



Snell
Advanced
Media

User Instruction Manual

IQMUX30/IQMUX31

3G/HD/SD-SDI Multiplexer for 8 or 4 AES/EBU Audio Streams

Information and Notices

Copyright and Disclaimer

Copyright protection claimed includes all forms and matters of copyrightable material and information now allowed by statutory or judicial law or hereinafter granted, including without limitation, material generated from the software programs which are displayed on the screen such as icons, screen display looks etc.

Information in this manual and software are subject to change without notice and does not represent a commitment on the part of SAM. The software described in this manual is furnished under a license agreement and can not be reproduced or copied in any manner without prior agreement with SAM or their authorized agents.

Reproduction or disassembly of embedded computer programs or algorithms prohibited.

No part of this publication can be transmitted or reproduced in any form or by any means, electronic or mechanical, including photocopy, recording or any information storage and retrieval system, without permission being granted, in writing, by the publishers or their authorized agents.

SAM operates a policy of continuous improvement and development. SAM reserves the right to make changes and improvements to any of the products described in this document without prior notice.

Contact Details

For details of our Regional Customer Support Offices, please visit the SAM website and navigate to Support/Contact Support.

www.s-a-m.com/support/contact-support/

Customers with a support contract should call their personalized number, which can be found in their contract, and be ready to provide their contract number and details.

Contents

Information and Notices	2
Copyright and Disclaimer	2
Contact Details	2
1. Introduction	5
1.1 Module Description	5
1.2 Order Codes	6
1.2.1 IQMUX30	6
1.2.2 IQMUX31	6
1.3 Rear Panel View	7
1.3.1 IQMUX30	7
1.3.2 IQMUX31	7
1.4 Enclosures	8
1.4.1 B-style Enclosure	8
1.4.2 A-style Enclosures	8
1.5 Feature Summary	9
2. Technical Specification	10
3. Connections (IQMUX30)	14
3.1 Input Connections	14
3.1.1 Serial In	14
3.1.2 AES/LTC In (Balanced - IQMUX3049-1A(B)/IQMUX3049-1A(B)3)	14
3.1.3 LTC In (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3 (Unbalanced)	14
3.1.4 AES In (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3)	14
3.2 Output Connections	15
3.2.1 Serial Out (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3)	15
3.2.2 Serial Out (Balanced - IQMUX3049-1A(B)/IQMUX3049-1A(B)3)	15
4. Connections (IQMUX31)	16
4.1 Input Connections	16
4.1.1 Serial In	16
4.1.2 AES In (Unbalanced - IQMUX3147-1A(B)/IQMUX3147-1A(B)3)	16
4.1.3 AES In (Balanced - IQMUX3149-2A(B)/IQMUX3149-2A(B)3)	16
4.2 Output Connections	16
4.2.1 Serial Out (Unbalanced - IQMUX3147-1A(B)/IQMUX3147-1A(B)3)	16
4.2.2 Serial Out (Balanced - IQMUX3149-2A(B)/IQMUX3149-2A(B)3)	16
5. Card Edge Controls	17
6. Controlling the IQMUX30/31 from the RollCall Control Panel	18
6.1 The Information Window	18
6.1.1 Video Status	18
6.1.2 Audio Input Status	18
6.2 Video	19
6.2.1 Video Input Select	19
6.2.2 Audio Input Select	19
6.2.3 Valid Input Standards	19
6.2.4 Default Output	20
6.2.5 Default Output Standard	20
6.2.6 Blanking	20
6.2.7 Freeze	20
6.3 Procamp	21
6.3.1 Procamp Enable	21
6.3.2 Black Level	21
6.3.3 Hue Adjust	21

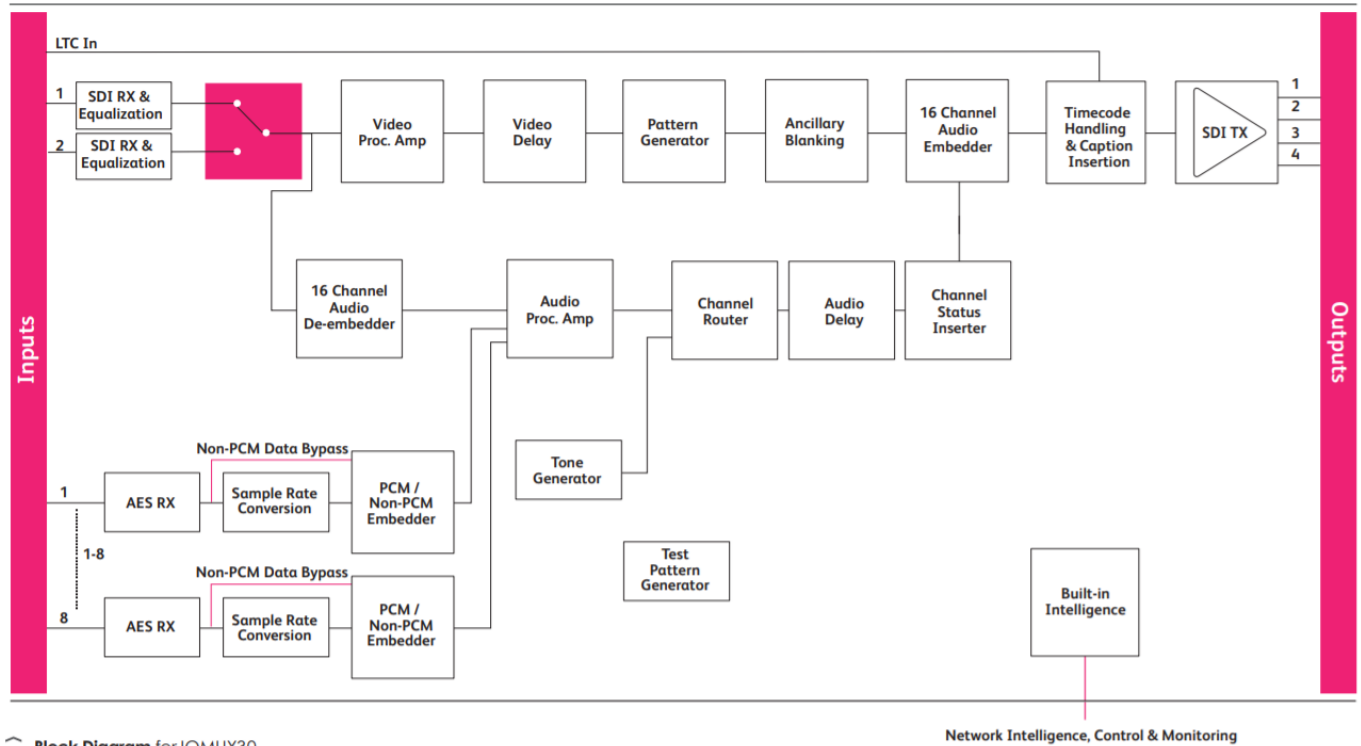
6.3.4 Master Video Gain	21
6.3.5 Y Gain	22
6.3.6 Cb/Cr Gain	22
6.3.7 Y/C Timing	22
6.3.8 Picture Position	22
6.4 Timecode	23
6.4.1 Source (HD)	23
6.4.2 Source (SD)	23
6.4.3 Status	23
6.4.4 On Timecode Loss	23
6.4.5 Timecode Insert	23
6.4.6 Output Lines	23
6.5 Video Delay	24
6.5.1 Horizontal Delay	24
6.5.2 Vertical Delay	24
6.5.3 Frame Delay Added	24
6.5.4 Active Video Delay	24
6.6 Embedder 1 to Embedder 4	25
6.6.1 Embedder <i>N</i> Enable	25
6.6.2 Pair 1 and Pair 2 Controls	25
6.7 Router Overview	27
6.8 Audio	28
6.8.1 Delays	28
6.8.2 Manual Coarse and Manual Fine Delay Controls	28
6.8.3 Tone	28
6.8.4 Audio Monitor	29
6.9 Dolby E	30
6.9.1 Dolby E Alignment	30
6.9.2 Line Standard	30
6.10 Pattern & Caption	31
6.10.1 Edit Caption	31
6.10.2 Select Caption	31
6.10.3 Pattern Select	31
6.11 Memories	32
6.11.1 Recall Memory	32
6.11.2 Save Memory	32
6.11.3 Last Recalled	32
6.11.4 Save Memory Name	33
6.12 Logging	34
6.12.1 Logging Misc	34
6.12.2 Logging Video Input 1/2	34
6.12.3 Logging Audio Input 1/2	35
6.12.4 Logging AES	35
6.12.5 Logging Video Output	35
6.12.6 Logging Audio Output	36
6.12.7 Log Field Descriptions	36
6.13 RollTrack	39
6.13.1 Disable All	39
6.13.2 RollTrack Index	39
6.13.3 RollTrack Source	39
6.13.4 RollTrack Address	39
6.13.5 RollTrack Command	40
6.13.6 RollTrack Sending	40
6.13.7 RollTrack Status	40
6.14 Status	41
6.14.1 Factory Defaults	41
6.14.2 Default Settings	41
6.14.3 Restart	41

1. Introduction

1.1 Module Description

The IQMUX30/31 provide 16-channel and 8-channel digital audio multiplexing respectively, for 3 Gbit/s SDI, HD-SDI 1.5 Gbit/s or SD-SDI 270 Mbit/s signals. Audio processing features include audio delay, gain, invert and channel level routing, while video delay and a video processing amplifier are also included in the feature set; LTC timecode insertion is also supported on the IQMUX30.

The IQMUX series are ideal as general digital ingest modules, where any digital audio source can be catered for, including combinations of embedded and external digital audio.



Block Diagram for IQMUX30

Network Intelligence, Control & Monitoring

1.2 Order Codes

The following product order codes are covered by this manual.

Note: Modules with “A” order codes (for example, IQMUX3048-2**A**) can be fitted into either A- or B-style enclosures. Modules with “B” order codes (for example, IQMUX3048-2**B**) can only be fitted into B-style enclosures. See page 8.

1.2.1 IQMUX30

IQMUX3048-2A IQMUX3048-2B	HD/SD-SDI 16-channel AES Multiplexer, 4 SDI outputs, 8 Unbalanced AES inputs.
IQMUX3048-2A3 IQMUX3048-2B3	3GHD/SD-SDI 16-channel AES Multiplexer, 4 SDI outputs, 8 Unbalanced AES inputs, 1 unbalanced LTC input.
IQMUX3049-1A IQMUX3049-1B	HD/SD-SDI 16-channel AES Multiplexer, 2 SDI outputs, 8 Balanced AES inputs
IQMUX3049-1A3 IQMUX3049-1B3	3G/HD/SD-SDI 16-channel AES Multiplexer, 2 SDI outputs, 8 Balanced AES inputs, 1 balanced LTC input.
IQMUX30-3G	Upgrade for IQMUX30 HD/SDI-SDI 16-channel AES Multiplexer to operate with 3 Gbit/s SDI signals.

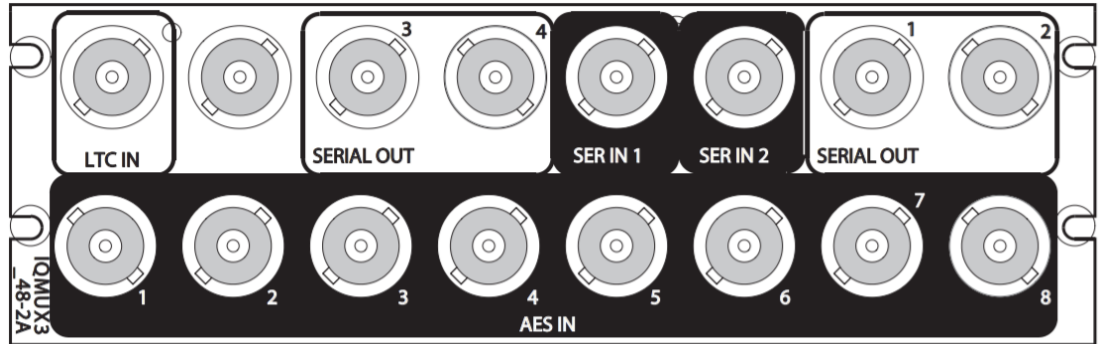
1.2.2 IQMUX31

IQMUX3147-1A IQMUX3147-1B	HD/SD-SDI 8-channel AES Multiplexer. 2 SDI outputs, 4 Unbalanced AES inputs.
IQMUX3147-1A3 IQMUX3147-1B3	3G/HD/SD-SDI 8-channel AES Multiplexer. 2 SDI outputs, 4 Unbalanced AES inputs.
IQMUX3149-1A IQMUX3149-1B	HD/SD-SDI 8-channel AES Multiplexer. 2 SDI outputs, 4 Balanced AES inputs.
IQMUX3149-1A3 IQMUX3149-1B3	3G/HD/SD-SDI 8-channel AES Multiplexer. 2 SDI outputs, 4 Balanced AES inputs.
IQMUX31-3G	Upgrade for IQMUX31 HD/SDI-SDI 8-channel AES Multiplexer to operate with 3 Gbit/s SDI signals.

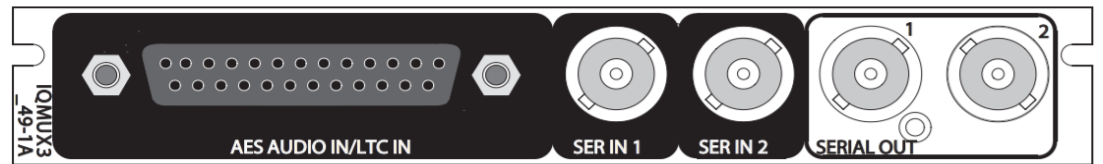
1.3 Rear Panel View

The following rear panel types are available.

1.3.1 IQMUX30

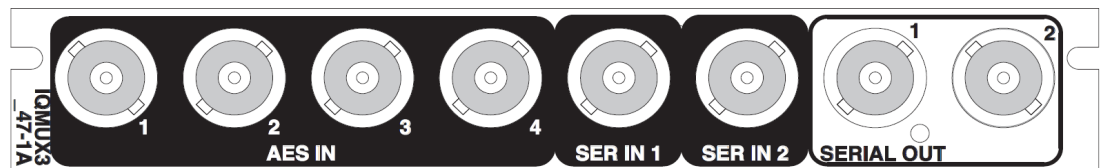


IQMUX3048-2A(B)/IQMUX3048-2A(B)3 (Unbalanced)



IQMUX3049-1A(B)/IQMUX3049-1A(B)3 (Balanced)

1.3.2 IQMUX31



IQMUX3147-1A(B)/IQMUX3147-1A(B)3 (Unbalanced)



IQMUX3149-1A(B)/IQMUX3149-1A(B)3 (Balanced)

1.4 Enclosures

The modules can be fitted into the enclosure types shown.

Important:

Although IQ modules are interchangeable between enclosures, their rear panels are enclosure specific. An IQH3B enclosure accepts modules with either “A” or “B” order codes. An IQH3A or IQH1A enclosure accepts modules with “A” order codes only. See page 6.

1.4.1 B-style Enclosure



Enclosure order codes: IQH3B-S-0, IQH3B-S-P

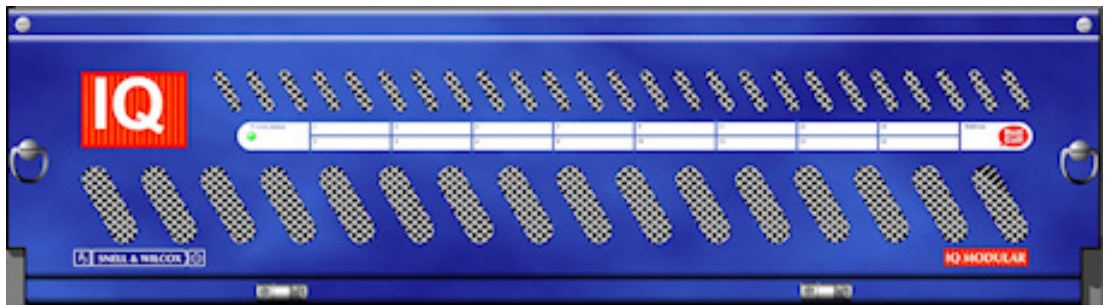
1.4.2 A-style Enclosures



Enclosure order code: IQH1A-S-P



Enclosure order codes: IQH3A-S-0, IQH3A-S-P



Enclosure order codes: IQH3A-E-0, IQH3A-E-P, IQH3A-0-0, IQH3A-0-P



Enclosure order code: IQH1A-S-P

1.5 Feature Summary

The IQMUX30 and IQMUX31 provide the following features:

- 16-channel 3G/HD/SD-SDI multiplexer capable of embedding synchronous or asynchronous AES inputs (IQMUX30)
- 8-channel 3G/HD/SD-SDI multiplexer capable of embedding synchronous or asynchronous AES inputs (IQMUX31)
- Standards supported:
 - 3G-SDI to SMPTE 424M/425M level A & B compatible
 - HD-SDI to SMPTE 292M/274M/296M
 - SD-SDI to SMPTE 259M-C
- Handles up to 16 channels of embedded audio present on the incoming SDI stream
- Channel level (Sub-frame) routing
- Audio proc. amp features including independent gain, invert and mute control
- Embedding continues on loss of SDI input (silence)
- Auto mute on AES input error
- Adjustable delay for selected audio channels
- Any group of embedded audio may be passed unchanged, processed or blanked
- Embedded Dolby E support – pair routing, delay and Dolby E header alignment
- PCM and non-PCM detection and reporting
- Handles Dolby E and PCM audio present in the same group
- Independent HANC and VANC blanking control
- LTC timecode insertion and embedded timecode handling support, including ability to output via the caption mechanism for monitoring purposes
- Input loss detection – default output of black/pattern/freeze
- Up to 9 frames of video delay and 2 seconds of audio delay
- Transparent to all ancillary data including VANC metadata
- Video controls including video gain and offset
- In-built test pattern generator and audio tone generator
- 2 SDI inputs and up to 4 active HD/SD-SDI outputs
- 16x user memories, save/recall/rename
- Rollcall control and monitoring compatible

2. Technical Specification

Inputs and Outputs	
Signal Inputs	
SDI Inputs	2x
Input 1 Cable Length	Up to 70 m Belden 1694A @ 3 Gbit/s Up to 160 m Belden 1694A @ 1.5 Gbit/s >350 m Belden 1694A @ 270 Mbit/s
Input 2 Cable Length	Up to 60 m Belden 1694A @ 3 Gbit/s Up to 100 m Belden 1694A @ 1.5 Gbit/s Up to 100 m Belden 1694A @ 270 Mbit/s
Unbalanced Digital Audio	IQMUX30: 8 x AES/EBU, AC3, Dolby-E (BNC) IQMUX31: 4 x AES/EBU, AC3, Dolby E (BNC)
Balanced Digital Audio	IQMUX30: 8 x AES/EBU, AC3, Dolby-E (25-Way D-Type) IQMUX31: 4 x AES/EBU, AC3, Dolby-E (25-Way D-Type)
Signal Outputs	
SDI Outputs	2x (IQMUX31), 4x (IQMUX30) for double-width, 2x for single-width
Controls	
Indicators	
Power	OK (Green)
CPU Running	OK (Green flashing)
FPGA Running	OK (Green flashing)
Status	OK (Green) Warning (Yellow) Error (Red)
Input 1	OK (Green)
Input 2	OK (Green)
Video Controls	
Input Standard	1125(1080)/50P (A & B), 1125(1080)/59P (A & B), 1125(1080)/29i, 1125(1080)/25i, 750(720)/59P, 750(720)/50P, 525(480)/29i, 625(576)/25i
Default Video Output Type	Pattern, Freeze, Black
Default Video Output Standard	Last Known Good, 1125(1080)/50P (A & B), 1125(1080)/59P (A & B), 1125(1080)/29i, 1125(1080)/25i, 750(720)/59P, 750(720)/50P, 525(480)/29i, 625(576)/25i
Input Select	Input 1, Input 2
Manual Freeze	On/Off
Freeze	Field/Frame
Video Delay Frames	0 - 9 F
VANC Data	Blank VANC
SD VANC Data	Line blanking (6 controls)
ProcAmp Enable	On/Off

Black Level	±100 mV in steps of 0.8 mV
Hue Adjust	±180 in steps of 1
Master Video Gain	±6 dB in steps of 0.1 dB
Y-Gain	±6 dB in steps of 0.1 dB
Cb/Cr Gain	±6 dB in steps of 0.1 dB
Y/C Timing	±8 pixels in 2 pixel steps (SD) ±16 pixels in 2 pixel steps (HD/3G)
Picture Position	±8 pixels in 2 pixel steps (SD) ±16 pixels in 2 pixel steps (HD/3G)
Pattern On	On/Off
Pattern Select	75% Color Bars, Black
Caption On	On/Off
Edit Caption	19 characters available

Audio Controls

Embedder Assignment	
Group 1 to 4 Enable	On/Off
Pair 1 to 8 Source L/Non-PCM	Dis-embed 1_1 to 8_2, AES 1 to 8, Tone, Silence
Pair 1 to 8 Source R	Dis-embed 1_1 to 8_2, AES 1 to 8, Tone, Silence
Pair 1 to 8 Stereo	Link channel pairs
Pair 1 to 8 Polarity L/R	On/Off
Pair 1 to 8 Gain L/R	+12 dB to -72 dB in 0.1 dB steps
Pair 1 to 8 Non-PCM	On/Off
Processed Audio Delay Control	
Coarse Manual Delay	Up to 1.75 s in 5 ms steps
Fine Manual Delay	± 0.25 s in 0.5 ms steps
Dolby-E	
Dolby-E Auto Alignment	On/Off
Tone	
Frequency L/R	100 Hz to 10 kHz in 100 Hz steps
Channel Ident	On/Off
HANC Data	Blank HANC (Removes all HANC data, including audio, when embedders disabled)
Audio Monitoring	
Silence Detect	0 to -80 dB in steps of 1 dB
Signal Overload Detect	0 to -80 dB in steps of 1 dB
Warning Timer	1 to 20 seconds in steps of 1 second
Other Controls	
User Memories	16x Save, Recall, Rename
Memory Naming	User configurable naming of memories 1 - 16
Information Window	Video Input Status, Audio Input Status

Factory Default	Resets all module settings to factory specified default values and clears memories
Default Settings	Resets all module settings to factory specified defaults but does not clear memories
Restart	Software restart of the module
Module Information	Reports following module information: Software version, Serial number, Build number, KOS version, Firmware version, PCB version

Specifications

Electrical	3 Gbit/s SDI, SMPTE 424M 1.5 Gbit/s HD-SDI, SMPTE 292M 270 Mbit/s SDI, SMPTE 259M-C/DVB-ASI
Connector/Format	BNC/ 75 Ohm panel jack on standard IQ connector panel
Return Loss	>-15 dB (270 Mbit/s, 1.5 Gbit/s) >-10 dB (3 Gbit/s)
Output Jitter	SD-SDI 0.2 UI (10 Hz)/0.2 UI (1 kHz) 3G/HD-SDI 1.0 UI (10 Hz)/0.2 UI (100 kHz)
Video Standards	1125(1080)/50p (A & B), 1125(1080)/59p (A & B), 750(720)/50p, 750(720)/59p, 1125(1080)/25i, 1125(1080)/29i, 625(576)/25i, 525(480)/29i
Typical Video Delay	Typical delay (input lock with Dolby E alignment off): 2 lines Typical delay (input lock with Dolby E alignment on): 1 frame
Embedded Audio Handling	HD - 24-bit synchronous 48 kHz to SMPTE 299M SD - 20-bit synchronous 48 kHz to SMPTE 272M-A
Embedded Audio Delay	Minimum (PCM) 2 ms Maximum (non-PCM) SD: 67 μ s HD: 28 μ s 3G-A: 15 μ s 3G-B: 25 μ s

Digital Audio Input (Balanced)

Connector/Format	25 W D
Sample Frequency	25 - 96 kHz (48 kHz for Reference)
Input Cable Length	>150 m of AES3 cable
Impedance	110 Ohms

Digital Audio Input (Unbalanced)

Connector/Format	BNC
Sample Frequency	25 - 96 kHz (48 kHz for Reference)
Input Cable Length	>500 m of RG59 cable
Impedance	75 Ohms
Standard	AES3-1992, SMPTE 272M A-1994, SMPTE 299M
Output Sampling	48 kHz frame locked

LTC Input Format

According to	SMPTE-12M 2008c
Frame Rate	23.94, 24, 25, 29.97, 30, 50, 59.98, 60 fps
Level	0.4V to 5V p-p for Unbalanced; 0.2V to 5V p-p for Balanced

LTC Port Unbalanced	
Input Connector Type	BNC
Input Impedance	75 Ohms
Input Signal Range	0.4V p-p to 5V p-p
LTC Port Balanced	
Input Connector Type	Differential via 2 pins of 25-pin D -Sub female AES AUDIO/LTC IN (and GND pin)
Input Impedance	10K Ohms
Input Signal Range	0.2V p-p to 5V p-p
Power Consumption	
Module Power Consumption	9 W max (A Frames) 8 PR (B Frames)

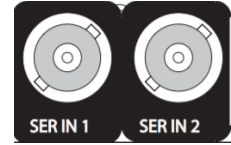
3. Connections (IQMUX30)

This section describes the physical input and output connections provided by the IQMUX30.

3.1 Input Connections

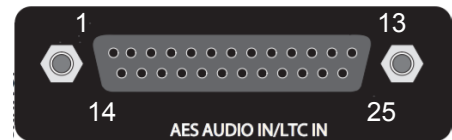
3.1.1 Serial In

Serial digital input connection to the module is via two BNC connectors, which terminate in 75 Ohms.



3.1.2 AES/LTC In (Balanced - IQMUX3049-1A(B)/IQMUX3049-1A(B)3)

AES and LTC input to balanced models is via a 25-way D-type connector.



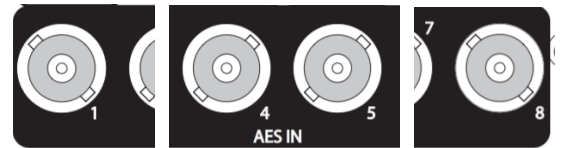
3.1.3 LTC In (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3 (Unbalanced))

LTC input to unbalanced models is via a BNC 75 Ohm connector.



3.1.4 AES In (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3)

AES input to the unbalanced models is via eight BNC connectors, which terminate in 75 Ohms.

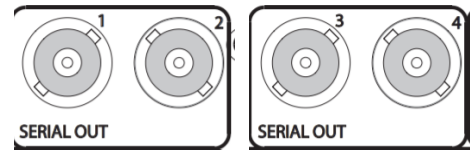


Pin	Connection	Pin	Connection
1	META_P	14	META_N
2	AES IN 8+	15	AES IN 8-
3	AES IN 7+	16	AES IN 7-
4	AES 7 GND	17	AES 6 GND
5	AES IN 6+	18	AES IN 6-
6	AES IN 5+	19	AES IN 5-
7	AES 5 GND	20	AES 4 GND
8	AES IN 4+	21	AES IN 4-
9	AES IN 3+	22	AES IN 3-
10	AES 3 GND	23	AES 2 GND
11	AES IN 2+	24	AES IN 2-
12	AES IN 1+	25	AES IN 1-
13	AES 1 GND		

3.2 Output Connections

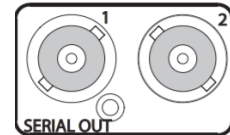
3.2.1 Serial Out (Unbalanced - IQMUX3048-2A(B)/IQMUX3048-2A(B)3)

SDI output from the unbalanced models is via four BNC connectors.



3.2.2 Serial Out (Balanced - IQMUX3049-1A(B)/IQMUX3049-1A(B)3)

SDI output from the balanced models is via two BNC connectors.



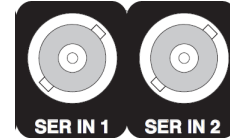
4. Connections (IQMUX31)

This section describes the physical input and output connections provided by the IQMUX31.

4.1 Input Connections

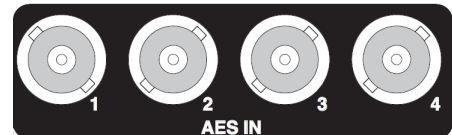
4.1.1 Serial In

Serial digital input connection to the module is made by means of two BNC connectors, which terminate in 75 Ohms.



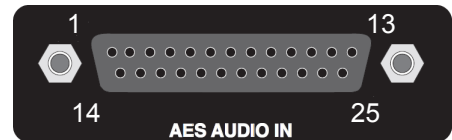
4.1.2 AES In (Unbalanced - IQMUX3147-1A(B)/IQMUX3147-1A(B)3)

AES input to the unbalanced models is made by means of four BNC connectors, which terminate in 75 Ohms.



4.1.3 AES In (Balanced - IQMUX3149-2A(B)/IQMUX3149-2A(B)3)

AES input to the balanced models is made by means of 25-way D-type connector.

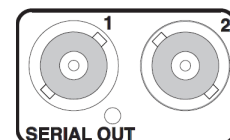


Pin	Connection	Pin	Connection
1	META_P	14	META_N
2	AES IN 8+	15	AES IN 8-
3	AES IN 7+	16	AES IN 7-
4	AES 7 GND	17	AES 6 GND
5	AES IN 6+	18	AES IN 6-
6	AES IN 5+	19	AES IN 5-
7	AES 5 GND	20	AES 4 GND
8	AES IN 4+	21	AES IN 4-
9	AES IN 3+	22	AES IN 3-
10	AES 3 GND	23	AES 2 GND
11	AES IN 2+	24	AES IN 2-
12	AES IN 1+	25	AES IN 1-
13	AES 1 GND		

4.2 Output Connections

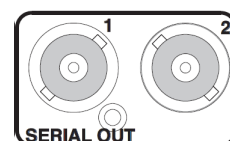
4.2.1 Serial Out (Unbalanced - IQMUX3147-1A(B)/IQMUX3147-1A(B)3)

SDI output from the unbalanced models is made by means of two BNC connectors.



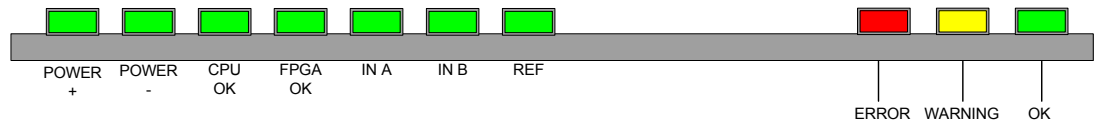
4.2.2 Serial Out (Balanced - IQMUX3149-2A(B)/IQMUX3149-2A(B)3)

SDI output from the balanced models is made by means of two BNC connectors.



5. Card Edge Controls

The LEDs on the edge of the module indicate its operating status.



LED	Color	Description
POWER +	Green	Indicates that a positive power supply is present.
POWER -	Green	Indicates that a negative power supply is present.
CPU OK	Green	This LED will flash to indicate that the CPU is running.
FPGA OK	Green	Flashes when the FPGA is running. When the module is booting, this LED is illuminated continuously, until the SDI is enabled.
IN A, IN B	Green	These LEDs are illuminated when valid input is present.
REF	Green	This LED indicates that a reference signal is present.
ERROR	Red	This LED indicates board fault conditions. When the module is booting, this LED is illuminated, until the SDI is enabled.
WARNING	Yellow	This LED is illuminated if one or more of the SDI inputs is not valid.
OK	Green	Indicates that the module is operating correctly.

6. Controlling the IQMUX30/31 from the RollCall Control Panel

6.1 The Information Window

The information window is displayed in the upper-right corner of each screen and displays basic information about the video and audio status of the module.

Select either **Video Status** or **Audio Input Status** to display the corresponding information.

6.1.1 Video Status

When **Video Status** is selected, the video input status is displayed:



Name	Status	Description	Standard
IN1:	OK	Input signal received	Detected video input standard is displayed, e.g. 1080/29i (Blank if input lost).
IN2:	FAIL	Input signal failed	
	LOST	No signal received	
	MISM	Mismatch format detected	
OUT:	OK	Output signal delivered	Selected video output standard is displayed, e.g. 1080/29i . A \$ symbol indicates that the caption is enabled. (Blank if disabled)
	BLK	Black output delivered	
	FRZ	Frozen output delivered	
	PAT	Pattern output delivered	

6.1.2 Audio Input Status

When **Audio Input Status** is selected, the status of the embedded audio input is displayed where:

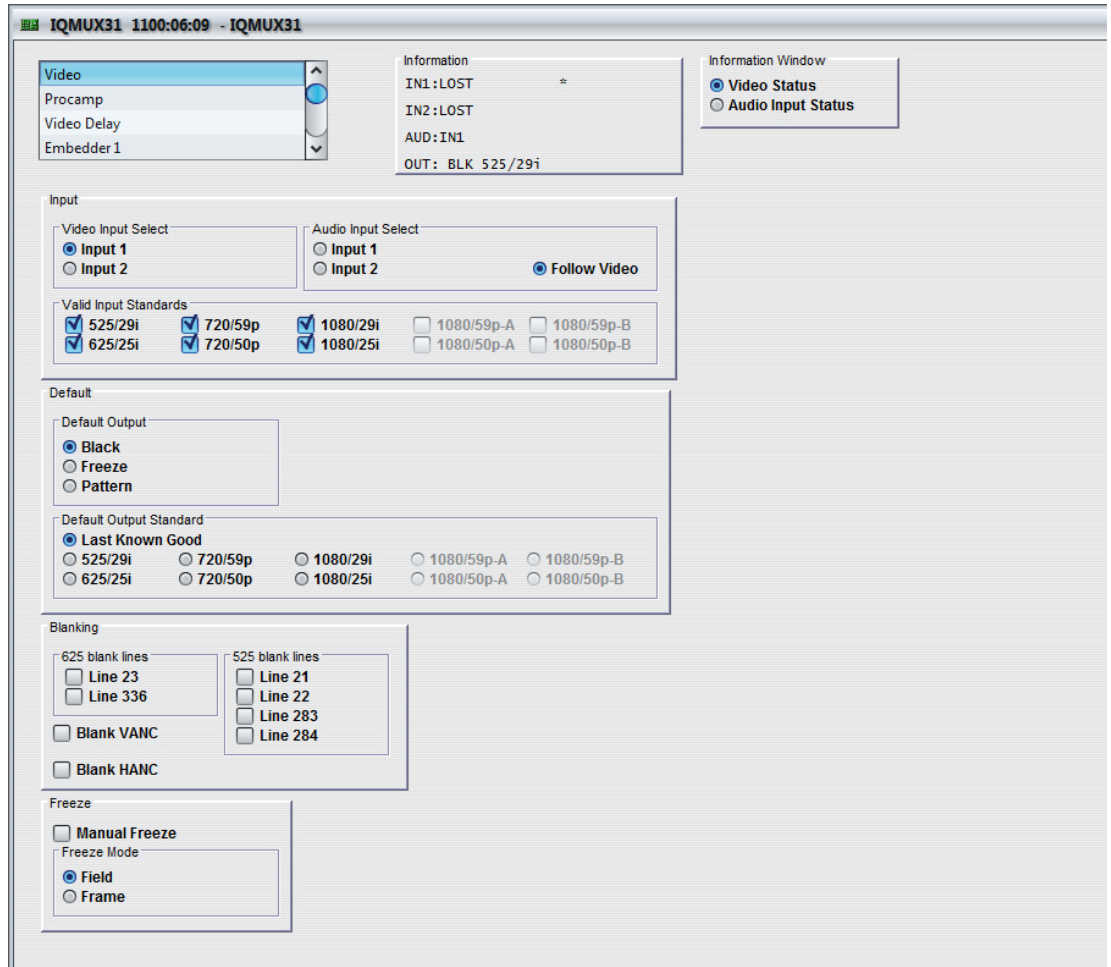


Name	Status	Description
Audio Embed Input	P	Channel is a PCM audio input.
-----	?	No audio input is detected.
	D	Signal is data (non-PCM, Dolby, etc.).
Audio AES Input	E	Signal is Dolby E.
-----	V	V bit present on audio channel.

6.2 Video

The **Video** screen enables you to specify the settings for the selected serial data input:

- Valid input standards.
- The default output standard.
- Any required ancillary blanking.
- Freeze options and apply a manual freeze to the output image.
- The default output.



6.2.1 Video Input Select

The **Input Select** control selects either Input 1 (at connector SER IN 1) or Input 2 (at connector SER IN 2) to be processed by the module.

6.2.2 Audio Input Select

The **Audio Input Select** control selects audio from either Input 1 or Input 2 to be processed by the module. If Follow Video is selected, the audio input will automatically match the video input selected.

6.2.3 Valid Input Standards

The **Valid Input Standards** check boxes specify the video input standards that the module will accept. The module will automatically detect the standard of the received input and block any signal that does not comply with these selected video formats.

By default, all input standards are selected.

6.2.4 Default Output

The **Default Output** control specifies the module's output in the event of signal loss at the input. Options are:

- **Black:** video out is a black screen
- **Freeze:** video output is frozen/paused
- **Pattern:** video output is a pre-determined test pattern or information screen

6.2.5 Default Output Standard

The **Default Output Standard** settings specify the output standard that the module will use if it cannot determine the correct output standard to use.

By default, the **Last Known Good** setting is selected, which uses the last valid output standard.

6.2.6 Blanking

The **Blanking** controls enable specific lines of VANC to be blanked.

- **625 blank lines:** Applied to 625 only, you can blank either or both of line 23 or line 336.
- **525 blank lines:** Applied to 525 only, you can blank any or all of lines 21, 22, 283, or 284.
- **Blank VANC:** Selecting this option blanks the following lines inclusively:

525: 11 – 20, 274 – 282

625: 7 – 22, 320 – 335

720: 8 – 25

1080i: 8 - 20, 570 – 583

1080P: 8 – 41

All VANC data from the end of the last active video line to the end of the RP168 switch line is always blanked, irrespective of this control.

- **Blank HANC:** Selecting this option removes all horizontal ancillary data including audio when the embedders are disabled and the audio is unprocessed.

6.2.7 Freeze

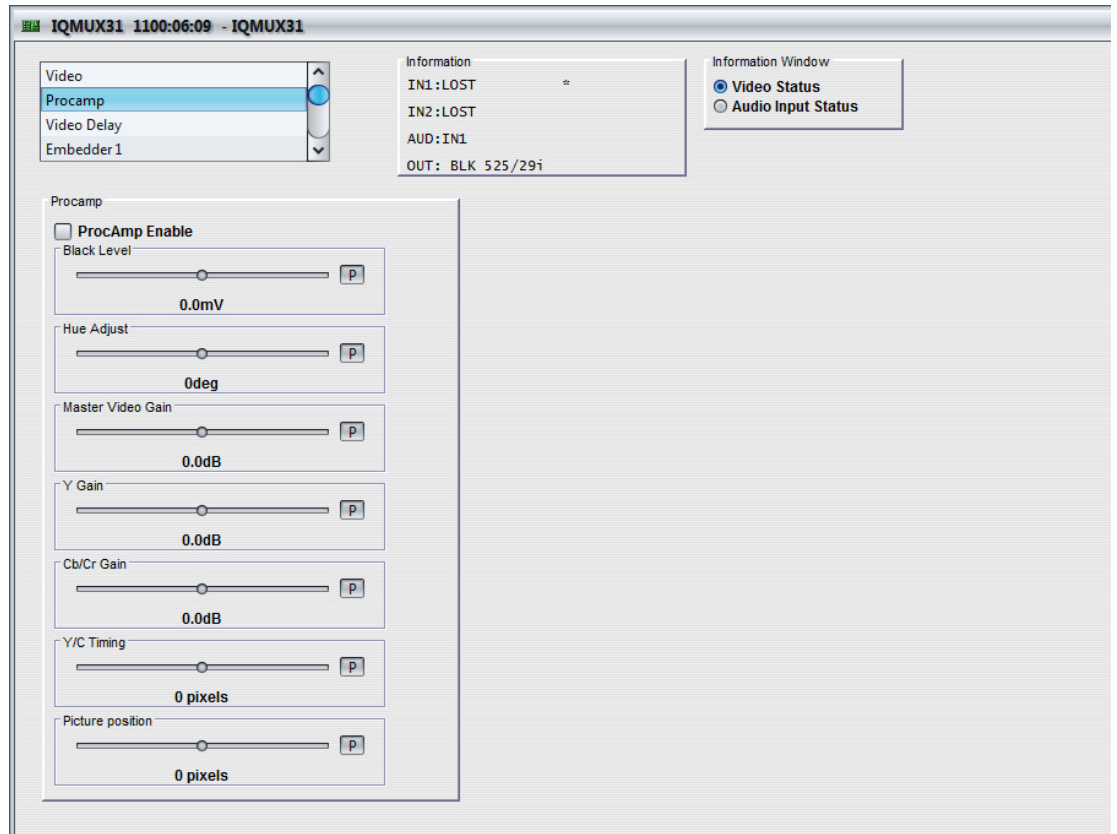
The **Manual Freeze** control freezes/pauses the output. Freeze type can be specified as either **Field** or **Frame**.

Note: This function is disabled on a power cycle of the module.

6.3 Procamp

The **Procamp** screen enables the processing amplifier settings to be adjusted:

- Black Level
- Hue Adjust
- Master Video Gain
- Y Gain (Luma)
- Cb/Cr Gain (Chroma)
- Y/C Timing
- Picture position



6.3.1 Procamp Enable

The **Procamp Enable** check box enables the video processing amplifier functions. Clear the check box to disable the Procamp functions.

6.3.2 Black Level

The **Black Level** control allows the channel's black level to be adjusted over a range of ± 100 mV in steps of 0.8 mV. The preset value is 0.

6.3.3 Hue Adjust

The **Hue** control allows the channel's hue to be adjusted over a range of $\pm 180^\circ$ in steps of 1° . The preset value is 0.

6.3.4 Master Video Gain

The **Master Video Gain** control allows the video gain to be adjusted over a range of ± 6 dB in steps of 0.1 dB. The preset value is 0.

6.3.5 Y Gain

The **Y Gain** control allows the luma to be adjusted over a range of ± 6 dB in steps of 0.1 dB. The preset is 0.

6.3.6 Cb/Cr Gain

The **Cb/Cr Gain** control allows the chrominance to be adjusted over a range of ± 6 dB in steps of 0.1 dB. The preset value is 0.

6.3.7 Y/C Timing

The **Y/C Timing** control allows the luma/chroma timing to be adjusted over a range of:

- ± 8 pixels in 2 pixel steps in SD
- ± 16 pixels in 2 pixel steps in HD/3G

The preset value is 0.

6.3.8 Picture Position

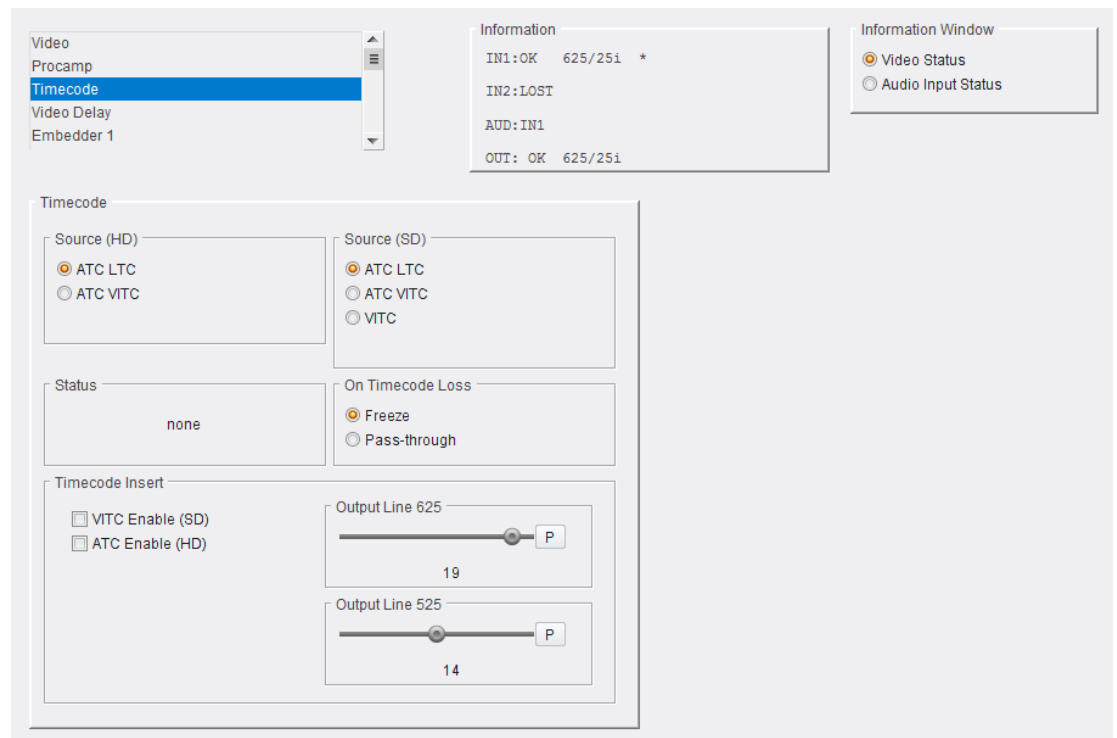
The **Picture Position** control allows the picture position to be adjusted over a range of:

- ± 8 pixels in 2 pixel steps SD
- ± 16 pixels in 2 pixel steps HD/3G

The preset value is 0.

6.4 Timecode

The **Timecode** page allows timing synchronization to be configured.



6.4.1 Source (HD)

Select the timecode source for HD signals. Options are:

- **ATC LTC** - Embedded LTC
- **ATC VITC** - Embedded VITC

6.4.2 Source (SD)

Select the timecode source for SD signals. Options are:

- **ATC LTC** - Embedded LTC
- **ATC VITC** - Embedded VITC
- **VITC** - Vertical interval timecode

6.4.3 Status

Displays current timecode status.

6.4.4 On Timecode Loss

Select the action to be taken if timecode data is lost. Options are:

- **Freeze**
- **Pass-through**

6.4.5 Timecode Insert

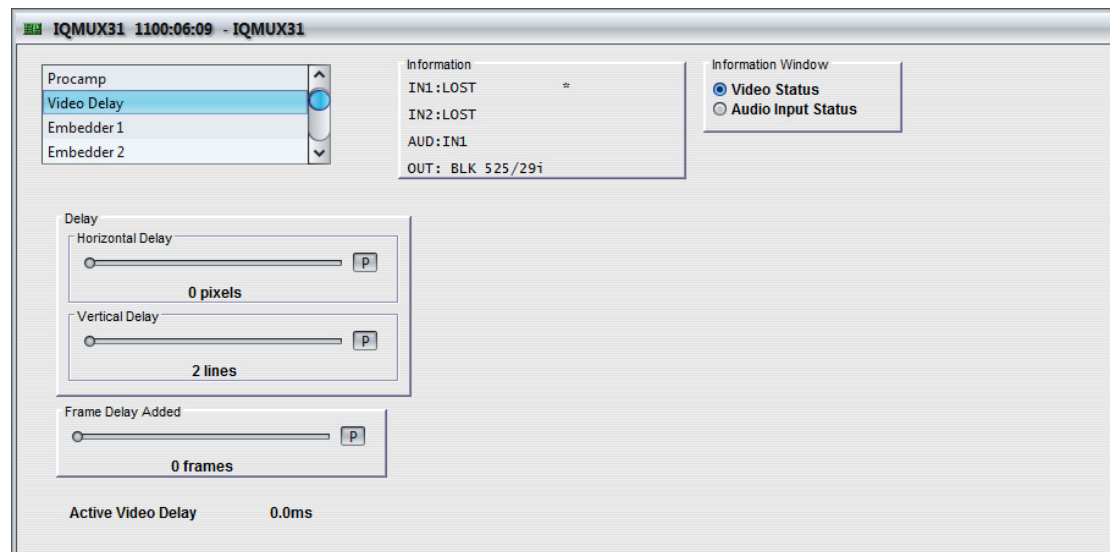
Use the check boxes to enable **VITC** or **ATC** timecode insertion. If neither are selected, time code packets will be passed through.

6.4.6 Output Lines

Use the sliders to select the output line on which to embed the timecode; the line number is displayed below the slider. Click **P** to reset to default values - Line 19 for 625-line, and 14 for 525-line standards.

6.5 Video Delay

The **Video Delay** screen enables the video delay mode to be specified.



6.5.1 Horizontal Delay

Use the slider bar to adjust the horizontal delay over a range of 0 to 1 line in 1 pixel steps. The preset value is 0.

If the delay is set to lower than the latency, the delay will stop at the latency but this will not be indicated. Additionally, if the vertical delay is set to 0, the lowest horizontal delay will equal the latency of the module rather than the delay specified by this control.

6.5.2 Vertical Delay

Use the slider bar to add up to 1 frame of vertical delay in steps of 1 line. The preset value is 0.

6.5.3 Frame Delay Added

You can specify up to 9 additional frames of delay using this slider bar.

The delay of non-PCM audio, or “pass-through” audio is also set by this control.

The delay, in ms, is displayed below this control.

6.5.4 Active Video Delay

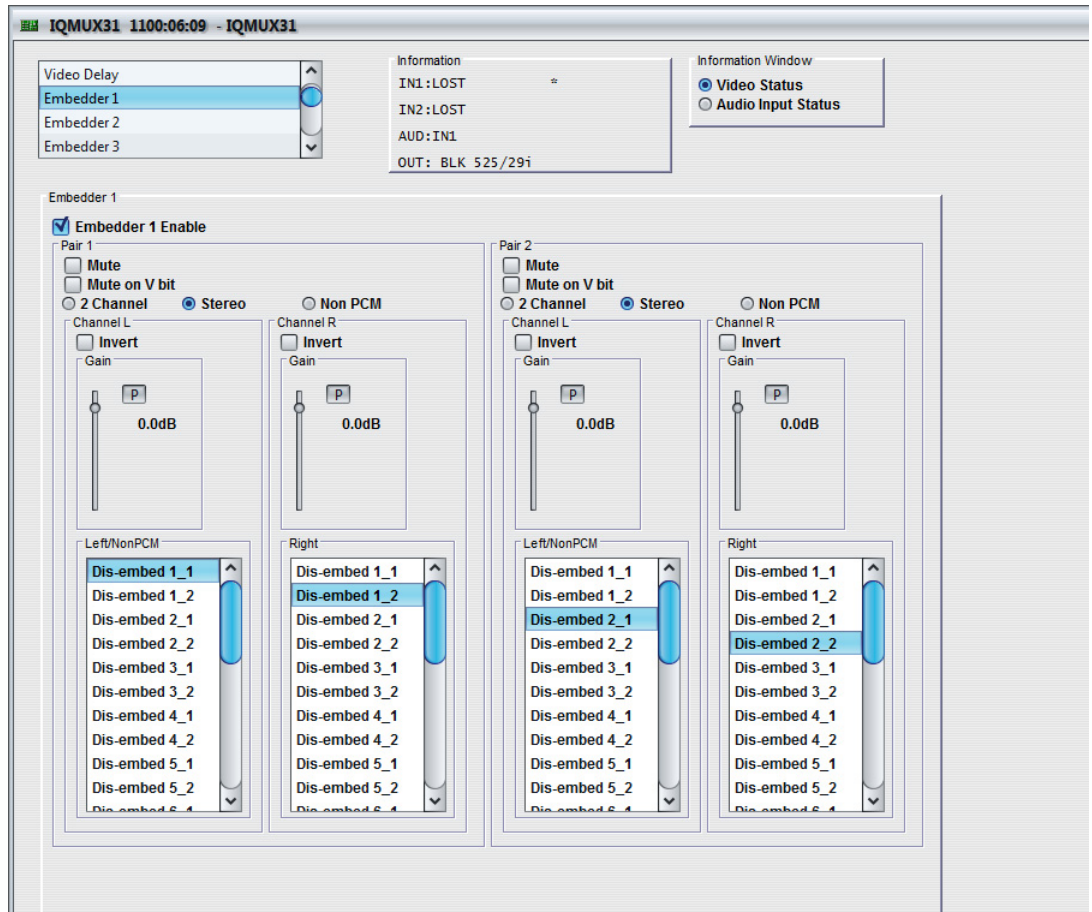
The total active video delay (in ms) is displayed at the bottom of this screen.

6.6 Embedder 1 to Embedder 4

Four embedder groups are provided. Each embedder group comprises two stereo audio pairs, each of which has a left and right channel. The settings on these screens enable you to:

- Enable or disable the embedder group.
- Apply a mute to a pair within the group.
- Configure each pair as either 2 Channel, Stereo, or Non-PCM.
- Configure each channel within the pair.
- Specify the route for each channel.

With the exception of the Embedder Enable control, each control is duplicated for Pair 1 and Pair 2.



Note: The control templates for Embedder 1 to Embedder 4 comprise the same controls. To avoid repetition, in this manual, the controls are only described once.

6.6.1 Embedder *N* Enable

This option, when checked, enables the embedder group.

6.6.2 Pair 1 and Pair 2 Controls

These controls configure the audio pair and specify the output route.

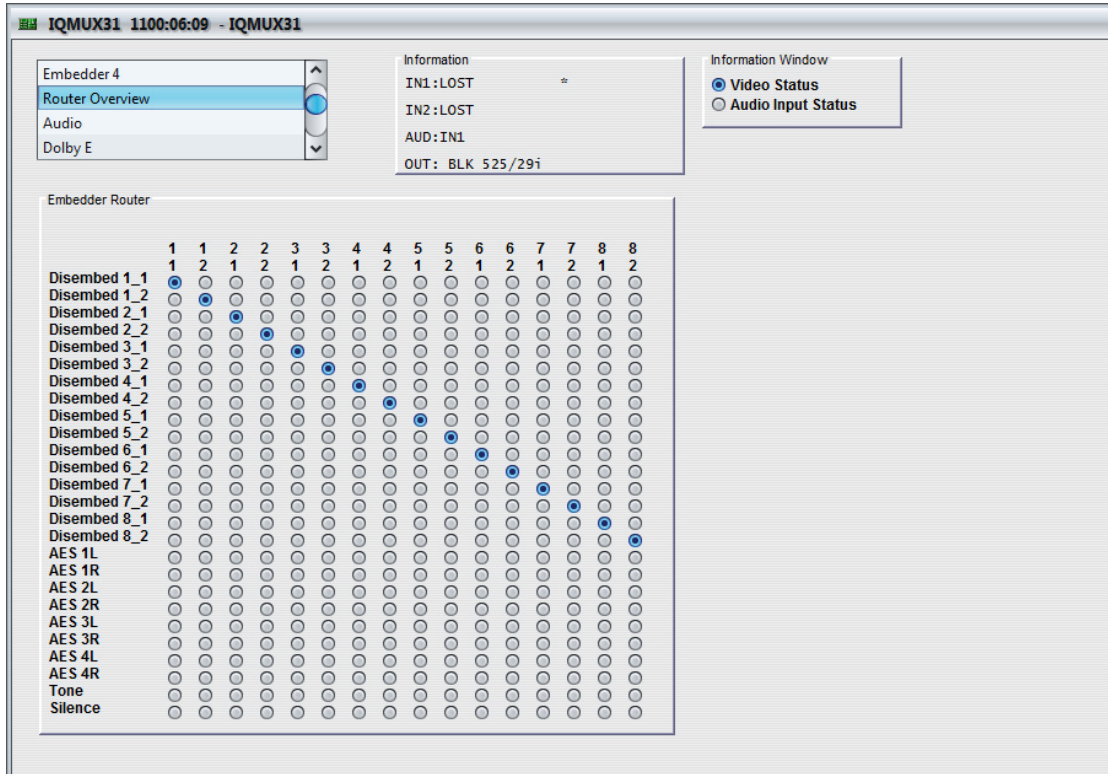
- **Mute:** When selected, applies a mute to the audio output pair.
- **Mute on V bit:** When selected, applies a mute to the audio output pair when the validity bit (timeslot 28 in the audio 32-timeslot subframe) is not set to zero, i.e. when defective samples are detected.
- **2 Channel:** When selected, configures the pair as separate L/R channels.
- **Stereo:** When selected, configures the L/R channels as a stereo pair.

- **Non PCM:** Enables routing of non-PCM data with the Source L/Non-PCM selection.
If in Non-PCM mode and a PCM source is selected, it will bypass the sample rate converters and be routed to the output but the Procamp and Audio Delay controls will have no effect.
If set to PCM mode and a Non-PCM source is selected, silence will be embedded.
- **Invert L/Invert R:** Inverts the signal (PCM sources only).
- **Gain L/Gain R:** The slider bar may be used to independently adjust the channel audio gain over a range of +12 dB to -72 dB in 0.1 dB steps (PCM only). The preset value is 0.
- **Left/NonPCM:** Routes the Left (PCM) or Non-PCM channel data to the option selected in the window. Options for the channel include a dis-embed path, a tone or silence.
- **Right:** Routes the Right (PCM) channel to the option selected in the window. Options for the channel include a dis-embed path, a tone or silence.

6.7 Router Overview

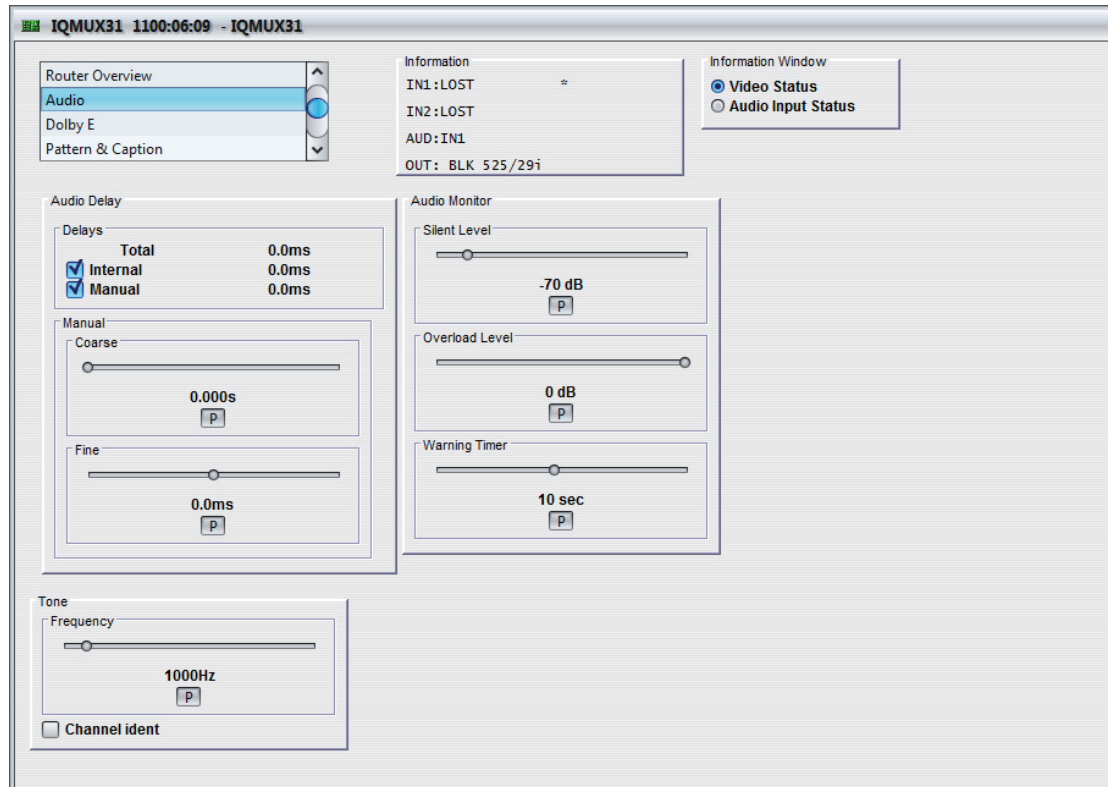
The **Router Overview** screen provides an overview of the embedder routing specified of the Embedder 1 to Embedder 4 screens. Changes that you make to the embedder routes on this screen are applied to the Embedder 1 to Embedder 4 screens (and vice versa). To apply more than simple routing, e.g. to use the gain or inversion controls, you must use the Embedder specific screens.

To specify a route on this screen, simply select it from the matrix.



6.8 Audio

The **Audio** screen enables the module audio settings to be configured.



6.8.1 Delays

These settings enable you to specify the amount of audio delay applied. The delay mechanisms are not exclusive of each other, the user is free to select any or all of the delay types, which will be added to create the module's total delay.

- **Internal:** The added delay is equal to the module's current video delay as set in the Video Delay menu.
- **Manual:** Selecting this option applies a delay equal the value specified by the Manual Coarse and Manual Fine delays, which are described below.

6.8.2 Manual Coarse and Manual Fine Delay Controls

The Manual Coarse and Manual Fine delay controls are added together to add a manual delay to the audio signal.

- **Manual Coarse:** This slider may be used to specify a delay of up to 1.75 s in 5 ms steps. The preset value for this control is 0.
- **Manual Fine:** This slider may be used to specify a delay of ± 0.25 s in 0.5 ms steps. The preset value for this control is 0.

6.8.3 Tone

- **Frequency:** This slider may be used to adjust the tone frequency for both L & R over a range of 100 Hz to 10 kHz in 100 Hz steps. The preset value for this control is 1 kHz.
- **Channel Ident:** When selected, this will identify the right channel by causing the tone to fluctuate.

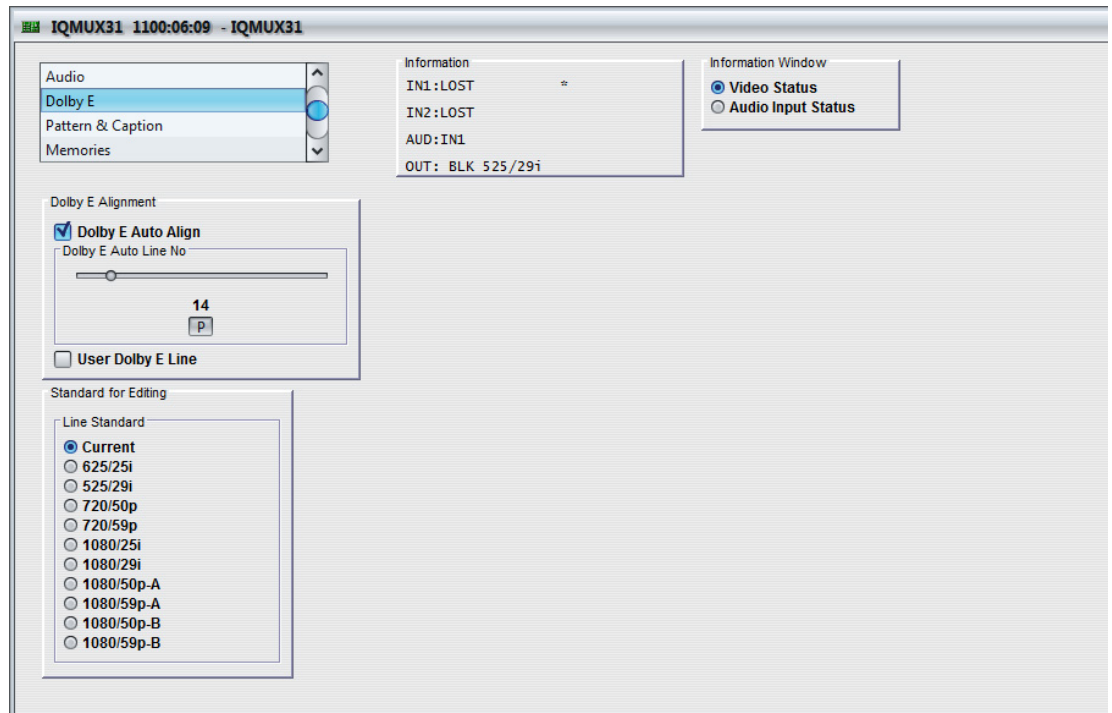
6.8.4 Audio Monitor

The Audio Monitor settings allow you to specify the level at which the audio signal is considered to have dropped to silence and the level at which the audio signal is considered to have risen to an overload condition.

- **Silent Level:** Use the slider bar to specify the level at which the signal is considered to have dropped to silence. The range of this control is 0 to -80 dB in steps of 1 dB and the preset value is -70 dB. The level set by this control must exist continuously for the time specified by the Warning Timer control for the signal to be considered silent.
- **Overload Level:** Use the slider bar to specify the level at which the signal is considered to have risen to an overload condition. The range of this control is 0 to -80 dB in steps of 1 dB and the preset value is 0 dB. The level set by this control must exist continuously for the time specified by the Warning Timer control for the signal to be considered overloaded.
- **Warning Timer:** Use the slider bar to specify the time that either of the above conditions must exist before considered to be true. The range of this control is 1 to 600 seconds in steps of 1 second. The preset value is 10 seconds.

6.9 Dolby E

The **Dolby E** screen enables the configuration of Dolby E settings.



6.9.1 Dolby E Alignment

- **Dolby E Auto Align:** This option enables Dolby E automatic (i.e. Dolby recommended) alignment. When enabled, the Dolby E header is automatically aligned with the video frame boundary to ensure error-free video switching. The slider displays the relevant line number used for alignment. Realigned Dolby audio can be routed to any audio pair by means of the L/Non-PCM controls on the Audio Embedder screens if the embedded pair in set to Non-PCM. Note that “pass-through” Dolby E, where neither embedder in a group is enabled, will not be re-aligned.

Note: If Dolby E guard-band is out of spec, then Dolby E is re-aligned to that specified by Dolby.

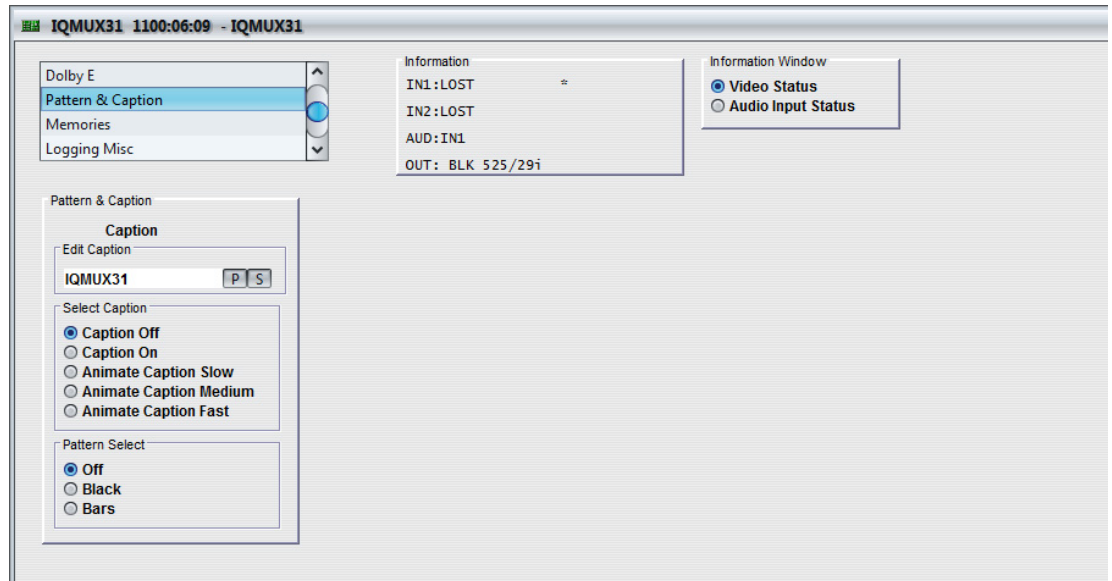
- **User Dolby E Line:** This option enables manual selection of Dolby E line. The slider displays the relevant line number used for alignment, which may be changed manually by dragging the slider. Clicking the **P** button returns the line number to the preset (automatic) value.

6.9.2 Line Standard

By default the **Current** video line standard is always selected. A different line standard may be selected by clicking the relevant radio button. The associated line number for the chosen line standard will be displayed by the above slider control.

6.10 Pattern & Caption

The **Pattern & Caption** screen settings enables a caption to be specified, turned on and off and pattern generation to be enabled.



6.10.1 Edit Caption

In the **Edit Caption** text field, a caption of up to 19 characters may be entered to be displayed when the caption function is enabled.

Clicking the **S** button saves the caption as entered.

Clicking the **P** button returns the caption to the default preset value.

6.10.2 Select Caption

The **Captions Off/Captions On** radio buttons may be used to turn the caption on and off. When enabled, the caption will appear as white text on a black background in the lower portion of the picture. Basic animation is also available, which enables a slow, medium, or fast scrolling effect from right to left, also known as a “ticker-tape” effect.

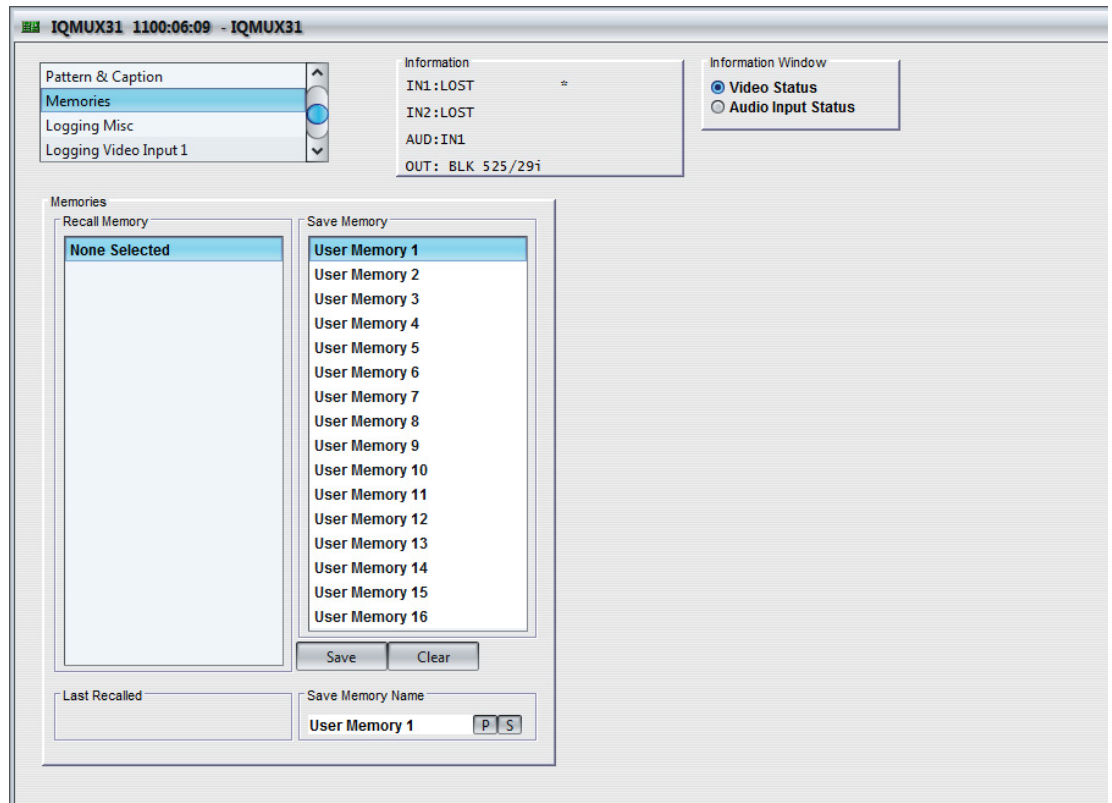
6.10.3 Pattern Select

The radio buttons enable/disable pattern generation. The options are:

- **Off**
- **Black**
- **Bars**

6.11 Memories

The **Memories** screen enables up to 16 setups to be saved and recalled later. Default memory names can be changed to provide more meaningful descriptions.



6.11.1 Recall Memory

This column lists the settings that have been previously saved. If no settings have been saved, **None Selected** is displayed.

To recall the settings saved in a memory:

In the **Recall Memory** column, select the memory to recall by clicking on it. The recalled settings will be applied and the memory name will appear in the **Last Recalled Memory** section.

Note: User memories do not recall log field states. I.e., whether a log value has been enabled or disabled.

6.11.2 Save Memory

This column lists the 16 pre-set memory names that are available for use.

To save settings:

In the **Save Memory** column, select a memory location, and then click **Save**. The current settings are saved and the memory appears in the **Recall Memory** column.

6.11.3 Last Recalled

The **Last Recalled** pane displays the most recently recalled memory. If any of the settings have been changed since it was recalled, an asterisk will be displayed after the memory name.

6.11.4 Save Memory Name

This option enables the pre-set memory names to be changed (to something more memorable or meaningful), if required.

To change a memory name:

In the **Save Memory Name** field, type the new memory name, and then click **S**. To return the memory to its default value, click the preset button (**P**).

6.12 Logging

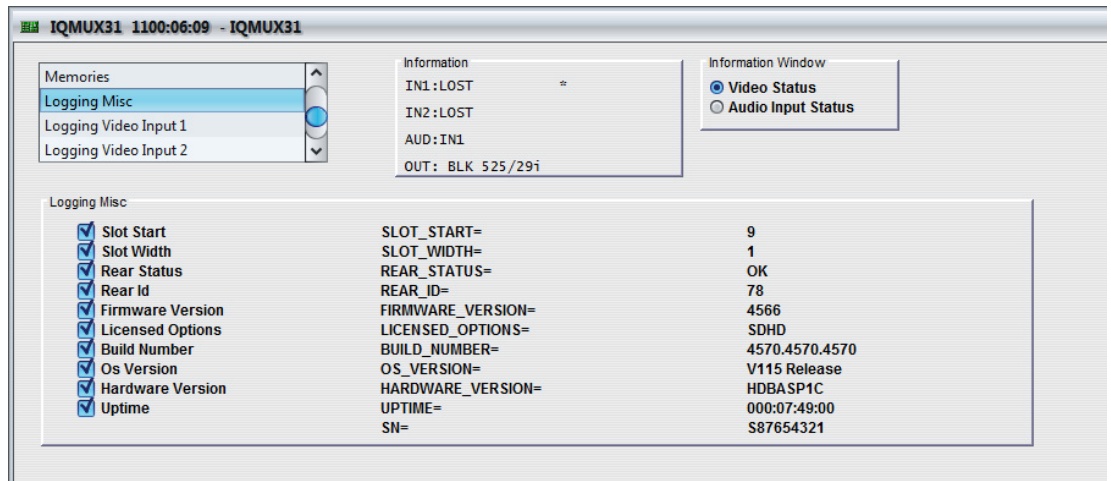
Information about several parameters can be made available to a logging device that is connected to the RollCall network.

Each logging screen comprises three columns:

- **Log Enable:** Select the check boxes that correspond to the parameters for which log information should be collected.
- **Log Field:** Displays the name of the logging field.
- **Log Value:** Displays the current log value.

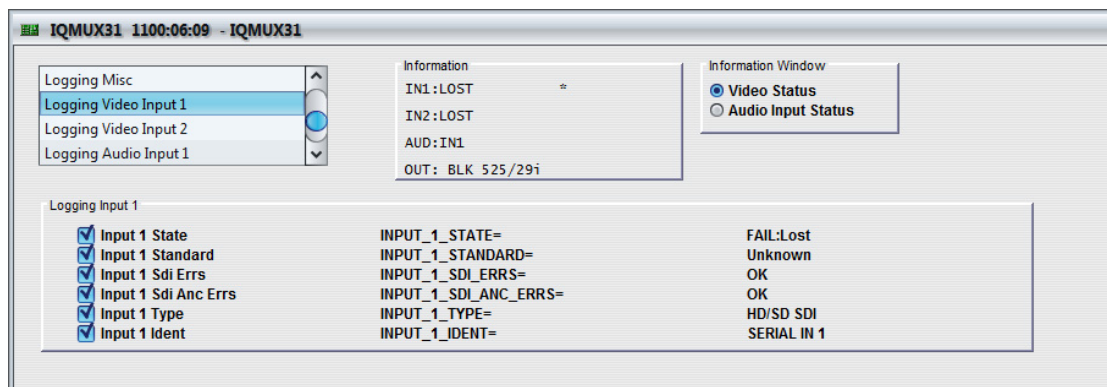
6.12.1 Logging Misc

The **Logging Misc** screen displays the current log information about the module’s basic parameters.



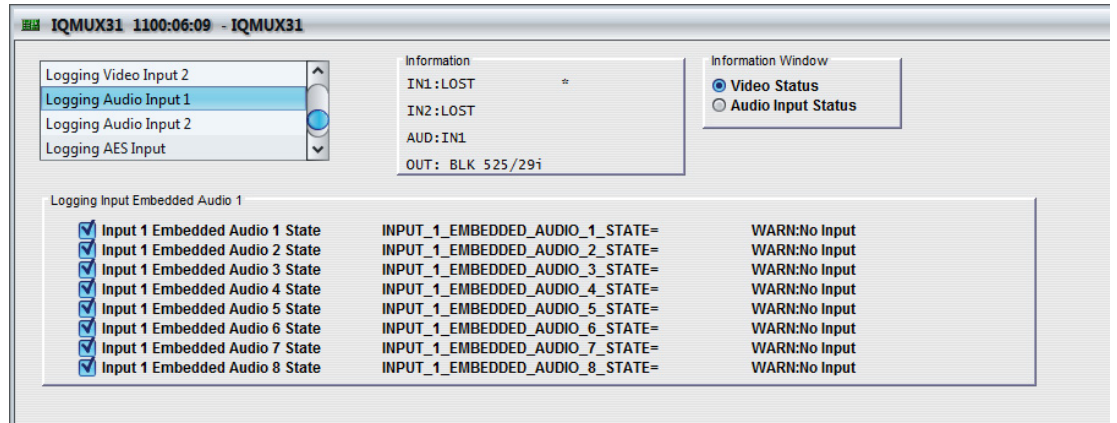
6.12.2 Logging Video Input 1/2

The **Logging Video Input 1/2** screens display the current log information for the relevant video inputs.



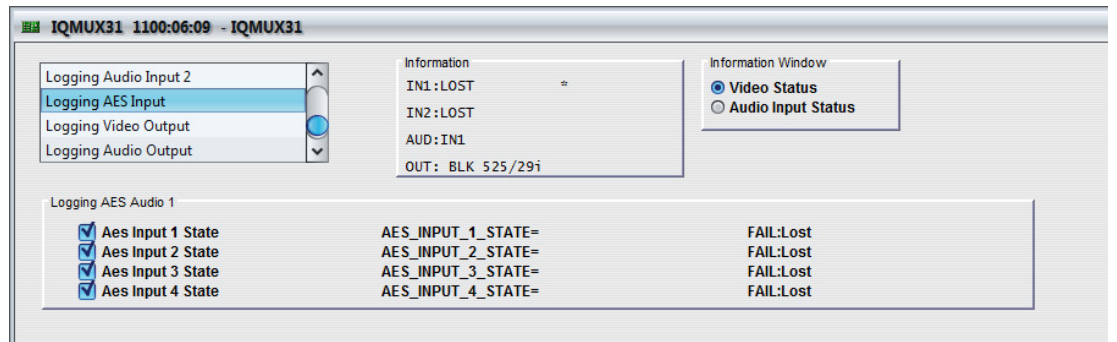
6.12.3 Logging Audio Input 1/2

The **Logging Audio Input 1/2** screens display the current log values for the eight audio pairs for each channel.



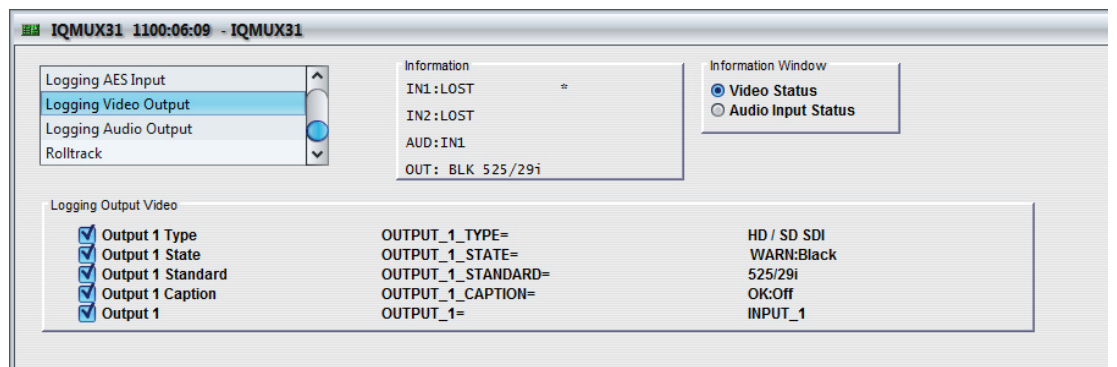
6.12.4 Logging AES

The **Logging AES** screen displays the current state of the AES inputs.



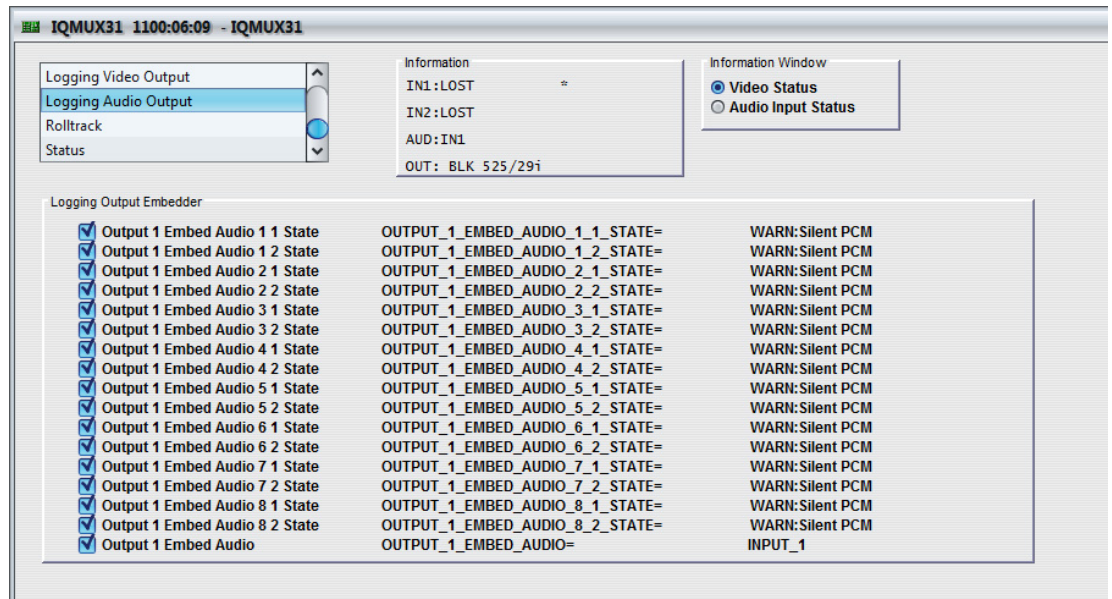
6.12.5 Logging Video Output

The **Logging Video Output** screen displays the current log information for the video output



6.12.6 Logging Audio Output

The **Logging Audio Output** screen displays the current log information for the audio output.



6.12.7 Log Field Descriptions

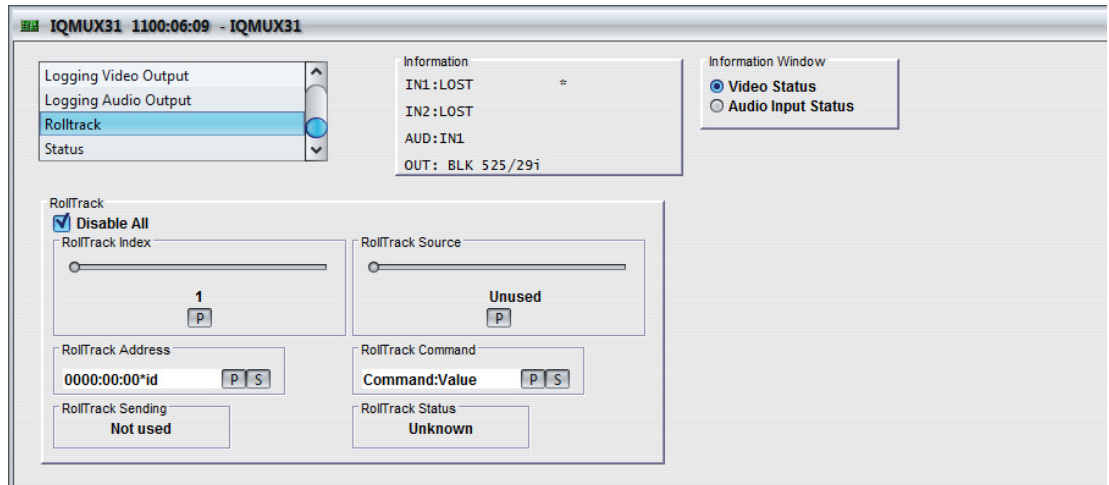
Log Field	Description
UPTIME=	Displays the time since the last restart in the format ddd:hh:mm:ss.
OS_VERSION=	Displays the operating system name and version. For example, KOS V115.
HARDWARE_VERSION=	Displays the hardware version number.
BUILD_NUMBER=	Displays the build number.
SN=	Displays the module serial number, which consists of an S followed by eight digits.
LICENSED_OPTIONS=	Displays any specially licensed options, if applicable.
FIRMWARE_VERSION=	Displays the FPGA version.
REAR_ID=	Displays a rear panel identifier number.
REAR_STATUS=	Display the status of the rear panel. Valid values are: <ul style="list-style-type: none"> • OK • FAIL:Lost
SLOT_WIDTH=	Displays the rear panel slot width. For example, 1 or 2.
SLOT_START=	Displays the rear panel slot start (boot-up) number.
INPUT_N_STATE=	Displays the current input state. Valid values are: <ul style="list-style-type: none"> • OK • WARN:Mismatch • FAIL:Lost <p>Note: WARN:Mismatch indicates that the input and output standards are not the same.</p>

Log Field	Description
INPUT_N_STANDARD=	<p>This displays the current input signal standard. For example, 1080/29i.</p> <p>If the input standard is not recognized or supported the field will display: WARN:Unknown</p>
INPUT_N_TYPE=	This displays the type of input as specified by the module's configuration. Valid values are 3G/HD /SD SDI.
INPUT_N_IDENT=	Display the input ID.
INPUT_N_SDI_ERRS=	<p>Displays SDI errors. Valid values are:</p> <ul style="list-style-type: none"> • OK • WARN
INPUT_N_SDI_ANC_ERRS=	<p>Displays ANC errors. Valid values are:</p> <ul style="list-style-type: none"> • OK • WARN
<p>INPUT_1_EMBEDDED_AUDIO_1_STATE= to INPUT_1_EMBEDDED_AUDIO_8_STATE= ----- INPUT_2_EMBEDDED_AUDIO_1_STATE= to INPUT_2_EMBEDDED_AUDIO_8_STATE=</p>	<p>These fields display the current embedded input audio state. Valid values are:</p> <ul style="list-style-type: none"> • OK:PCM • OK:Data • OK:DolbyE • WARN:No Input • FAIL:Lost
AES_INPUT_N_STATE=	<p>These field display the current AES input status. Valid values are:</p> <ul style="list-style-type: none"> • OK:PCM • OK:Data • OK:DolbyE • WARN:No Input • FAIL:Lost
OUTPUT_N_TYPE=	3G/HD/SD SDI
OUTPUT_N_STATE=	<ul style="list-style-type: none"> • OK • WARN:Pattern • WARN:Black • WARN:Freeze
OUTPUT_N_STANDARD=	Displays the current output video standard.
OUTPUT_N_CAPTION=	<ul style="list-style-type: none"> • OK:Off • WARN:On
OUTPUT_N=	Displays the relevant input source for the output video.

Log Field	Description
OUTPUT_1_EMBED_AUDIO_1_1_STATE= to OUTPUT_1_EMBED_AUDIO_8_2_STATE=	These fields display the current embedded output audio state. Valid values are: <ul style="list-style-type: none">• OK:PCM• OK:Data• OK:DolbyE• WARN:Silent PCM• WARN:Overload PCM• FAIL:Input Lost
OUTPUT_1_EMBED_AUDIO=	Displays which input is selected as the current embedded audio output.

6.13 RollTrack

The **RollTrack** screen allows information to be sent, via the RollCall™ network, to other compatible modules connected on the same network.



6.13.1 Disable All

When checked, all RollTrack items are disabled.

6.13.2 RollTrack Index

This slider enables up to 70 RollTrack outputs to be setup. Dragging the slider selects the RollTrack Index number, displayed below the slider. Clicking the **P** button selects the default preset value.

6.13.3 RollTrack Source

This slider enables the source of information that triggers the transmission of data to be selected. Dragging the slider selects the RollTrack source, displayed below the slider. Clicking the **P** button selects the default preset value. When no source is selected, **Unused** is displayed.

6.13.4 RollTrack Address

This item enables the address of the selected destination module to be set.

The address may be changed by typing the new destination in the text area and then selecting the **S** button to save the selection. Clicking the **P** button returns to the default preset destination.

The RollTrack address consists of four sets of numbers, for example, **0000:10:01*99**.

- The first set (**0000**) is the network segment code number.
- The second set (**10**) is the number identifying the (enclosure/mainframe) unit.
- The third set (**01**) is the slot number in the unit
- The fourth set (**99**) is a user-settable number that is a unique identification number for the destination unit in a multi-unit system. This ensures that only the correct unit will respond to the command. If left at 00 an incorrectly fitted unit may respond inappropriately.

6.13.5 RollTrack Command

This item enables a command to be sent to the selected destination unit.

The command may be changed by typing a code in the text area and then selecting the **S** button to save the selection. Clicking the **P** button returns to the default preset command.

The RollTrack command consists of two sets of numbers, for example: **84:156**.

- The first number (**84**) is the actual RollTrack command.
- The second number (**156**) is the value sent with the RollTrack command.

6.13.6 RollTrack Sending

A message is displayed here when the unit is actively sending a RollTrack command. Possible RollTrack Sending messages are:

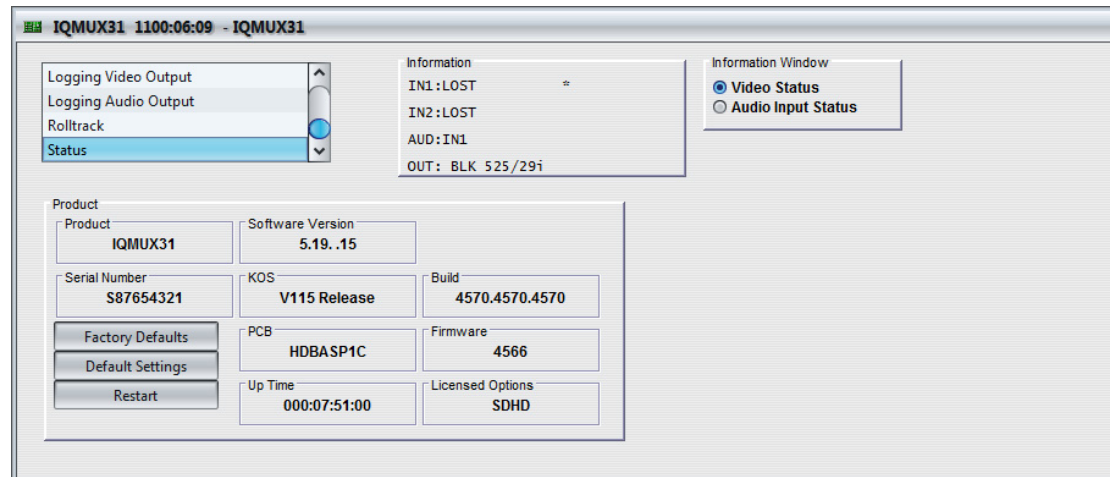
String	A string value is always being sent.
Number	A number value is always being sent.
No	The message is not being sent.
Yes	The message is being sent.
Internal Type Error	Inconsistent behavior. Please contact your local SAM agent.

6.13.7 RollTrack Status

A message is displayed here to indicate the status of the currently selected RollTrack index. Possible RollTrack Status messages are:

OK	RollTrack message sent and received OK.
Unknown	RollTrack message has been sent but it has not yet completed.
Timeout	RollTrack message sent but acknowledgement not received. This could be because the destination unit is not at the location specified.
Bad	RollTrack message has not been correctly acknowledged at the destination unit. This could be because the destination unit is not of the type specified.
Disabled	RollTrack sending is disabled.

6.14 Status



- **Product:** The name of the module.
- **Software Version:** The currently installed software version number.
- **Serial No:** The module serial number.
- **Build:** The factory build number. This number identifies all parameters of the module.
- **KOS:** The operating system version number.
- **PCB:** The Printed Circuit Board revision number.
- **Firmware:** The module firmware revision number.
- **Up Time:** The time since the module was last started.
- **Licensed Options:** The currently installed licensed options associated with the module.

6.14.1 Factory Defaults

The **Factory Defaults** button enables the module settings to be reset to their factory defaults.

Note: Resetting the module to its factory defaults also clears all the saved memory settings.

6.14.2 Default Settings

The **Default Settings** button enables module settings to be reset to their factory defaults, leaving user memories intact.

6.14.3 Restart

The **Restart** button enables the module to be rebooted, simulating a power-up/power-down cycle.