X1200 Series Routers
X0601H-444 Routers

Instruction Manual

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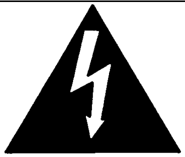
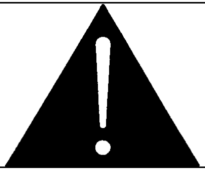
	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "Dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature ac-companying the product.

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REVISION HISTORY

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1.6.4	Added *relay bypass* to Program GPI menu	July 2010

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CHAPTER 1: OVERVIEW
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1. OVERVIEW

The X1200 series twelve input routing switchers provide a convenient, low cost way to route Standard and High definition serial digital signals. The X1200S routers are used for 270, 360 & 540Mb/s standard definition serial digital signals, while the X1200H routers are used for 1.5Gb/s HDTV serial digital signals. The X0601H-444 router is based on similar hardware to the X1200H routers and is used for dual link 1.5 Gb/s 4:4:4 HDTV serial digital signals.

The router is available in video only or video with AES configurations. The X1202S-AES and X1202H-AES units come with 2 levels of AES audio routing for each of the two video busses. The X1202S-AES4 and X1202H-AES4 units come with 4 levels of AES audio routing for each of the two video busses. The X1201 routers have only one video bus and similar audio configurations. The X0601H-444 routers have one dual link video bus only. The AES output busses can be used in an audio follow video mode, or can be broken away from their associated video buss. Table 1-1 shows the model numbers of the basic routers and the capabilities of each.

Model	Video		Audio	
			Configuration	Breakout Panels
X1201S	SDI	12 x 1	None	0
X1201S-AES	SDI	12 x 1	2 12 x 1	1
X1201S-AES4	SDI	12 x 1	4 12 x 1	2
X1202S	SDI	12 x 2	None	0
X1202S-AES	SDI	12 x 2	2 12 x 2	1
X1202S-AES4	SDI	12 x 2	4 12 x 2	2
X1201H	HD	12 x 1	None	0
X1201H-AES	HD	12 x 1	2 12 x 2	1
X1201H-AES4	HD	12 x 1	4 12 x 2	2
X1202H	HD	12 x 2	None	0
X1202H-AES	HD	12 x 2	2 12 x 2	1**
X1202H-AES4	HD	12 x 2	4 12 x 2	2
X0601H-444	4:4:4 HD	6 x 1	None	0
X0601H-444-AES4	4:4:4 HD	6 x 1	4 6 x 1	1

Table 1-1: Basic Router Models and Features

**Some early versions of the X1202H-AES models were shipped with two audio breakout panels. On these units, the AES audio router sections can also be configured as four 12 x 1 AES audio busses. (The assignment of which mode the AES section of the router operates and which AES busses are associated to the Video busses, is programmable from the *Setup* menu.)

The router electronics are housed in a 1RU rack mount frame with breakout panels for the audio connections. The standard router has built-in front panel controls, but can also be purchased with a rack mount remote control panel that replaces the built-in control panel (RCP version). An additional remote control panel (X1202S-REMOTE or X1202H-REMOTE) can also be ordered for any version. All units can also be controlled by contact closures on the GPI control port or through the RS-232 serial remote control port using industry standard switcher protocols.

The X1200 series SoftSwitch™ versions (referred to as SS versions throughout this manual) of the router have the following additional features. The Video 1 output has adjustable vertical timing with respect to the genlock input, and line synchronizers on the video inputs can accommodate differences in timing up to approximately +/- one half line for the V1 output. All the AES outputs will have a continuous AES carrier locked to either the video genlock or DARS reference (when the DARS reference is used, Z bit alignment of the AES outputs is also guaranteed). The audio outputs that follow the Video 1 buss use Evertz patent pending SoftSwitch™ technology to eliminate audible pops when switches are performed. For the SoftSwitch™ technology to function correctly, the audio sources must be synchronous with the chosen *Audio Reference* for the router (see section 3.6.4).

The X0601H-444 series SoftSwitch™ versions (referred to as SS versions throughout this manual) of the router have the following additional features. All the AES outputs will have a continuous AES carrier locked to either the video genlock or DARS reference (when the DARS reference is used, Z bit alignment of the AES outputs is also guaranteed). The audio outputs use Evertz patent pending SoftSwitch™ technology to eliminate audible pops when switches are performed. For the SoftSwitch™ technology to function correctly, the audio sources must be synchronous with the chosen *Audio Reference* for the router (see section 3.6.4).

Table 1-2 shows the model numbers of the SoftSwitch™ equipped routers and the capabilities of each.

Model	Video		Audio	
			Configuration	Breakout Panels
X1201S+SS	SDI	12 x 1	None	0
X1201S-AES+SS	SDI	12 x 1	2 12 x 1	1
X1201S-AES4+SS	SDI	12 x 1	4 12 x 1	2
X1202S+SS	SDI	12 x 2	None	0
X1202S-AES+SS	SDI	12 x 2	2 12 x 2	1
X1202S-AES4+SS	SDI	12 x 2	4 12 x 2	2
X1201H+HSS	HD	12 x 1	None	0
X1201H-AES+HSS	HD	12 x 1	2 12 x 2	1
X1201H-AES4+HSS	HD	12 x 1	4 12 x 2	2
X1202H+HSS	HD	12 x 2	None	0
X1202H-AES+HSS	HD	12 x 2	2 12 x 2	1**
X1202H-AES4+HSS	HD	12 x 2	4 12 x 2	2
X0601H-444-AES4	HD	6 x 1	4 6 x 1	1

Table 1-2: SoftSwitch™ Router Models

The Embedded SoftSwitch™ (referred to as ESS versions throughout this manual) versions of the router have all the features of the SS versions as well as the following additional features. The embedded audio on the Video 1 buss uses Evertz patent pending SoftSwitch™ technology to eliminate audible pops when switches are performed. For the Embedded SoftSwitch™ technology to function correctly, the AES sources must be synchronous with the *Video reference* and the A*udio Reference* for the router must be set to *video* (see section 3.6.4). If Embedded SoftSwitch™ functionality is not required (e.g. Dolby E in the embedded stream) then the DARS reference can be used with the AES portions of the router. Table 1-3 shows the model numbers of the Embedded SoftSwitch™ equipped routers and the capabilities of each. There is no Embedded SoftSwitch™ version of the X0601H-444 at the time of writing.

Model	**Video**		**Audio**	
			Configuration	**Breakout Panels**
X1201S+ES	SDI	12 x 1	None	0
X1201S-AES+ES	SDI	12 x 1	2 12 x 1	1
X1201S-AES4+ES	SDI	12 x 1	4 12 x 1	2
X1202S+ES	SDI	12 x 2	None	0
X1202S-AES+ES	SDI	12 x 2	2 12 x 2	1
X1202S-AES4+ES	SDI	12 x 2	4 12 x 2	2
X1201H+HES	HD	12 x 1	None	0
X1201H-AES+HES	HD	12 x 1	2 12 x 2	1
X1201H-AES4+HES	HD	12 x 1	4 12 x 2	2
X1202H+HES	HD	12 x 2	None	0
X1202H-AES+HES	HD	12 x 2	2 12 x 2	1**
X1202H-AES4+HES	HD	12 x 2	4 12 x 2	2

Table 1-3: Embedded SoftSwitch™ Router Models

Features:

- Standard definition units support SMPTE 259M (270Mb/s,360Mb/s,540Mb/s) video signals
- High definition units support SMPTE 292M (1.5 Gb/s) video signals
- High definition units can be operated in a non-reclock mode to pass SMPTE 259M and SMPTE 310M video signals
- Units can be genlocked to an external source so that a “clean switch” can be achieved
- Auto-timing of V1 buss inputs to perform a clean video switch when SoftSwitch™ or Embedded SoftSwitch™ option is installed
- Optional SoftSwitch™ technology eliminates hot-switch audio pops on AES outputs following V1 buss
- Optional Embedded SoftSwitch™ technology eliminates hot-switch audio pops on embedded audio on V1 buss
- With embedded SoftSwitch™ option, SoftSwitch™ is performed on all 4 audio groups
- Switch point is fully controllable from the front panel
- Video input presence detection displayable on the front panel
- Front panel or remote control panel versions available. Second control panel can be ordered for either version
- Parallel GPI and RS-232 serial control
- Programmable source input names available on the front panel
- Optional video and audio input relay bypass for power failure bypass protection
- Optional dual power supplies
- Field upgradeable firmware as new features become available

X0601H-444 Additional Features

- 4:4:4 High definition units support SMPTE 372M Dual Link (1.5 Gb/s) video signals
- Clean video switch is not available when SoftSwitch™ option is installed

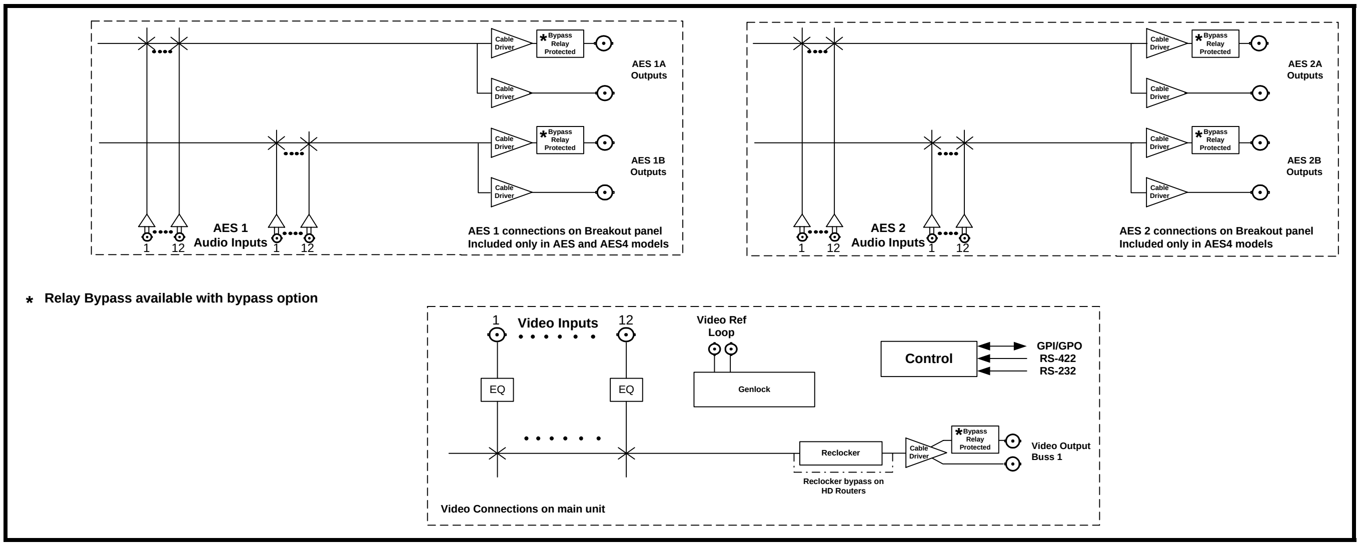

Cable Driver
Bypass Relay Protected
AES 1A Outputs
AES 1B Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2A Outputs
AES 2B Outputs
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
* Relay Bypass available with bypass option
Video Inputs
Video Ref Loop
Control
GPI/GPO
RS-422
RS-232
EQ
Genlock
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Connections on main unit

Figure 1-1: X1201 Block Diagram

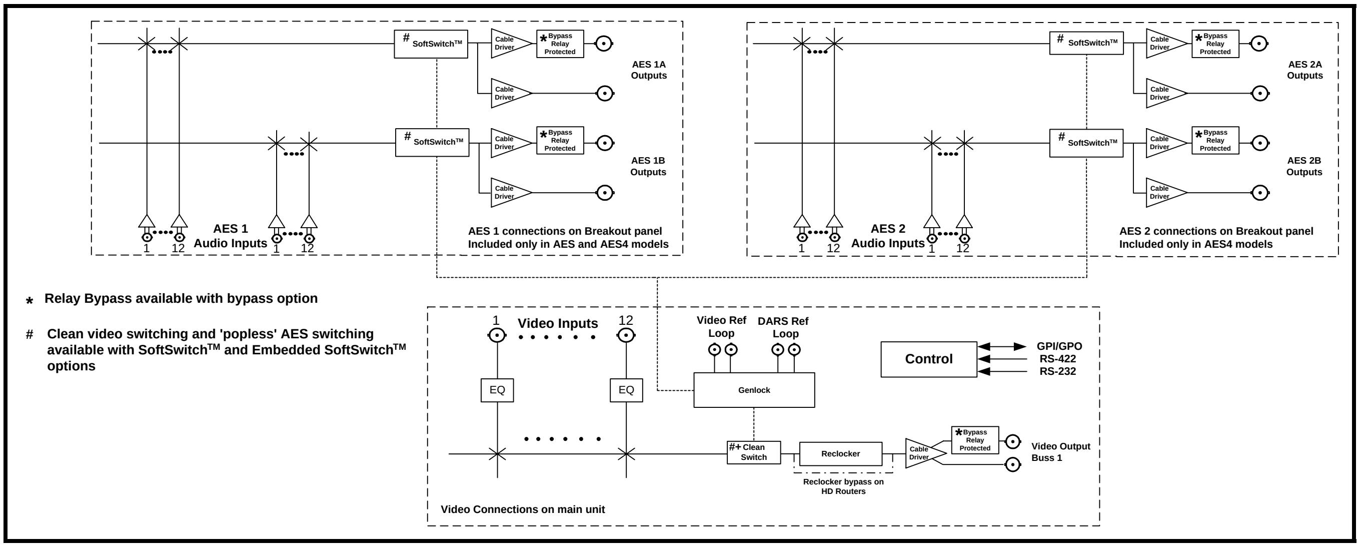
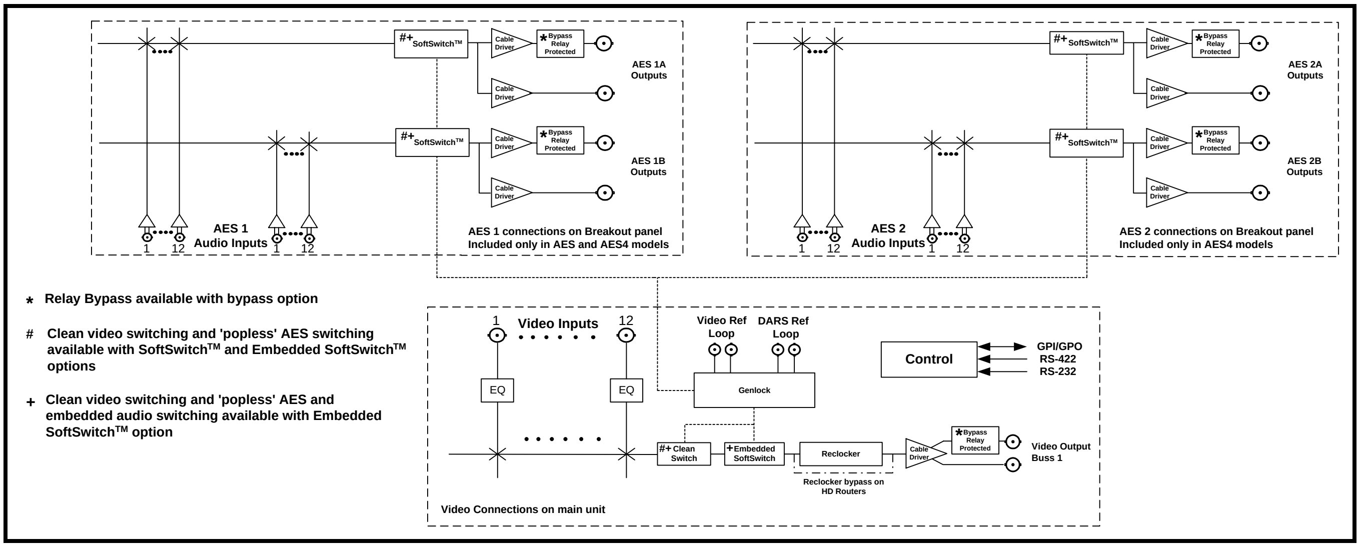

SoftSwitch™
Cable Driver
Bypass Relay Protected
AES 1A Outputs
AES 1B Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2A Outputs
AES 2B Outputs
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
* Relay Bypass available with bypass option
# Clean video switching and 'popless' AES switching available with SoftSwitch™ and Embedded SoftSwitch™ options
Video Inputs
Video Ref Loop
DARS Ref Loop
Control
GPI/GPO
RS-422
RS-232
EQ
Genlock
#+ Clean Switch
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Connections on main unit

Figure 1-2: X1201 SoftSwitch™ Block Diagram

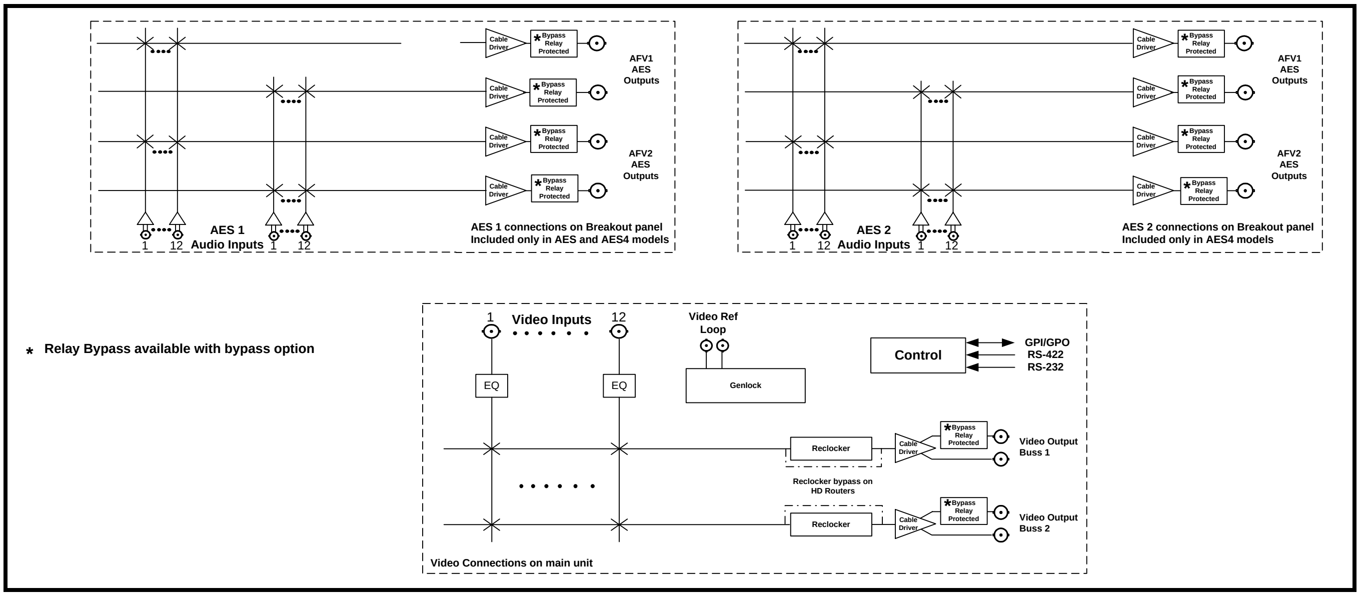

#+ SoftSwitch™
Cable Driver
Bypass Relay Protected
AES 1A Outputs
AES 1B Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2A Outputs
AES 2B Outputs
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
Video Inputs
EQ
Video Ref Loop
DARS Ref Loop
Genlock
Control
GPI/GPO
RS-422
RS-232
#+ Clean Switch
+ Embedded SoftSwitch
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Connections on main unit

* Relay Bypass available with bypass option

# Clean video switching and 'popless' AES switching available with SoftSwitch^{TM} and Embedded SoftSwitch^{TM} options

+ Clean video switching and 'popless' AES and embedded audio switching available with Embedded SoftSwitch^{TM} option

Figure 1-3: X1201 Embedded SoftSwitch™ Block Diagram


Cable Driver
Bypass Relay Protected
AFV1 AES Outputs
AFV2 AES Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
Video Inputs
EQ
Video Ref Loop
Genlock
Control
GPI/GPO
RS-422
RS-232
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Output Buss 2
Video Connections on main unit

* Relay Bypass available with bypass option

Figure 1-4: X1202 Block Diagram

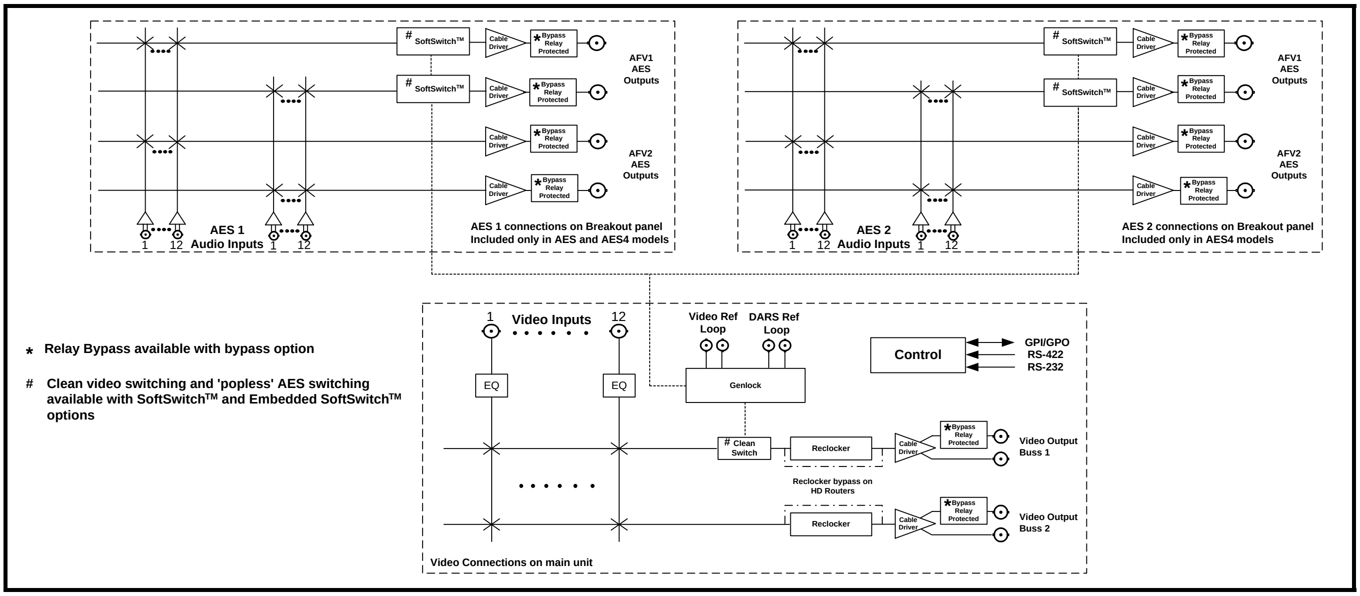

SoftSwitch™
Cable Driver
Bypass Relay Protected
AFV1 AES Outputs
AFV2 AES Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
* Relay Bypass available with bypass option
# Clean video switching and 'popless' AES switching available with SoftSwitch™ and Embedded SoftSwitch™ options
Video Inputs
EQ
Video Ref Loop
DARS Ref Loop
Genlock
Control
GPI/GPO
RS-422
RS-232
# Clean Switch
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Output Buss 2
Video Connections on main unit

Figure 1-5: X1202 SoftSwitch™ Block Diagram

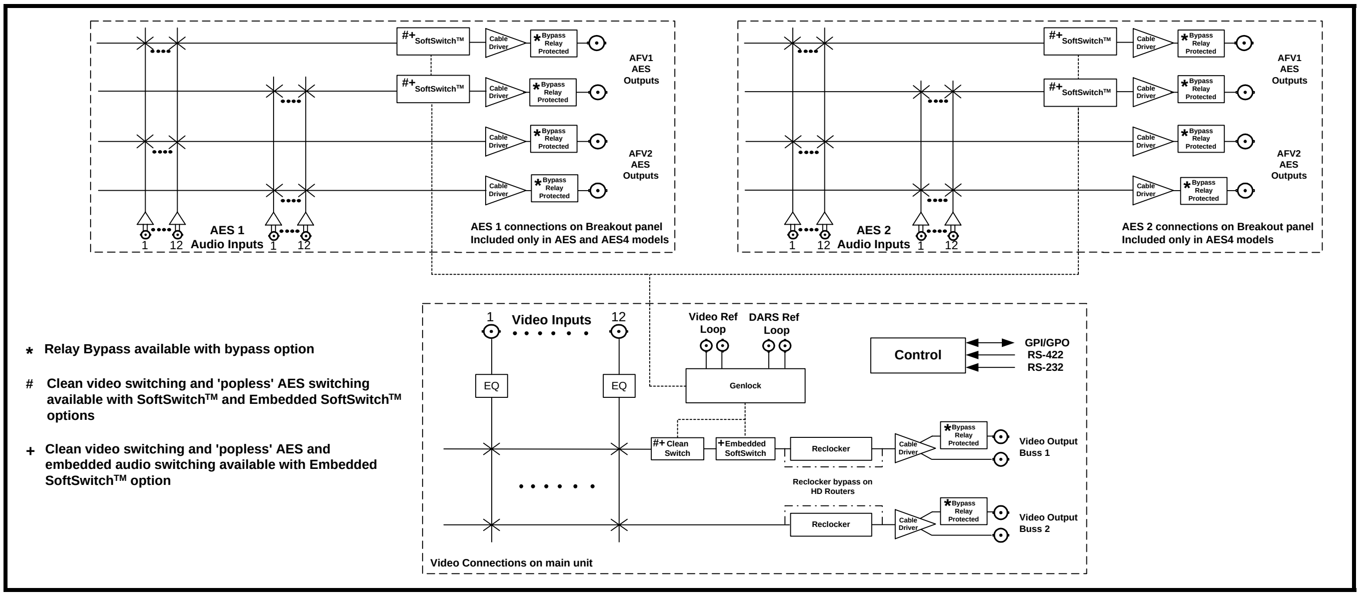
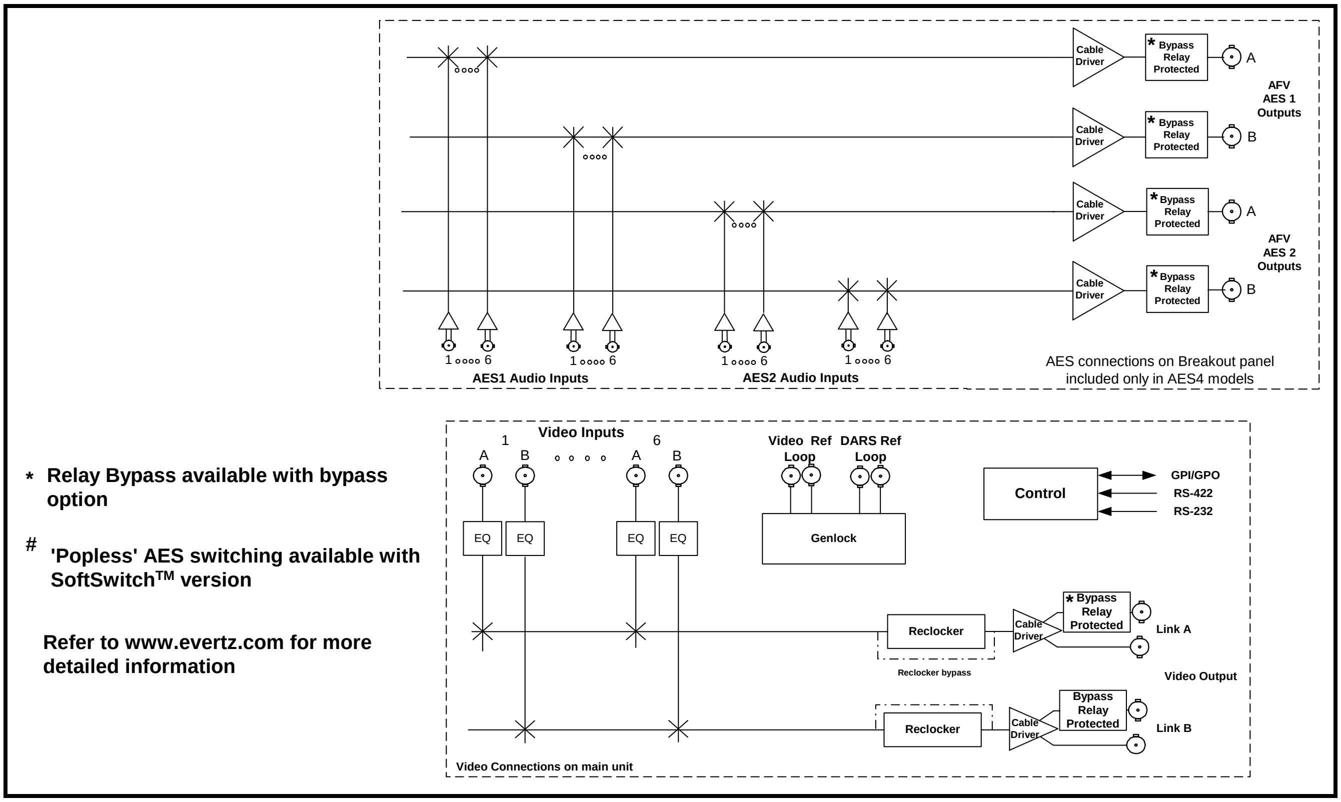

#+ SoftSwitch™
Cable Driver
Bypass Relay Protected
AFV1 AES Outputs
AFV2 AES Outputs
AES 1 Audio Inputs
1
12
AES 1 connections on Breakout panel Included only in AES and AES4 models
AES 2 Audio Inputs
AES 2 connections on Breakout panel Included only in AES4 models
* Relay Bypass available with bypass option
# Clean video switching and 'popless' AES switching available with SoftSwitch™ and Embedded SoftSwitch™ options
+ Clean video switching and 'popless' AES and embedded audio switching available with Embedded SoftSwitch™ option
Video Inputs
EQ
Video Ref Loop
DARS Ref Loop
Genlock
Control
GPI/GPO
RS-422
RS-232
#+ Clean Switch
+ Embedded SoftSwitch
Reclocker
Reclocker bypass on HD Routers
Video Output Buss 1
Video Output Buss 2
Video Connections on main unit

Figure 1-6: X1202 Embedded SoftSwitch™ Block Diagram

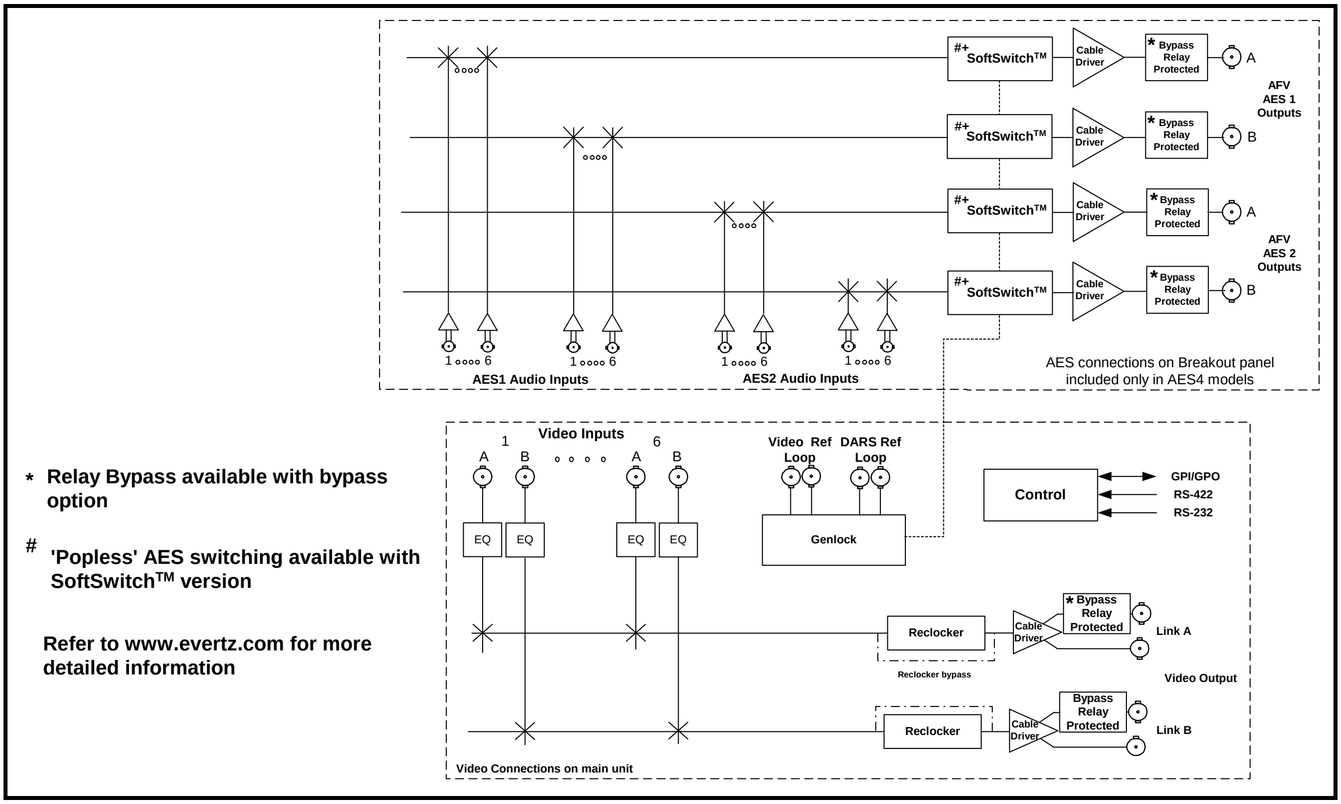

Cable Driver
* Bypass Relay Protected
A
B
AFV AES 1 Outputs
AFV AES 2 Outputs
1 oooo 6
AES1 Audio Inputs
AES2 Audio Inputs
AES connections on Breakout panel included only in AES4 models
Video Inputs
1
6
A
B
o o o o
Video Ref Loop
DARS Ref Loop
Control
GPI/GPO
RS-422
RS-232
EQ
Genlock
Reclocker
Reclocker bypass
Link A
Link B
Video Output
Video Connections on main unit

* Relay Bypass available with bypass option

# 'Popless' AES switching available with SoftSwitch^{TM} version

Refer to www.evertz.com for more detailed information

Figure 1-7: X0601H-444 Block Diagram


#+ SoftSwitch™
Cable Driver
* Bypass Relay Protected
A
B
AFV AES 1 Outputs
AFV AES 2 Outputs
1 oooo 6
AES1 Audio Inputs
AES2 Audio Inputs
AES connections on Breakout panel included only in AES4 models
Video Inputs
1
6
A
B
o o o o
Video Ref Loop
DARS Ref Loop
Control
GPI/GPO
RS-422
RS-232
EQ
Genlock
Reclocker
Reclocker bypass
Link A
Link B
Video Output
Video Connections on main unit

* Relay Bypass available with bypass option

# 'Popless' AES switching available with SoftSwitch^{TM} version

Refer to www.evertz.com for more detailed information

Figure 1-8: X0601H-444 SoftSwitch™ Block Diagram

1.1. HOW TO USE THIS MANUAL

This manual is organised into 7 chapters: Overview, Installation, Operation, Technical Description, Serial Protocol, Output Configurations, and System Timing. This chapter contains a quick summary of the router features and a glossary to define concepts and terms used throughout the remainder of the manual.

Chapter 2 provides a detailed description of the rear panel connectors, and how the router should be connected into your system.

Chapter 3 provides a detailed description of the operation of the front panel controls, starting with an overview of the pushbuttons and front panel indicators. The operation of the router using the optional remote control panel is identical to the front panel.

Chapter 4 provides an overview of how to update the firmware in the unit and other technical issues.

Chapter 5 is a programmer's reference to the serial control protocol.

Chapter 6 provides a pictorial representation of video and audio output configurations for each version of the router.

Chapter 7 provides a few video timing examples to aid the system designer in properly timing the router.

✍ **This symbol is intended to alert the user to important operating instructions.**

⚠ **The exclamation point within an equilateral triangle is intended to alert the user to the presence of important safety related operating and maintenance (Servicing) instructions in this manual.**

1.2. GLOSSARY

CCIR-601: (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for Y, B-Y, R-Y and RGB component digital television signals.

SERIAL DIGITAL: Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

4Fsc: Four times sub-carrier sampling rate uses in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.

4:2:2: A commonly used term for a component digital video format. The numerals 4:2:2 denote the ratio of the sampling frequencies of the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.

SDI: An abbreviation for *serial digital interface*, this acronym is most commonly used to refer to Standard definition serial digital television video signals up to 540 Mb/s.

HDTV: An abbreviation for *high definition television*, this acronym is most commonly used to refer to High definition serial digital television video signals at 1.485 Gb/s.

AES: (Audio Engineering Society): A professional organisation that recommends standards for the audio industries.

AES/EBU: Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union organisations.

ANALOG: An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing digits 0 and 1.

A-TO-D CONVERTER (ANALOG-TO-DIGITAL): A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal.

BIT: A binary representation of 0 or 1. One of the quantized levels of a pixel.

BIT PARALLEL: Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE 125M, EBU 3267-E and CCIR 656.

BIT SERIAL: Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fiber optics. This standard is covered under SMPTE 259M and CCIR 656.

BIT STREAM: A continuous series of bits transmitted on a line.

BYTE: A complete set of quantized levels containing all the bits. Bytes consisting of 8 to 10 bits per sample are typical in digital video systems.

CABLE EQUALIZATION: The process of altering the frequency response of a video amplifier to compensate for high frequency losses in coaxial cable.

CCIR (International Radio Consultative Committee): An international standards committee. (This organisation is now known as ITU.)

CCIR-601: (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for the Y, B-Y, R-Y and RGB component digital television signals.

CCIR-656: (This document now known as ITU-R656). The physical parallel and serial interconnect scheme for CCIR-601. CCIR-656 defines the parallel connector pinouts as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces. It reflects definitions found in EBU Tech 3267 (for 625 line systems) and SMPTE 125M (parallel 525 line systems) and SMPTE 259M (serial 525 line systems).

CLIFF EFFECT: (also referred to as the ‘digital cliff’) This is a phenomenon found in digital video systems that describes the sudden deterioration of picture quality due to excessive bit errors, often caused by excessive cable lengths. The digital signal will be perfect even though one of its signal parameters is approaching or passing the specified limits. At a given moment however, the parameter will reach a point where the data can no longer be interpreted correctly, and the picture will be totally unrecognisable.

COMPONENT ANALOG: The non-encoded output of a camera, video tape recorder, etc., consisting of the three primary colour signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats these three components have been translated into a luminance signal and two colour difference signals, for example Y, B-Y, R-Y.

COMPONENT DIGITAL: A digital representation of a component analog signal set, most often Y, B-Y, R-Y. The encoding parameters are specified by CCIR-601. The parallel interface is specified by CCIR-656 and SMPTE 125M.

COMPOSITE ANALOG: An encoded video signal such as NTSC or PAL video that includes horizontal and vertical synchronising information.

COMPOSITE DIGITAL: A digitally encoded video signal, such as NTSC or PAL video that includes horizontal and vertical synchronising information.

D1: A component digital video recording format that uses data conforming to the CCIR-601 standard. Records on 19 mm magnetic tape. (Often used incorrectly to refer to component digital video.)

D2: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 19 mm magnetic tape. (Often used incorrectly to refer to composite digital video.)

D3: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 1/2" magnetic tape.

DUAL LINK: A serial digital interface for transporting HDTV signals with data rates above 1.5 Gb/s using a dual link HD SDI (link A and link B), based upon the SMPTE 292M data structure.

EBU (European Broadcasting Union): An organisation of European broadcasters that among other activities provides technical recommendations for the 625/50 line television systems.

EBU TECH 3267-E: The EBU recommendation for the parallel interface of 625 line digital video signal. This is a revision of the earlier EBU Tech 3246-E standard that was in turn derived from CCIR-601.

EDH: Error Detection and Handling (EDH) is defined in SMPTE RP-165 as a method of determining when bit errors have occurred along the digital video path. According to RP-165, two error detection checkwords are used, one for active picture samples, and the other on a full field of samples. Three sets of flags are used to convey information regarding detected errors, to facilitate identification of faulty equipment or cabling. One set of flags is associated with each checkword, and the third is used to evaluate ancillary data integrity. The checkwords and flags are combined into a special error detection data packet that is included as ancillary data in the serial digital signal.

EMBEDDED AUDIO: Digital audio is multiplexed onto a serial digital video data stream.

GVG TEN-XL: A 10 x 1 router made by the Grass Valley Group. The serial control protocol used for this router has become an industry standard. The control protocol used to control the Evertz 95XX series routers is an extension of this protocol.

ITU: The United Nations regulatory body governing all forms of communications. ITU-R (previously CCIR) regulates the radio frequency spectrum, while ITU-T (previously CCITT) deals with the telecommunications standards.

ITU-R601: See CCIR601

PIXEL: The smallest distinguishable and resolvable area in a video image. A single point on the screen. In digital video, a single sample of the picture. Derived from the words *picture element*.

RESOLUTION: The number of bits (four, eight, ten, etc.) determines the resolution of the signal. Eight bits is the minimum resolution for broadcast television signals.

4 bits = a resolution of 1 in 16.
8 bits = a resolution of 1 in 256.
10 bits = a resolution of 1 in 1024.

SERIAL DIGITAL: Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

SMPTE (Society of Motion Picture and Television Engineers): A professional organisation that recommends standards for the film and television industries.

SMPTE 125M: The SMPTE standard for bit parallel digital interface for component video signals. SMPTE 125M defines the parameters required to generate and distribute component video signals on a parallel interface.

SMPTE 244M: The SMPTE standard for bit parallel digital interface for composite video signals. SMPTE 244M defines the parameters required to generate and distribute composite video signals on a parallel interface.

SMPTE 259M: The SMPTE standard for standard definition serial digital component and composite interfaces.

SMPTE 274M: The SMPTE standard for bit parallel digital interface for high definition component video signals with an active picture of 1080 lines x 1920 pixels.

SMPTE 292M: The SMPTE standard for high definition serial digital component interfaces.

SMPTE 296M: The SMPTE standard for bit parallel digital interface for high definition component video signals with an active picture of 720 lines x 1280 pixels.

SMPTE 299M: The SMPTE standard for embedding AES audio into SMPTE 292M serial digital high definition video.

SoftSwitch™: An Evertz patent pending technology that eliminates audio pops and clicks due to interruptions of the AES carrier. These interruptions are often caused by non-synchronous switching of the inputs, or may be present from upstream devices. Embedded SoftSwitch™ uses the same technology to remove pops and clicks from embedded audio.

TRS-ID: Abbreviation for "Timing Reference Signal Identification". A reference signal used to maintain timing in composite digital systems. (It is four words long.)

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2. INSTALLATION

2.1. REAR PANEL

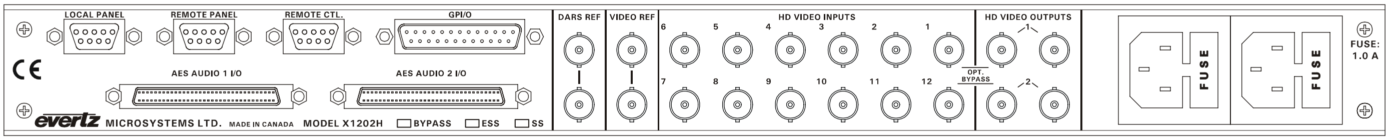

LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
DARS REF
VIDEO REF
HD VIDEO INPUTS
6
5
4
3
2
1
7
8
9
10
11
12
OPT. BYPASS
HD VIDEO OUTPUTS
1
2
FUSE
FUSE
FUSE: 1.0 A
CE
evertz MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H
BYPASS
ESS
SS

Figure 2-1: X1202H-AES4 Rear Panel Layout

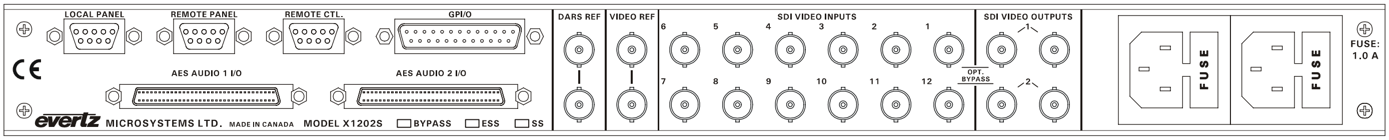

LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
DARS REF
VIDEO REF
SDI VIDEO INPUTS
6
5
4
3
2
1
7
8
9
10
11
12
OPT. BYPASS
SDI VIDEO OUTPUTS
1
2
FUSE
FUSE
FUSE: 1.0 A
CE
evertz MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202S
BYPASS
ESS
SS

Figure 2-2: X1202S-AES4 Rear Panel Layout

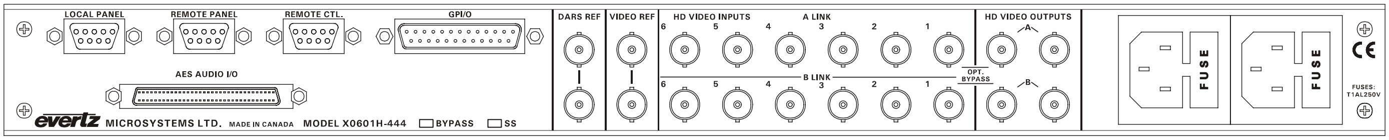

LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO I/O
DARS REF
VIDEO REF
HD VIDEO INPUTS
A LINK
6
5
4
3
2
1
B LINK
6
5
4
3
2
1
OPT. BYPASS
HD VIDEO OUTPUTS
A
B
FUSE
FUSE
CE
FUSES: T1AL250V
evertz MICROSYSTEMS LTD. MADE IN CANADA MODEL X0601H-444
BYPASS
SS

Figure 2-3: X0601H-444-AES4 Rear Panel Layout

Sections 2.1.1 to 2.1.8 describe the purpose of the rear panel connectors and the specific signals that should be connected to the routers. Router versions that have SoftSwitch™, Embedded SoftSwitch™ or Bypass relay options installed will have the option checked (√) on the rear panel. Chapter 6 provides pictorial representations of the video and audio output configurations for each version of the router.

2.1.1. Standard Definition Digital Video Connections (X1200S)

SDI VIDEO INPUTS 1 to 12: These BNC connectors are for connecting 10-bit serial digital video signals, compatible with the SMPTE 259M standard to the respective video input buss.

SDI VIDEO OUTPUTS 1 and 2: There are two video output connectors for each of the two video router busses on X1202S routers. The Video from the selected Video Input buss will be available on two outputs for each bus. X1201S routers do not have the Second output bus.

When the bypass relay option is fitted, **INPUT 1** is protected by a bypass relay to the adjacent **OUTPUT 1** BNC for both X1202S and X1201S routers. **INPUT 12** is protected by a bypass relay to the adjacent **OUTPUT 2** BNC on the X1202S routers only. The bypass relays will activate in the event of power loss to the router and can also be activated from the front panel menu.

2.1.2. High Definition Digital Video Connections (X1202H)

HD VIDEO INPUTS 1 to 12: These BNC connectors are for connecting 10-bit serial digital video signals, compatible with the SMPTE 292M standard to the respective video input buss.

HD VIDEO OUTPUTS 1 and 2: There are two video output connectors for each of the two video router busses. The Video from the selected Video Input buss will be available on two outputs for each bus.

When the bypass relay option is fitted, **INPUT 1** is protected by a bypass relay to the adjacent **OUTPUT 1** BNC and **INPUT 12** is protected by a bypass relay to the adjacent **OUTPUT 2** BNC. The bypass relays will activate in the event of power loss to the router and can also be activated from the front panel menu.

2.1.3. High Definition Digital Video Connections (X0601H-444)

HD VIDEO INPUTS 1 to 6: These two sets of BNC connectors are for connecting dual link 10-bit serial digital video signals, compatible with the SMPTE 372M standard to the respective video input buss. Connect the Link A signals to the Link A inputs and the Link B signals to the Link B inputs. When operating the router in the *Dual 6x1* mode the two sets of inputs are treated as separate 6 input router inputs.

HD VIDEO OUTPUTS A and B: There are two video output connectors for each link of the dual link video router busses. The dual link Video from the selected Video Input buss will be available on two outputs for each link. Then the router is operated in the *dual 6x1* mode the Link A and Link B outputs are separated. The Link A inputs are routed to the Link A output and the Link B inputs are routed to the Link B buss.

When the bypass relay option is fitted, **INPUT 1** on each link is protected by a bypass relay to the adjacent **OUTPUT 1** BNC on each link. The bypass relays will activate in the event of power loss to the router and can also be activated from the front panel menu.

2.1.4. AES Audio Connections (X1200 Series)

There are two 68 pin connectors used to connect the AES Audio Breakout panels to the Router using the cables provided. The X1202ABO or X1201ABO are used for unbalanced AES signals and the X1202ABOB or X1201ABOB are used for balanced AES signals. Each Audio Breakout Panels have two identical sections consisting of 12 AES inputs and 2 outputs. Earlier versions of the router may not have either or both audio connectors installed. See sections 2.1.4.1 to 2.1.4.3 for information about connecting the audio for the version of the router that you have.

When connecting the Audio Breakout Panel cables, insert the cable carefully into the connector on the router and the breakout panel, being careful not to bend the pins. Press it firmly in place and hand-tighten the hold down screws firmly to provide proper strain relief.

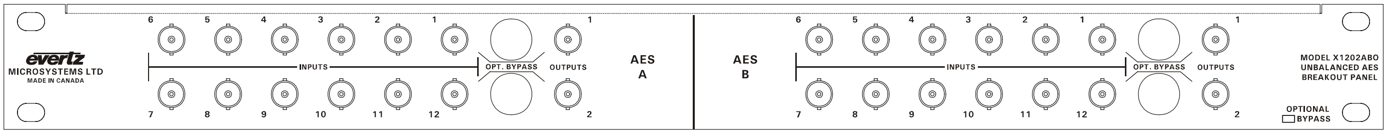

evertz
MICROSYSTEMS LTD
MADE IN CANADA
6
5
4
3
2
1
1
INPUTS
OPT. BYPASS
OUTPUTS
7
8
9
10
11
12
2
AES
A
AES
B
MODEL X1202ABO
UNBALANCED AES
BREAKOUT PANEL
OPTIONAL
BYPASS

Figure 2-4: X1202ABO Audio Breakout Panel Layout

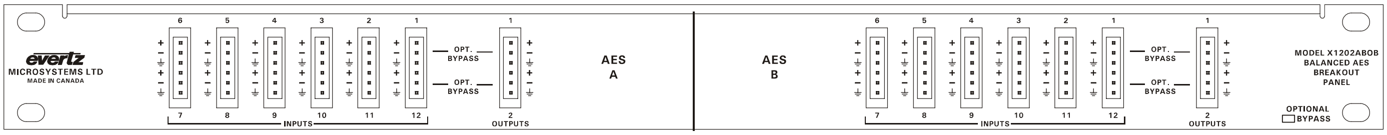

evertz
MICROSYSTEMS LTD
MADE IN CANADA
6
5
4
3
2
1
1
OPT.
BYPASS
OPT.
BYPASS
7
8
9
10
11
12
INPUTS
2
OUTPUTS
AES
A
AES
B
MODEL X1202ABOB
BALANCED AES
BREAKOUT
PANEL
OPTIONAL
BYPASS

Figure 2-5: X1202ABOB Audio Breakout Panel Layout

INPUTS 1 to 12: On the ABO version panel these BNC connectors are for connecting unbalanced AES audio signals compatible with the SMPTE 276M standard to the respective audio input buss.

On the ABOB version panel these removable terminal strip connectors are for connecting balanced AES audio signals compatible with the AES3 standard to the respective audio input buss. The audio cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel.

OUTPUTS 1 and 2: On the ABO version panel these BNC connectors are for connecting unbalanced AES audio signals compatible with the SMPTE 276M standard from the respective audio input buss.

On the ABOB version panel these removable terminal strip connectors are for connecting balanced AES audio signals compatible with the AES3 standard from the respective audio input buss. The audio cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel.

On the X1202ABO used with the X1202 routers, **INPUT 1** is protected by a bypass relay to the adjacent **OUTPUT 1** BNC and **INPUT 12** is protected by a bypass relay to the adjacent **OUTPUT 2** BNC when the bypass relay option is fitted. On the X1201ABO used with the X1201 routers, **INPUT 1** is protected by a bypass relay to the adjacent **OUTPUT 1** BNC when the bypass relay option is fitted. The bypass relays will activate in the event of power loss to the router and can also be activated from the front panel menu.

2.1.4.1. Audio Connections on Router Models with the AES Option Fitted

Routers fitted with the AES option are shipped with one breakout panel. This panel is connected to the **AES AUDIO 1 I/O** connector using the cable provided. On the X1202ABO and X1202ABOB panels used with the X1202 routers, inputs for the 1A and 2A busses are on the AES A section of the breakout panel. (See Figure 6-6 and Figure 6-7) Outputs 1 and 2 of the AES A section are the outputs from the 1A and 2A busses respectively. Inputs for the 1B and 2B busses are on the AES B section of the breakout panel. Outputs 1 and 2 of the AES B section are the outputs from the 1B and 2B busses respectively. On the X1201ABO and X1201ABOB panels used with the X1201 routers, outputs 1 and 2 are identical. (See Figure 6-2)

2.1.4.2. Audio Connections On Early Router Models With The AES Option Fitted (two breakout panels shipped)

Some early versions of the routers with the AES option were shipped with two breakout panels. On these routers there are two distinct modes of operation. The *AES MODE* menu item on the *INPUT SETUP* menu is used to select the desired mode.

In the 4(12x1) mode there are four separate 12 x 1-router sections that can be independently assigned to follow one of the video busses. Routers fitted with the AES option are shipped with one breakout panel. Inputs for the 1A and 1B busses are on the panel connected to the **AES AUDIO 1 I/O** connector. Outputs 1 and 2 of the AES A and AES B sections are identical outputs from the 1A and 1B busses respectively. Inputs for the 2A and 2B busses are on the panel connected to the **AES AUDIO 2 I/O** connector. Outputs 1 and 2 of the AES A and AES B sections are identical outputs from the 2A and 2B busses respectively. (See Figure 6-12 and Figure 6-13)

In the 2(12x2) mode there are two 12 x 2 router sections. The inputs and outputs from the 1A and 1B busses follow the V1 buss and are located on the on the breakout panel connected to the **AES AUDIO 1 I/O** connector. The inputs to 2A and 2B audio busses are internally connected to the inputs of the 1A and 1B audio busses respectively (The inputs on the breakout panel connected to the **AES AUDIO 2 I/O** connector are not used in this mode). The outputs from the 2A and 2B busses follow the V2 buss and are located on the breakout panel connected to the **AES AUDIO 2 I/O** connector. (See Figure 6-10 and Figure 6-11)

2.1.4.3. Audio Connections on Router Models with the AES4 Option Fitted

Routers fitted with the AES4 option are shipped with two breakout panels. The inputs and outputs from the 1A and 1B busses are located on the breakout panel connected to the **AES AUDIO 1 I/O** connector. The Audio from the selected Audio Input buss associated with video buss 1 will be available on output 1 of AES A and AES B sections of the breakout panel. On the X1202ABO and X1202ABOB panels used with the X1202 routers, audio from the selected Audio Input buss associated with video buss 2 will be available on output 2 of AES A and AES B sections of the breakout panel. (See Figure 6-8 and Figure 6-9) On the X1201ABO and X1201ABOB panels used with the X1201 routers, outputs 1 and 2 are identical. (See Figure 6-3)

The inputs and outputs from the 2A and 2B busses and are located on the breakout panel connected to the **AES AUDIO 2 I/O** connector. The Audio from the selected Audio Input buss associated with video buss 1 will be available on output 1 of AES A and AES B sections of the breakout panel. Audio from the selected Audio Input buss associated with video buss 2 will be available on output 2 of AES A and AES B sections of the breakout panel. On the X1201ABO and X1201ABOB panels used with the X1201 routers, outputs 1 and 2 are identical.

2.1.5. AES Audio Connections (X0601H-444-AES4)

There is one 68 pin connector used to connect the AES Audio Breakout panel to the Router using the cable provided. The X0601ABO panel is used for unbalanced AES signals and the X0601ABOB panel is used for balanced AES signals. The Audio Breakout Panels have four identical sections consisting of 6 AES inputs and 1 output. Some versions of the router may have one or two audio connectors installed. See sections 2.1.4.1 to 2.1.4.3 for information about connecting the audio for the version of the router that you have.

When connecting the Audio Breakout Panel cables, insert the cable carefully into the connector on the router and the breakout panel, being careful not to bend the pins. Press it firmly in place and hand tighten the hold down screws firmly to provide proper strain relief.

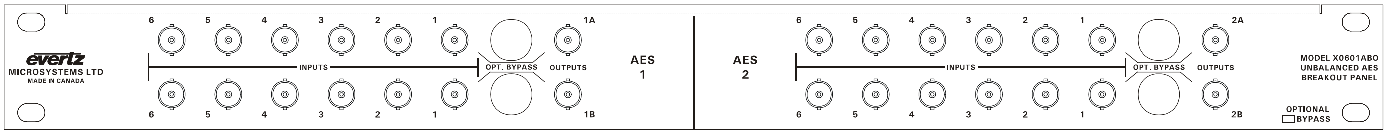

evertz
MICROSYSTEMS LTD
MADE IN CANADA
6
5
4
3
2
1
1A
INPUTS
OPT. BYPASS
OUTPUTS
1B
AES 1
AES 2
2A
2B
MODEL X0601ABO
UNBALANCED AES
BREAKOUT PANEL
OPTIONAL
BYPASS

Figure 2-6: X0601ABO Audio Breakout Panel Layout

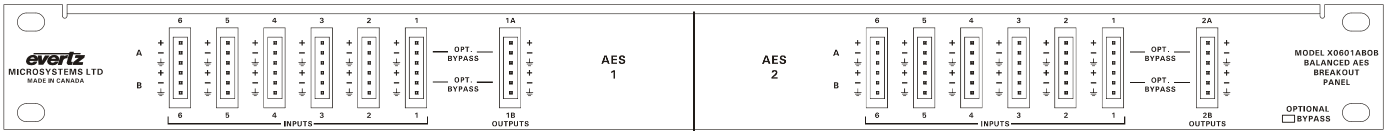

evertz
MICROSYSTEMS LTD
MADE IN CANADA
A
B
6
5
4
3
2
1
1A
OPT. BYPASS
1B
INPUTS
OUTPUTS
AES 1
AES 2
2A
2B
MODEL X0601ABOB
BALANCED AES
BREAKOUT
PANEL
OPTIONAL
BYPASS

Figure 2-7: X0601ABOB Audio Breakout Panel Layout

INPUTS 1 to 6: On the ABO version panel these BNC connectors are for connecting unbalanced AES audio signals compatible with the SMPTE 276M standard to the respective audio input buss.

On the ABOB version panel these removable terminal strip connectors are for connecting balanced AES audio signals compatible with the AES3 standard to the respective audio input buss. The audio cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel.

OUTPUTS: On the ABO version panel these BNC connectors are for connecting unbalanced AES audio signals compatible with the SMPTE 276M standard from the respective audio input buss.

On the ABOB version panel these removable terminal strip connectors are for connecting balanced AES audio signals compatible with the AES3 standard from the respective audio input buss. The audio cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel.

INPUT 1: is protected by a bypass relay to the adjacent **OUTPUT** connector when the bypass relay option is fitted. The bypass relays will activate in the event of power loss to the router and can also be activated from the front panel menu.

The inputs and outputs from the 1A and 1B busses and are located on the left side of the breakout panel labelled **AES 1**. The Audio from the selected Audio Input buss associated with video buss will be available on the output of 1A and 1B sections of the breakout panel. The inputs and outputs from the 2A and 2B busses are located on the right side of the breakout panel labelled **AES 2**. The Audio from the selected Audio Input buss associated with video buss will be available on output 2A and 2B sections of the breakout panel. (See Figure 6-8 and Figure 6-9)

2.1.6. Reference Connections

VIDEO REF: is a high impedance loop through for connecting an analog video or tri-level sync (X1200H or X0601H series only) reference. The *REFERENCE* menu is used to select the correct type of video reference being used.

DARS REF: (X1202-AES-SS and X1202-AES4-SS only) is a high impedance loop through for a Digital Audio Reference Signal. The *REFERENCE* menu is used to select the use of the DARS signal when the Softswitch™ is enabled on Softswitch™ routers.

2.1.7. Remote Control Connections

REMOTE CTL: This 9 pin female D connector provides an RS-232 serial interface used for updating the firmware or external serial remote control. The *Setup* menu is used to configure the REMOTE CTL port for external control or firmware updating. (See section 3.3.). This port is wired at the factory as an RS232 DCE port as shown in Table 2-1.

The port can also be used to connect a remote control panel to the router. To connect to a remote panel the port must be configured as a SMPTE 207M Tributary as shown in Table 2-2. To reconfigure the port the user must remove the top cover and reposition jumper J26 so that it is on pins 2 & 3 (toward header J23) and move the ribbon cable to header J23.

If you are planning to use a second remote control/automation, remove the top cover and reposition jumper J26 so that it is on pins 2 & 3 (toward header J23) and move the ribbon. Communications to the remote panel is through a standard straight through RS-422 connection. See section 2.3.2.

Pin #	Name	Description
1	GND	Chassis ground
2	TxD	RS-232 Transmit Output
3	RxD	RS-232 Receive Input
4		
5	Sig Gnd	RS-232 Signal Ground
6		
7	RTS	RS-232 RTS Input
8	CTS	RS-232 CTS Output
9		

Table 2-1: Router RS-232 Port Pin Definitions

REMOTE PANEL: This 9 pin female D connector provides an RS-422 serial interface used if the local panel is not attached to the main chassis. This port is wired as a SMPTE 207M Tributary as shown in Table 2-2.

Pin #	Name	Description
1	GND	Chassis ground
2	Tx-	RS-422 Tx-(a) Output
3	Rx+	RS-422 Rx+(b) Input
4	GND	
5		
6	GND	
7	Tx+	RS-422 Tx+(b) Output
8	Rx-	RS-422 Rx-(a) Input
9	GND	

Table 2-2: Router RS-422 Port Pin Definitions

LOCAL PANEL: This connector is currently not used.

GPI / O: This female DB-25 pin connector provides 14 General Purpose Opto-isolated inputs (GPIs) and 4 General Purpose isolated relay outputs (GPOs). **Vint** provides +5Volts from the Router and **Vext** is used to provide external power to the Opto-isolators. Typically **Vint** and **Vext** are connected together so that the isolators may be powered from the router. Table 2-3 shows the pin definitions of the GPIO connector. Figure 2-8 shows a schematic of the GPIO circuitry. See section 2.4 for more information on connecting the General Purpose inputs and outputs. The functions of the GPIs and GPOs are assigned using the Setup menu and can be used to select crosspoints and receive tallies from the router. See section 3.12 and 3.13 for information on setting up the GPIO operation.

Pin #	Name	Description
1	GPI 01	General Purpose Input 01
2	GPI 02	General Purpose Input 02
3	GPI 03	General Purpose Input 03
4	GPI 04	General Purpose Input 04
5	GPI 05	General Purpose Input 05
6	GPI 06	General Purpose Input 06
7	GPI 07	General Purpose Input 07
8	GPI 08	General Purpose Input 08
9	GPI 09	General Purpose Input 09
10	GPI 10	General Purpose Input 10
11	GPI 11	General Purpose Input 11
12	GPI 12	General Purpose Input 12
13	GPI 13	General Purpose Input 13
14	GPI 14	General Purpose Input 14
15	Vext	External voltage input to power opto-isolators
16	Vint	Protected +5 volts output from router
17	GPO 01 C	General Purpose Output 01 Common contact
18	GPO 01 NC	General Purpose Output 01 Normally closed contact
19	GPO 02 C	General Purpose Output 02 Common contact
20	GPO 02 NC	General Purpose Output 02 Normally closed contact
21	GPO 03 C	General Purpose Output 03 Common contact
22	GPO 03 NC	General Purpose Output 03 Normally closed contact
23	GPO 04 C	General Purpose Output 04 Common contact
24	GPO 04 NC	General Purpose Output 04 Normally closed contact
25	GND	Router Chassis ground

Table 2-3: GPI/O Pin Definitions

2.1.8. Power Connections

The router has one or two (redundant supply is optional) universal power supplies that operate on either 100-115 or 220-240 volts AC at 50 or 60 Hz and automatically senses the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry modules on the rear panel. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

The IEC 320 power entry modules combine a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.

CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING THE MAINS PLUG GROUND PIN MUST BE MAINTAINED.

2.2. MOUNTING

The router is equipped with rack mounting angles and fits into a standard 19 inch by 1.75 inch by 17.75 inch (483 mm x 45 mm x 451mm) rack space. The mounting angles may be removed if rack mounting is not desired.

2.3. CONNECTING THE REMOTE CONTROL PANEL

The X1200 and X0601H-444 series routers can be sold with integrated front panel control, or with a rack mountable remote control panel (RCP version). On the RCP version, the front panel of the main unit has only the PSU Status indicators. A second control panel (model X1202-REMOTE or X0601-REMOTE) can be added to either version.

2.3.1. Connecting the Primary Remote Control Panel (RCP Version)

On the RCP version of the router, the primary control panel is connected to the **REMOTE PANEL** connector using the straight-through cable provided. For longer distances, simply make your own cable of the required length according to the specifications in Table 2-4. Communications to the remote panel is through a standard straight-through RS-422 connection, so the panel can be located up to 1000 feet from the main electronics unit. A plug in 12 VDC adapter supplies power for the remote control panel.

Router End			Remote Panel End	
9 pin D Male	**Pin**	**Belden 9729**	**9 pin D Female**	**Pin**
	1			1
Tx-	2	-------1a------	Rx-	2
Rx+	3	-------2b------	Tx+	3
Rx Gnd	4	---drain 2----	Rx Gnd	4
	5			
Tx Gnd	6	---drain 1----	Tx Gnd	6
Tx+	7	-------1b-----	Rx+	7
Rx-	8	-------2a------	Tx-	8
	9			9
Frame Gnd	Shield	---drain 1----	Frame Gnd	Shield

Table 2-4: Remote Control Panel Extender Cable

2.3.2. Connecting a Second Remote Control Panel

On either the Front Panel Control or Remote Control version of the router a second control panel can be connected to the **REMOTE CONTROL** connector using a straight-through cable provided. For longer distances, simply make your own cable of the required length according to the diagram in Table 2-4. The default configuration of the **REMOTE CONTROL** port on the router is RS-232. Before connecting the remote panel, the port must be configured as a SMPTE 207M Tributary as shown in Table 2-2. To reconfigure the port the user must remove the top cover, reposition jumper J26 so that it is on pins 2 & 3 (toward header J23) and move the ribbon. Communications to the remote panel is through a standard straight through RS-422 connection, so the panel can be located up to 1000 feet from the main electronics unit. A plug in 12 VDC adapter supplies power for the remote control panel.

2.4. CONNECTING THE GENERAL PURPOSE INPUTS AND OUTPUTS

The 25 pin GPI/O connector has 14 programmable general purpose inputs (GPI) and 4 programmable general purpose outputs (GPO) as shown in Table 2-3. The schematic representation is in Figure 2-8. The GPIs are opto-isolated inputs that can be powered from an external source or from the frame. The GPOs are relay contacts that are normally closed when the power to the router is off.

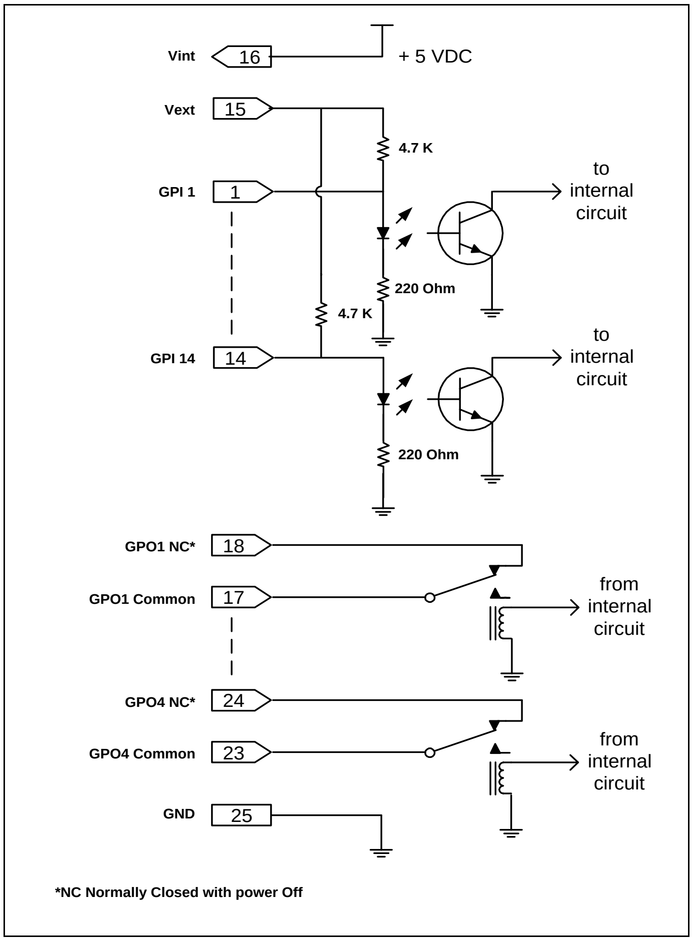

Vint
16
+ 5 VDC
Vext
15
4.7 K
GPI 1
1
to
internal
circuit
220 Ohm
4.7 K
to
internal
circuit
GPI 14
14
220 Ohm
GPO1 NC*
18
GPO1 Common
17
from
internal
circuit
GPO4 NC*
24
GPO4 Common
23
from
internal
circuit
GND
25
*NC Normally Closed with power Off

Figure 2-8: General Purpose I/O Schematic

2.4.1. Connecting the General Purpose Inputs

The GPI's are used to activate video and audio bus crosspoints and are programmable in a number of configurations. The GPIs can be configured to operate in one of three encoded modes. In these modes, many of the GPI inputs are pre-assigned to a function. The unused inputs are still available for the user to assign to a particular function using the *Program Gpi's* menu item. When the GPI Encoding is set to none, all 14 inputs are available for the user to assign to particular functions. Sections 3.12.3.1 to 3.12.3.3 describe how each of the GPI encoding modes work and which inputs are available for user assignment.

When the GPI inputs are independently programmed, they can be set to activate on rising or falling edges, or high or low levels. The factory default is for *low* level activation, which means a ground level on the input will trigger the GPI function when the Opto-isolator is normally powered. See Figure 2.2 and 2.3

The *high* level activation can be used when you need to trigger the GPI function by providing a positive voltage to a GPI input. This mode is not generally used and should not be considered a first choice.

The *falling* edge activation is used to trigger a GPI function by removing a provided voltage to a GPI or by making a closure to ground when the Opto-isolator is already powered. The falling edge GPI will respond the same as a *low* level activation when the Opto-isolator is normally powered.

The *rising* edge activation is used to trigger a GPI function when power is provided to the Opto-isolator, or when the GPI closure to ground is released. This function can be used to trigger a GPI function when a GPO error tally is released.

The user can connect GP+5V supplied from the frame (Vint pin) into the Vext pin to provide power to the GPIO Opto-isolator circuitry. In this configuration the user can activate GPIs simply by connecting the GPI input pins to Ground (see Figure 2-9). This can be done with a button, switch, relay or an open collector transistor.

Warning: Do not connect one frame's GP+5V to another frame's GP+5V.

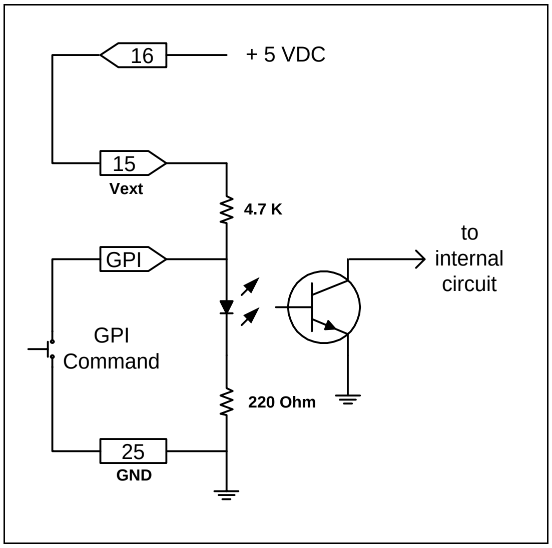

16
+ 5 VDC
15
Vext
4.7 K
GPI
to internal circuit
GPI Command
220 Ohm
25
GND

Figure 2-9: Powering the General Purpose Input Opto-Isolators from the Router

Alternately, an external voltage source may be applied as shown in Figure 2-10. The Vext voltage must be greater than the voltage supplied to the GPI by at least 5v.

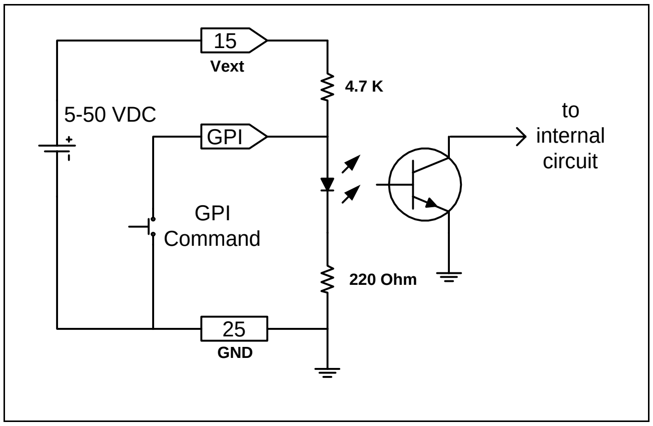

15
Vext
4.7 K
5-50 VDC
+
GPI
to internal circuit
GPI Command
220 Ohm
25
GND

Figure 2-10: Powering the General Purpose Input Opto-Isolators from an External Power Supply

2.4.2. Connecting the General Purpose Outputs

The Programmable GPOs are used to trigger alarms or to provide a limited tally capability. The GPOs will be in the de-energised state when the power is off so all contacts will be closed. When the router is powered up the GPO Relay contacts will open. An alarm or tally will cause a contact closure. The 4 GPO contact sets can be operated in one of two encoded modes. The GPOs can be configured to operate in one of two encoded modes. In these modes, many of the GPO contacts are pre-assigned to a function. When the GPO Encoding is set to none, all 4 contact sets are available for the user to assign to particular functions. Section 3.13.3 describes how each of the GPO encoding modes work and how to configure the GPOs using the *GPO SETUP* menu.

2.4.3. GPI/O Examples

By careful use of the GPIs and GPOs you can create some unique control scenarios for controlling the router, Figure 2-11 shows one such application. By setting up jumpers for the GPI/O connector and setting the GPI/O configurations in the router *Setup* menu, you can create an auto changeover for a program feed. If input 1 fails, when the GPI/O is configured to the specifications in this example, and that input is currently selected on the output of bus V1, the router will automatically select input 2.

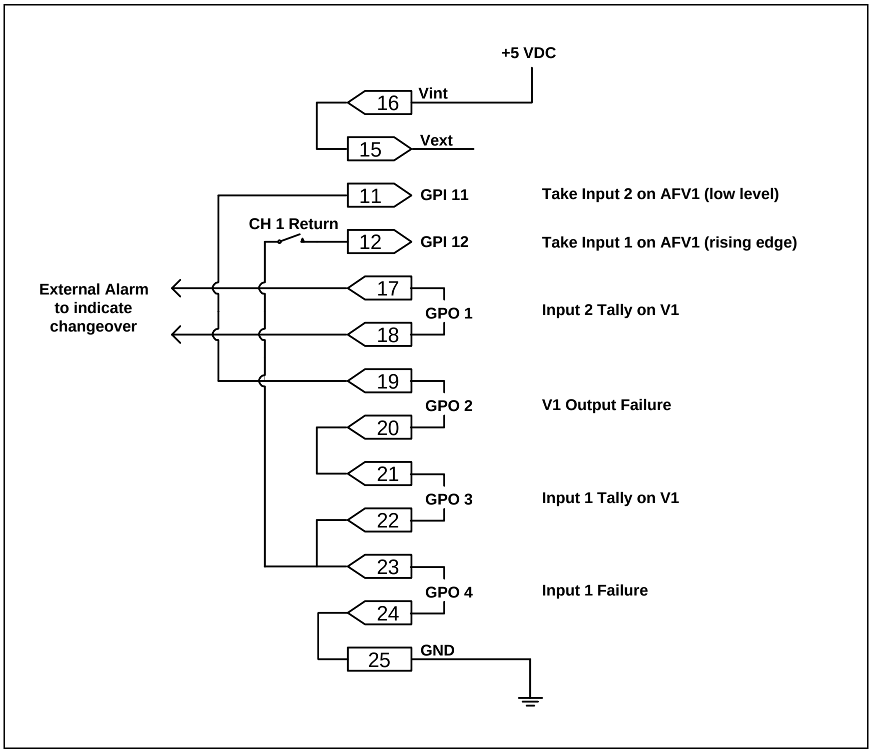

+5 VDC
16
Vint
15
Vext
11
GPI 11
Take Input 2 on AFV1 (low level)
CH 1 Return
12
GPI 12
Take Input 1 on AFV1 (rising edge)
External Alarm to indicate changeover
17
GPO 1
Input 2 Tally on V1
18
19
GPO 2
V1 Output Failure
20
21
GPO 3
Input 1 Tally on V1
22
23
GPO 4
Input 1 Failure
24
25
GND

Figure 2-11: GPIO Example – Auto Changeover to Input 2 on Loss of Input 1

If the “CH 1 Return” switch is closed, input 1 will be automatically selected when it is present again. The down side of this is that if the Input 1 signal failure is sporadic the router will chatter between input 1 and 2. The purpose here is to show the use of a rising edge GPI trigger.

Also, this functionality can co-exist with the *HEX* and *AFV HEX* GPI encoding as GPI 11 and GPI 12 are both available for user functions in these encoded GPI modes.

2.5. CONTROLLING THE ROUTER USING THE EXTERNAL SERIAL PROTOCOL

The X1200 series routers can be controlled from router control devices or it can control other devices employing industry standard router control protocols. Currently the only control protocol supported is the Grass Valley Ten-XL ASCII protocol. The control device is connected to the router using the **REMOTE CTL** connector on the rear panel. The *REMOTE CTL* menu is used to configure the **REMOTE CTL** port for external control using the *Baud Rate, Serial Format, Serial Address* and *Serial Control* menu items. See section 3.14 for information about configuring the **REMOTE CTL** port parameters. See chapter 5 for detailed information about controlling the router.

2.5.1. Connecting the Router to a Grass Valley Ten XL ASCII Control Device

Use the *External control* item on the *Setup Menu* and select `Gvg ten xl ASCII` protocol. The *Baud Rate, Serial Address,* and *Serial Format* menu settings must be set to match those required by the GVG control device. If the router is being controlled by another device, set the *Serial Control* menu setting to `slave`. If the router is controlling another device using its remote control port then set the *Serial Control* menu setting to `master`. The **REMOTE CTL** port is shipped from the factory configured for RS-232 operation. If you require RS-422 operation then you will have to change the port wiring as described in section 2.3.2.

When connecting two X1200 series routers together in a master/slave relationship make sure that the **REMOTE CTL** port is configured the same at both ends (including the RS-232 or RS-422 wiring). Use the cable configuration shown in Table 2-5 for RS-232 wiring and the cable configuration shown in Table 2-6 for RS-422 wiring. For other applications consult the manual for the equipment you are connecting, configure the port accordingly and use the information in Table 2-1 and Table 2-2 to make the appropriate cable.

Master 1202 End			Slave 1202 End	
9 pin D Male	Pin	Belden 9729	9 pin D Male	Pin
	1			1
TxD	2	-------2b------	RxD	3
RxD	3	-------1a------	TxD	2
	4			4
Gnd	5	---drain 2----	Gnd	5
	6			6
RTS	7	-------1b-----	CTS	8
CTS	8	-------2a------	RTS	7
	9			9
Frame Gnd	Shield	---drain 1----	Frame Gnd	Shield

Table 2-5: Master 1202 to Slave 1202 Cable – RS-232 Configuration

Master 1202 End			Slave 1202 End	
9 pin D Male	**Pin**	**Belden 9729**	**9 pin D Male**	**Pin**
Gnd	1	---drain 2----	Gnd	1
Tx-/TxD	2	-------2b------	Rx-/RxD	8
Rx+/RxD	3	-------1a------	Tx+/TxD	7
RxGnd	4		RxGnd	4
	5			5
TxGnd	6		TxGnd	6
Tx+/RTS	7	-------1b-----	Rx+/CTS	3
Rx-/CTS	8	-------2a------	Tx-/RTS	2
	9			9
Frame Gnd	Shield	---drain 1----	Frame Gnd	Shield

Table 2-6: Master 1202 to Slave 1202 Cable – RS-422 Configuration

2.6. Configuring the X1200 Series Router with Ethernet Support

Section 2.6 describes the hardware configuration for the X1200 series router with Ethernet support. The X1200 router with Ethernet option provides remote monitoring and control capability using Evertz's VistaLINK® via Ethernet networking. Figure 2-12 shows the rear panel of the X1200 Series router with Ethernet Support.

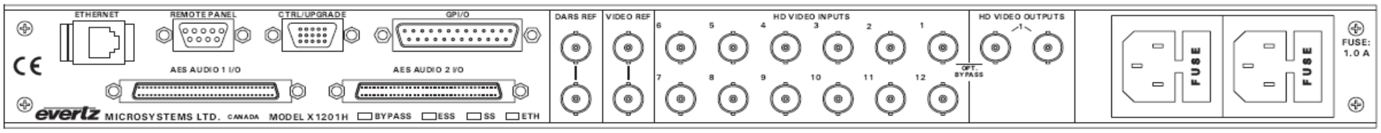

ETHERNET
REMOTE PANEL
CTRL/UPGRADE
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
CE
evertz MICROSYSTEMS LTD. CANADA MODEL X1201H
BYPASS
ESS
SS
ETH
DARS REF
VIDEO REF
HD VIDEO INPUTS
6
5
4
3
2
1
7
8
9
10
11
12
OPT. BYPASS
HD VIDEO OUTPUTS
1
FUSE
FUSE
FUSE: 1.0 A

Figure 2-12:X1200 Series Router with Ethernet (VLPRO) Support Rear Panel

2.6.1. Essential Cable Connections

The DB15-to-DB9 cable and mini null adapter (Figure 2-13) provided are used for normal operation, Remote Control and firmware updating.

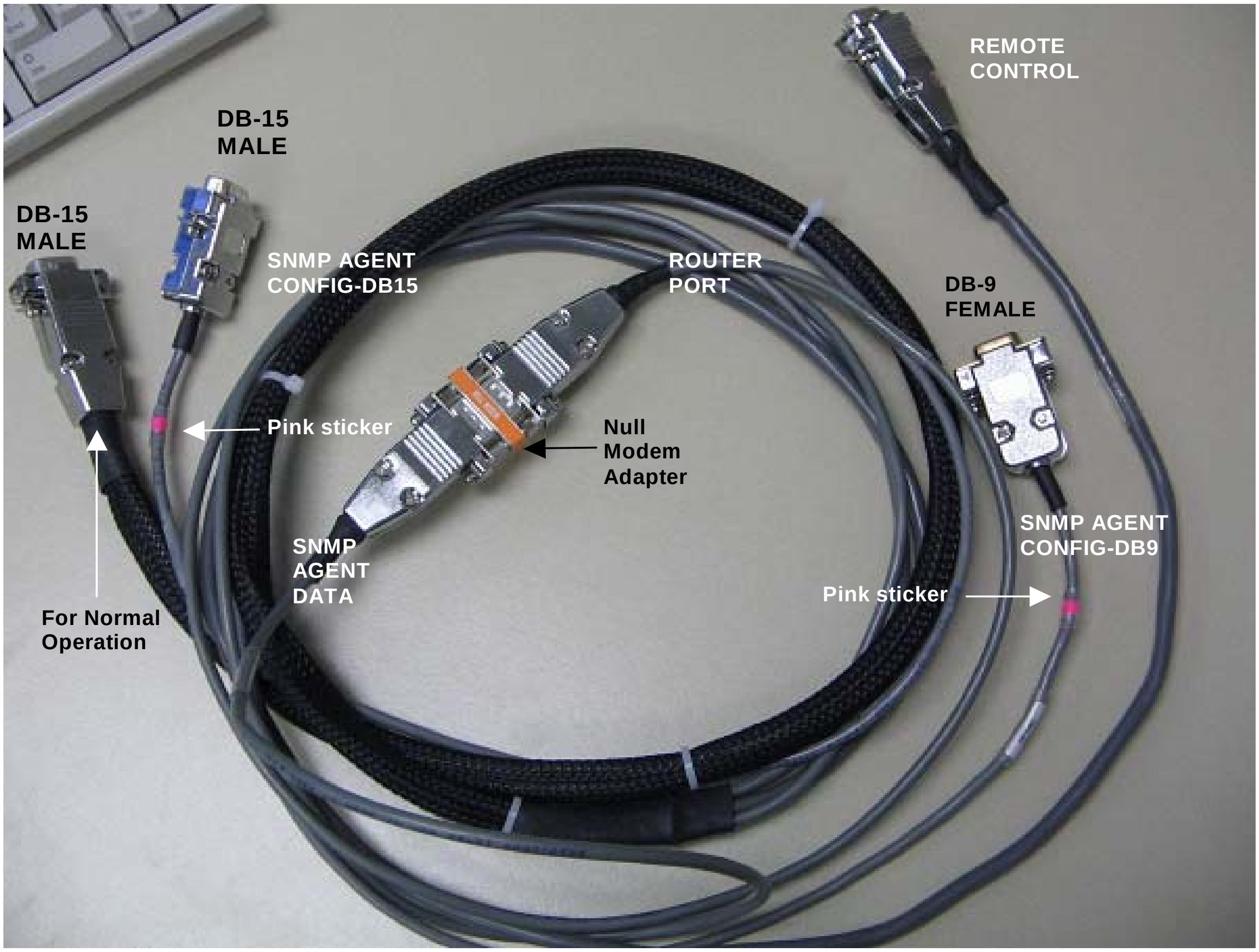

REMOTE CONTROL
DB-15 MALE
DB-15 MALE
SNMP AGENT CONFIG-DB15
ROUTER PORT
DB-9 FEMALE
Pink sticker
Null Modem Adapter
SNMP AGENT CONFIG-DB9
SNMP AGENT DATA
Pink sticker
For Normal Operation

Figure 2-13: DB15 & DB9 Cable and Mini Null Adapter

2.6.1.1. DB15 Male Connectors

There are two DB15 male connectors (Figure 2-13). Only one of connectors is connecting to the “CTRL/UPGRADE” port depending on the option. The connector with the pink stripe (around the cable as shown in Figure 2-13 or on the shell as shown in Figure 2-14), labelled “**SNMP AGENT CONFIG-DB15”**, is only used for upgrading and configuring the SNMP agent. The other DB15 connector is used during normal operation and to upgrade router firmware.

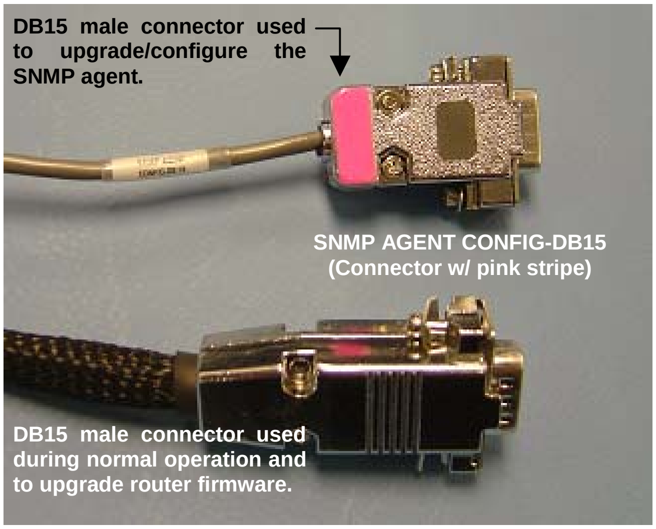

DB15 male connector used to upgrade/configure the SNMP agent.
SNMP AGENT CONFIG-DB15 (Connector w/ pink stripe)
DB15 male connector used during normal operation and to upgrade router firmware.

Figure 2-14: DB15 Male Connectors

2.6.1.2. DB9 Female Connectors

There are 4 DB9 female connectors. The two connectors "**ROUTER PORT**" and "**SNMP AGENT DATA**" are connected through the mini null modem adapter during normal operation. (See Figure 2-15) The connector labelled "**REMOTE CONTROL**" is used for external remote control. The "**ROUTER PORT**" connector is also used for router firmware upgrade. "**SNMP AGENT CONFIG-DB9**" connector is used to configure and upgrade the SNMP agent.

2.6.1.3. Cable Pinout and Pin Definition

The DB15 to DB9 cable is essential for the normal operation of the router with Ethernet support. The table below summarizes the pinout of the DB15 connector to the three DB9 connectors.

DB15 "SNMP AGENT CONFIG-DB15"	Definition (RS232)	DB9 "SNMP AGENT CONFIG-DB9"
Pin 5	DTE's Rx	Pin 2
Pin 7	DTE's Tx	Pin 3
Pin 3	Ground	Pin 5

Table 2-7: SNMP Agent Configuration Cable Pinout and Pin Definition

DB15 Normal Operation Cable	Definition (RS422)	Definition (RS232)	DB9 "REMOTE CONTROL"	DB9 "SNMP AGENT DATA"	DB9 "ROUTER PORT"
Pin 1		DTE's Rx			Pin 2
Pin 2		DTE's Tx			Pin 3
Pin 3		Ground			Pin 5
Pin 4		DTE's Rx		Pin 2	
Pin 6		DTE's Tx		Pin 3	
Pin 8	Ground	Ground	Pin 1		
Pin 9	DTE's Rx-	DTE's Rx	Pin 2		
Pin12	DTE's Tx+	DTE's Tx	Pin 3		
Pin 15	Ground		Pin 4		
Pin 11	Ground	Ground	Pin 5		
Pin 14	Ground		Pin 6		
Pin10	DTE's Rx+	DTE's RTS	Pin 7		
Pin 13	DTE's, Tx-	DTE's CTS	Pin 8		
			Pin 9		

Table 2-8: Normal Operation DB15 to DB9s Cable Pinout and Pin Definition

If using your own cable and connectors for normal operation with 10XL communication, the following wiring information is provided to properly configure your hardware:

Step 1: Cross connections on high density DB15 side:

(a) Connect pin 1 to pin 6.
(b) Connect pin 2 to pin 4.
(c) Connect pin 3 to Ground.

Step 2: Configure the port according to the following table in order to create an appropriate cable:

High Density DB15 (Male Connector)	Definition (RS422)	Definition (RS232)
Pin 8	Ground	Ground
Pin 9	DTE's Rx-	DTE's Rx
Pin12	DTE's Tx+	DTE's Tx
Pin 15	Ground	
Pin 11	Ground	Ground
Pin 14	Ground	
Pin10	DTE's Rx+	DTE's RTS
Pin 13	DTE's, Tx-	DTE's CTS

Table 2-9: DB15 Pin Definitions for RS422 and RS232 Interface

Step 3: The **"CTRL/UPGRADE" port** is wired at the factory as a RS232 DCE port. To use **RS422** serial interface for remote control, **open the top cover** and move the **grey cable labelled "3"** to header **J7** on **A1200-K7700PTX** board with **red wire** facing **Pin 1** of the header (**pin 1** is indicated by a **white dot** at the corner of the header).

2.6.2. Connection for Normal Operation

1. Connect the DB15 connector (the connector without the pink stripe) to **CTRL/UPGRADE** port.

2. Use the 9-pin male-to-male null modem adapter to connect the connectors labelled as "**ROUTER PORT**" AND "**SNMP AGENT DATA**" on the cable.

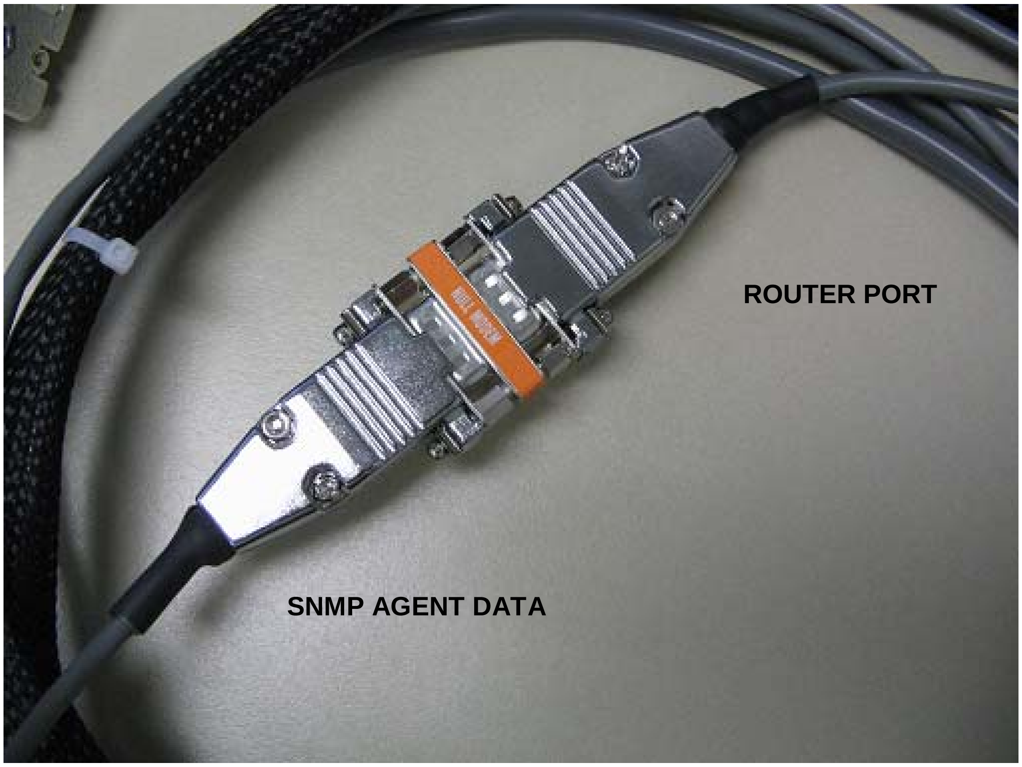


Figure 2-15: Essential Connection for Normal Operation

2.6.3. Connecting the Router (with Ethernet) Using an External Serial Protocol

The X1200 series routers can be controlled from router control devices or can control other devices employing industry standard router control protocols. Currently the only control protocol supported is the Grass Valley Ten-XL ASCII protocol. The control device is connected to the router with the Ethernet option using the DB9 connector — labelled as "**REMOTE CONTROL**" on the cable provided. The *REMOTE CTL* menu is used to configure the "**REMOTE CONTROL**" port for external control using the *Baud Rate*, *Serial Format*, *Serial Address* and *Serial Control* menu items. See section 3.1.4 for information about configuring the "**REMOTE CONTROL**" port parameters. See chapter 5 for detailed information on controlling the router.

This port is wired at the factory as a RS232 DCE port as shown in Table 2-10.

DB9 Remote Control Pin #	Router End (DCE) Description	Direction	User End (DTE) Name
1	Ground		Ground
2	Transmit Output	→	Rx
3	Receive Input	←	Tx
4			
5	Ground		Ground
6			
7	Clear to Send Input	←	RTS
8	Request to Send Output	→	CTS
9			

Table 2-10: RS232 DCE Port Pin Definition

To use RS422 serial interface for remote control, open the top cover and move the grey cable labelled “3” to header J7 on A1200-K7700PTX board. The pin definition of RS422 interface is shown in Table 2-11.

DB9 Remote Control Pin #	Router End (DCE) Description	Direction	User End (DTE) Name
1	Ground		Ground
2	Transmit (-) Output	→	Rx-
3	Receive (+) Input	←	Tx+
4	Ground		Ground
5	Ground		Ground
6	Ground		Ground
7	Transmit (+) Output	→	Rx+
8	Receive (-) Input	←	Tx-
9			

Table 2-11: RS422 Pin Definition

2.6.4. Connecting the Remote Control Panel for the Router with ETH option

Follow the same procedure outlined in section 2.3 to connect the remote control panel to the router.

2.6.5. Configuring the Network

To configure the network settings of the product, select *Network Configuration* from the *Main Menu*.

To go to the main menu:

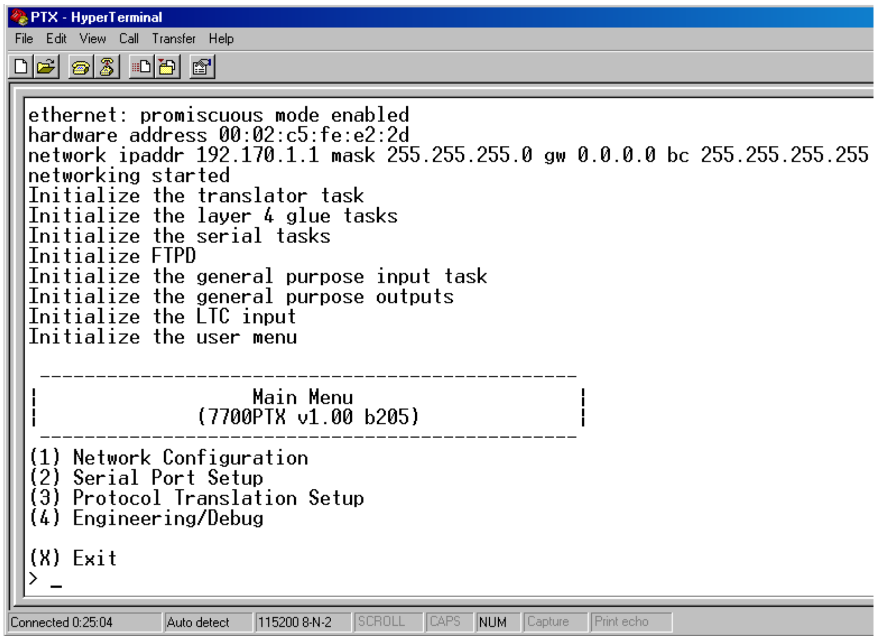
1. Power off the router unit.
2. Disconnect the DB15 and the “*CTRL/UPGRADE*” port from the real panel.
3. Connect the second DB15 male connector labelled “**SNMP AGENT CONFIG-DB15**” (the connector with pink stripe) to the “*CTRL/UPGRADE*” port.
4. Connect an adapter cable to a PC running a console or terminal application (such as Windows HyperTerminal) to the “**SNMP AGENT CONFIG-DB9**” connector.
5. Start the terminal program.

6. Configure the port settings of the terminal program as follows:

Baud	**115200**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

7. Power on the router unit.

8. After bootup, a screen similar to the following should be displayed:



```
ethernet: promiscuous mode enabled
hardware address 00:02:c5:fe:e2:2d
network ipaddr 192.170.1.1 mask 255.255.255.0 gw 0.0.0.0 bc 255.255.255.255
networking started
Initialize the translator task
Initialize the layer 4 glue tasks
Initialize the serial tasks
Initialize FTPD
Initialize the general purpose input task
Initialize the general purpose outputs
Initialize the LTC input
Initialize the user menu

 ------------------------------------------------
|                   Main Menu                    |
|              (7700PTX v1.00 b205)              |
 ------------------------------------------------
(1) Network Configuration
(2) Serial Port Setup
(3) Protocol Translation Setup
(4) Engineering/Debug

(X) Exit
> _
```

9. Go to Network configuration by selecting 1 from the main menu. If DHCP is desired, the *Use DHCP* field should be set to *true*. Otherwise, input the IP address, subnet mask, and gateway (if any), then set the *Use DHCP* field to *false*.

10. Once the network settings are configured, select *Save and Exit* before exiting the *Network Configuration* menu. The board must be rebooted for network changes to take effect.

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3. OPERATION

The router electronics is housed in a 1RU rack mount frame and is controlled from the built-in front panel controls. Each model can also be purchased with an optional rack mount remote control panel that replaces the built-in control panel. Operation of the remote control panel is identical to the built-in control panel. A second control panel can also be purchased for the routers. This panel is connected to the **REMOTE CTL** port and allows the user to access all of the router functions except the *Setup* menu. All units can also be controlled by contact closures on the GPI control port or through the **REMOTE CTL** serial remote control port using Grass Valley switcher protocol.

3.1. OVERVIEW OF THE FRONT PANEL DISPLAY AND CONTROLS

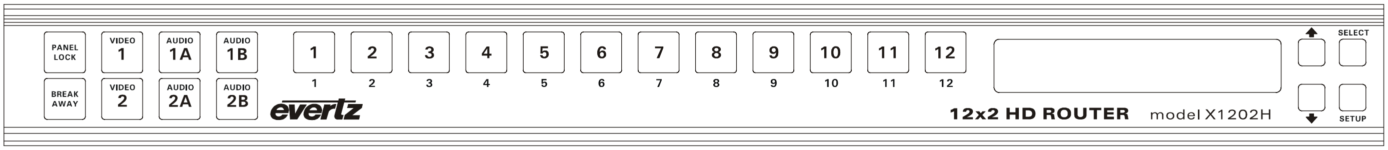
PANEL LOCK
VIDEO 1
AUDIO 1A
AUDIO 1B
1
2
3
4
5
6
7
8
9
10
11
12
BREAK AWAY
VIDEO 2
AUDIO 2A
AUDIO 2B
evertz
12x2 HD ROUTER
model X1202H
SELECT
SETUP

Figure 3-1: X1200 Front Panel Layout

The front panel layout for the X1202S and X1202H routers are identical.

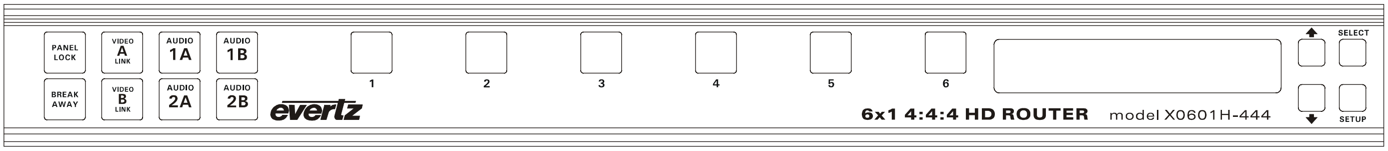
PANEL LOCK
VIDEO A LINK
AUDIO 1A
AUDIO 1B
1
2
3
4
5
6
BREAK AWAY
VIDEO B LINK
AUDIO 2A
AUDIO 2B
evertz
6x1 4:4:4 HD ROUTER
model X0601H-444
SELECT
SETUP

Figure 3-2: X0601H-444 Front Panel Layout

3.1.1. Video Router Controls (X1201 and X1202 Routers)

1 to 12: These 12 buttons allow the user to select between the 12 available video inputs for the two video output busses, as well as selecting the 12 available audio inputs for the four AES busses. The button caps can be removed to allow the user to provide their own legends for the buttons.

V1, V2, 1A, 1B, 2A, 2B: These six buttons are used to select the Bus to be controlled by buttons 1 to 12.

PANEL LOCK: This button locks out the use of the control panel.

The router may still be controlled from the GPI inputs or the serial remote control protocol when the front panel is Locked.

BREAKAWAY: This button initiates the breakaway selection. Pressing this button after the desired breakaway is selected performs the switch of the Video and its associated Audio breakaways.

3.1.2. Video Router Controls (X0601H-444 Routers)

1 to 6: These six buttons allow the user to select between the six available video inputs for the video output buss. The button caps can be removed to allow the user to provide their own legends for the buttons.

VA, VB: These two buttons are used to select the video Bus to be controlled by buttons 1 to 6. The Button LEDs are illuminated to show that both the A and B links will be switched together.

PANEL LOCK: This button locks out the use of the control panel.

The router may still be controlled from the GPI inputs or the serial remote control protocol when the front panel is Locked.

3.1.3. Setup Key Group

SETUP: This button is used to enter the *Setup* menu, which controls various setup options to configure the operating modes of the router. (See section 3.3 for a complete description of the *Setup* menu.) When you are in the *Setup* menu, this button is also used to back out of menu selections to the next higher menu level. When exiting the *Setup* menu, the **SETUP** button is also used to discard *menu* option settings and return to normal panel operation.

SELECT: This button is used to choose a sub-menu and navigate to the next level down in the menu structure. It is also used to make a menu selection. When exiting the *Setup* menu, the **SELECT** button is also used to save *menu* option settings and return to normal panel operation.

↑ & ↓ The arrow keys are used to navigate through various menu options at a menu level in the *Setup* menu. When the router is in *source labelling* mode, the arrow keys are used to select various characters in the source name.

3.1.4. Front Panel Display Messages

In addition to the normal operating mode displays that show the names of the inputs that have been selected, the 1200 series routers show some diagnostic messages to help the user diagnose possible system problems.

`Video Ref. Fail` This message will alternate with the current display message when the video reference signal is not present.

`DARS Ref. Fail` This message will alternate with the current display message when the Audio Reference menu item is set to DARS, and the DARS reference signal is not present. The Audio reference will default to the Video Reference in this case.

`Genlock Fail` This message will alternate with the current display message when the Audio Reference menu item is set to DARS, and neither the Video Reference or the DARS reference signal are present.

3.2. OVERVIEW OF FRONT PANEL OPERATION

3.2.1. Audio Follow Video Switching (AFV)

The X1200 series routers have one or two video busses and up to four audio busses (1A, 1B, 2A and 2B) depending on the model (see Table 1-1). The X0601H-444 series routers have one video buss and up to four audio busses (1A, 1B, 2A and 2B) depending on the model (see Table 1-1).

The X1201 routers fitted with the AES option have a dual 12 x 1 AES configuration and are shipped with one breakout panel (X1201ABO or X1201ABOB). On these units, audio busses 1A and 1B will follow the video V1 buss. (See Figure 6-2) The X1201 routers fitted with the AES4 option have a quad 12 x 1 AES configuration and are shipped with two breakout panels (X1201ABO or X1201ABOB). On these units, audio busses 1A, 1B, 2A and 2B will follow the video V1 buss. (See Figure 6-3).

The X1202 routers fitted with the AES option have a dual 12 x 2 AES configuration and are shipped with one breakout panel (X1202ABO or X1202ABOB). On these units, audio busses 1A and 1B will follow the video V1 buss and audio busses 2A and 2B will follow the video V2 buss. (See Figure 6-6 and Figure 6-7)

The X1202 routers fitted with the AES4 option have a quad 12 x 2 AES configuration and are shipped with two breakout panels (X1202ABO or X1202ABOB). On these units, output 1 from audio busses 1A, 1B, 2A and 2B will follow the video V1 buss and output 2 from audio busses 1A, 1B, 2A and 2B will follow the video V2 buss. (See Figure 6-8 and Figure 6-9).

Some early X1202 routers fitted with the AES option were shipped with two breakout panels. These units can be used in either a dual 12 x 2 configuration or quad 12 x 1 configuration where the audio busses can be associated with either video buss V1 or V2. When these units were shipped from the factory they were configured in the quad 12 x 1 mode and audio busses 1A and 1B are assigned to video buss V1. Similarly audio busses 2A and 2B are assigned to video buss V2. (See Figure 6-10 to Figure 6-13)

The X0601H-444 routers fitted with the AES4 option have a quad 6 x 1 AES configuration and are shipped with one breakout panel (X0601ABO or X0601ABOB). On these units, audio busses 1A, 1B, 2A and 2B will follow the video buss. (See Figure 6-3)

To select a crosspoint for buss V1, press the **V1** button and then select the desired input by pressing one of the buttons from **1** to **12.** Note that when buss V1 is selected, the **V1** button will light up as well as the buttons corresponding to the audio busses that are assigned to follow video buss V1. On the X0601 series routers both Video Line A and Link B buttons will light up indicating that both links will be switched together. When the desired input is selected the button for that bus will light and the video label for that input will be displayed on the front panel display. The input labels for the associated audio busses may be displayed momentarily by pressing the respective audio buss keys.

When selecting an audio bus that has been assigned to a video bus, all the buttons for that AFV assigned group will light up and any input selection will affect the whole group.

On early versions of the X1202 routers with the AES option operating in the quad 12 x 1 configuration, the Audio busses that follow the respective video busses can be changed using the *Input Setup* menu. Any audio channel that has not been assigned to an AFV group will not be affected by V1 or V2 switch selections and may be independently controlled by pressing the respective audio buss selector button.

The switch selection may be disallowed if there is no video present on the input selection, which depends on the setting of the *No Video Action* menu item in the *Input Setup* menu. A message `No Video Present` will be temporally displayed. Similarly if the Video input has been turned off using the *Video V1 and* V2 menu item in the *Input Setup* menu, the switch will be disallowed and the message `Input turned off` will be displayed. Turning off Audio inputs in the *Input Setup* menu will cause the audio switch to be ignored by any AFV switching.

3.2.2. Breakaway Audio On An Audio Follow Video Group

If the user wants to select a different audio input than what the video buss normally dictates, the router allows for a breakaway function to take place. To initiate a breakaway function, the first step is to select the desired input for the Video buss as described in section 3.2.1. Then press the **BREAKAWAY** key to enter the breakaway selection mode. The **BREAKAWAY** key will blink to indicate that the breakaway mode has been entered. At the same time all of the audio buss keys for that breakaway group will light up along with the current selected input key. To break away audio Bus 1B press the **Audio 1B** key. The **Audio 1B** key will blink to indicate the specific breakaway buss. Press the key for the desired input selection for the audio 1B buss. The selected input key will also blink indicating that it will be selected for audio buss 1B when the breakaway is completed. The other input key that is still lit represents the buss selection for the V1 buss and the 1A audio buss that have not changed. The breakaway is now set up. To complete the breakaway, press the **BREAKAWAY** key again. The **BREAKAWAY** key and the two input keys will light up on the panel.

To identify which input belongs to which buss, press the button for the buss in question. Only the input button and the button for that buss will light up and all other keys will be temporally extinguished. During that short interval the display will show the input label for that input key.

To cancel the breakaway simply press the next input selection. At this time all the busses in that AFV group will track to that input selection.

It is also possible when in breakaway mode to select breakaways for all the Audio busses that are assigned to follow the video. It is also possible for the breakaway to work on the video bus. This allows for a salvo switch where all audio and video busses are switched to different inputs.

Turning off Audio inputs in the *Input Setup* menu will cause the audio switch to be ignored by any AFV Breakaway switching.

3.2.3. Independent Audio Bus Switching

On early versions of the X1202 router that can be configured as a quad 12 x 1 AES, the audio busses can be switched independently of the video buss. If the user wants to have an audio bus independent of an AFV group switch, then that bus needs to be released from its AFV assignment using the *Input Setup* menu. This shall be described later in the manual. If audio 1B has been released from its AFV assignment it will switch as an independent bus.

When the user selects the **1B** key it will light up and all other bus selection keys will extinguish. One of the twelve input keys will light up and the display will show the audio input label for the selection. Pressing another input key will cause that input to be selected on that bus only.

In independent Audio Bus switching, switch selection will be disallowed if the input has been turned off in the *Input Setup* menu. A message **"Input turned off"** will be temporally displayed.

3.3. FRONT PANEL SETUP MENU

REFERENCE
- Video Reference
- Output Timing
- Input Timing
- Audio Reference

TRANSITION
- Switch Line
- Video Line Sync
- Audio SoftSwitch
- EA SoftSwitch

INPUT SETUP
- AES Mode
- Audio Follow V1
- Audio Follow V2
- Video V1 and V2
- Audio 1A inputs
- Audio 1B inputs
- Audio 2A inputs
- Audio 2B inputs
- No Video Action
- Input Standard

INPUT LABEL
- Input Label File
- Label Video
- Label Audio 1A
- Label Audio 1B
- Label Audio 2A
- Label Audio 2B

OUTPUT SETUP
- Setup V1 Output
- Setup V2 Output

BYPASS
- Bypass All A & V

GPI SETUP
- Disable All GPI's
- Enable All GPI's
- GPI Encoding
- GPI Type
- Program GPI's

GPO SETUP
- Disable All GPO's
- Enable All GPO's
- GPO Encoding
- GPO Type
- Program GPO's

REMOTE CTL
- Baud Rate
- Serial Format
- Serial Address
- Serial control
- Protocols

PRESETS
- Load Factory
- Load Preset 1
- Load Preset 2
- Save Preset 1
- Save Preset 2

UTILITY
- XPT Panel Lock
- Firmware Version
- Firmware Update
- Firmware Bin

EXIT
- Save and Exit
- Exit no Save
- Return to Menu

Figure 3-3: Overview of the Setup Menu

The *SETUP* menu system uses a 16 digit alphanumeric display and provides a quick intuitive method of configuring the router. The *SETUP* Menu contains items that pertain to the overall operation of the router. These items are normally only required to be set up at installation time and do not pertain to the day-to-day operation of the unit.

3.4. NAVIGATING THE SETUP MENU

To enter the on-screen menu system, press the **SETUP** key. This will bring you to the main *Setup* menu where you can use the ↑ **&** ↓ keys to move up and down the list of available sub-menus. Top level menu items are shown in UPPERCASE. Once you have chosen the desired sub-menu, press the **SELECT** key to select the next menu level.

Once in a sub-menu, there may be another menu layer (shown in Title Case), or there may be a list of parameters to adjust (shown in lower case). If there is another set of menu options, use the ↑ **&** ↓ keys to select the desired menu item and press the **SELECT** key. Continue this process until you get to the bottom of the menu tree where the list of parameters to be adjusted is shown.

To adjust any parameter, use the ↑ **&** ↓ keys to move up or down to the desired parameter. To view the possible values for that item, press the **SELECT** key. The current value for that parameter will be blinking. Pressing the ↑ **&** ↓ keys allows you to display the possible values for the selected menu item. The various menu values that are not currently selected will NOT be blinking. When you have stopped at the desired value, press the **SELECT** key to save your selection. The value will begin blinking; indicating that it is the current value. To move up one level in the menu press the **SETUP** key. The parameter value that is blinking will become the current value when you exit the menu system by selecting the *Exit and Save* menu option.

You can select other parameters from that sub-menu by using the ↑ **&** ↓ keys, followed by the **SELECT** key. Alternately you can move up one menu item by pressing the **SETUP** key.

When you have made all the desired changes, press the **SETUP** key one or more times until you return to the top of the Menu tree where you will be presented with an Exit menu. Using the ↑ **&** ↓ keys, choose one of the three options and then press the **SELECT** key. A description of the actions taken for each *Exit* menu option is shown below. You will be prompted to press the **SELECT** key one more time to confirm your decision. Pressing the **SETUP** key at this time will return you to the *Exit* menu level.

SAVE AND EXIT	Selecting this option will permanently save all the changes you made while in the *Setup* menu. This option will enable the user to exit the *Setup* menu and return to normal front panel operation.
EXIT NO SAVE	Selecting this option will discard all the changes you made in the *Setup* menu and restore the settings that were in use when you entered the *Setup* menu. This menu option will enable the user to exit the *Setup* menu and return to normal front panel operation.
RETURN TO MENU	This menu option will enable the user to return to the top level of the *Setup* menu at the menu item you last selected.

Each of the menu items, with function explanations, is described in the following sections.

3.5. FRONT PANEL SETUP MENU – MAIN MENU

The Front panel *Setup* menu is arranged in a layered structure that groups similar configuration items together. The following section provides a brief description of the first level of menus that appear when you enter the menu. Selecting one of these items will take you to the next menu level. Sections 3.6 to 3.16 provide detailed descriptions of each of the sub-menus. The tables in sections 3.6 to 3.16 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

REFERENCE	This menu is used to set up the Genlock Reference.
TRANSITION	This menu is used to set up the Transition type for audio and video.
INPUT SETUP	This menu is used to assign which video and audio inputs are enabled and which audio busses are assigned to follow each of the video busses.
INPUT LABEL	This menu is used to change the default labels for the video and audio inputs.
OUTPUT SETUP	This menu is only available on the X1202H HD Router. It is used to select whether the video outputs will be reclocked or non-reclocked.
BYPASS	This menu is used to manually activate the video and audio bypass relays.
GPI SETUP	This menu is used to configure the 14 General Purpose inputs.
GPO SETUP	This menu is used to configure the 4 General Purpose outputs.
REMOTE CONTROL	This menu is used to configure the Serial Remote Control port.
PRESETS	This menu is used to save and recall user presets, and to restore the router to its factory default condition.
UTILITY	This menu is used to view the current firmware version, to upload new firmware into the router and engage Crosspoint Lock.

3.6. CONFIGURING THE ROUTER REFERENCES

The *REFERENCE* menu is used to configure the reference timing for the router. The chart below shows the items available in the *REFERENCE* menu. On most routers, only the *Reference video* menu item is available. The other menu items are used for configuring the SoftSwitch™ features of routers fitted with the SoftSwitch™ option. Sections 3.6.1 and 3.6.4 provide detailed information about each of the sub-menus.

Video Reference	Configures the video reference type.
Output Timing	Adjusts the timing of the video output V1 in relation to the Video Reference input on SoftSwitch™ equipped routers.
Input Timing	Adjusts the line synchronizer timing of the video output V1 in relation to the Video Reference input on SoftSwitch™ equipped routers.
Audio Reference	Selects the Audio reference on SoftSwitch™ equipped routers.

3.6.1. Setting Up the Video Reference

The *Video Reference* menu is used to select the type of video reference being used for the router. The Video reference is used to control the switching point in the video when crosspoints are changed. When the video reference connected does not match the setting of this menu item the front panel will show a message `Video Ref Fail`.

- *REFERENCE*
  - *Video Reference*
    - *ref:ntsc/60*
    - *ref:ntsc/59.94*
    - *ref:pal/50*
    - *ref:none*

The standard definition X1200S series router can accept only NTSC or PAL video references.

The *ref:none* selection is only available on non SoftSwitch™ routers. When this option is selected, the router may be operated without a video reference and the video switch point will occur at a random point. The front panel message `Video Ref Fail` will not be shown.

REFERENCE
  Video Reference
    ref:ntsc/60
    ref:ntsc/59.94
    ref:pal/50
    ref:1080i/60
    ref:1080i/59.94
    ref:1080i/50
    *ref:1080p/30**
    *ref:1080p/29.97**
    *ref:1080p/25**
    ref:1080p/24sF
    ref:1080p/23.98sF
    ref:720p/60
    ref:720p/59.94
    ref:none

The high definition X1200H series router can accept NTSC or PAL, or Tri-level sync HD video references.

In general, the reference video should be chosen to match the standard of the video program material passing through the router. For HD program video, a standard definition reference video can be used as long as it is at the same frame rate.

e.g.	HDSDI PGM Video	Analog Genlock Video
	1080i/59.94	NTSC/59.94 1080i/59.94
	1080i/50	PAL/50 1080i/50
	720p/59.94	NTSC/59.94 720p/59.94

- These Video Reference formats are not available on the SS and ESS versions of the X1200H

The *ref:none* selection is only available on non SoftSwitch™ routers. When this option is selected, the router may be operated without a video reference and the video switch point will occur at a random point. The front panel message `Video Ref Fail` will not be shown.

3.6.2. Setting Up the Video Output Timing (SoftSwitch™ and Embedded SoftSwitch™ routers only)

REFERENCE
  Output timing
    V phase = 1

This menu item is used to set the vertical phase of the V1 output on the SoftSwitch™ and Embedded SoftSwitch™ versions of the routers. The *V phase* has valid values from 1 to the number of lines per frame and adjusts V1 output phase delayed with respect to reference video. The timing of the V2 output is not adjustable.

When the *V phase* is adjusted the “V phase” label will blink when the incoming signal that was selected when entering the *Setup* menu is within the line synchronizer range.

3.6.3. Setting Up the Video Line Synchronizer Timing (SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

REFERENCE
Input timing
line phase = 0

This menu item is used to set the line synchronizer acceptance range with respect to the video reference for the V1 output on the SoftSwitch™ and Embedded SoftSwitch™ routers.

Setting *V phase* to "1" and line phase to "0" are the standard settings. This will allow any incoming video signal with a +/- one half line timing with respect to the applied video reference, to switch cleanly on the V1 bus. The output on V1 will remain constant at 1 line delayed with respect to the applied video reference signal. The timing of the V2 output is not adjustable.

The line phase has the following valid values:

1202S	0 to +/-700 samples (approx. +/- 25 μsec)
1202H	0 to +/-940 samples (approx. +/- 12 μsec) for 1080 line standards
1202H	0 to +/-620 samples (approx. +/- 8 μsec) for 720 line standards

***Line Phase* is specific to a particular video standard. Therefore, if the *Input Standard* is changed from a 1080 line standard to a 720 line standard, the *Line Phase* will be reset to 0, and must be set up again for the new video standard.**

The *V phase* and *Line phase* adjustments are REAL TIME ADJUSTMENTS and will effect router timing even without the *EXIT AND SAVE* menu option. The *EXIT AND SAVE* menu item will save the values while the *EXIT AND NO SAVE* menu item will return the router to the original values. For difficult timing situations the presets can be used for different timing setups.

3.6.4. Setting Up the AES Audio Reference (SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

REFERENCE
Audio Reference
lock to video
lock 48 kHz DARS

This menu is used to select the type of audio reference used for the SoftSwitch™ and Embedded SoftSwitch™ routers. These routers can accept a DARS reference signal to insure the Z bit alignment on the AES outputs. If *video* is selected, the Z bit alignment of the AES outputs is random. If *DARS* is selected and the DARS reference is absent, the router will revert to *video* lock. In order for the SoftSwitch™ technology to function correctly on the SS routers, the audio sources must be synchronous with the chosen *Audio Reference.*

In order for the Embedded SoftSwitch™ technology to function correctly on the ESS routers, the AES sources must be synchronous with the *Video reference* and the A*udio Reference* for the router should be set to *video*. (If you are using a DARS reference with ESS, then the DARS reference must be locked to the video reference.) If Embedded SoftSwitch™ functionality is not required (e.g. Dolby E in the embedded stream) then the AE SoftSwitch can be disabled and the router can function the same as a SoftSwitch™ equipped router.

3.7. CONFIGURING THE VIDEO AND AUDIO TRANSITIONS

3.7.1. Configuring the Switch Line

TRANSITION
Switch Line
Switch line = 10

On the Standard Definition Routers this menu allows the user to select which line of the video reference the switching will occur on. Valid values are 1 to 64, with the default switch line set to 10.

TRANSITION
Switch Line
Switch line = 7

On HD routers this menu allows the user to select which line of the video reference the switching will occur on.

On routers that do not have SoftSwitch™ or Embedded SoftSwitch™, the switch line number will be the line number of the video reference.

When using a bi-level sync reference on SoftSwitch™ and Embedded SoftSwitch™ equipped routers, the switch line number will be the equivalent line number in HD as shown in Figure 3-4 and Figure 3-5. When using a tri-level sync reference the switch line number will be the line number of the HD video reference. Valid values are 1 to 64, with the default switch line set to 7 as per SMPTE RP168-2002. For proper timing operation the *Input Standard* setting on the *INPUT SETUP* menu must be set to match the input video format. (See section 3.8.5)

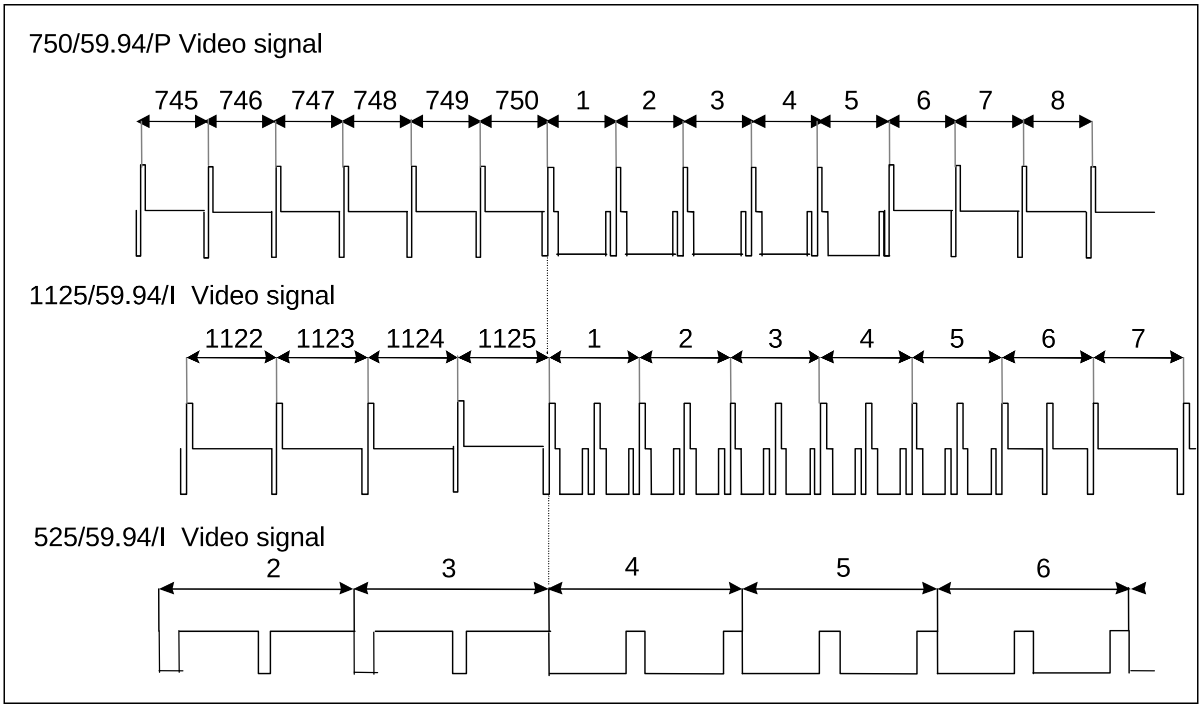

Figure 3-4: Switch Line Selection in 59.94 Hz Field Rate Systems

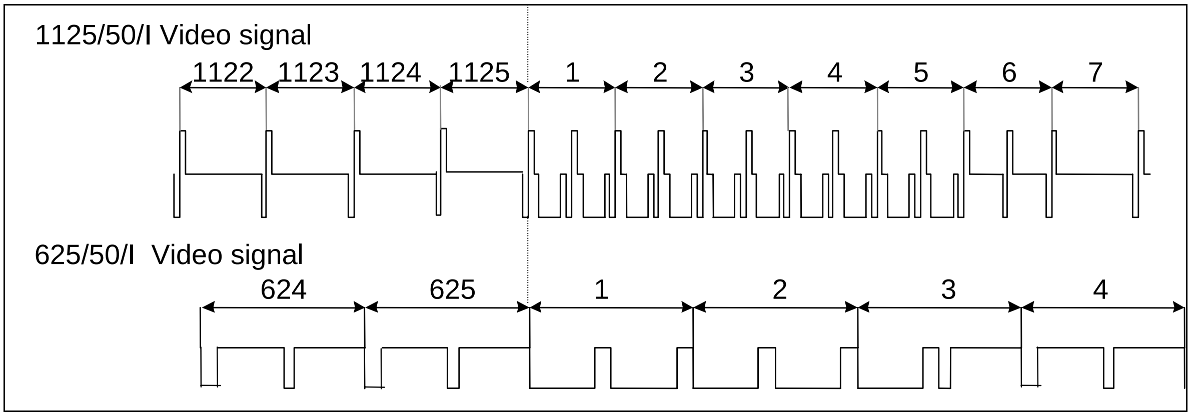

Figure 3-5: Switch Line Selection in 50 Hz Field Rate Systems

3.7.2. Enabling the Video Line Synchronizer on for Clean Video Switches (SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

TRANSITION
  Video Line Sync
    line sync:off
    line sync on

This menu allows the user to control the video line synchronizer function on the SoftSwitch™ and Embedded SoftSwitch™ equipped routers. The Line Synchronizer control only affects the V1 video buss output.

When the line synchronizer is set to *Off*, the router will provide a hard switch on the V1 buss.

When the line synchronizer is set to *On*, the router will provide a clean switch on the V1 buss when the input signals are within the line synchronizer range. If the input signal is outside the line synchronizer range the router will attempt to synchronize the signal but may cause timing shifts in the output picture.

3.7.3. Enabling the AES Audio SoftSwitch™ for Clean Audio Switches (SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

The *Audio SoftSwitch* menu item provides a series of sub-menus that allow the user to enable the Audio SoftSwitch™ for each audio buss on the SoftSwitch™ and Embedded SoftSwitch™ equipped routers. For simplicity, only the menu items for the 1A1 buss are shown in the manual.

TRANSITION
  Audio SoftSwitch
    1A1 softswitch
      s.switch:off
      s.switch:on
      s.switch:nonpcm

When Audio SoftSwitch™ for an audio buss is On, the router will provide a clean AES switch on the respective audio busses associated with the V1 buss.

Audio SoftSwitch™ turned *Off* for the 1A1 audio bus
Audio SoftSwitch™ turned *On* for the 1A1 audio bus – use for linear PCM audio
Audio SoftSwitch™ turned *On* for the 1A1 audio bus – special mode for use with non PCM audio sources such as Dolby E.

3.7.4. Enabling the Embedded Audio SoftSwitch™ for Clean Audio Switches (Embedded SoftSwitch™ equipped routers only)

TRANSITION
  EA SoftSwitch
    embedded ss:off
    embedded ss:on

This menu allows the user to enable the embedded audio SoftSwitch™ on the Embedded SoftSwitch™ equipped routers. When Embedded Audio SoftSwitch is On, the router will provide a clean audio switch on linear PCM audio embedded on the V1 buss.

This function can be turned *On* or *Off* and should be *Off* when switching non-linear PCM embedded audio such as Dolby E.

3.8. CONFIGURING THE VIDEO AND AUDIO INPUTS

The *INPUT SETUP* menus are used to configure the input video standard for the router, disable unused video and audio inputs, and configure which Audio busses will follow video busses 1 and 2 in an 'Audio follow video' switch. The chart below shows the items available in the *INPUT SETUP* menu. Sections 3.8.1 and 3.8.3 provide detailed information about each of the sub-menus.

AES Mode	Configures whether the AES will be quad 12 x 1 or dual 12 x 2 configuration
Audio Follow V1	Configures which audio busses will follow the Video 1 buss
Audio Follow V2	Configures which audio busses will follow the Video 2 buss
Video V1 and V2	Allows the user to disable unused video inputs
Audio 1A inputs	Allows the user to disable unused inputs on the Audio 1A buss
Audio 1B inputs	Allows the user to disable unused inputs on the Audio 1B buss
Audio 2A inputs	Allows the user to disable unused inputs on the Audio 2A buss
Audio 2B inputs	Allows the user to disable unused inputs on the Audio 2B buss
No Video Action	Allows the user to determine the operation when there is not video input
Input Standard	Allows the user to set the input video standard for the router

3.8.1. Setting the Configuration of the AES Router Section (Early X1202H-AES Routers with 2 breakout panels only)

INPUT SETUP
  AES mode
    4(12 x 1)
    2(12 x 2)

Some early units fitted with the AES option were shipped with two breakout panels.

In the 2(12 x 2) configuration audio busses 1A and 1B are associated with video buss 1, and 2A and 2B are associated with video buss 2. The *Audio follow V1* and *Audio follow V2* menu items are disabled.

In the 4(12 x 1) configuration the four audio busses can be associated with either video buss V1 or V2 using the *Audio follow V1* and *Audio follow V2* menu items.

3.8.2. Setting Up the Audio Follow Video Groups

On early units fitted with the AES option that were shipped with two breakout panels, when the *AES Mode* is set to 4(12x1), the *Audio Follow V1* and *Audio Follow V2* menu items sets up which audio busses are assigned to follow video buss 1 and 2 respectively. For simplicity, only the menu items for the V1 are shown in the manual. These menu items are disabled when these routers are in the 2(12x2) mode, and for later routers shipped with one breakout panel.

INPUT SETUP
  A Follow V1 Setup
    AFV sel buss
    1A
    2B
    2A
    2B

When you select this menu item the V1 button will be blinking. The buttons for the Audio busses that are assigned to V1 will be On. If you make any changes the V1 button will stop blinking

To remove an assigned audio buss press one of the illuminated buttons - the LED will go Off and a message (e.g. `1A available`) will be shown momentarily on the front panel.

To assign an available audio buss, press on of the non-illuminated buttons – the LED will go On and a message (e.g. `1A assigned`) will be shown momentarily on the front panel.

To confirm your selection press the **SELECT** button. The V1 button will start blinking again indicating that you have confirmed your changes.

3.8.3. Configuring Which Inputs are Active

The *V1 and V2 Inputs, Audio 1A Inputs* and *Audio 1B Inputs* menu items allow the user to disable unused inputs. When an input is disabled, the router will not perform a switch to that input even if the front panel button is pressed. Also, disabled inputs will not cause the Input failure tally output to trigger. Disabling inputs for each of the busses operates the same way, but for simplicity, only the *V1 and V2 Inputs* will be shown in the manual.

- *INPUT SETUP*
  - *V1 and V2 Inputs*
    - *video i/p setup*

When you select this menu item the V1 and V2 buttons will be blinking. The buttons for the video inputs that are enabled will be On. If you make any changes the V1 and V2 buttons will stop blinking

To disable an input, press the corresponding button - the LED will go Off and a message (e.g. `Input xx disabled`) will be shown momentarily on the front panel.

To enable an input, press the corresponding button - the LED will go On and a message (e.g. `Input xx enabled`) will be shown momentarily on the front panel.

To confirm your selection press the **SELECT** button. The V1 and V2 buttons will start blinking again indicating that you have confirmed your changes.

On the early units fitted with the AES option that were shipped with two breakout panels; if the *AES Mode* is set to 4(12x1), the *Audio 2A Inputs* and *Audio 2B Inputs* menu items allow the user to disable unused inputs on the Audio 2A and 2B busses. On these routers, when the *AES Mode* is set to 2(12x2), the inputs for the 2A and 2B busses are taken from the 1A and 1B inputs, so these menu items are disabled.

3.8.4. Configuring When There Is No Video Input Present

- *INPUT SETUP*
  - *No video action*
    - *no video:take*
    - *no video:no take*
    - *no video:black*
    - *no video:no tak**

This menu item determines whether a selected switch will occur if there is no video present on the selected input.

When it is set to *take* the switch to the input will be made.

When it is set to *no take* the switch will not be allowed from the front panel or GPI control, but will be allowed from 10XL serial control protocol.

When it is set to *no tak** the switch will not be allowed from the front panel, GPI control or 10XL serial control protocol. When no video is present the router will echo the previous crosspoint on the 10XL serial port. When video is present the switch will be allowed and the new selection will be echoed on the 10XL serial port.

On the HD SoftSwitch™ and SD or HD Embedded SoftSwitch™ routers there is an additional mode. When it is set to *black* and the Line synchronizer is turned on, the switch will be allowed and the video output will be black. When the Line synchronizer is turned off, the switch will be allowed and the output video will contain whatever is present at the input.

3.8.5. Configuring the Router Video Standard (HD SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

INPUT SETUP
  Input Standard
    std:1080i/60
    std:1080i/59.94
    std:1080i/50
    std:1080p/24sF
    std:1080p/23.98sF
    std:720p/60
    std:720p/59.94

The high definition X1202H series routers equipped with SoftSwitch™ and Embedded SoftSwitch™ have a line synchronizer to provide clean video switches. In order for the line synchronizer to work correctly, this menu item must be used to set the video standard in use in the router.

3.9. LABELLING THE VIDEO AND AUDIO INPUTS

The X1200 Series Routers provide a simple method of identifying each of the video sources with a 16 character label. The *INPUT LABEL* menu is used to change the default input labels for the video and audio inputs. You can either input the label text from a text file (see section 3.9.1), or manually update the individual input labels from the front panel (see section 3.9.2). The chart below shows the items available in the *INPUT LABEL* menu.

On early units fitted with the AES option that were shipped with two breakout panels; if the *AES Mode* is set to 4(12x1), the *Label Audio 2a* and *Label Audio 2b* menu items allow the user to label the inputs on the Audio 2A and 2B busses. On these routers, when the *AES Mode* is set to 2(12x2), the inputs for the 2A and 2B busses are taken from the 1A and 1B inputs therefore these menu items are disabled.

Input Label File	Allows the user to upload and download input labels from a text file
Label Video	Allows the user to label the Video inputs
Label Audio 1a	Allows the user to label the Audio 1A inputs
Label Audio 1b	Allows the user to label the Audio 1B inputs
Label Audio 2a	Allows the user to label the Audio 2A inputs
Label Audio 2b	Allows the user to label the Audio 2B inputs

3.9.1. Uploading/Downloading Input Labels from a Text File

INPUT LABEL
  Input Label File
    Receive File
    Send File

This menu item is used to upload and download Input Label text files with a terminal program.

Receive File allows you to upload new input labels from a text file.

Send File allows you to download the current input labels to a text file.

It is important to make sure that the structure of the text file containing the router labels is correct, or the router will not accept any of the label definitions. The simplest way to create a file with the correct layout is to download the current labels from the router using the *Send File* menu option. You can then edit the label names and upload the new file back to the router using the *Receive File* menu option.

Any serial protocol (remote panel or GVG) that is currently open on the remote port will be closed during the Label updating procedure. The serial protocol will be re-opened once the upload or download has finished.

Use the procedure described in section 4.3 to upload label text files to the router.

3.9.2. Changing the Input Labels from the Front Panel

From the *Input Label* menu use the ↑ **&** ↓ buttons and press the **SELECT** key to select the input buss you wish to label. The method of labelling each of the inputs is the same. The button corresponding to the buss you have chosen will blink. For simplicity the manual will only describe how to label the video inputs.

Press the button corresponding to the input you wish to label. The label associated with the selected input bus will be displayed on the front panel with the leftmost character blinking. Use the ↑ **&** ↓ buttons to change the first character of the displayed label. When you change the blinking character, the buss LED will stop blinking. When you have selected the desired character, press the **SELECT** button to save the changes for the first character and advance to the next character. The buss LED will start blinking again indicating you have confirmed the changes to the first character. Follow the same procedure until you have finished entering the label. Make sure that you press the **SELECT** button after you change the rightmost character. Press the **SETUP** button to return to the *select input* menu. To change the label on another input press the desired input button and follow the same procedure. When you have changed all the labels for the selected buss, press the **SETUP** button to return to the *INPUT LABEL* menu.

3.10. CONFIGURING THE VIDEO OUTPUTS (HD ROUTERS ONLY)

The *OUTPUT SETUP* menu items are used to configure the Video Outputs on the High Definition routers. This menu is not available on the Standard Definition routers. The chart below shows the items available in the *OUTPUT SETUP* menu. Section 3.10.1 provide detailed information about the sub-menus.

Setup V1 Output	Configures whether the outputs from Video Buss 1 will be reclocked or non-reclocked
Setup V2 Output	Configures whether the outputs from Video Buss 2 will be reclocked or non-reclocked

3.10.1. Selecting the Reclocking Mode of the HD Video Outputs (HD Routers only)

OUTPUT SETUP
  Setup V1 Output
    reclocked
    non reclocked

The *Setup V1 Output* and *Setup V2 Output* menu items determine if the respective video outputs will be reclocked or not. For simplicity, only the menu items for V1 are shown in the manual.

When the router is operated in the *relcocked* mode it will pass only SMPTE 292M video.

When the router is operated in the *non relcocked* mode it will pass SMPTE 292M, SMPTE 259M and SMPTE 310M video.

3.11. MANUALLY ACTIVATING THE BYPASS RELAYS

The *BYPASS* menu items are used to manually activate the Video and Audio bypass relays. (If the Bypass Relay Option is not installed this menu will be disabled.) The chart below shows the items available in the *BYPASS* menu. The relays will not activate until you exit the menu system with the *Exit and Save* menu option. Section 3.11.1 provides detailed information about the sub-menu.

Bypass All A & V	This menu allows the user to manually activate all video and audio bypass relays.

3.11.1. Manually Activating All the Bypass Relays

BYPASS *Bypass All A & V* *off* *on*	Manually activates all the bypass relays when set to *On*. Releases the bypass relays when set to *Off.*

3.12. CONFIGURING THE GENERAL PURPOSE INPUTS (GPI)

The X1200 series routers can be controlled remotely by using 14 general purpose (GPI) inputs. The functions of these inputs can be programmed to suit the specific requirements of the user. The *GPI SETUP* menus are used to configure the functions of the GPI inputs. The GPIs can be configured to act independently of each other or in one of three Encoded modes. In addition a global GPI disable function allows the user to override the programmed functions of GPIs. See section 2.4 for information about connecting the GPI inputs. The chart below shows the items available in the *GPI SETUP* menu. Sections 3.12.1 to 3.12.5 provide detailed information about each of the sub-menus.

Disable all Gpi's	This menu allows the user to manually override the programmed functions of all GPI inputs and disable them.
Enable all Gpi's	This menu allows the user to turn off the manual override of the GPI inputs and return them to their programmed functions.
Gpi Encoding	This menu allows the user to choose one of four pre-defined encoding modes for the GPI inputs.
Gpi Type	This menu allows the user to select whether the GPI input will be level or edge triggered.
Program Gpi's	This menu allows the user to program different functions for the GPI inputs that are not previously assigned using one of the encoding modes.

3.12.1. Overriding (Temporarily Disable) the GPI Functions

GPI SETUP *Disable all Gpi's*	Pressing the **SELECT** key when this menu item is shown will override the programmed functions of all the GPI inputs. The GPI inputs will not respond when they are disabled.

3.12.2. Turning Off the GPI Override (Return the GPIs to their Programmed Functions)

GPI SETUP *Enable all Gpi's*	Pressing the **SELECT** key when this menu item is shown will restore the programmed functions of all the GPI inputs. Individual GPIs can be still be disabled using the *Program Gpi's* menu item (see section 3.12.5).

3.12.3. Configuring the Encoding mode for the GPI Inputs

- *GPI SETUP*
  - *Gpi Encoding*
    - *gpi enc:none*
    - *gpi enc:standard*
    - *gpi enc:hex*
    - *gpi enc:afv hex*
    - *gpi enc:std.2*

The GPIs can be configured to operate in one of three Encoded modes. In these modes, many of the GPI inputs are pre-assigned to a function. The unused inputs are still available for the user to assign to a particular function using the *Program Gpi's* menu item.

When the GPI Encoding is set to *none*, all 14 inputs are available for the user to assign to particular functions using the *Program GPI* menu item for the specific GPI. Section 3.12.5 describes how to program individual GPI functions.

Sections 3.12.3.1 to 3.12.3.3 describes how each of the GPI encoding modes work and which inputs are available for user assignment.

3.12.3.1. Standard GPI Encoding

Standard GPI encoding is designed to allow simple selection of an 'Audio follow Video' switch of one of the input groups to one of the output busses from an automation system. There are twelve GPIs to select each input and two GPIs to perform the switch of either the AFV1 or AFV2 output busses. To select a crosspoint for the V1 Buss, ground one of the twelve input selection GPIs and while it is grounded connect GPI 13 to ground to take the switch. Follow the same procedure for Video Buss 2. Note that the selection of the crosspoint will not take until you ground either GPI13 or GPI14 while holding one of the GPI selection inputs to ground.

GPI #	**Action**	**Function**
1	Low	Select Input 1
2	Low	Select Input 2
3	Low	Select Input 3
4	Low	Select Input 4
5	Low	Select Input 5
6	Low	Select Input 6
7	Low	Select Input 7
8	Low	Select Input 8
9	Low	Select Input 9
10	Low	Select Input 10
11	Low	Select Input 11
12	Low	Select Input 12
13	Falling Edge	Switch selected input to AFV1 Outputs
14	Falling Edge	Switch selected input to AFV2 Outputs

Table 3-1: Standard GPI Encoding Functions

3.12.3.2. HEX GPI Encoding

HEX GPI encoding is designed to 'Audio follow Video' or breakaway switch selection. Four inputs are encoded to select one of the twelve inputs. Eight GPI inputs perform the switch to one of the video or audio busses or one of the AFV groups. There are two GPI inputs available for user-defined functions.

GPI #	Action	Function
1	High or low Level	Four HEX encoded inputs select 1 of the 12 input busses – see Table 3-3
2		
3		
4		
5	Falling Edge	Switch selected input to V1 Output
6	Falling Edge	Switch selected input to V2 Output
7	Falling Edge	Switch selected input to 1A Output
8	Falling Edge	Switch selected input to 1B Output
9	Falling Edge	Switch selected input to 2A Output
10	Falling Edge	Switch selected input to 2B Output
11	High or low Level (only applicable when AES4 option installed)	High: GPI 7 to 10 control breakaway of audio associated with V1 video buss Low: GPI 7 to 10 control breakaway of audio associated with V2 video buss
12	Set by GPI type menu	Set by Program GPI Menu
13	Falling Edge	Switch selected input to AFV1 Outputs
14	Falling Edge	Switch selected input to AFV2 Outputs

Table 3-2: HEX GPI Encoding Functions

GPI 4	GPI 3	GPI 2	GPI 1	Input Select
Low	Low	Low	Low	Invalid selection
Low	Low	Low	High	1
Low	Low	High	Low	2
Low	Low	High	High	3
Low	High	Low	Low	4
Low	High	Low	High	5
Low	High	High	Low	6
Low	High	High	High	7
High	Low	Low	Low	8
High	Low	Low	High	9
High	Low	High	Low	10
High	Low	High	High	11
High	High	Low	Low	12
High	High	Low	High	Invalid selection
High	High	High	Low	Invalid selection
High	High	High	High	Invalid selection

Table 3-3: HEX Input Selection (HEX and AVF HEX Encoding)

3.12.3.3. AFV HEX GPI Encoding

AFV HEX GPI encoding is designed to permit separate '*Audio follow Video'* switch selection for both V1 and V2 busses. Four inputs are encoded to select one of the twelve inputs for the AFV1 group. Four inputs are encoded to select one of the twelve inputs for the AFV2 group. Two GPI inputs perform the switch to one of the AFV groups. There are four GPI inputs available for user-defined functions.

GPI #	Action	Function
1	High or low Level	Four HEX encoded inputs select 1 of the 12 input busses – see Table 3-3
2		
3		
4		
5	High or low Level	Four HEX encoded inputs select 1 of the 12 input busses – see Table 3-5
6		
7		
8		
9	Set by GPI type menu	Set by Program GPI Menu
10	Set by GPI type menu	Set by Program GPI Menu
11	Set by GPI type menu	Set by Program GPI Menu
12	Set by GPI type menu	Set by Program GPI Menu
13	Falling Edge	Switch input selected by GPI1-4 to AFV1 Outputs
14	Falling Edge	Switch input selected by GPI5-8 to AFV2 Outputs

Table 3-4: AFV HEX GPI Encoding Functions

GPI 8	GPI 7	GPI 6	GPI 5	Input Select
Low	Low	Low	Low	Invalid selection
Low	Low	Low	High	1
Low	Low	High	Low	2
Low	Low	High	High	3
Low	High	Low	Low	4
Low	High	Low	High	5
Low	High	High	Low	6
Low	High	High	High	7
High	Low	Low	Low	8
High	Low	Low	High	9
High	Low	High	Low	10
High	Low	High	High	11
High	High	Low	Low	12
High	High	Low	High	Invalid selection
High	High	High	Low	Invalid selection
High	High	High	High	Invalid selection

Table 3-5: HEX Input Selection for AFV2 (AVF HEX Encoding)

3.12.3.4. Standard 2 GPI Encoding

Standard 2 GPI encoding is designed to allow simple selection of an 'Audio follow Video' switch of one of the input groups to one of the output busses using momentary push buttons connected to the GPIs. There are twelve GPIs to select each input and two GPIs to select whether the switch applies to either the AFV1 or AFV2 output busses. To select a crosspoint for the V1 Buss hold GPI 13 at the same time as you ground one of the twelve input selection GPIs. If you want to switch both video busses at the same time then hold both GPI 13 and GPI 14 LOW at the same time as you ground one of the twelve input selection GPIs. Note that if you are holding GPI 13 or GPI 14 grounded then selection of the crosspoint will take immediately when you ground the respective GPI.

GPI #	Action	Function
1	Low	Select Input 1
2	Low	Select Input 2
3	Low	Select Input 3
4	Low	Select Input 4
5	Low	Select Input 5
6	Low	Select Input 6
7	Low	Select Input 7
8	Low	Select Input 8
9	Low	Select Input 9
10	Low	Select Input 10
11	Low	Select Input 11
12	Low	Select Input 12
13	Low	Enable AFV1 Buss Control
14	Low	Enable AFV2 Buss Control

Table 3-6: Standard GPI Encoding Functions

3.12.4. Configuring Whether the GPI Inputs are Edge or Level Activated

- *GPI SETUP*
  - *Gpi Type*
    - *Gpi 1 type*
      - *gpi type:fall*
      - *gpi type:rise*
      - *gpi type:high*
      - *gpi type:low*

This menu configures whether the GPI inputs that are available for user functions will activate on rising or falling edges, or high or low levels.

Individual menus for each GPI input allow each input to be independently configured. For simplicity only the *Gpi 1 type* menu will be shown.

3.12.5. Programming the GPI Inputs Functions

The GPI inputs can be configured to operate in one of four modes using the *Gpi Encoding* menu item. In three of these modes, many of the GPI inputs have pre-assigned functions, and the unused inputs are available for the user to program for a specific function. In the fourth mode (when the GPI Encoding is set to *none*) all 14 GPI inputs are available for the user to program for specific functions.

The *Program Gpi* menu is used to program the functions of the GPI inputs that are available for user functions. Individual menus for each GPI input allow each input to be independently configured. For simplicity, only the *Gpi 1 type* menu will be shown.

- *GPI SETUP*
  - *Program Gpi's*
    - *Program Gpi 1*
      - *disable gpi*
      - *afv1 sel. i/p*
      - *afv2 sel. i/p*
      - *v1 sel. i/p*
      - *v2 sel. i/p*
      - *1a(afv1) sel i/p*
      - *1b(afv1) sel i/p*
      - *2a(afv1) sel i/p*
      - *2b(afv1) sel i/p*
      - *1a(afv2) sel i/p*
      - *1b(afv2) sel i/p*
      - *2a(afv2) sel i/p*
      - *2b(afv2) sel i/p*
      - *10xl v1 redirect*
      - *10xl v2 redirect*
      - *line sync on/off*
      - *relay bypass*

If the GPI function is already determined by one of the encoding modes, the front panel will display a message such as `Gpi 1 Encoded.`

The *afv1* and *afv2* functions will cause the selected video and associated audio inputs to switch to the indicated output busses.

The *v1* and *v2* functions will cause the selected video input to switch to the indicated output video buss.

The *1a, 1b, 2a* and *2b* functions will cause the selected audio input to switch to the output audio buss shown in brackets. (e.g. *1a(afv1)* will cause the selected audio input to switch to the 1a audio output associated with V1.)

The *10xl v1 and V2 redirect* functions will cause the respective video buss to respond to GVG 10XL serial commands issued to address 0, in spite of the programmed *Serial Address* for that video buss. This feature allows both/either video buss to be controlled by standard Single drop GVG Protocol. See section 5.1 for further information about controlling the router using GVG 10XL Serial Protocol commands.

The Program GPI's can enable or disable the line synchronizer function using the *line sync on/off* menu option.

The Program GPI's can activate the bypass relays using the *relay bypass* menu option.

When one of these modes is selected the button corresponding to the selected input will blink. To select another input press the corresponding button (the input button LED will turn On) and confirm your selection by pressing the **SELECT** key (the input button LED will blink).

The *Disable GPI* menu item will turn off the GPI input.

3.13. CONFIGURING THE GENERAL PURPOSE OUTPUTS (GPO)

The X1200 series routers have four general purpose (GPO) outputs that can be programmed to various functions to suit the specific requirements of the user. The *GPO SETUP* menus are used to configure the functions of the GPO outputs. See section 2.4 for information about connecting the GPO outputs. The chart below shows the items available in the *GPI SETUP* menu. Sections 3.13.1 to 3.13.5 provide detailed information about each of the sub-menus.

Disable all Gpo’s	This menu allows the user to manually override the programmed functions of all GPO outputs and disable them.
Enable all Gpo’s	This menu allows the user to enable all GPO outputs and return them to their programmed functions.
Gpo Encoding	This menu allows the user to choose one of three pre-defined encoding modes for the GPO outputs.
Gpo Type	This menu allows the user to select whether the GPO output will be latched or momentary.
Program Gpo’s	This menu allows the user to program different functions for the GPO outputs.

3.13.1. Overriding (Temporarily Disable) the GPO Functions

GPO SETUP *Disable all Gpo’s*	Pressing the **SELECT** key when this menu item is shown will override the programmed functions of all the GPO outputs. The GPO outputs will be Off when they are disabled.

3.13.2. Turning Off the GPO Override (Return the GPOs to their Programmed Functions)

GPO SETUP *Enable all Gpo’s*	Pressing the **SELECT** key when this menu item is shown will restore the programmed functions of all the GPO outputs. Individual GPOs can be disabled using the *Program Gpo’s* menu item (see section 3.13.5).

3.13.3. Configuring the Encoding Mode for the GPO Outputs

GPO SETUP *Gpo Encoding* *gpo enc:none* *gpo enc:hex v1* *gpo enc:hex v2*	The GPOs can be configured to operate in one of two Encoded modes. In these modes, the GPO outputs are pre-assigned to provide encoded tallies of the router input selections for the V1 or V2 busses. Section 3.13.3.1 describes how the GPO encoding modes work. When the GPO Encoding is set to *none*, all 4 outputs are available for the user to assign to particular functions. Section 3.13.5 describes how to program the individual GPO functions.

3.13.3.1. HEX GPO Encoding

The *HEX V1* and *HEX V2* GPO encoding modes are designed to allow the four GPO outputs to give tallies for either the V1 or V2 busses respectively. The four General purpose outputs are encoded to provide tallies to indicate which one of the twelve inputs is currently routed to the video buss as shown in Table 3-7. The encoded tally is held low while the respective video input is routed to the video output buss.

GPO 4	GPO 3	GPO 2	GPO 1	Output Select
Low	Low	Low	Low	Power Off
Low	Low	Low	High	1
Low	Low	High	Low	2
Low	Low	High	High	3
Low	High	Low	Low	4
Low	High	Low	High	5
Low	High	High	Low	6
Low	High	High	High	7
High	Low	Low	Low	8
High	Low	Low	High	9
High	Low	High	Low	10
High	Low	High	High	11
High	High	Low	Low	12

Table 3-7: HEX Encoded Output Tallies

3.13.4. Configuring Whether the GPO Outputs are Latched or Momentary

- *GPO SETUP*
  - *Gpo Type*
    - *Gpo 1 type*
      - *gpo type:latch*
      - *gpo type:1/2 sec*

This menu configures whether the GPO outputs that are available for user functions will be latched or momentary (0.5 seconds in duration) when the GPO encoding is set to *none*.

Individual menus for each GPO output allow each output to be independently configured. For simplicity, only the *Gpo 1 type* menu will be shown.

3.13.5. Programming the GPO Output Functions

- *GPO SETUP*
  - *Program Gpo's*
    - *Program Gpo 1*
      - *disable gpo*
      - *power failure*
      - *output v1 fail.*
      - *output v2 fail.*
      - *ref. video fail.*
      - *any v i/p fail.*
      - *sel. v i/p fail.*
      - *sel. v1 i/p tally*
      - *sel. v2 i/p tally*

The *Program Gpo's* menu is used to program the functions of the GPO outputs that are available for user functions. Individual menus for each GPO output allow each output to be independently configured. For Simplicity, only the *Program Gpo 1* menu will be shown.

Disable GPO will turn off the GPO output

The rest of the GPO functions will cause one of the outputs to activate as a tally for various conditions as shown in the chart below.

When one of the sel. xx i/p modes is selected, the button corresponding to a previously selected input will blink. To select another input press the corresponding button (the input button LED will turn On) and confirm your selection by pressing the SELECT key (the input button LED will blink). Note that multiple inputs can be assigned to a single GPO.

3.14. CONFIGURING THE REMOTE CONTROL PORT OPERATION

The X1200 series routers can be externally controlled using the REMOTE CONTROL port, or can operate as a controller to another slave router. The *REMOTE CTL* menu is used to configure the parameters and protocol for the Remote Control Port. The chart below shows the items available in the *GPI SETUP* menu. Sections 3.13.1 to 3.13.5 provide detailed information about each of the sub-menus. Also see section 2.5 and 5 for specific information about connecting the router to the external device.

Baud Rate	This menu allows the user to set the baud rate.
Serial Format	This menu allows the user to set the serial data format (word length, parity and stop bits)
Serial Address	This menu allows the user to select the address of the router that is required for multi-drop protocols.
Serial Control	This menu allows the user to select whether the router will be the master (controller) or slave (controlled) device.
Protocol	This menu allows the user to select which control protocol will be used.

3.14.1. Selecting the Baud Rate for Remote Control Port

- *REMOTE CTL*
  - *Baud Rate*
    - *baud:9600*
    - *baud:19200*
    - *baud:38400*

This menu item is used to select the baud rate used by the Remote Control port. The baud rate normally will vary depending on the routing switcher control device. The *Serial Format, Serial Address* and *Serial Control* settings must also be set to match the desired control protocol.

3.14.2. Selecting the Serial Data Format for the Remote Control Port

- *REMOTE CTL*
  - *Serial Format*
    - *format:8.n.1*
    - *format:8.e.1*
    - *format:8.o.1*
    - *format:7.n.1*
    - *format:7.e.1*
    - *format:7.o.1*

This menu item is used to select the serial data format used by the Remote Control port. The data format normally will vary depending on the routing switcher control device. The *Baud Rate, Serial Address* and *Serial Control* settings must also be set to match the desired control protocol.

3.14.3. Selecting the Serial Control Address

REMOTE CTL
  Serial Address
    address = 1
    valid address values are 0 to 64

The GVG Ten XL protocol allows multiple devices to be addressed. The *Serial Address* menu item is used to set a unique address for each router that is connected. When the X1200 series router is operating in the *master* mode, it will send out commands to the router that matches its *serial address*. When the X1200 series router is operating in the *slave* mode, it will only respond to commands that match its *serial address.* If two X1200 series routers are connected in a master/slave configuration, then the address of both routers must be set the same. For more information about addressing both video bus outputs using the GVG Ten XL protocol see section 5.1

Use the ↑ and ↓ arrows to select the desired address and press the **SELECT** key to confirm the new address.

The *Baud Rate, Serial Format* and *Serial Control* settings must also be set to match the desired control protocol.

3.14.4. Selecting the Serial Data Control Mode

REMOTE CTL
  Serial Control
    control:slave
    control:master

This menu item is used to select whether the router will issue commands or respond to commands on the Remote Control port.

When set to *master*, the router will issue commands using the currently selected protocol.

When set to *slave*, the router will respond to the commands it receives on the control port.

The *Baud Rate, Serial Format,* and *Serial Address* settings must also be set to match the desired control protocol.

3.14.5. Selecting the External Remote Control Protocol

REMOTE CTL
  Protocols
    gvg ten xl ascii
    remote panel

This menu item is used to select the protocol used for control by routing switcher control devices.

The *Baud Rate, Serial Format, Serial Address* and *Serial Control* settings must also be set to match the desired control protocol.

When the Protocol is set to *Remote Panel* the 1202-REMOTE remote control panel can be connected to this port. In this mode, the *Baud Rate* and *Serial Format* settings are forced to *9600 baud, 8.n.2.* Also, the physical port wiring must be changed to RS-422 as described in section 2.3.2.

3.15. SAVING AND RECALLING CONFIGURATION PRESETS

The *PRESETS* menu allows the user to save specific configurations to one of two non-volatile presets. Using this menu, these presets can be restored, or the user can restore the router to its factory preset configuration. The chart below shows the items available in the *PRESETS* menu. Sections 3.13.1 to 3.13.5 provide detailed information about each of the sub-menus.

Load Factory	This allows the user to restore the router to the factory default configuration.
Load Preset 1	This allows the user to recall the router configuration in user preset 1.
Load Preset 2	This allows the user to recall the router configuration in user preset 2.
Save Preset 1	This allows the user to save the current router configuration to user preset 1.
Save Preset 2	This allows the user to save the current router configuration to user preset 2.

3.15.1. Restoring the Factory Default Settings

PRESETS
Load Factory

This menu item is used to restore the factory default values of all the programmable features in the router.

Pressing the **SELECT** key when this menu item is shown will prompt you to confirm that you want to load the Factory Default configuration. Doing this will override all of your current configuration items. To proceed, press the **SELECT** key one more time. The front panel display will briefly show a message indicating that the Factory default configuration has been loaded. The configuration will become active until you exit the menu system with the *Exit and Save* menu option.

3.15.2. Recalling a Saved User Preset Configuration

PRESETS
Load Preset 1

This menu item is used to recall the values of all the programmable features in the router saved in user preset 1. (A similar menu item allows you to recall user preset 2).

Pressing the **SELECT** key when this menu item is shown will prompt you to confirm that you want to load the user preset configuration. Doing this will override all of your current configuration items. To proceed, press the **SELECT** key one more time. The front panel display will briefly show a message indicating that the user preset configuration has been loaded. The configuration will become active until you exit the menu system with the *Exit and Save* menu option.

3.15.3. Saving the Router Configuration to a User Preset

PRESETS
  Save Preset 1

This menu item is used to save the values of all the programmable features of the router in user preset 1. (A similar menu item allows you to save into user preset 2).

Pressing the **SELECT** key when this menu item is shown will prompt you to confirm that you are saving the current configuration to the user preset. Doing this will overwrite the values currently saved in the user preset. To proceed, press the **SELECT** key one more time. The front panel display will briefly show a message indicating that the user preset configuration has been saved. The saved preset configuration will be copied to the non-volatile memory when you exit the menu system with the *Exit and Save* menu option. (It takes approximately 30 seconds to complete the copy to non-volatile memory after you exit the menu.)

3.16. MANAGING THE ROUTER FIRMWARE

The *UTILITY* menu allows the user to view the firmware, update the firmware to a new version and engage Crosspoint Lock. The chart below shows the items available in the *UTILITY* menu. Sections 3.13.1 to 3.13.5 provide detailed information about each of the sub-menus.

XPT Panel Lock	This allows the user to block crosspoint changes. The user will be unable to switch inputs.
Firmware Version	This allows the user to view the current firmware version.
Firmware Update	This allows the user to update the firmware in the router.
Firmware Bin	This allows the user to view the name of the firmware file that is currently loaded.

3.16.1. XPT Panel Lock

UTILITY
  XPT Panel Lock
    none
    Local Panel
    Remote Panel
    GPI Control
    all

This allows the user to block crosspoint changes. The user will be unable to switch inputs.

When set to *none*, changes to the crosspoint will not be blocked.

When set to *Local Panel*, the user will be unable to use the front panel to change the crosspoints.

When set to *Remote Panel*, the user will be unable to change the crosspoints using the remote panel.

When set to *GPI Control*, the user will be unable to change the crosspoints using the GPIs.

When set to *all*, crosspoint changes from all of the above inputs (*Local Panel, Remote Panel,* and *GPI Control*) will be blocked.

3.16.2. Reading the Router Firmware Version

Menu	Description
UTILITY *Firmware Version*	This menu item is used to read the firmware version of the router.

3.16.3. How to Update the Router Firmware

UTILITY
Firmware Update
Sel to upgrade

This menu item is used to initiate an upload of new firmware into the router.

Pressing the **SELECT** key when this menu item is shown will prompt you to confirm that you are updating the firmware. Doing this will erase the current firmware. To proceed, press the **SELECT** key one more time. The front panel display will show a message indicating that the router is waiting for you to upload new firmware. See section 4.2 for more information on updating the firmware.

CHAPTER 4: TECHNICAL DESCRIPTION

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4. TECHNICAL DESCRIPTION

4.1. SPECIFICATIONS

4.1.1. Video Specifications (X1200S Series)

4.1.1.1. SDI Video Inputs

Standards:	SMPTE 259M (270Mb/s, 360Mb/s, 540Mb/s)
Number of Inputs:	12
Connector:	BNC per IEC 61169-8 Annex A
Equalisation:	Automatic up to 250m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss:	> 15 dB up to 540 Mb/s
Input Timing	(V1 buss on SoftSwitch™ and Embedded SoftSwitch™ equipped models only)
Input Range:	measured with respect to the Genlock reference ± one half line when *V phase* = 1, *Fine phase* = 0

4.1.1.2. SDI Video Outputs

Standard:	Same as Input
Number of Outputs:	
X1201S	1 buss, 2 outputs, input 1 bypass protected when bypass relay option is installed
X1202S	2 busses, 2 outputs per buss, input 1 and 12 bypass protected when bypass relay option is installed.
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal
DC Offset:	0V ±0.5V
Rise and Fall Time:	200ps nominal
Overshoot:	<10% of amplitude
Return Loss:	> 15 dB up to 540 Mb/s
Wide Band Jitter:	< 0.2 UI
Output Timing	(V1 buss on SoftSwitch™ and Embedded SoftSwitch™ equipped Models only)
Output phase:	measured with respect to the Genlock reference Adjustable 1 line to a full frame of delay - set by *V phase* parameter

While the output timing is adjustable, the active video content will align to the nearest line. Output timing is measured with respect to the Genlock reference and is associated with the V1 Buss Only.

4.1.2. Video Specifications (X1200H Series and X0601H-444)

4.1.2.1. HD Video Inputs

Standards:
Reclock mode SMPTE 292M (1.5 Gb/s)
Non-reclock mode SMPTE 259M (270Mb/s, 360Mb/s, 540Mb/s), DVB-ASI, SMPTE 310M (19.4 Mb/s)
Number of Inputs: 12 (6 pair on X0601H-444)
Connector: BNC per IEC 61169-8 Annex A
Equalisation: Automatic up to 100m
with Belden 1694 or equivalent cable
(50 m on Inputs 1 and 12 when the optional Bypass relays are installed)
Return Loss: > 15 dB up to 1.5 Gb/s

Input Timing (V1 buss on SoftSwitch™ and Embedded SoftSwitch™ equipped models only)
Input Range: measured with respect to the Genlock reference
± one half line when *V phase* = 1, *Fine phase* = 0

4.1.2.2. HD Video Outputs

Standard: Same as Input
Number of Outputs:
X0601H-444 1 dual link buss, 2 outputs per link, input 1 of each link bypass protected when bypass relay option is installed. May be operated as two independent 6x1 routers.
Reclocking on links may be turned off on each buss independently in dual 6x1 mode
X1201H 1 buss, 2 outputs, input 1 bypass protected when bypass relay option is installed.
X1202H 2 busses, 2 outputs per buss, input 1 and 12 bypass protected when bypass relay option is installed.
Reclocking on outputs may be turned off on each buss independently.
Connector: BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude
Wide Band Jitter: < 0.2 UI
Return Loss: > 15 dB up to 1 Gb/s, > 12 dB up to 1.5 Gb/s
Output Timing (V1 buss on SoftSwitch™ and Embedded SoftSwitch™ equipped Models only)
Output phase: measured with respect to the Genlock reference
Adjustable 1 line to a full frame of delay - set by *V phase* parameter

While the output timing is adjustable, the active video content will align to the nearest line. Output timing is measured with respect to the Genlock reference and is associated to the V1 Buss Only.

4.1.3. Video Reference

Type:	Menu selectable - depends on video format (See section 2.1.4) NTSC or PAL Colour Black 1 V p-p Composite bi-level sync (525i/59.94 or 625i/50) 300 mV HD Tri-level Sync (X1202H versions only)
Connectors:	BNC per IEC 61169-8 Annex A
Termination:	High impedance loop through

4.1.4. AES Audio Inputs

Standards:	SMPTE 276M single ended AES
Number of Inputs:	
X1201-AES	2 groups of 12 (on one 1201ABO AES Breakout panel provided with router)
X1201-AES4	4 Groups of 12 (on two 1201ABO AES Breakout panels provided with router)
X1202-AES	2 Groups of 12(on one 1202ABO AES Breakout panel provided with router)
X1202-AES4	4 Groups of 12(on two 1202ABO AES Breakout panels provided with router)
Connector:	BNC per IEC 61169-8 Annex A on breakout panels provided with router
Signal Level:	1 V p-p ± 10%

4.1.5. AES Audio Outputs

Standards:	SMPTE 276M single ended AES
Number of Outputs:	
X1201-AES	2 busses, 2 outputs per bus
X1201-AES4	4 busses, 2 outputs per bus, On X1201 routers, input 1 bypass protected when bypass relay option is installed
X1202-AES	4 busses, 1 output per bus
X1202-AES4	8 busses, 1 output per bus On X1202 routers, inputs 1 and 12 bypass protected when bypass relay option is installed
Connector:	BNC per IEC 61169-8 Annex A on breakout panels provided with router
Signal Level:	1 v p-p
Reference:	From Video Reference. On SoftSwitch™ equipped routers, menu selectable to Video or DARS. On Embedded SoftSwitch™ equipped routers, menu selectable to Video or DARS when Embedded SoftSwitch™ is disabled. When Embedded SoftSwitch™ is enabled audio must be referenced from video reference.

4.1.6. DARS Reference (SoftSwitch™ and Embedded SoftSwitch™ equipped routers only)

Type:	Digital Audio Signal with 48Khz sample rate.
Standard:	SMPTE 276M-1995 single ended AES
Connectors:	BNC per IEC 61169-8 Annex A
Termination:	High impedance loop through

4.1.7. GPI Control Port

Number of Inputs:	14 opto-isolated, programmable functions
Number of Outputs:	4 sets of relay contacts, normally closed, programmable functions
Relay Max Ratings:	1 A at 30 V DC

4.1.8. Serial Remote Control

Standard: RS-232 or RS-422, programmable baud rate
Connector: 9 pin female "D"
Protocol: GVG Ten XL ASCII, master or slave or Remote Control Panel

4.1.9. Electrical

Voltage: Auto ranging 100 - 240 Volts AC, 50/60 Hz, 40W
Power: 30 VA
Fuse Rating: 250 V, 1amp time delay
Safety: TüV Listed, complies with EU safety directives
EMI/RFI: Complies with FCC Part 15 Class A regulations
Complies with EU EMC directive

4.1.10. Physical

Dimensions: 19" W x 1.75" H x 18.75" D.
(483mm W x 45mm H x 477mm D)
Weight: 8 lbs. (3.5Kg)

4.2. UPGRADING FIRMWARE

The X1200 series routers contain firmware that is contained in a FLASH EPROM device. From time to time firmware updates will be provided to add additional features to the unit.

You will need the following equipment in order to update the X1200 Router Firmware:
- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male).
- Terminal program that is capable of Xmodem file transfer protocol (such as HyperTerminal).
- New firmware supplied by Evertz.

4.2.1. Upgrading Firmware for Router Without Ethernet Option

4.2.1.1. Step 1 – Terminal Program Setup

1. Connect the serial cable to the **SERIAL REMOTE** DB9 connector on the rear panel.

2. Connect the 9-pin connector on the end of the serial update cable to the PCs' RS-232 communications port.

3. Start the terminal program.

4. Configure the port settings of the terminal program as follows:

Baud	57600
Parity	no
Data bits	8
Stop bits	2
Flow Control	None

5. Power up the X1200 series router unit.

4.2.1.2. Step 2 – Invoke Upload Mode via the Front Panel

If you cannot invoke the upload mode via the front panel outlined in Step 2 then follow the steps described in Step 3 (section 4.2.1.3).

6. You can invoke the Software upgrade mode using the front panel Setup Menu. (See section 3.2 for information on how to operate the front panel menus.)

   - Press the **SETUP** button once to enter the front panel menu.
   - Press the **↑ & ↓** keys until the front panel display reads `FIRMWARE.`
   - Press the **SELECT** button then press the **↑ & ↓** keys until the front panel display reads `Firmware Update.`
   - Press the **SELECT** button and the front panel display should now show the message `Sel to upgrade`.
   - Press the **SELECT** button to confirm the *Upgrade* operation, or press the **SETUP** button three times to return to the top of the menu tree where you will be presented with the exit menu. (See section 3.4)
   - Proceed to Step 4 (section 4.2.1.4) for instructions on uploading the firmware.

4.2.1.3. Step 3 – Invoke Upload Mode from the Terminal Program

In the event that you cannot initiate upload mode from the front panel menu, you may send commands to the Router to initiate upload mode using the terminal program.

7. Power up the X1200 Router. After the unit powers up, a banner with the boot code version information should appear in the terminal window. The cursor to the right of the word `BOOT>` should be spinning for about 5 seconds then the unit will continue to boot.

   For example:

```
EVERTZ MCF5407 MONITOR 2.3 BUILD 8
COPYRIGHT 1997, 1998, 1999, 2000, 2001, 2002 EVERTZ MICROSYSTEMS LTD.
28F160C3B FLASH DETECTED
BRD=X1202
MODEL=X1202H-AES4-SS
PROD=X1202H-AES4-SS
FRAME=9000SFF
MCF5407 COLD BOOT> |
```

8. The following is a list of possible reasons for failed communications:

   - Defective Serial Upgrade cable.
   - Wrong communications port selected in the terminal program.
   - Improper port settings in the terminal program. (Refer to step 7 for settings). Note that HyperTerminal will not change port settings while connected. Click on HyperTerminal's "Disconnect" Button then click the "Reconnect" button to activate changes to the port settings.

9. While the cursor is spinning press the <CTRL> and <X> keys on your computer keyboard at the same time, this should stop the cursor from spinning. The spinning prompt will only remain for about 5 seconds. You must press <CTRL-X> during this 5 second delay. If the unit continues to boot-up, simply cycle the power and repeat this step.

10. Hit the <ENTER> key on your computer once.

11. Type the word “upgrade”, without quotes, and hit the <ENTER> key once.

12. The boot code will ask for confirmation. Type "y", without quotes.

13. You should now see a prompt asking you to upload the file.

4.2.1.4. Step 4 – Uploading the New Firmware

14. Upload the “*.bin” file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the unit’s Boot code will time out. You can restart the upgrade process by power cycling the unit.

15. The boot code will indicate whether the operation was successful upon completion of the upload.

    For Example:

```
UPLOAD OKAY
MCF5407 COLD BOOT> |
```

16. The following is a list of possible reasons for a failed upload:

    - If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
    - The supplied “*.bin” file is corrupt.
    - Wrong file specified to be uploaded.
    - Wrong file transfer protocol used – make sure you specify Xmodem, not Xmodem 1K.
    - The PCs’ RS-232 communications port cannot handle a port speed of 57600.
    - Noise induced into the Serial Upgrade cable.

4.2.1.5. Step 5 – Completing the Upgrade

17. Type the word “boot”, without quotes, and hit the <ENTER> key once or power cycle the unit. The unit should now reboot.

18. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

4.2.2. Upgrading Firmware for Router with Ethernet Option

4.2.2.1. Upgrade Router Firmware via Serial Connection

RS232 (without flow control) serial interface is supported for the upgrade option. The pin description is shown in Table 4-1.

DB9 Remote Control Pin #	Router End (DCE) Description	Direction	User End (DTE) Name
1	Ground		Ground
2	Transmit Output	→	Rx
3	Receive Input	←	Tx
4			
5	Ground		Ground
6			
7			
8			
9			

Table 4-1: RS-232 Pin Definition

1. To upgrade the router, disconnect the “ROUTER PORT” and the “SNMP AGENT DATA”.

2. Connect an adapter cable to a PC running a console or terminal application (such as Windows HyperTerminal) to the “**ROUTER PORT**” connector.

3. Start the terminal program.

4. Configure the port settings of the terminal program as follows:

Baud	**57600**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

5. Power up the X1200 Series router unit.

6. Follow Step 2 to Step 5 (sections 4.2.1.2 to 4.2.1.5) to complete the configuration.

4.2.2.2. Upgrade SNMP Agent Via Serial Connection

RS232 (without flow control) serial interface is supported for the upgrade option. The pin description is the same as Table 4-1.

1. Power off the router unit.
2. Disconnect the DB15 and the “*CTRL/UPGRADE*” port from the real panel.
3. Connect the second DB15 male connector labelled as “**SNMP AGENT CONFIG-DB15**” (the connector with the pink stripe, see Figure 2-14) to the “*CTRL/UPGRADE*” port.
4. Connect an adapter cable to a PC running a console or terminal application, such as Windows HyperTerminal, to the “**SNMP AGENT CONFIG-DB9**” connector.
5. Start the terminal program.

6. Configure the port settings of the terminal program as follows:

Baud	**115200**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

7. Power on the router unit.
8. After a few moments, the prompt *PPCBOOT>* will appear. Enter the command “upload”.
9. Start the firmware upload on the terminal application (for instance, in *HyperTerminal* select Transfer/Send File…), use Xmodem as the transfer protocol, and select the firmware file. (For example: *snmpagent.bin.*)
10. Once the upload is complete the message upload *okay* is displayed.
11. Power off the router unit.
12. Disconnect the serial adapter cable and remove the pink striped DB15 connector from “CTRL/UPGRADE” port at the rear panel.
13. Connect the other DB15 connector to the “CTRL/UPGRADE” port, and the router will return to the normal operation connection (Ensure that the “ROUTER PORT” connector and “SNMP AGENT DATA” connector is connected through the mini null modem adapter, see Figure 2-15).
14. Power on the router unit.

4.2.2.3. Upgrade the SNMP Agent Firmware Via TCP/IP

1. Open a command prompt window (in Windows: *Start/Programs/Accessories/Command Prompt*).
2. Enter the location of the firmware file. (For example: *cd c:\temp*.)
3. Enter the PTX IP address. (For example: *ftp –A 192.168.18.22*)
4. Enter the FTP command *put*, followed by the firmware file name.
   (For example: *put snmpagent.bin*)
5. When the transfer is complete, enter the FTP command: *bye*.
6. Step 5 begins the process of saving the firmware to the non-volatile flash of the router unit. The process will take approximately 2 minutes.
7. Power off the PTX.
8. Power on the PTX.

4.3. UPLOADING ROUTER INPUT LABELS FROM A TEXT FILE

The *Input Label File* menu item allows labels for the video and audio inputs to be input from the serial port of the router using a simple terminal program such as HyperTerminal. It is important to ensure that the structure of the text file that contains the router labels is correct, or the router will not accept any of the label definitions. The simplest way to create a file with the correct layout is to download the current labels from the router using the *Send File* menu option. You can then edit the label names, and then upload the new file back to the router using the *Receive File* menu option.

Any serial protocol (remote panel or GVG) that is currently open on the remote port will be closed during the label updating procedure. The serial protocol will be reopened once the upload or download has finished.

The following procedure describes the process used to upload labels to the router:

4.3.1. Step 1 – Terminal Program Setup

1. Connect a 'straight through' serial cable to the **SERIAL REMOTE** DB9 connector on the rear panel

2. Connect the 9 pin connector on the end of the serial update cable to the PCs' RS-232 communications port

3. Start the terminal program.

4. Configure the port settings of the terminal program as follows:

Baud	**57600**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

   If you are using HyperTerminal, use *File/Properties* menu item. Note that HyperTerminal will not change port settings while connected. Click on HyperTerminal's "Disconnect" Button, then click the "Reconnect" button to activate changes to the port settings.

5. Configure the terminal program to capture text to a file. If you are using HyperTerminal, use the *Transfer/Capture Text* menu item.

4.3.2. Step 2 – Download the Current Labels from the Router

6. Invoke the *Label Send File* mode using the front panel *Setup* menu. (See section 3.4 for information on how to operate the front panel menus.)

   - Press the **SETUP** button once to enter the front panel menu.
   - Press the ↑ **&** ↓ keys until the front panel display reads `INPUT LABEL.`
   - Press the **SELECT** button
   - Press the ↑ **&** ↓ keys until the front panel display reads `Input Label File.`
   - Press the **SELECT** button.
   - Press the ↑ **&** ↓ keys until the front panel display reads `Send file?`
   - Press the **SELECT** button to send the file to the terminal program.

7. Once you have captured the file, you will need to close the capture file. If you are using HyperTerminal this is executed using the *Transfer/Capture Text* menu item again.

4.3.3. Step 3 – Editing the Label Text File

8. Using a text editor such as Notepad, edit the input labels in the file you have captured.

Note: It is not recommended that you use a word processor such as Microsoft Word, as it may append hidden control codes into the text file, which will not allow the edited file to be uploaded correctly to the router.

The file structure is as follows:

```
[category_a]<CR><LF>
labelvar_a1=value 1<CR><LF>
labelvar_a3=value 2<CR><LF>
labelvar_a2=value 3<CR><LF>
[category_b]<CR><LF>
labelvar_b1=value<CR><LF>
labelvar_b2=value<CR><LF>
<CR><LF>
<CR><LF>
<CR><LF>
Note: <CR><LF> = Enter key
```

Each category is enclosed in square brackets [ ] and identifies the input category (e.g. `[VIDEO]`, `[AUDIO1A]`) for a group of associated label variables. The label variables must follow their associated category in the file and represent the label names that can be changed in the router. The value that follows the equals sign is a 16 character maximum length text string that is assigned to the variable. Alphanumeric characters such as a-z, A-Z, 0-9 and punctuation (ISO Character values 32 to 126) are valid. Label variables can be in any order as long as they occur in the correct category section of the file. Physical inputs on the router that do not have an associated label variable will retain their original value when the label file is uploaded to the router. If a label variable is specified more than once, the last value in the file will be used.

4.3.4. Step 4 – Upload the New Label File to the Router

9. Invoke the *Label Receive File* mode using the front panel Setup Menu. (See section 3.2 for information on how to operate the front panel menus.)

   - Press the **SETUP** button once to enter the front panel menu.
   - Press the ↑ **&** ↓ keys until the front panel display reads `INPUT LABEL.`
   - Press the **SELECT** button
   - Press the ↑ **&** ↓ keys until the front panel display reads `Input Label File.`
   - Press the **SELECT** button.
   - Press the ↑ **&** ↓ keys until the front panel display reads `Receive file?`
   - Press the **SELECT** button. A text prompt `Send file to router now` will appear on the terminal program screen.

10. Configure the terminal program to send the label text file. If you are using HyperTerminal, use the *Transfer/Send Text File* menu item.

11. Exit the menu system by pressing the **SETUP** key one or more times until you return to the top of the menu tree where you will be presented with an Exit menu. Using the ↑ **&** ↓ keys, choose the *SAVE AND EXIT* item and then press the **SELECT** key. You will be prompted to press the **SELECT** key one more time to confirm your decision.

4.3.5. Sample Label Text Files

Example 1

The `[AUDIO2B]` category is before the `[VIDEO]` category, but will still be accepted. Variables input4_audio2B to input12_audio2B for the `[AUDIO2B]` category will not be modified. For the `[VIDEO]` category, input1_video is specified more than once so the last occurrence is used.

```
[AUDIO2B]
input1_audio2B=INPUT # 1 (2B)
input2_audio2B=INPUT # 2 (2B)
input3_audio2B=INPUT # 3 (2B)
[VIDEO]
input1_video=Input # 1 Video
input2_video=Input # 2 Video
input1_video=Test # 1 Video
```

Example 2

All the variables for the `[VIDEO]` category are in alphabetic order. Variables input4_audio2B to input7_audio2B for `[AUDIO2B]` are out of order but will still be accepted.

```
[VIDEO]
input1_video=Input # 1 Video
input2_video=Input # 2 Video
input3_video=Input # 3 Video
input4_video=Input # 4 Video
input5_video=Input # 5 Video
input6_video=Input # 6 Video
input7_video=Input # 7 Video
input8_video=Input # 8 Video
input9_video=Input # 9 Video
input10_video=Input # 10 Video
input11_video=Input # 11 Video
input12_video=Input # 12 Video
[AUDIO2B]
input1_audio2B=INPUT # 1 (2B)
input2_audio2B=INPUT # 2 (2B)
input3_audio2B=INPUT # 3 (2B)
input8_audio2B=INPUT # 8 (2B)
input9_audio2B=INPUT # 9 (2B)
input10_audio2B=INPUT # 10 (2B)
input11_audio2B=INPUT # 11 (2B)
input12_audio2B=INPUT # 12 (2B)
input4_audio2B=INPUT # 4 (2B)
input5_audio2B=INPUT # 5 (2B)
input6_audio2B=INPUT # 6 (2B)
input7_audio2B=INPUT # 7 (2B)
```

Example 3

The `[AUDIO2B]` category has a variable that does not belong to it (input1_video). An error message will be displayed on HyperTerminal and on the router front panel indicating the reason.

```
[AUDIO2B]
input1_audio2B=INPUT # 1 (2B)
input2_audio2B=INPUT # 2 (2B)
input3_audio2B=INPUT # 3 (2B)
input1_video=Input   # 1 Video
```

HyperTerminal output:

```
Warning: Unrecognized variable: input1_video
Error: Some labels or variables were not recognized
```

Front panel output:

```
Bad labels/vars
```

4.4. SERVICING INSTRUCTIONS

CAUTION – These servicing instructions are for use by qualified service personnel only. To reduce risk of electric shock do not perform any servicing instructions in this section of the manual unless you are qualified to do so.

CAUTION – If the router is fitted with dual power supplies, ensure that power is removed from both supplies before performing any work on the unit.

4.4.1. Changing the Fuses

Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use time delay 5 x 20 mm fuses rated for 250 Volts with a current rating of 1 amp. Carefully reinsert the fuse holder into the power entry module.

CHAPTER 5: SERIAL CONTROL

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5. SERIAL CONTROL OF THE ROUTERS

5.1. GVG TEN-XL ASCII PROTOCOL

The following sections are provided as a technical reference for programmers who want to write their own software to control the Evertz X1200 series routers using the GVG TEN-XL ASCII command protocol. There are some hardware differences between the X1200 series routers and the Grass Valley TEN-XL routers, which have required differences in implementation of the protocol for the X1200 series routers.

The GVG Ten XL protocol allows multiple devices to be addressed on a multi-drop serial connection. The GVG TEN-XL protocol was originally designed to control 10 x 1 routers, therefore each video buss (with its associated audio busses) in the X1200 routers has its own address. In the X1202 routers, these addresses are one set in the *Serial Address* menu item and the next high number. (i.e. if the *Serial Address* menu item is set to 10, then address 10 will correspond to video buss 1 and its associated audio busses, and address 11 will correspond to video buss 2 and its associated audio busses.) In the X1201 routers, only the serial address set in the *Serial Address* menu is used.

Some implementations of the GVG Ten XL protocol only allow one device to be addressed on a single-drop serial connection. These implementations use address 0 only. When controlling X1201 routers from single drop GVG protocol, set the *Serial Address* to 0. In the X1202 routers, special provisions have been made to override the programmed *Serial Address* and re-direct the control to either video buss. Setting one or two of the GPI Inputs to one of the 10XL Redirect GPI Input functions can accomplish this. When one GPI is pulled to ground, all serial commands to address 0 will control the respective video buss, regardless of the setting of the *Serial Address* menu item. To control the other video buss, ground the other GPI input. If both GPIs are active at the same time the higher GPI number will have priority. If you set the *Serial Address* to 0, and one GPI is programmed to the *10XL redirect V2* function, serial commands will control V1 buss when the GPI is inactive, and the V2 buss when the GPI is active.

When the X1200 series router is operating in the *master* mode, it will send out commands to the router that matches its *serial addresses*. When the X1200 series router is operating in the *slave* mode, it will only respond to commands that match its *serial addresses.* If two X1200 series routers are connected in a master/slave configuration, then the addresses of both routers must be set the same.

The *Setup Menu* in the router must be used to configure the **REMOTE CTL** port. See section 3.14 for information about configuring the serial port.

5.1.1. Serial Data Format

In GVG's TEN-XL ASCII protocol all words sent and received use the following format:

Standard:	RS-232 (Can be set to RS-422 by changing internal Jumpers. See section 2.3.2)
Data Rate:	Default 38400 Baud (Can be set using the *Baud Rate* menu item)
Data Format:	Default 8 data bits, even parity, 1 stop bit (Can be set using the *Serial Format* menu item)

5.1.2. Definitions

1 GVG’s TEN-XL ASCII protocol uses standard ASCII hex codes for the transmission of commands. Programmers must use the hex equivalent code in order to successfully convey commands from their controlling software to the X1200 series router. Hexadecimal [hex] numbers are represented with the prefix “0x.”

i.e. decimal “14” = “0x0E.”

2. There are two reserved words in GVG TEN-XL ASCII Protocol. They are illustrated in the table below.

Reserved Word	Hexadecimal Equivalent	Control Character
STX	0x02	^B
ENQ	0x05	^E

3. Internal crosspoint numbers are ‘zero-based’, meaning that crosspoint number 1 is accessed as source 0. Since GVG TEN-XL protocol is based on 10 internal crosspoints and the Evertz 12 x 1 router family contains 12 internal crosspoints it was necessary to extend the protocol to include crosspoint #11 and #12. Valid sources range from 0 to 11 decimal or 0x00 to 0x0B as shown in Table 5-1.

Data Byte		Corresponding Source
Hex Value	ASCII Character	
0x30	0	1
0x31	1	2
0x32	2	3
0x33	3	4
0x34	4	5
0x35	5	6
0x36	6	7
0x37	7	8
0x38	8	9
0x39	9	10
0x41	A	11*
0x42	B	12*

* Not found in regular GVG TEN-XL protocol.

Table 5-1: Crosspoint numbers and their Internal Source Numbers

5.1.3. Command Formats

Commands are issued by concatenating a sequence of hex codes or parameters as shown in Table 5-2. All codes are adjacent to each other with no spaces in between bytes.

Parameter	Definition
[STX]	ASCII hex code for Start of Transmission
[ENQ]	ASCII hex code for Inquiry
[HI ADDR]	ASCII hex code for the High byte of the address
[LO ADDR]	ASCII hex code for the Low byte of the address
[XPT(V)]	ASCII hex code for Video crosspoint (i.e.0..9, A, B)
[XPT(A)]	ASCII hex code for Audio crosspoint (i.e.0..9, A, B)
[PSUPP]	ASCII hex code for the Power Supply Status (not implemented – always returns ASCII ‘F’ or 0x46)

Table 5-2: ASCII Command Definitions

5.1.3.1. Write or Take Command

This command is used to switch the active crosspoint in the router.

```
[STX][HI ADDR][LO ADDR][XPT(V)][XPT(A)]
```

5.1.3.2. Read or Query Command

This command is used to read back the status of the router.

```
[STX][HI ADDR][LO ADDR][ENQ]
```

5.1.3.3. Reply Command String

This reply is sent back from the router in response to the Write or Read command. It indicates which audio and video crosspoints are active, and the current status of the power supplies.

```
[XPT(V)][XPT(A)][PSUPP]
```

5.1.4. Command Examples

The following are examples of the GVG’s TEN-XL ASCII protocol write and read commands controlling a X1202S-AES model router. The *Serial Address* menu item is assumed to be set to 01, therefore video Buss 1 will be addressed as 01 and video buss 2 will be addressed as 02.

5.1.4.1. Input Selection – Audio Follow Mode

Switch the video 1 buss and its associated audio busses to video input 4 (crosspoint # 3)

ASCII string: ^B0133 [^B = control+B which is the STX code]
Hex string: [0x02][0x30][0x31][0x33][0x33]
This will cause the router to switch the video to input 4 or video crosspoint #3, and both audio channels of the audio to input 4 or audio crosspoint #3, and then reply with:

ASCII string: 331
Hex string: [0x33][0x33][0x46]

to indicate that the router has switched. Note-The router will always respond to a valid request.

5.1.4.2. Input Selection – Breakaway Mode

Switch the video 2 buss to video input 2 (crosspoint # 1).
Switch the audio associated with the video 2 buss to audio input 4 (crosspoint # 3)

ASCII string: ^B0213 [^B = control+B which is the STX code]
Hex string: [0x02][0x30][0x32][0x31][0x33]

This will cause the router to switch the video 2 output to input 2 or video crosspoint #1, and the audio 2A and 2B busses to input 4 or audio crosspoint #3, and then reply with:

ASCII string: 131
Hex string: [0x31][0x33][0x46]

to indicate that the router has switched.

5.1.4.3. Router Status Request

Request the crosspoint settings of the video 2 buss and its associated audio busses.

ASCII string: ^B02^E [^B = control+B which is the STX code]
[^E = control+E which is the ENQ code]
Hex string: [0x02][0x30][0x32][0x05]

This will cause the router to respond with the current crosspoint status:

ASCII string: 131
Hex string: [0x31][0x33][0x46]

to indicate that the router video 2 buss is set to video input 2 or crosspoint #1 and the associated audio busses are set to audio input 4 or crosspoint #3.

CHAPTER 6: VIDEO AND AUDIO OUTPUT CONFIGURATIONS

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6. VIDEO AND AUDIO OUTPUT CONFIGURATIONS

The following diagrams show the video bus outs and their associated audio buss outputs for each version of the router. The shaded buttons indicate which buttons are illuminated on the front panel.

6.1. MODEL X1201 - 12 X 1 OUTPUT CONFIGURATIONS

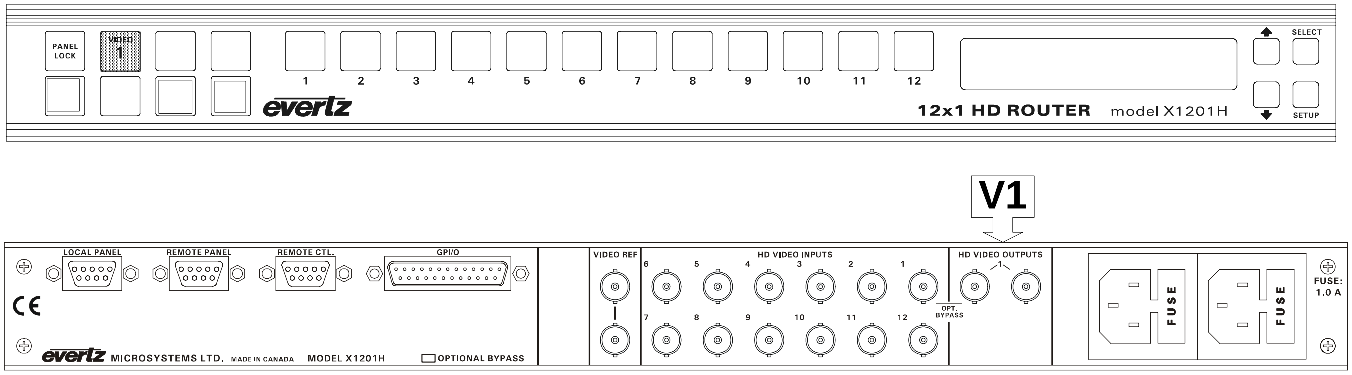
PANEL LOCK
VIDEO 1
1 2 3 4 5 6 7 8 9 10 11 12
evertz
12x1 HD ROUTER
model X1201H
SELECT
SETUP
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
CE
evertz MICROSYSTEMS LTD. MADE IN CANADA
MODEL X1201H
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A

Figure 6-1: Model 1201 - Video 1 Output Buss

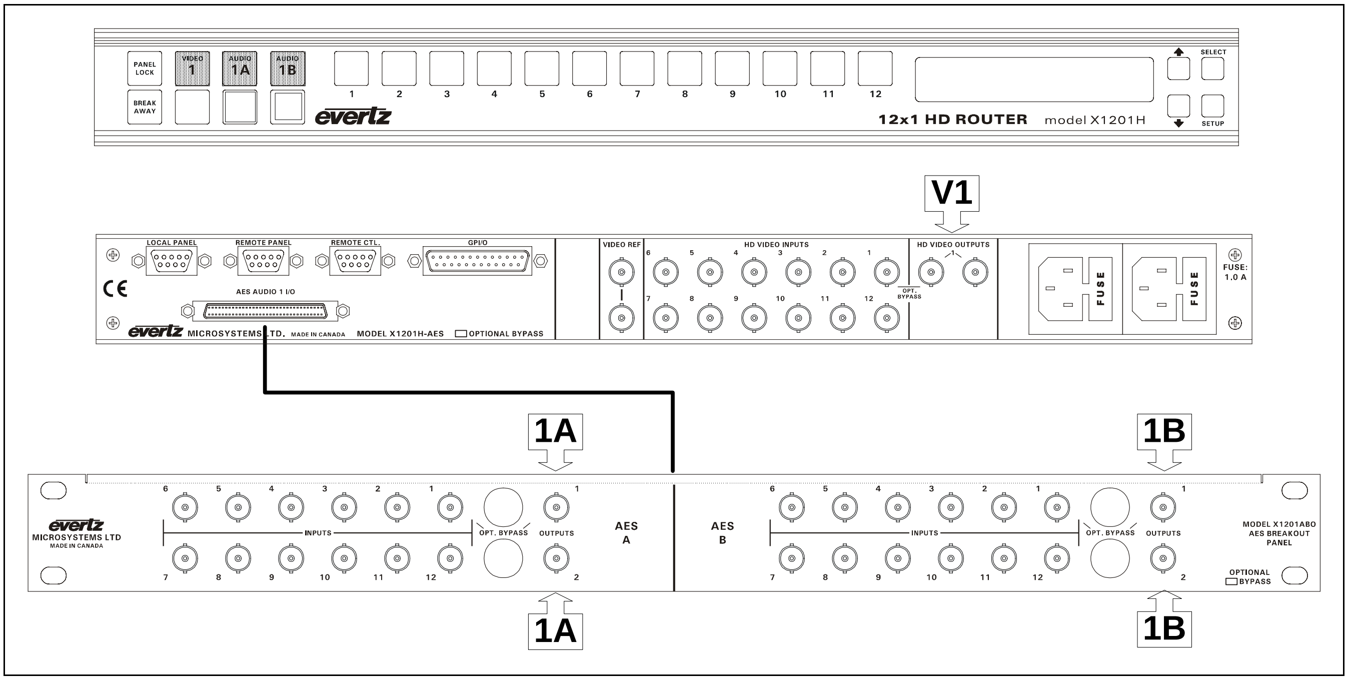
PANEL LOCK
BREAK AWAY
VIDEO 1
AUDIO 1A
AUDIO 1B
1 2 3 4 5 6 7 8 9 10 11 12
evertz
12x1 HD ROUTER
model X1201H
SELECT
SETUP
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
evertz MICROSYSTEMS LTD. MADE IN CANADA
MODEL X1201H-AES
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
1A
1B
evertz MICROSYSTEMS LTD MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1201ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
1A
1B

Figure 6-2: Model 1201-AES – Video 1 and associated Audio

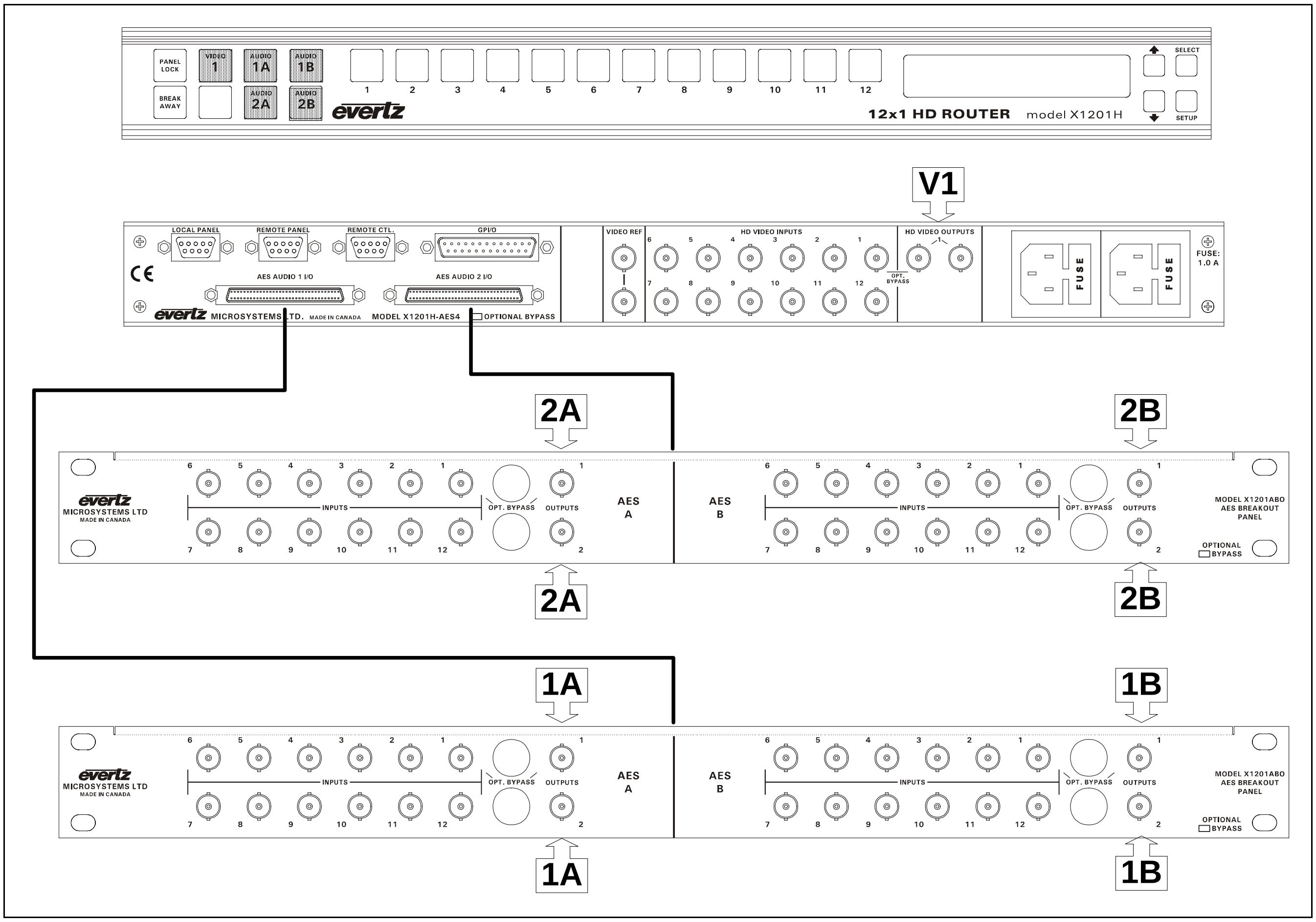
PANEL LOCK
VIDEO 1
AUDIO 1A
AUDIO 1B
BREAK AWAY
AUDIO 2A
AUDIO 2B
evertz
1 2 3 4 5 6 7 8 9 10 11 12
SELECT
SETUP
12x1 HD ROUTER model X1201H
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
evertz MICROSYSTEMS LTD. MADE IN CANADA
MODEL X1201H-AES4
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
2A
2B
evertz MICROSYSTEMS LTD MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1201ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
2A
2B
1A
1B
1A
1B

Figure 6-3: Model 1201-AES4 – Video 1 and associated Audio

6.2. MODEL X1202 - 12 X 2 OUTPUT CONFIGURATIONS

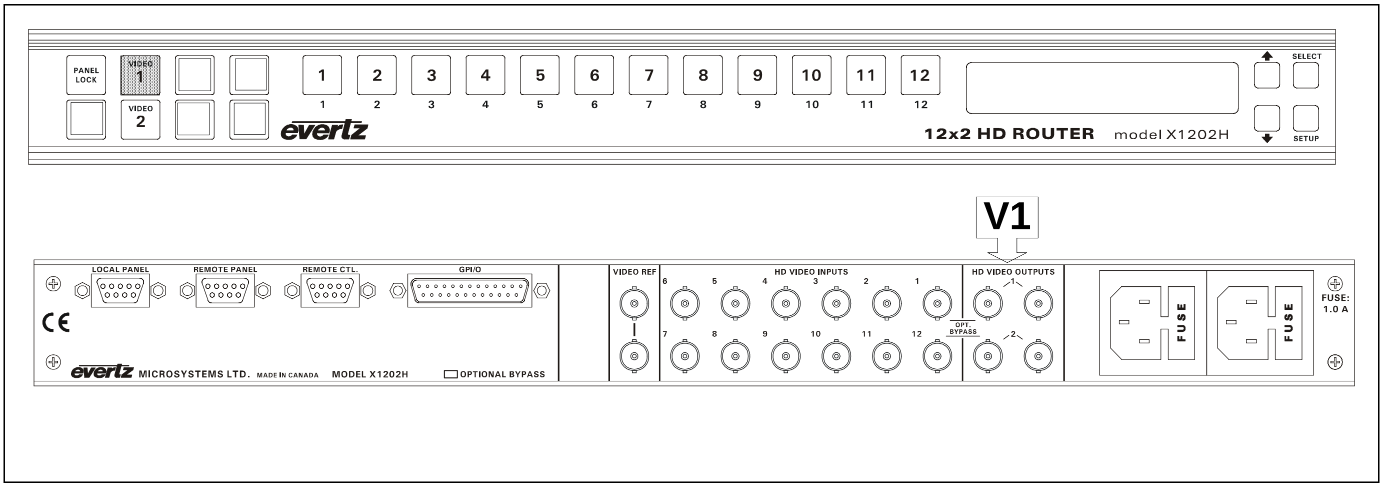
PANEL LOCK
VIDEO 1
VIDEO 2
1 2 3 4 5 6 7 8 9 10 11 12
12x2 HD ROUTER model X1202H
SELECT
SETUP
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H
OPTIONAL BYPASS

Figure 6-4: Model 1202 - Video 1 Output Buss

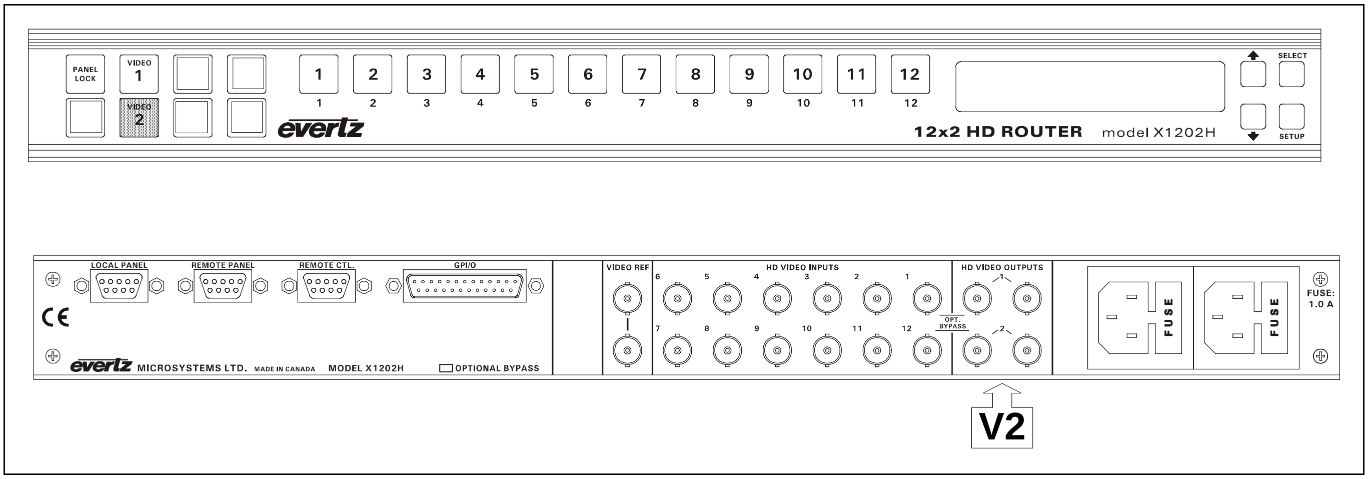
PANEL LOCK
VIDEO 1
VIDEO 2
1 2 3 4 5 6 7 8 9 10 11 12
12x2 HD ROUTER model X1202H
SELECT
SETUP
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H
OPTIONAL BYPASS
V2

Figure 6-5: Model 1202 - Video 2 Output Buss

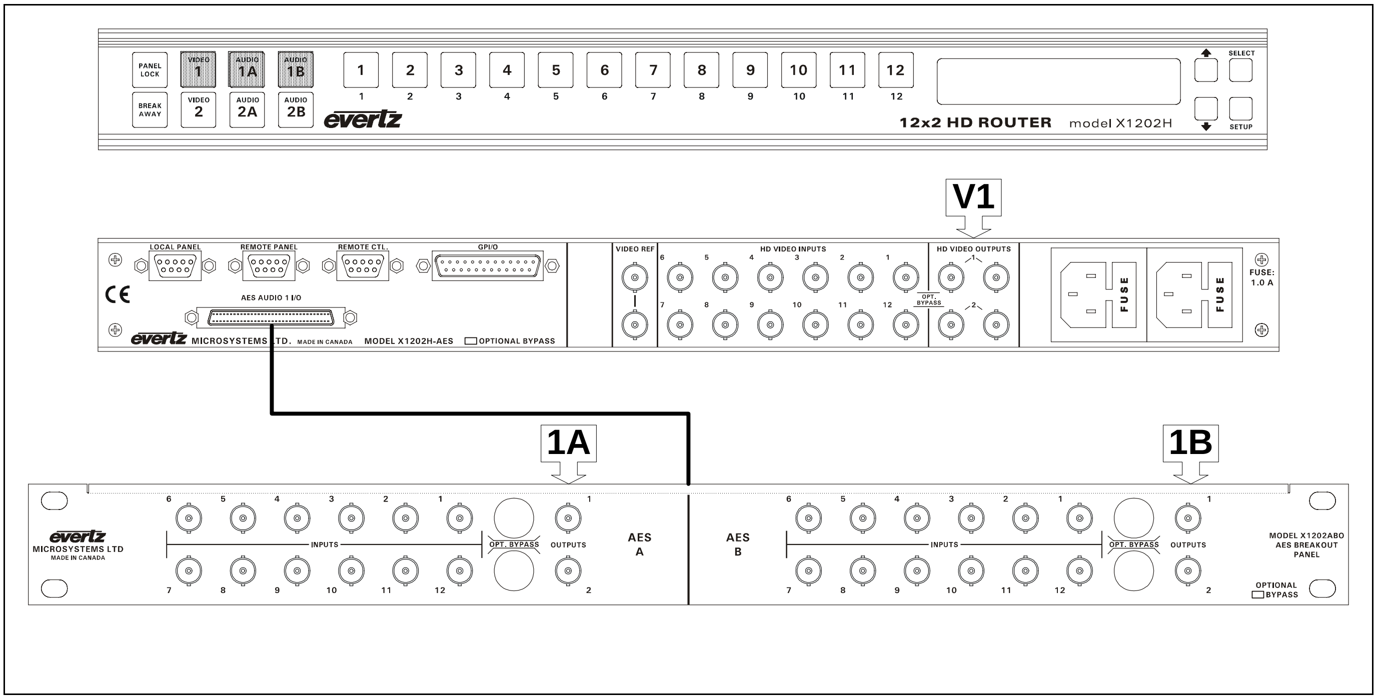
PANEL LOCK
BREAK AWAY
VIDEO 1
VIDEO 2
AUDIO 1A
AUDIO 2A
AUDIO 1B
AUDIO 2B
1 2 3 4 5 6 7 8 9 10 11 12
evertz
12x2 HD ROUTER
model X1202H
SELECT
SETUP
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
evertz MICROSYSTEMS LTD.
MADE IN CANADA
MODEL X1202H-AES
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
1A
1B
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MICROSYSTEMS LTD
MADE IN CANADA
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS

Figure 6-6: Model 1202-AES – Video 1 and associated Audio

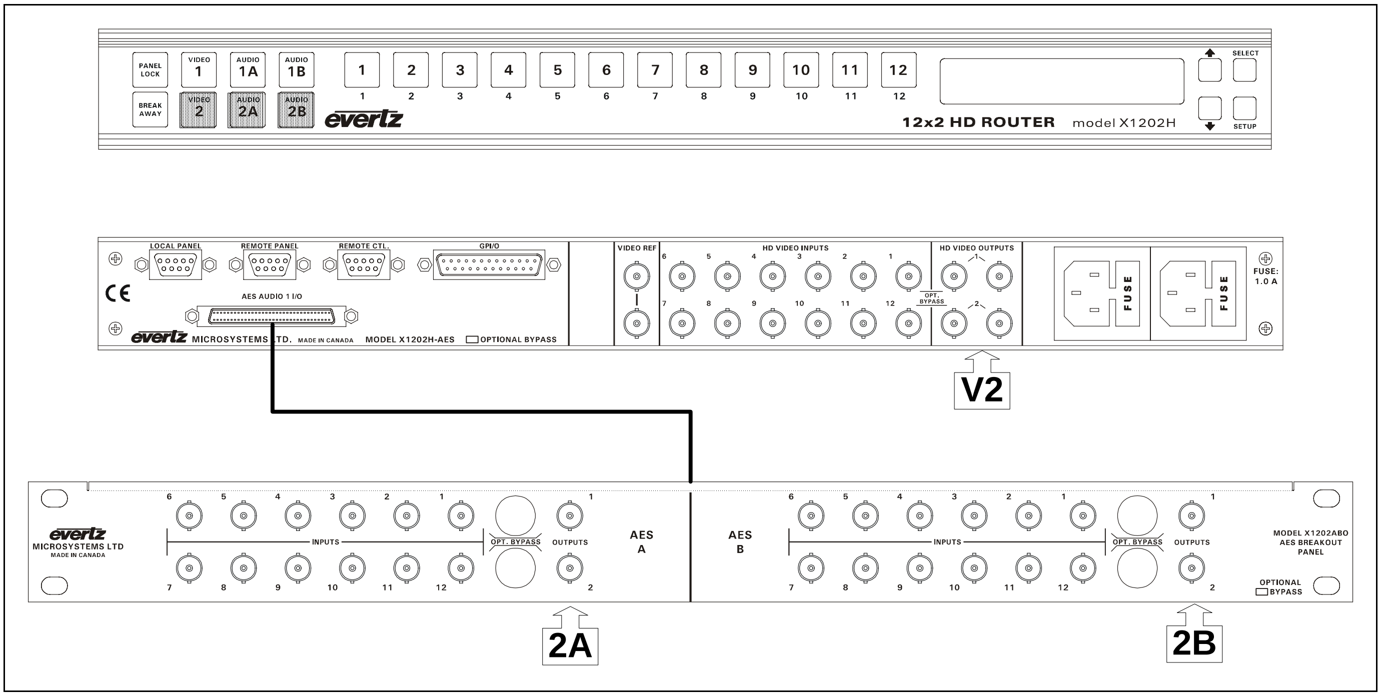
PANEL LOCK
BREAK AWAY
VIDEO 1
VIDEO 2
AUDIO 1A
AUDIO 2A
AUDIO 1B
AUDIO 2B
1 2 3 4 5 6 7 8 9 10 11 12
evertz
12x2 HD ROUTER
model X1202H
SELECT
SETUP
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
evertz MICROSYSTEMS LTD.
MADE IN CANADA
MODEL X1202H-AES
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
V2
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MICROSYSTEMS LTD
MADE IN CANADA
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
2A
2B

Figure 6-7: Model 1202-AES – Video 2 and associated Audio

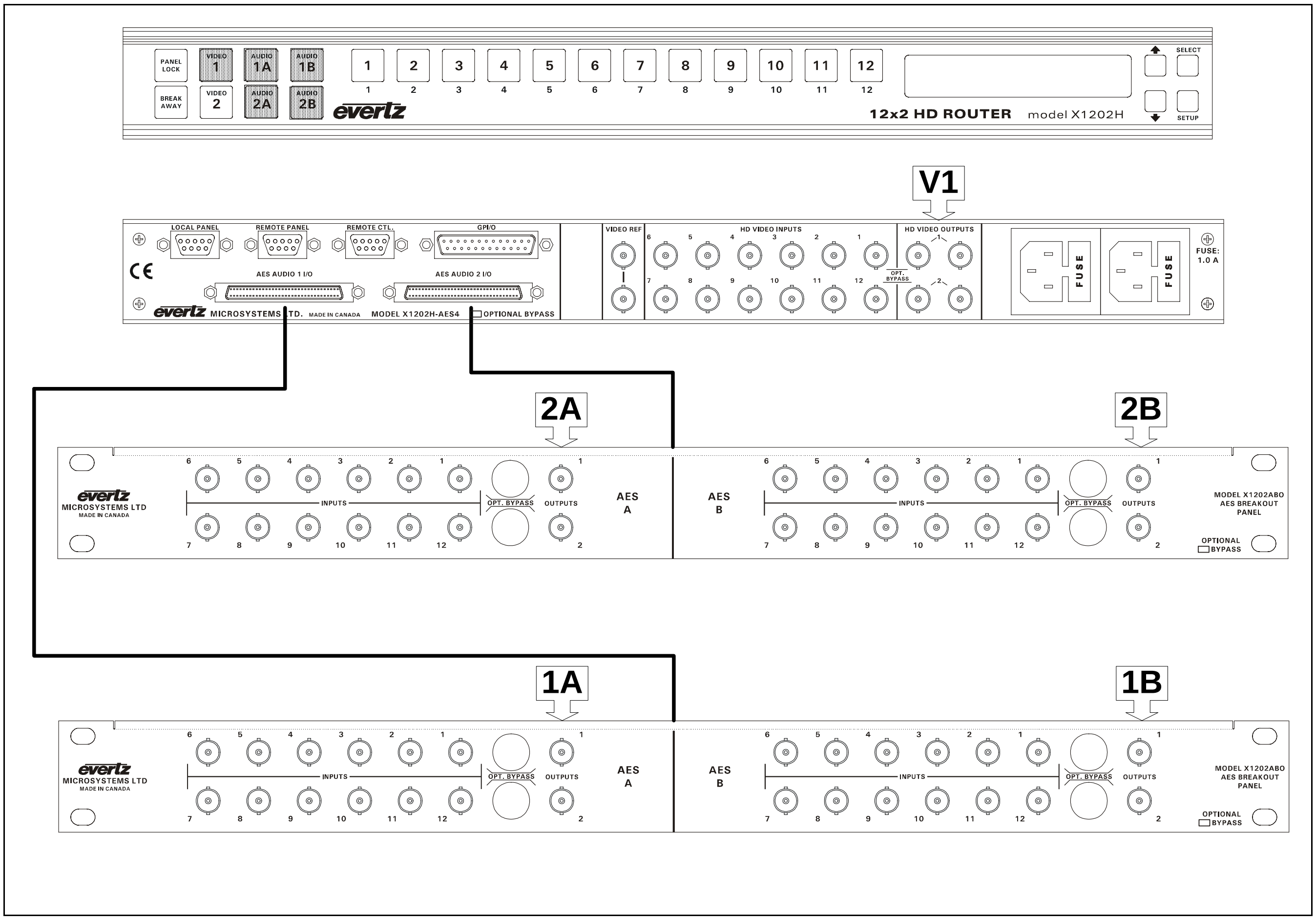
PANEL LOCK
BREAK AWAY
VIDEO 1
VIDEO 2
AUDIO 1A
AUDIO 1B
AUDIO 2A
AUDIO 2B
SELECT
SETUP
12x2 HD ROUTER model X1202H
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H-AES4 OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
2A
2B
1A
1B
MICROSYSTEMS LTD
MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS

Figure 6-8: Model 1202-AES4 – Video 1 and associated Audio

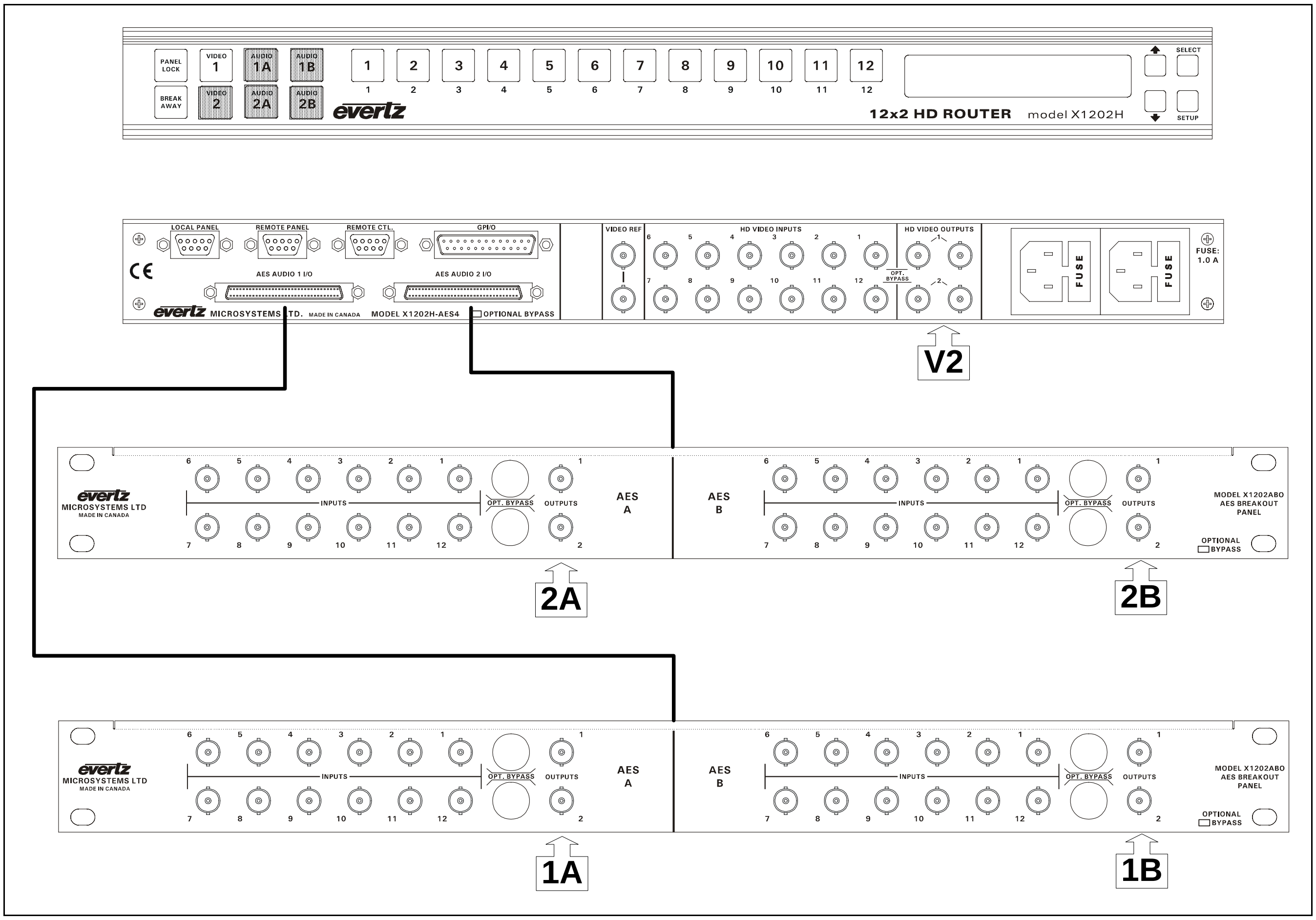
PANEL LOCK
VIDEO 1
AUDIO 1A
AUDIO 1B
BREAK AWAY
VIDEO 2
AUDIO 2A
AUDIO 2B
SELECT
SETUP
12x2 HD ROUTER
model X1202H
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
MICROSYSTEMS LTD.
MADE IN CANADA
MODEL X1202H-AES4
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
V2
INPUTS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
2A
2B
1A
1B

Figure 6-9: Model 1202-AES4 – Video 2 and Associated Audio

6.3. MODEL X1202 (EARLY VERSIONS WITH 2 BREAKOUT PANELS) - 12 X 2 OUTPUT CONFIGURATIONS

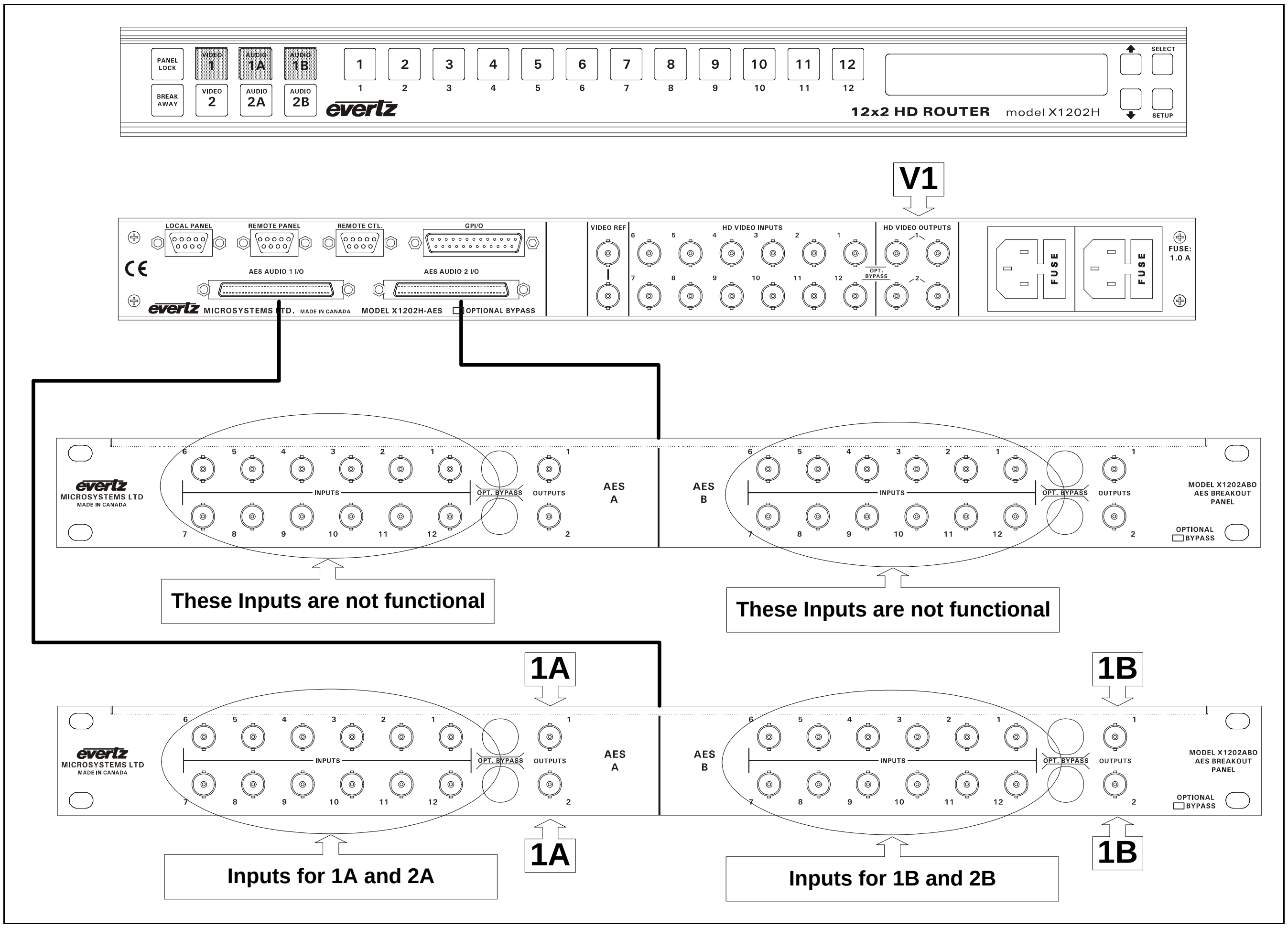
PANEL LOCK
BREAK AWAY
VIDEO 1
AUDIO 1A
AUDIO 1B
VIDEO 2
AUDIO 2A
AUDIO 2B
1 2 3 4 5 6 7 8 9 10 11 12
SELECT
SETUP
12x2 HD ROUTER model X1202H
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H-AES OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
MICROSYSTEMS LTD MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
These Inputs are not functional
These Inputs are not functional
1A
1B
1A
1B
Inputs for 1A and 2A
Inputs for 1B and 2B

Figure 6-10: Model 1202-AES (Early Version with AES Mode set to 2(12 x 2)) – Video 1 and Associated Audio

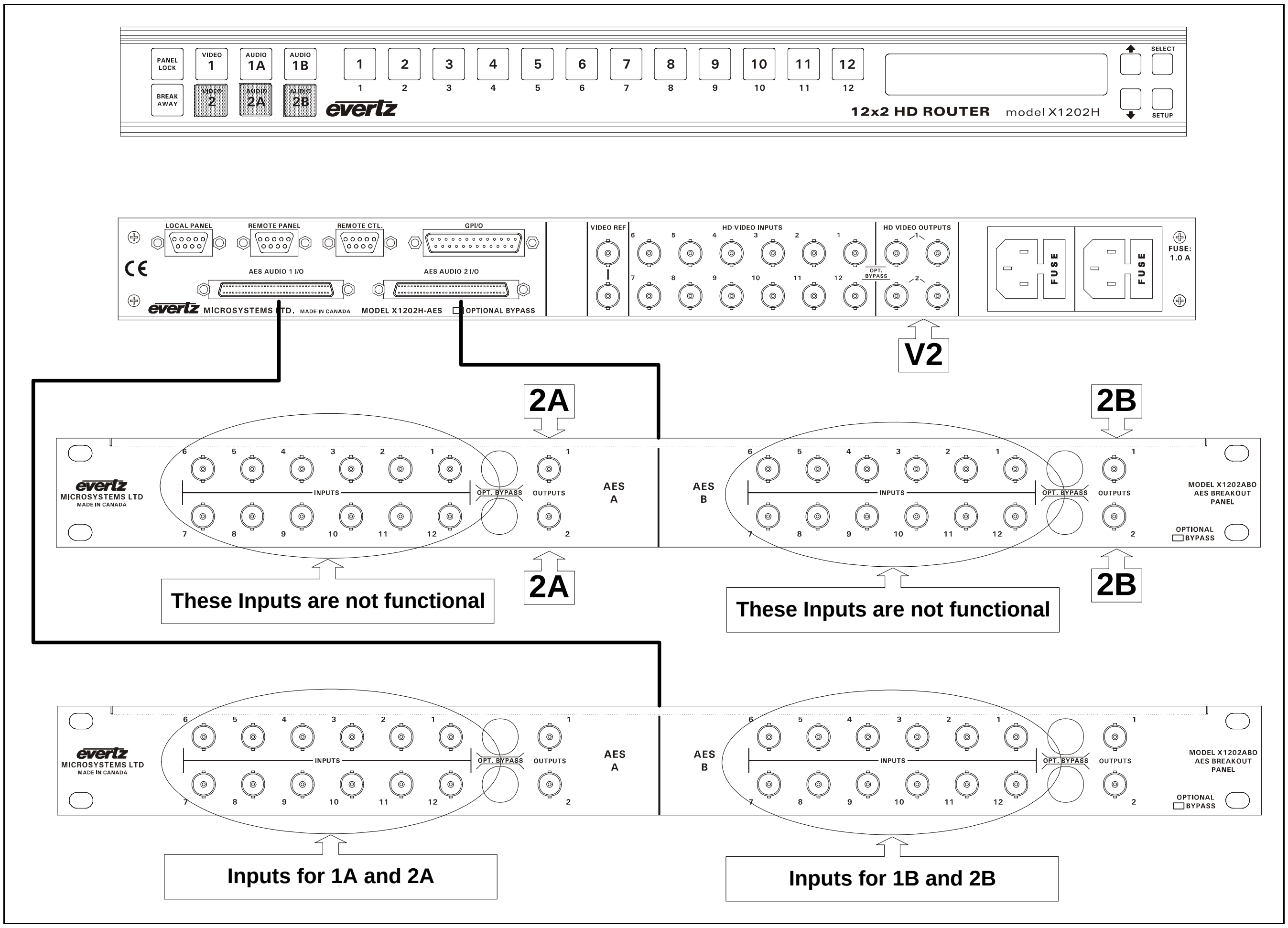
12x2 HD ROUTER model X1202H
PANEL LOCK
BREAK AWAY
VIDEO 1
VIDEO 2
AUDIO 1A
AUDIO 2A
AUDIO 1B
AUDIO 2B
SELECT
SETUP
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
MICROSYSTEMS LTD. MADE IN CANADA MODEL X1202H-AES OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE: 1.0 A
V2
2A
2B
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
These Inputs are not functional
These Inputs are not functional
Inputs for 1A and 2A
Inputs for 1B and 2B

Figure 6-11: Model 1202-AES (Early Version with AES Mode set to 2(12 x 2))
– Video 2 and Associated Audio

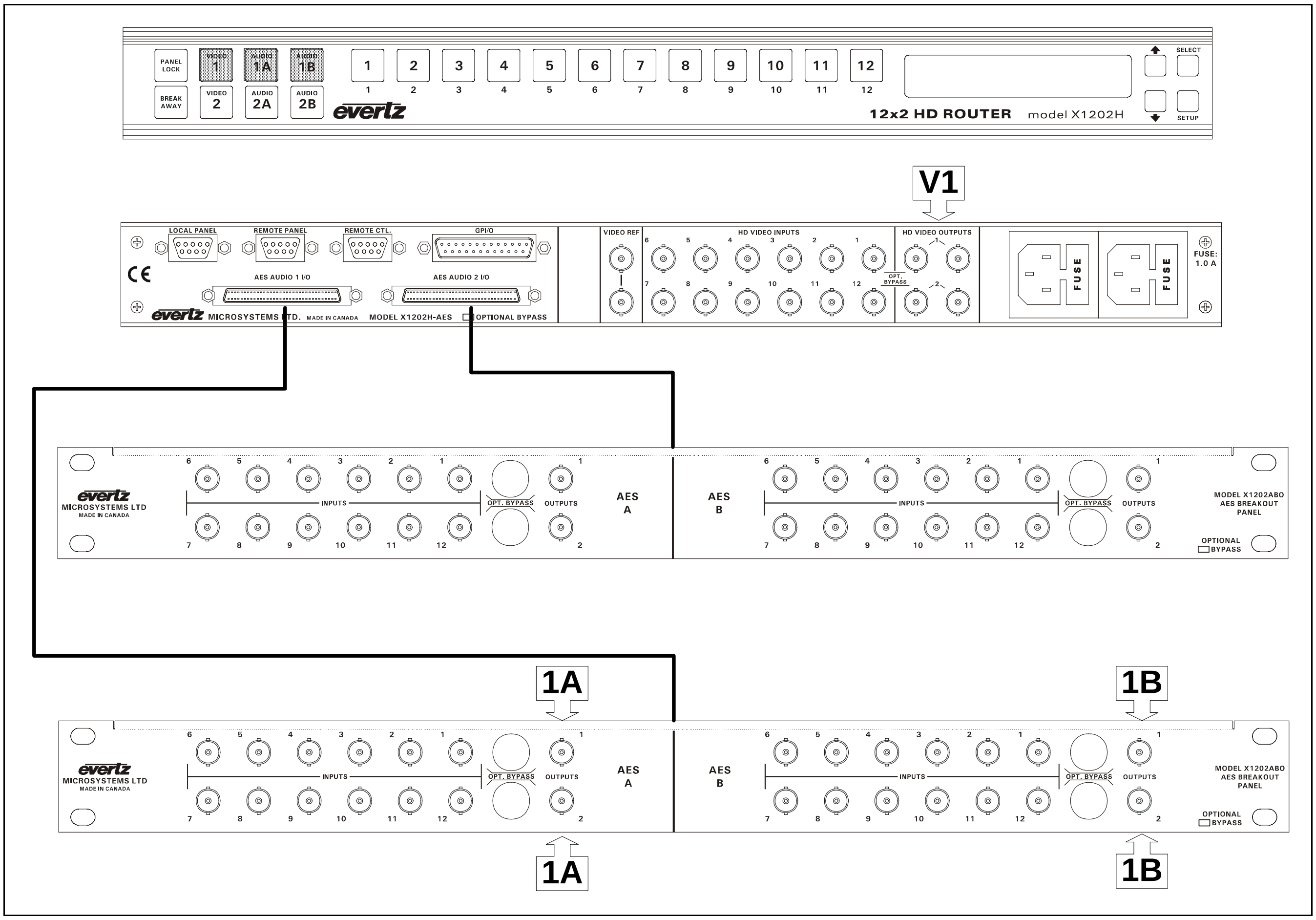
PANEL LOCK
VIDEO 1
AUDIO 1A
AUDIO 1B
BREAK AWAY
VIDEO 2
AUDIO 2A
AUDIO 2B
1 2 3 4 5 6 7 8 9 10 11 12
SELECT
SETUP
12x2 HD ROUTER model X1202H
V1
LOCAL PANEL
REMOTE PANEL
REMOTE CTL
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
MICROSYSTEMS LTD. MADE IN CANADA
MODEL X1202H-AES
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
MICROSYSTEMS LTD
MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS
1A
1B
1A
1B

Figure 6-12: Model 1202-AES (Early Version with AES Mode set to 4(12 x 1) and default AFV grouping) – Video 1 and Associated Audio

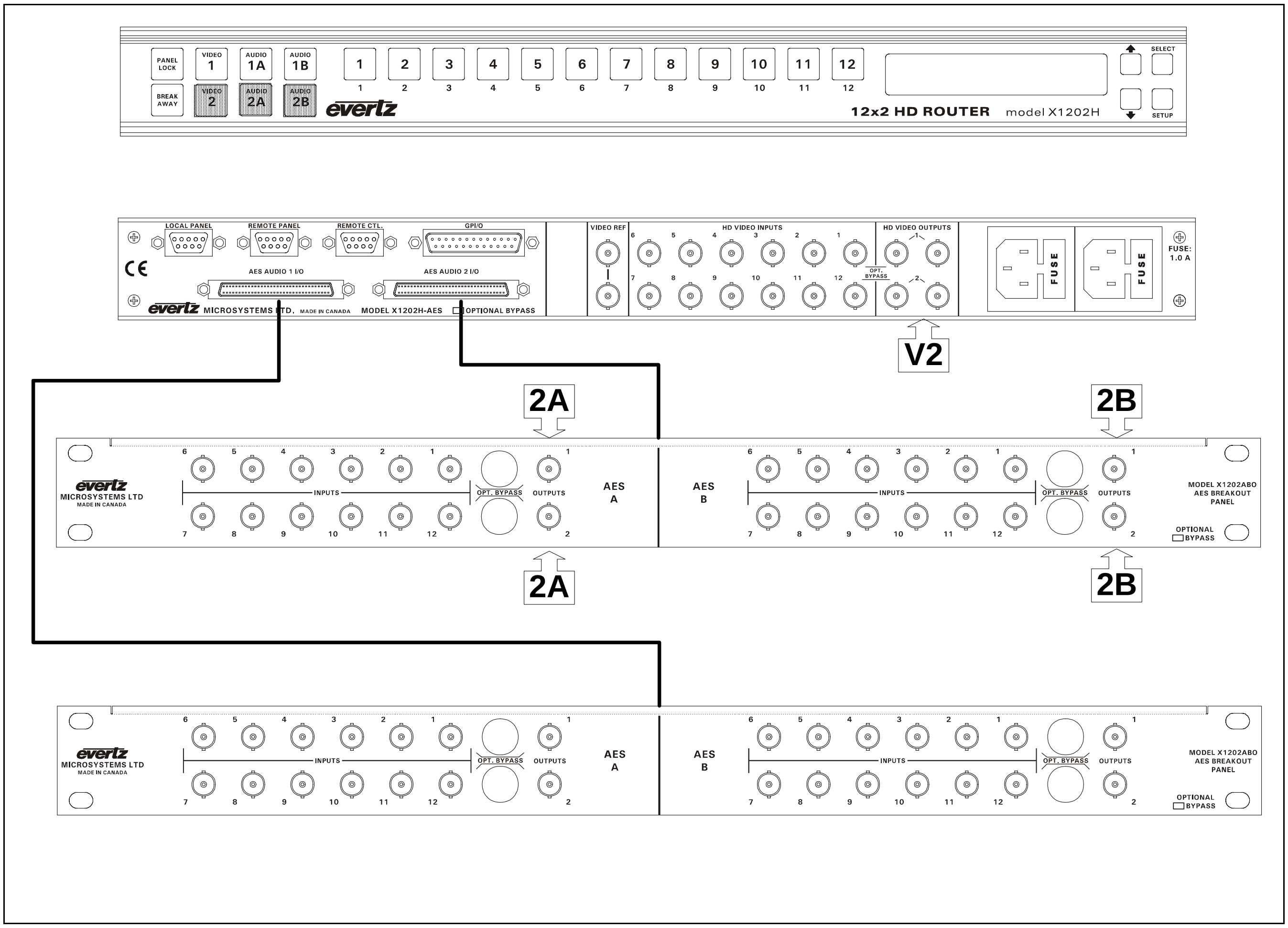
PANEL LOCK
VIDEO 1
AUDIO 1A
AUDIO 1B
BREAK AWAY
VIDEO 2
AUDIO 2A
AUDIO 2B
evertz
12x2 HD ROUTER
model X1202H
SELECT
SETUP
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO 1 I/O
AES AUDIO 2 I/O
evertz MICROSYSTEMS LTD. MADE IN CANADA
MODEL X1202H-AES
OPTIONAL BYPASS
VIDEO REF
HD VIDEO INPUTS
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSE: 1.0 A
V2
2A
2B
2A
2B
evertz MICROSYSTEMS LTD MADE IN CANADA
INPUTS
OPT. BYPASS
OUTPUTS
AES A
AES B
MODEL X1202ABO AES BREAKOUT PANEL
OPTIONAL BYPASS

Figure 6-13: Model 1202-AES (Early Version with AES Mode set to 4(12 x 1) and default AFV grouping) – Video 2 and Associated Audio

6.4. MODEL X0601H-444 – DUAL LINK 6 X 1 OUTPUT CONFIGURATIONS

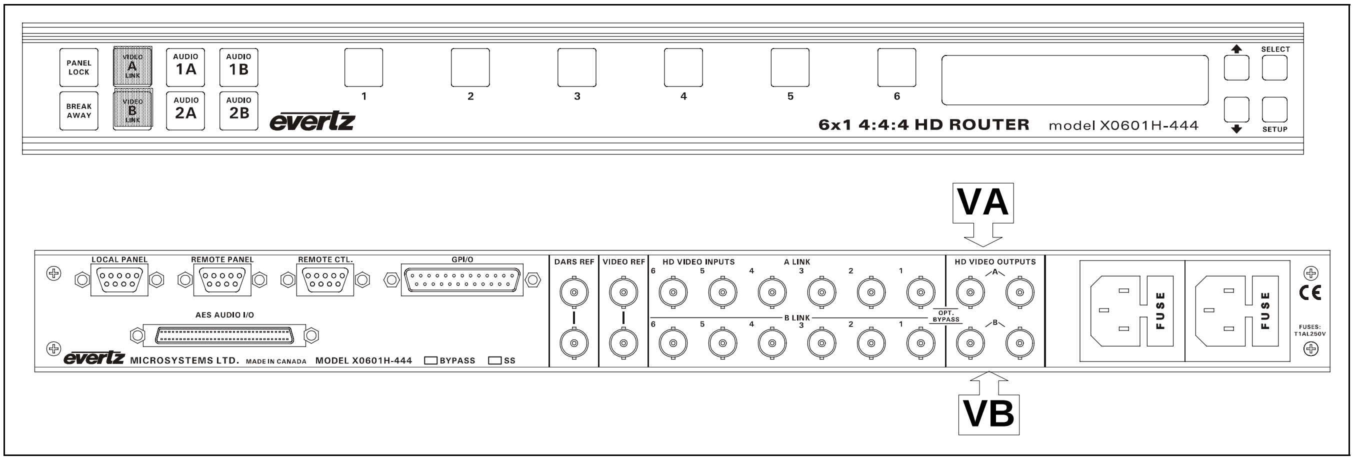
PANEL LOCK
BREAK AWAY
VIDEO A LINK
VIDEO B LINK
AUDIO 1A
AUDIO 1B
AUDIO 2A
AUDIO 2B
1 2 3 4 5 6
SELECT
SETUP
6x1 4:4:4 HD ROUTER model X0601H-444
VA
LOCAL PANEL
REMOTE PANEL
REMOTE CTL.
GPI/O
AES AUDIO I/O
DARS REF
VIDEO REF
HD VIDEO INPUTS
A LINK
B LINK
HD VIDEO OUTPUTS
OPT. BYPASS
FUSE
FUSES: T1AL250V
MICROSYSTEMS LTD. MADE IN CANADA MODEL X0601H-444
BYPASS
SS
VB

Figure 6-14: Model X0601H-444 - Video Output Buss

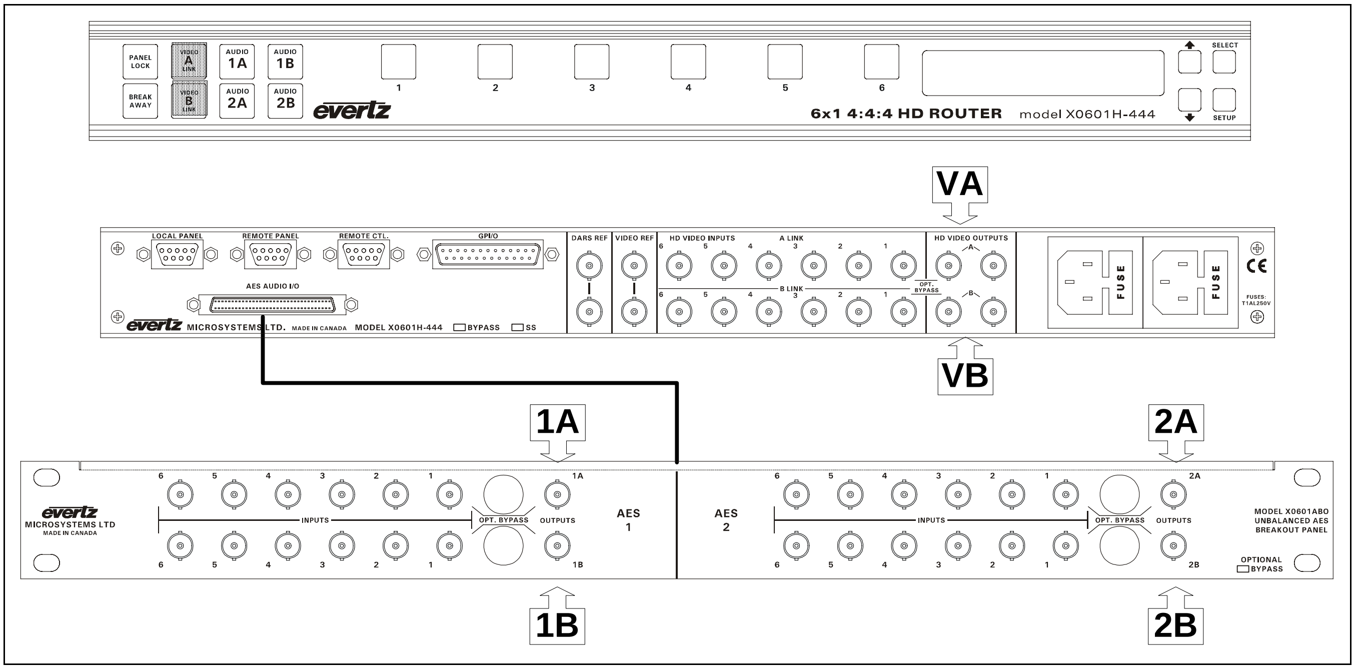
PANEL LOCK
BREAK AWAY
VIDEO A LINK
VIDEO B LINK
AUDIO 1A
AUDIO 1B
AUDIO 2A
AUDIO 2B
6x1 4:4:4 HD ROUTER model X0601H-444
VA
VB
1A
2A
1B
2B
INPUTS
OPT. BYPASS
OUTPUTS
AES 1
AES 2
MICROSYSTEMS LTD MADE IN CANADA
MODEL X0601ABO UNBALANCED AES BREAKOUT PANEL
OPTIONAL BYPASS

Figure 6-15: Model X0601H-444-AES4 – Video and Associated Audio

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CHAPTER 7: VIDEO TIMING CONSIDERATIONS

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7. VIDEO TIMING CONSIDERATIONS

The following diagrams show how to set up the system timing under a number of different input signal conditions so that SoftSwitch™ and Embedded SoftSwitch™ equipped routers can perform a clean switch on the V1 buss.

7.1. ALL INPUT SIGNALS ARE TIMED TO REFERENCE

This example shows the timing setup for a clean switch when all input signals are in time with the reference. The V1 buss output will be delayed 1 line with respect to the reference. A clean switch is also attainable on the V2 buss output.

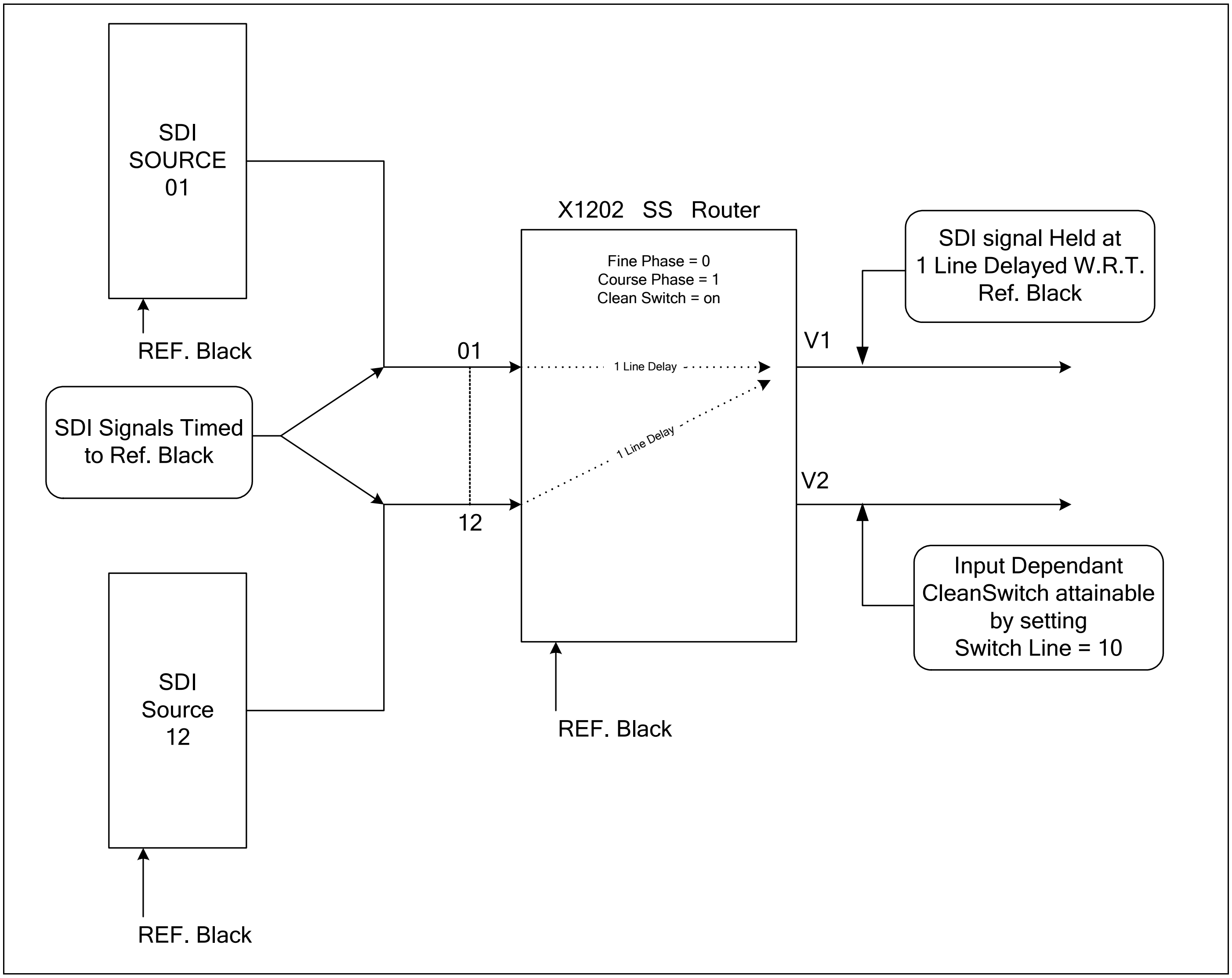
SDI SOURCE 01
REF. Black
SDI Signals Timed to Ref. Black
SDI Source 12
REF. Black
01
12
X1202 SS Router
Fine Phase = 0
Course Phase = 1
Clean Switch = on
1 Line Delay
1 Line Delay
REF. Black
V1
V2
SDI signal Held at 1 Line Delayed W.R.T. Ref. Black
Input Dependant CleanSwitch attainable by setting Switch Line = 10

Figure 7-1: Timing Example 1 – Inputs in Time with Reference

7.2. INPUT SIGNALS ARE WITHIN TIMED TO WITHIN +/- 1 LINE OF REFERENCE

This example shows the input timing range requirements for a clean switch in the most basic configuration. The V1 buss output will be delayed 1 line with respect to the reference. A clean switch is not attainable on the V2 buss output.

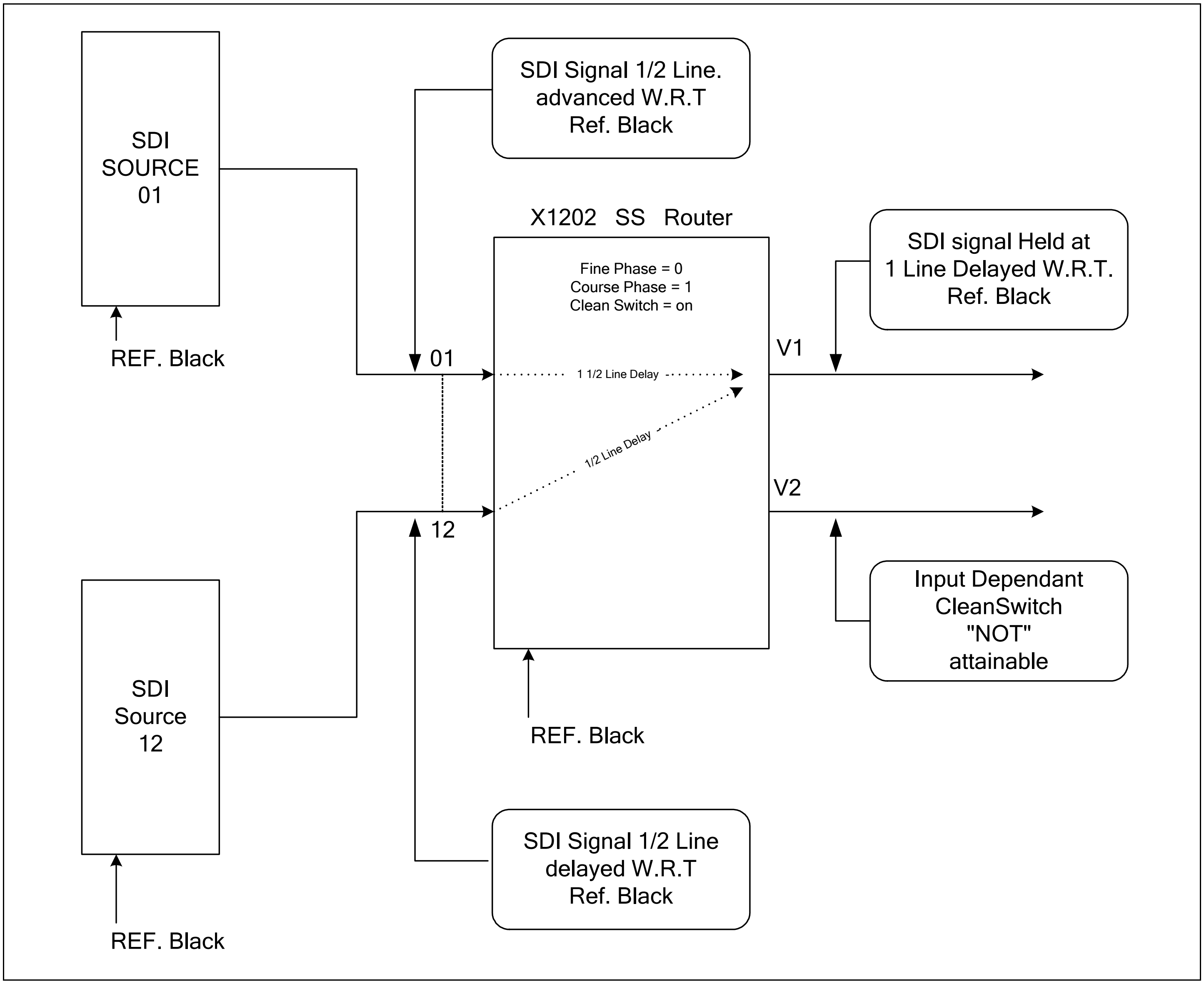
SDI SOURCE 01
REF. Black
SDI Signal 1/2 Line. advanced W.R.T Ref. Black
X1202 SS Router
Fine Phase = 0
Course Phase = 1
Clean Switch = on
SDI signal Held at 1 Line Delayed W.R.T. Ref. Black
01
V1
1 1/2 Line Delay
1/2 Line Delay
V2
12
Input Dependant CleanSwitch "NOT" attainable
REF. Black
SDI Source 12
SDI Signal 1/2 Line delayed W.R.T Ref. Black
REF. Black

Figure 7-2: Timing Example 2 – Inputs in Time with Reference

7.3. ALL INPUT SIGNALS ARE TIMED TOGETHER BUT DELAYED 5 LINES FROM REFERENCE

This example shows how to set up the router timing when the input signals are delayed by more than one line. The V1 buss output will be delayed 6 lines with respect to the reference. A clean switch is also attainable on the V2 buss output.

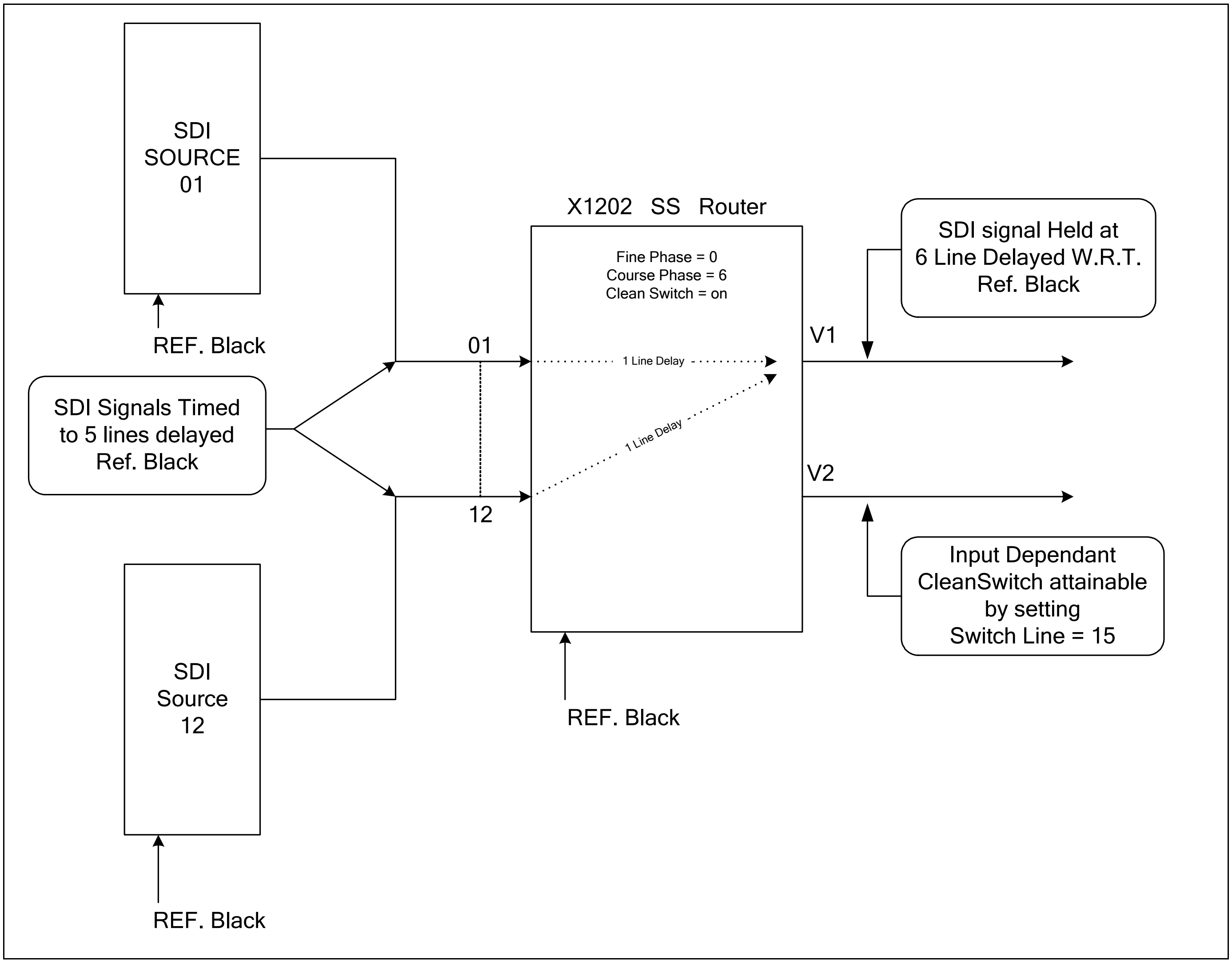
SDI SOURCE 01
REF. Black
SDI Signals Timed to 5 lines delayed Ref. Black
SDI Source 12
REF. Black
X1202 SS Router
Fine Phase = 0
Course Phase = 6
Clean Switch = on
01
12
1 Line Delay
1 Line Delay
V1
V2
REF. Black
SDI signal Held at 6 Line Delayed W.R.T. Ref. Black
Input Dependant CleanSwitch attainable by setting Switch Line = 15

Figure 7-3: Timing Example 3 – Inputs in Time but Delayed 5 Lines from Reference

7.4. ALL INPUT SIGNALS ARE TIMED WITHIN A RANGE OF +/- 1 LINE FROM EACH OTHER BUT DELAYED 5 LINES FROM REFERENCE

This example shows how the router can perform a clean switch on input signals that are delayed by more than a one from the reference, and are mistimed with respect to each other. The V1 buss output will be delayed 6 lines with respect to the reference. A clean switch is not attainable on the V2 buss output.

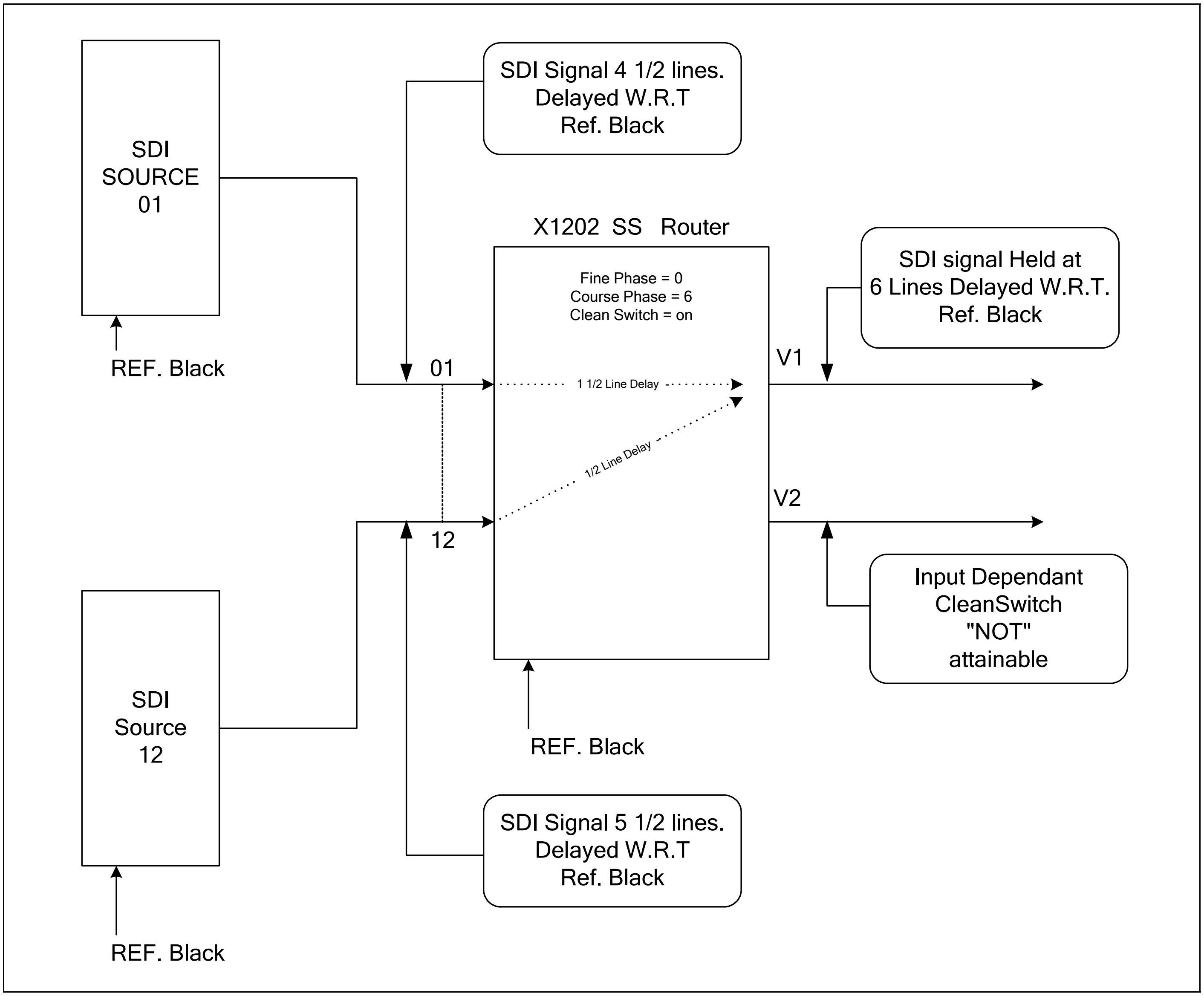
SDI SOURCE 01
REF. Black
SDI Signal 4 1/2 lines. Delayed W.R.T Ref. Black
X1202 SS Router
Fine Phase = 0
Course Phase = 6
Clean Switch = on
SDI signal Held at 6 Lines Delayed W.R.T. Ref. Black
V1
01
1 1/2 Line Delay
1/2 Line Delay
V2
12
Input Dependant CleanSwitch "NOT" attainable
REF. Black
SDI Source 12
SDI Signal 5 1/2 lines. Delayed W.R.T Ref. Black
REF. Black

Figure 7-4: Timing Example 4 – Inputs Not in Time and Delayed from Reference

7.5. ALL INPUT SIGNALS ARE TIMED WITHIN A RANGE OF +/- 1 LINE FROM EACH OTHER BUT DELAYED 5 LINES FROM REFERENCE

This example shows how a production switcher can be clean switched in and out of a 1200 series SoftSwitch™ or Embedded SoftSwitch™ router used as a bypass router. Controlling the timing of the incoming signals can allow all sources to be switched cleanly in the X1200 series router. At the same time all the signals are in time to the production switcher. Finally, the production switcher can also be presented to the bypass router within the range of the X1200 series router's line synchronizer.

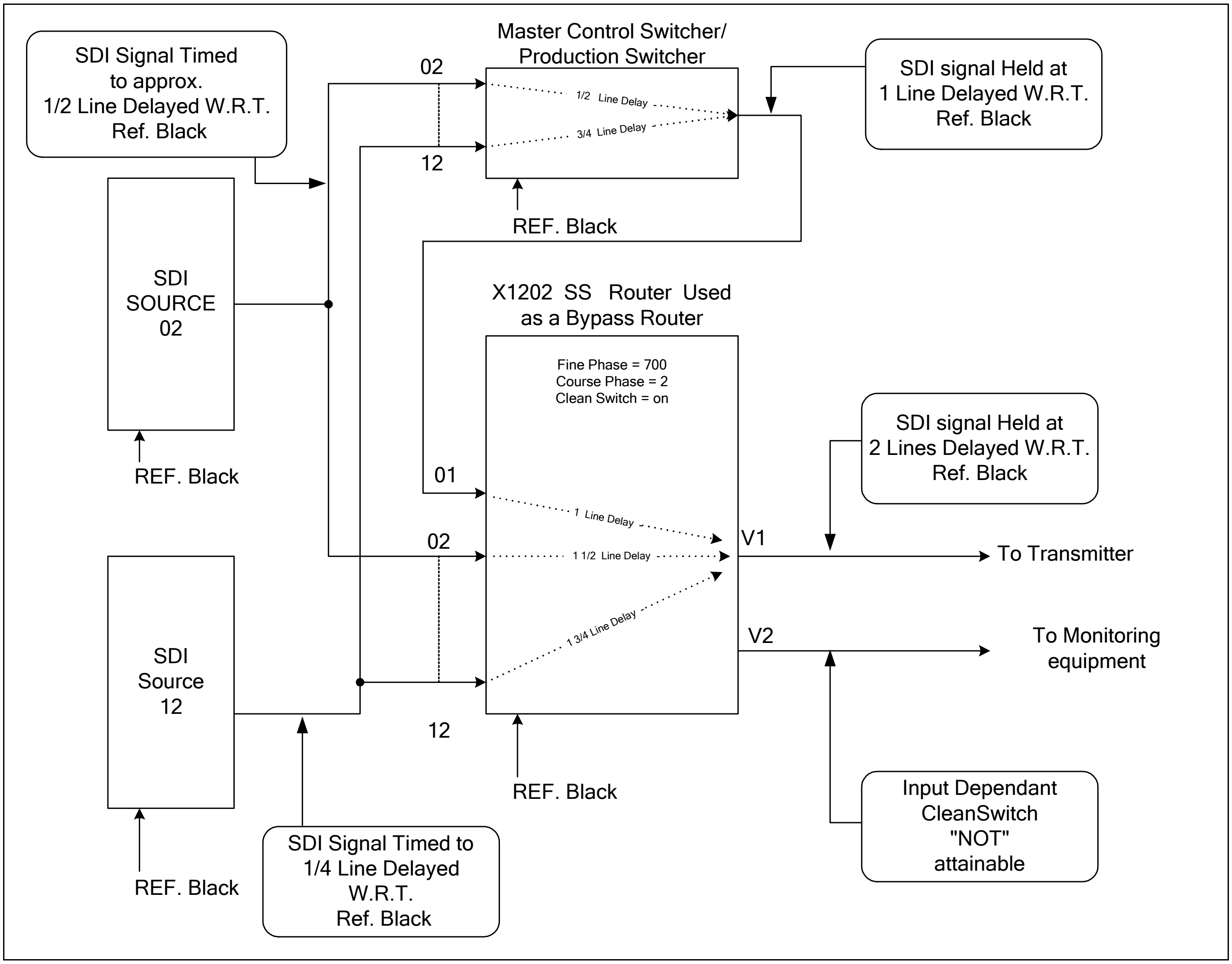
SDI Signal Timed
to approx.
1/2 Line Delayed W.R.T.
Ref. Black
Master Control Switcher/
Production Switcher
02
12
1/2 Line Delay
3/4 Line Delay
SDI signal Held at
1 Line Delayed W.R.T.
Ref. Black
REF. Black
SDI
SOURCE
02
REF. Black
X1202 SS Router Used
as a Bypass Router
Fine Phase = 700
Course Phase = 2
Clean Switch = on
SDI signal Held at
2 Lines Delayed W.R.T.
Ref. Black
01
1 Line Delay
02
1 1/2 Line Delay
V1
To Transmitter
1 3/4 Line Delay
V2
To Monitoring
equipment
SDI
Source
12
12
REF. Black
Input Dependant
CleanSwitch
"NOT"
attainable
REF. Black
SDI Signal Timed to
1/4 Line Delayed
W.R.T.
Ref. Black

Figure 7-5: Timing Example 5 – Bypass Router for Production Switcher

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