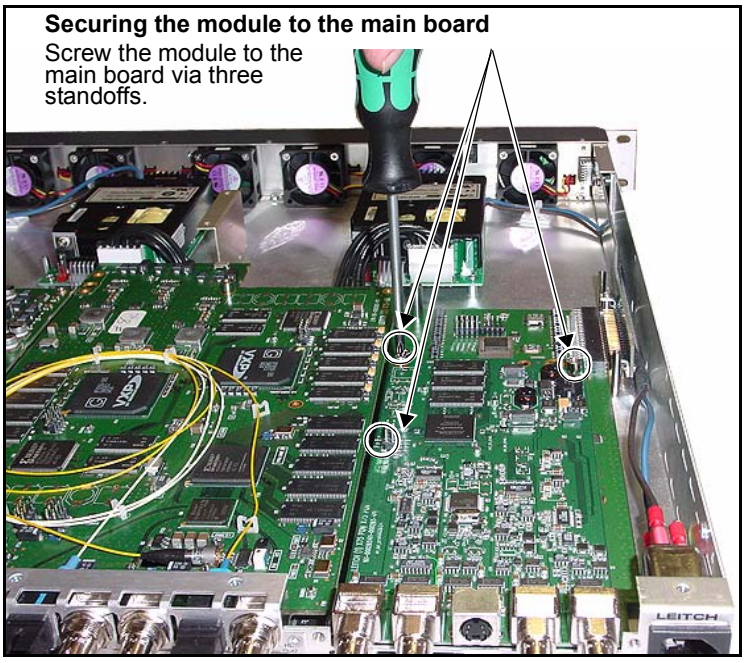


Figure C-20. Securing the Module to the Main Board

8. Screw the back panel into place using the screws removed in step 2.
9. Replace the chassis cover using the original screws. See "Preparing the X75HD/X75SD for Servicing" on page 231 for more information on replacing the cover.

Removing an Existing Module

If you must remove an existing decoder 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 231), 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 246 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. 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.

Installing Noise Reducer and Audio Limiter Software Options

Installing a Software Option

If you have ordered the or X75OPT-ASL, X75OPT-DOLBY-1, X75OPT-NR, or X75OPT-SNMP 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-2 describes the various options of the audio limiter.

Table C-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	• 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 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-21 shows the transfer function of the Audio Limiter:

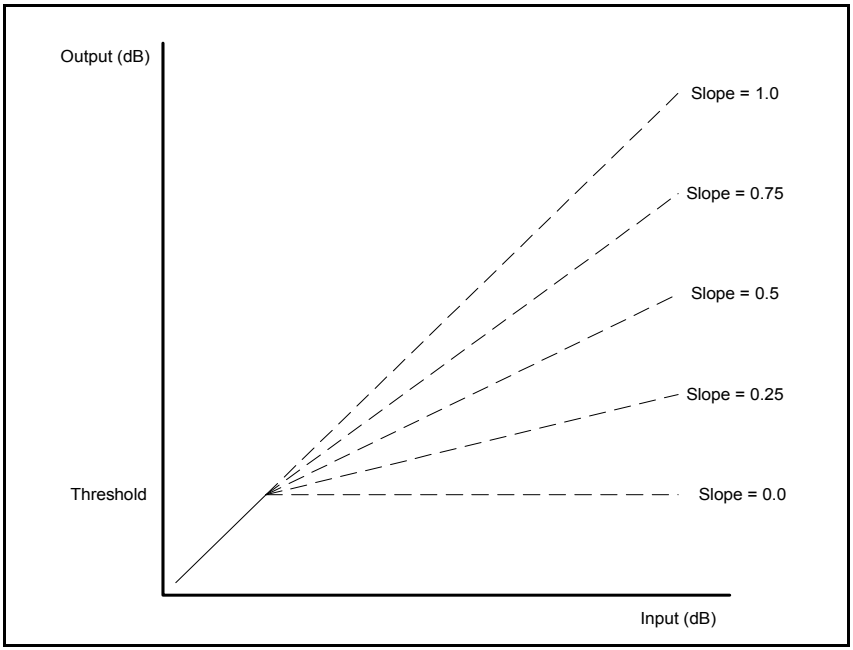


Figure C-21. Audio Limiter Transfer Function

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 231), 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 236 to locate these screws.

3. Remove the three screws that secure the audio submodule to the main board.

   See Figure C-8 on page 236 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. Inspect the connectors on the module and main board to ensure that all pins are straight.

5. Install the Dolby decoder module in the socket. (See Figure C-22.)

6. Press down the edges slowly until you hear the metal clips click.

7. Reinstall the audio module gently and install all screws.

Figure C-22. 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 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 256.

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 231 for more information.

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-23.

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.

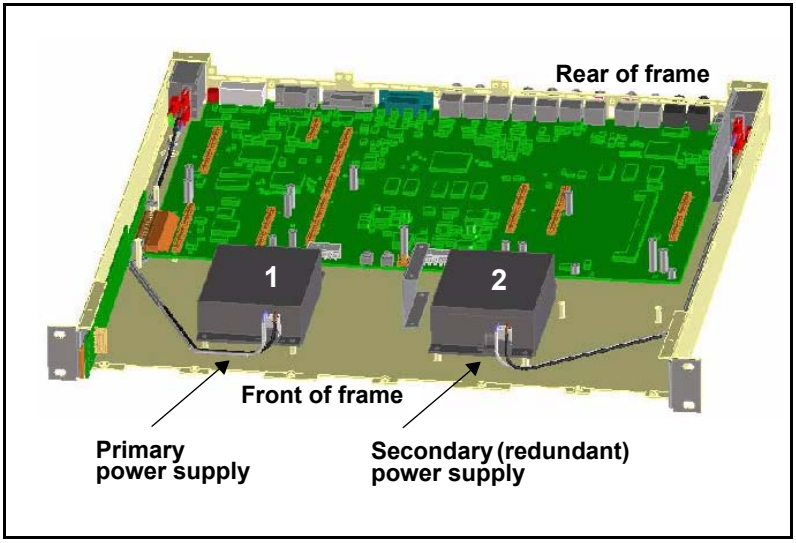


Figure C-23. Location of Connected Power Supply

3. Remove the main DC power cable and secondary DC ribbon cable that connect the power supply. (See Figure C-24.)

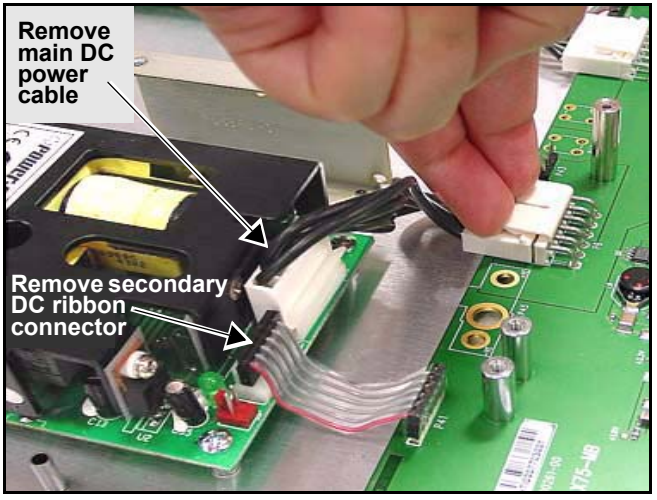


Figure C-24. Removing the DC and Ribbon Cables

4. Disconnect the polarized AC cables from the power supply. (See Figure C-25.)

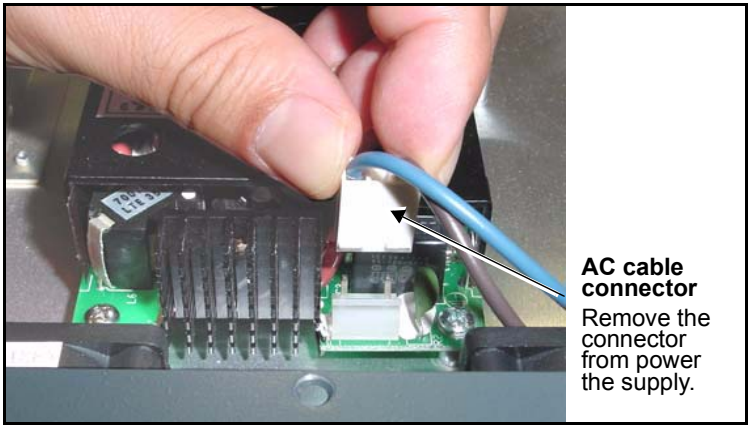


Figure C-25. Removing AC Cable from Power Supply

5. Unscrew the power supply from the chassis floor.

   Figure C-26 shows the location of the four screws you need to remove. Keep these screws for later reuse.

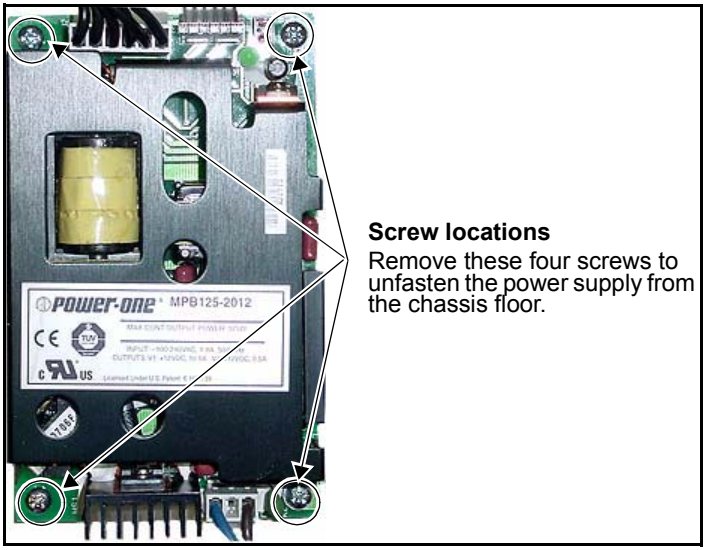


Figure C-26. Removing the Power Supply

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 231).

   A redundant power supply is installed on the right side of the frame (labelled 2, below), as seen from the front. (See Figure C-27.)

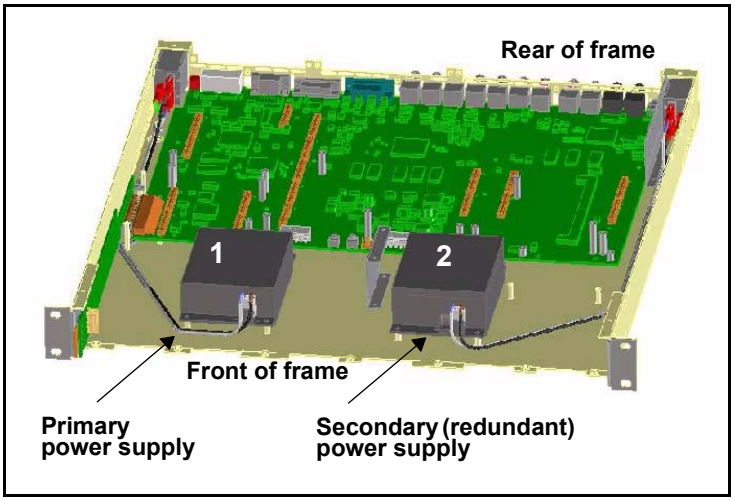


Figure C-27. Where to Install a Redundant Power Supply

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-26 on page 255.)

   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-28.)

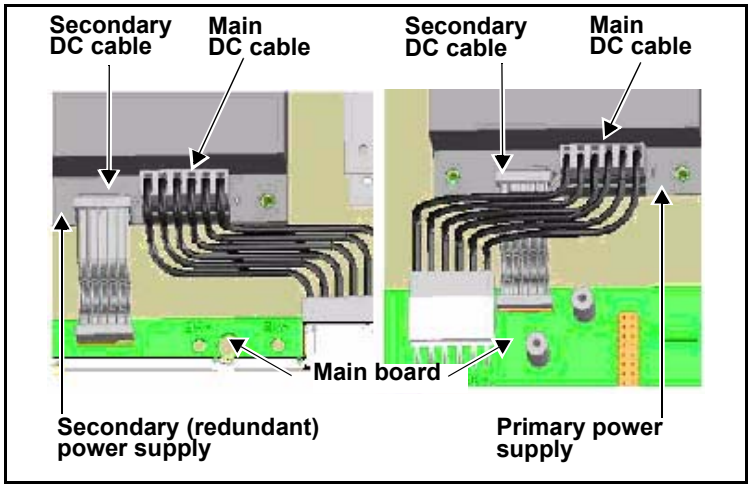


Figure C-28. Connecting DC and Ribbon Cables

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-29 on page 258).

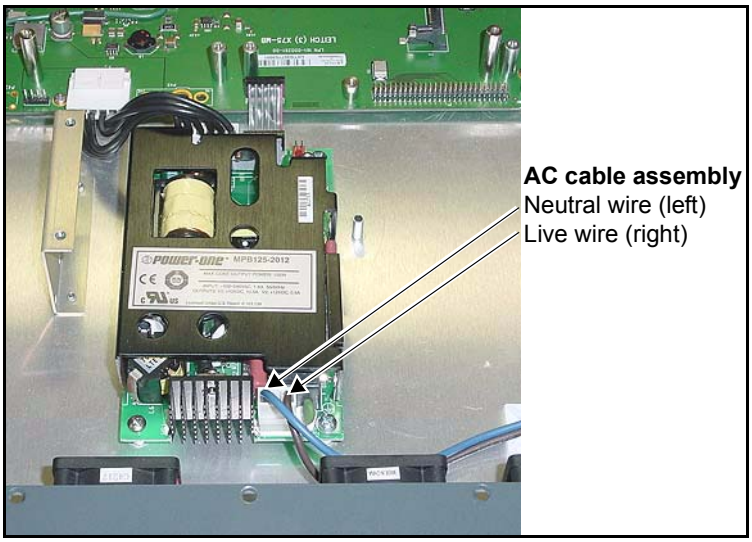


Figure C-29. Connecting AC Cables to Power Supply

5. Secure the AC cabling to the chassis. (See Figure C-30 on page 259.)

   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.

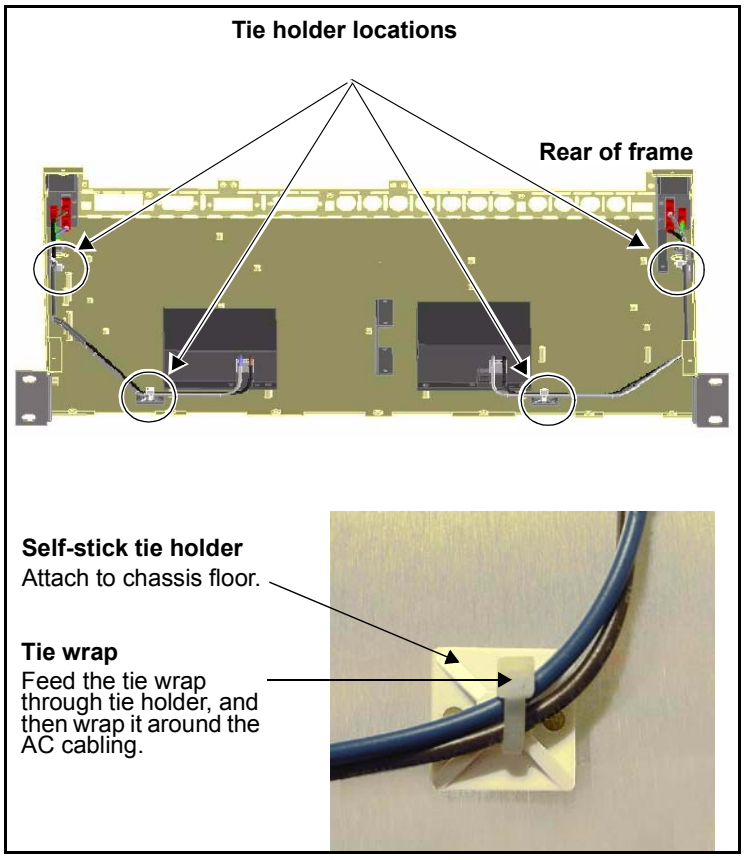


Figure C-30. Attaching Tie Wraps to AC Cabling

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-31 on page 260.)

   Ensure the following during installation:

   - The Ground plug on the inlet faces must face the outside chassis wall.
   - The AC inlet must snap securely into place.

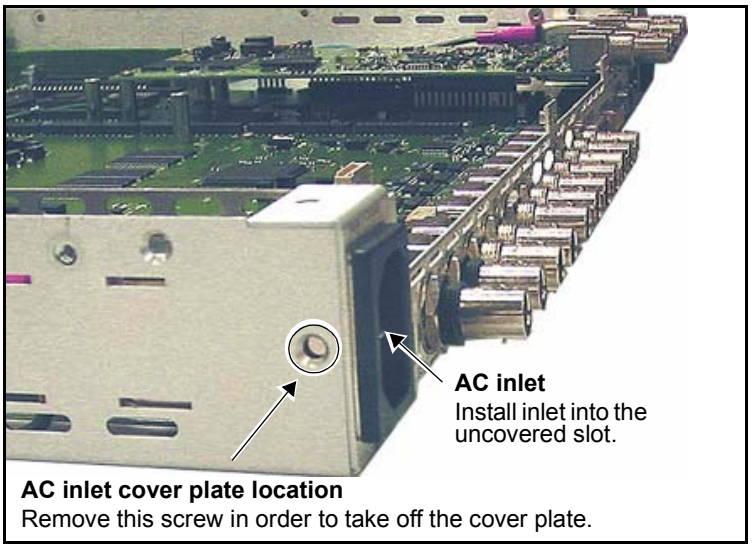


Figure C-31. Removing Cover Plate and Installing AC Inlet

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-32.)

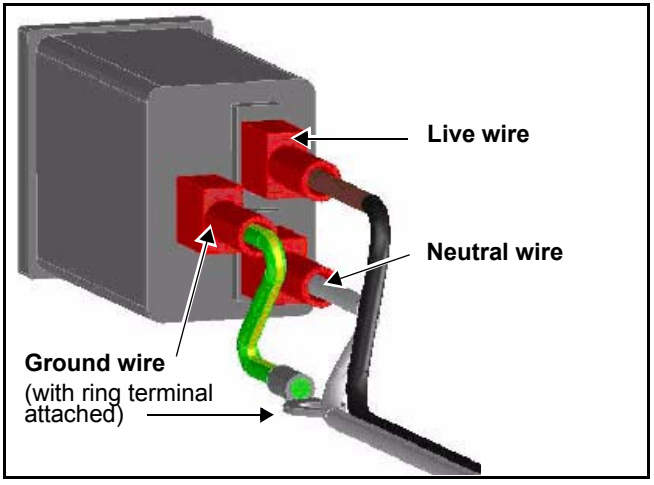
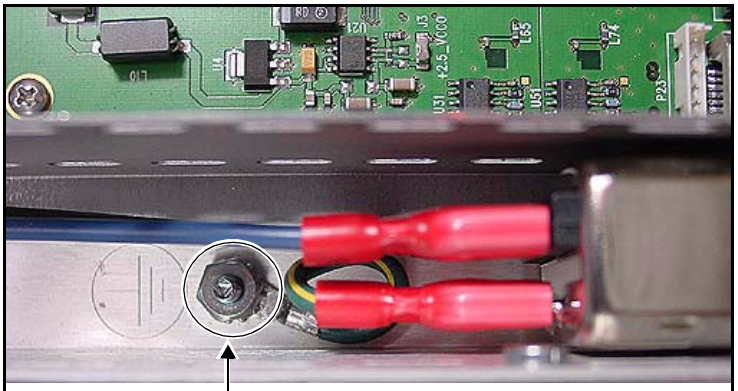


Figure C-32. Connecting AC Cables to Inlet

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.



Grounding screw location
Using the provided ring terminal and nut, attach the end of the grounding wire to the chassis floor to ground the unit.

Figure C-33. 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 231 for more information on replacing the cover.

Installing Fans

To replace a fan or 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-34.)

   Retain the screws.

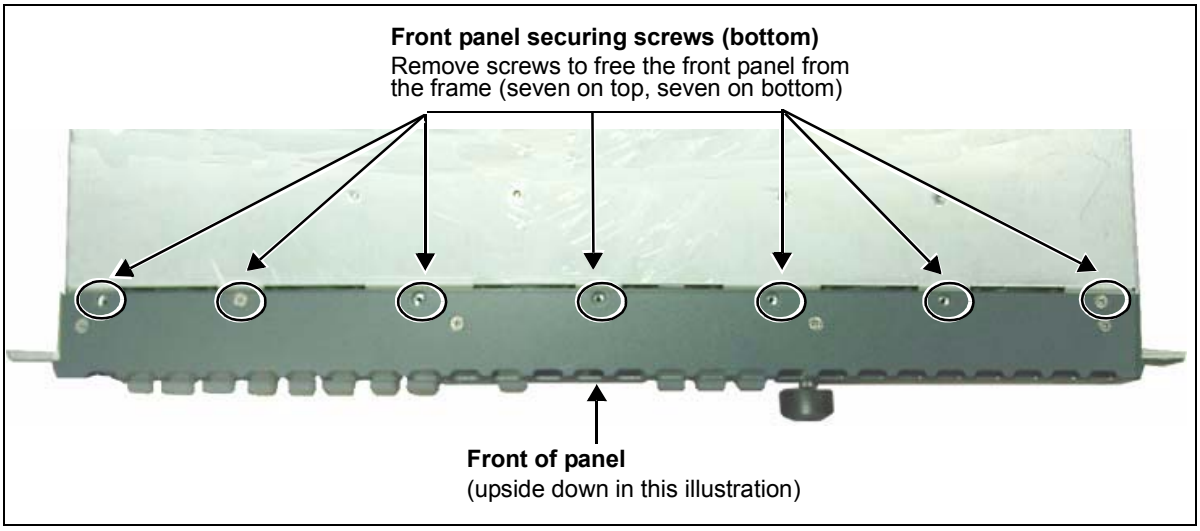


Figure C-34. Freeing the Front Panel from the Frame

3. Pull the front panel away from the frame. (See Figure C-35.)

   Although a frame-mounted local control panel is shown below, this procedure also applies to blank front panels.

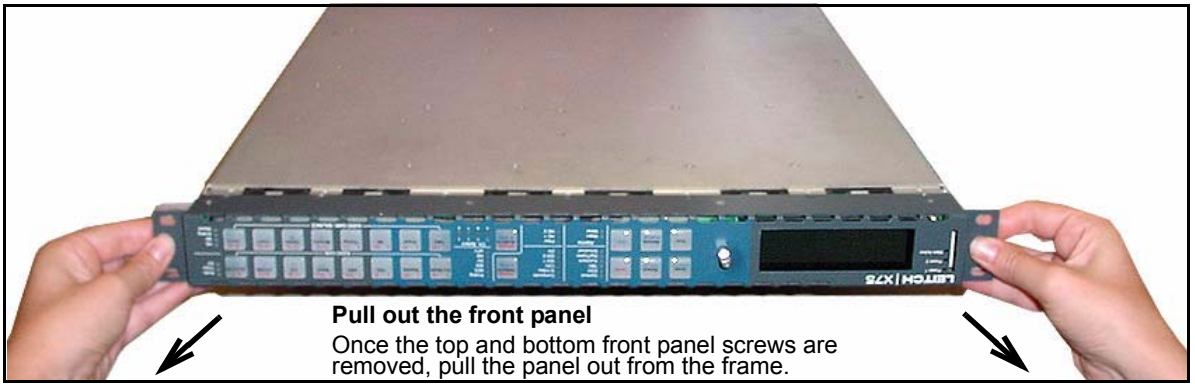


Figure C-35. Removing the Front Panel

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-36.)

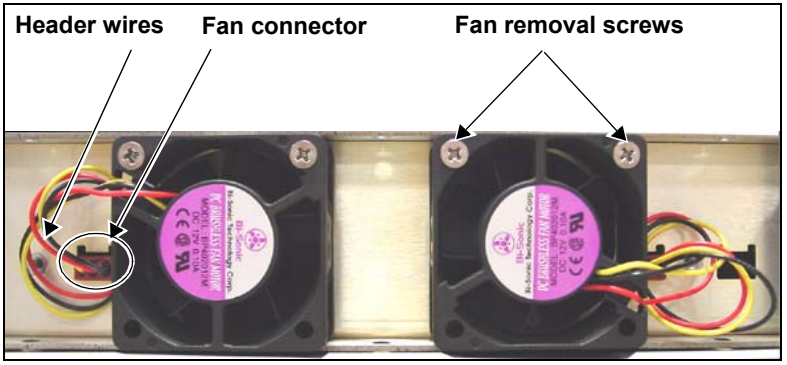


Figure C-36. Removing Header Wires from Fan Assembly Connector

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-37.)

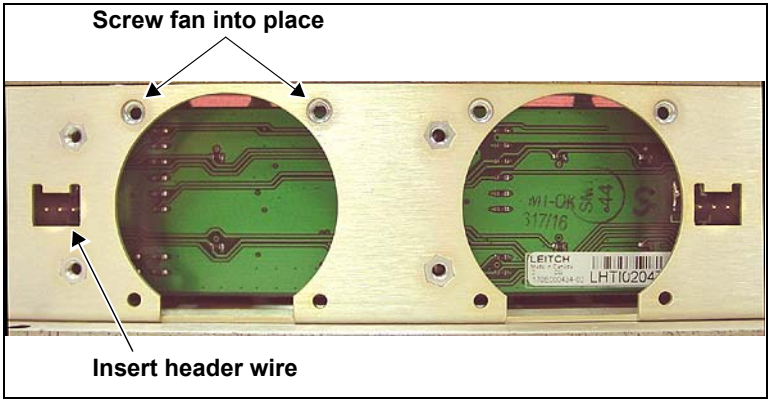


Figure C-37. Replacing a Fan within the Assembly

7. Connect the new fan's header wires to the corresponding fan assembly connector.
8. Replace the fan assembly inside the front cover, and then secure the assembly into place using the original screws from step 3.
9. Secure the front panel to the X75HD/X75SD frame using the original screws from step 2.
10. Close the front panel, re-establish any connections, and then reapply power to the frame.

Index

Symbols

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

R

S

T

U

V

W

X

Trademarks and Copyright

Warranty

Leitch Incorporated ("Leitch") warrants to each original end-user purchaser or licensee (each, a "Customer") of hardware or software products manufactured by Leitch (each, a "Product"), or of non-warranty repair or other services provided by Leitch ("Services"), that each such Product and all such Services will be free from defects in materials and workmanship that adversely affect the Product's performance or the Services' intended purpose for a period (the "Warranty Period") of:

- One year for server hardware Products;
- Two years for non-server, and Desktop hardware Products;
- Ninety days for parts, assemblies and supplies to support hardware Products previously sold to Customers;
- Ninety days for media of software licensed separately from Leitch hardware Products, and encoding created by Leitch as physically affixed on or embedded in such media;
- The same period as the hardware Product warranty for media of software licensed as an integral part of any Leitch hardware Product, and encoding created by Leitch as physically affixed on or embedded in such media
- Ninety days for Services.

Please refer to the current "Leitch Limited Warranty Policy" for a complete description of the warranty provided, including important exclusions and limitations as well as procedures for obtaining warranty service.

[WORLDWIDE SUPPORT]

Leitch Technology is a 32-year global leader in the design and distribution of high-performance video systems for the professional television industry. Leitch offers the most extensible products and interoperable systems, enabling operations of any size to achieve a truly Integrated Content Environment. Leitch is the most trusted name for increasing performance and productivity through solutions that streamline workflow of content production, processing, transmission and management. With a sole focus on and commitment to the television industry, Leitch provides unparalleled customer support.

Leitch Americas

Support Headquarters

Phone: +1 (416) 642 3611
Toll Free: +1 (888) LEITCH6 (534 8246)
Fax: +1 (416) 445 9020
Email: service@leitch.com
Post Products: service.post@leitch.com

Server & AgileVision Products

Phone: +1 (818) 843 7004
Toll Free: +1 (888) 843 7004
Fax: +1 (818) 450 2199
Server Products: service.servers@leitch.com
AgileVision Products:service.agilevision@leitch.com

Leitch Europe

Europe & Africa - All Product Support

Phone: +44 1344 446099
Fax: +44 1344 446090
Email: service.europe@leitch.com
Post Products: service.post.eu@leitch.com

Leitch Asia

Asia/Pacific Rim - All Product Support

Phone: +852 2776 0628
Fax: +852 2776 0227
Email: service.asia@leitch.com
Post Products: service.post.asia@leitch.com

Please visit www.leitch.com/support/service for more information.