



Snell  
Advanced  
Media

---

# User Instruction Manual

## **IQMUX32**

Dual 3G/HD/SD-SDI Multiplexer for 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/](http://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

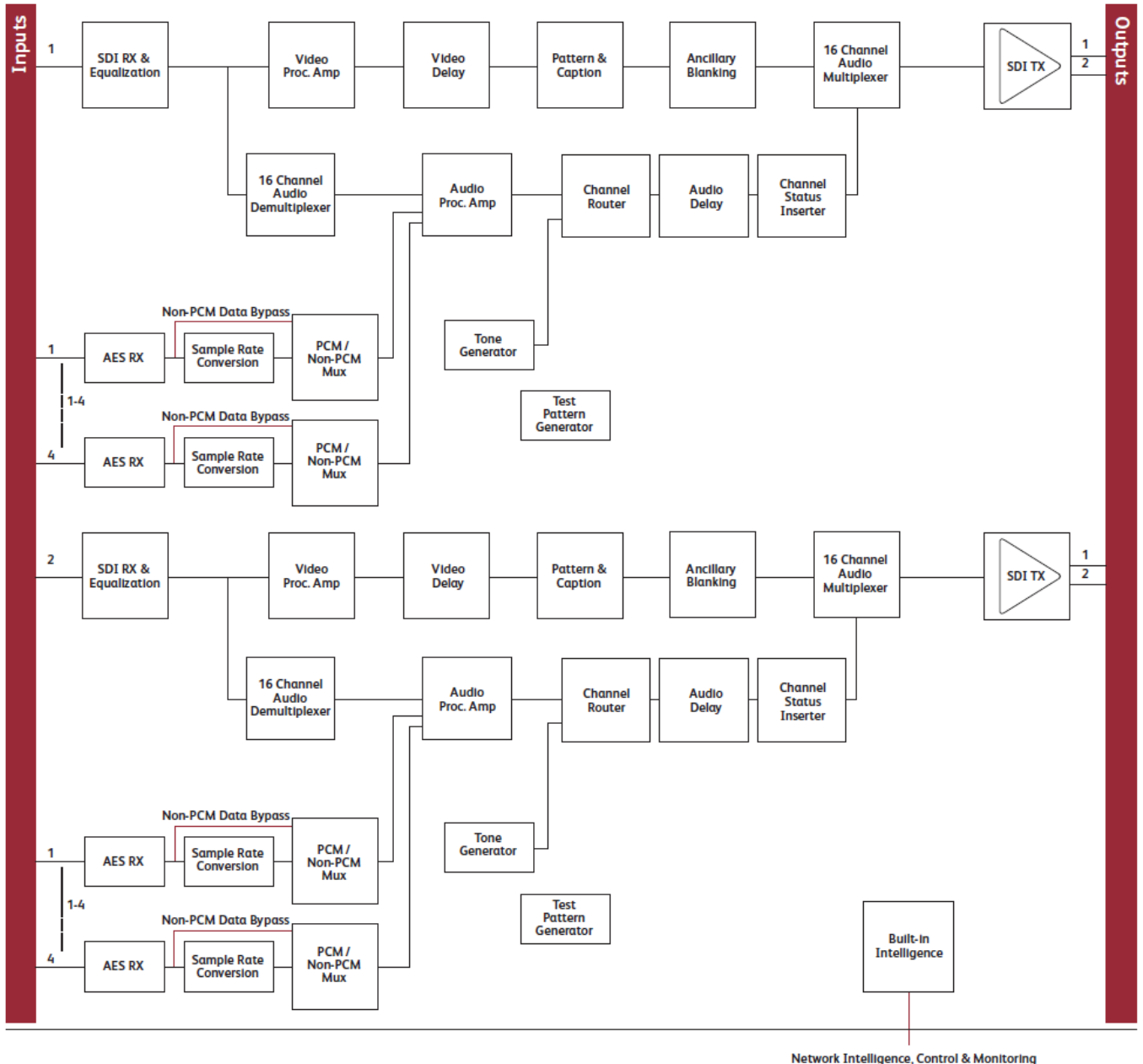
<b>Information and Notices</b> .....	2
Copyright and Disclaimer .....	2
Contact Details .....	2
<b>1. Introduction</b> .....	5
1.1 Module Description .....	5
1.2 Order Codes .....	6
1.3 Rear Panel View .....	6
1.4 Enclosures .....	7
1.4.1 B-style Enclosure .....	7
1.4.2 A-style Enclosures .....	7
1.5 Feature Summary .....	8
<b>2. Technical Specification</b> .....	9
<b>3. Connections</b> .....	12
3.1 IQMUX3248-2A(B) / IQMUX3248-2A(B)3 .....	12
3.1.1 Serial In .....	12
3.1.2 AES In .....	12
3.1.3 Serial Out .....	12
3.2 IQMUX3249-1A(B) / IQMUX3249-1A(B)3 .....	12
3.2.1 Serial In .....	12
3.2.2 AES In .....	12
3.2.3 Serial Out .....	13
<b>4. Card Edge Controls</b> .....	14
<b>5. Controlling the IQMUX32 from the RollCall Control Panel</b> .....	15
5.1 The Information Window .....	15
5.1.1 Video Status .....	15
5.1.2 Audio Input Status .....	15
5.1.3 Audio AES Status .....	16
5.2 Video 1 / 2 .....	17
5.2.1 Valid Input Standards .....	17
5.2.2 Default Output .....	17
5.2.3 Default Output Standard .....	18
5.2.4 Blanking .....	18
5.2.5 Freeze .....	18
5.2.6 Horizontal Delay .....	18
5.2.7 Vertical Delay .....	18
5.2.8 Frame Delay Added .....	18
5.3 Procamps .....	19
5.3.1 Procamp Enable .....	19
5.3.2 Black Level .....	19
5.3.3 Hue Adjust .....	19
5.3.4 Master Video Gain .....	20
5.3.5 Y Gain .....	20
5.3.6 Cb/Cr Gain .....	20
5.3.7 Y/C Timing .....	20
5.3.8 Picture Position .....	20
5.4 Embedder 1 to Embedder 4 .....	21
5.4.1 Embedder <i>N</i> Enable .....	21
5.4.2 Pair 1 and Pair 2 Controls .....	22
5.5 Router Overview 1/2 .....	23

5.6 Audio	24
5.6.1 Delays	24
5.6.2 Manual Coarse and Manual Fine Delay Controls	24
5.6.3 Tone	25
5.7 Audio Monitor	26
5.7.1 Silent Level	26
5.7.2 Overload Level	26
5.7.3 Warning Timer	26
5.8 Pattern & Caption	27
5.8.1 Edit Caption	27
5.8.2 Select Caption	27
5.8.3 Pattern Select	27
5.9 Memories	28
5.9.1 Recall Memory	28
5.9.2 Save Memory	28
5.9.3 Last Recalled	28
5.9.4 Save Memory Name	29
5.10 Logging	30
5.10.1 Logging Misc	30
5.10.2 Logging Video Input 1/2	30
5.10.3 Logging Audio Input 1/2	31
5.10.4 Logging AES	31
5.10.5 Logging Video Output 1/2	32
5.10.6 Logging Audio Output 1/2	32
5.10.7 Log Field Descriptions	33
5.11 RollTrack	35
5.11.1 Disable All	35
5.11.2 RollTrack Index	35
5.11.3 RollTrack Source	35
5.11.4 RollTrack Address	35
5.11.5 RollTrack Command	36
5.11.6 RollTrack Sending	36
5.11.7 RollTrack Status	36
5.12 Status	37
5.12.1 Factory Defaults	37
5.12.2 Default Settings	37
5.12.3 Restart	37

# 1. Introduction

## 1.1 Module Description

The IQMUX32 is a dual 8-channel digital audio multiplexing 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, whilst video delay and a video processing amplifier are also included in the feature set.



Block Diagram for IQMUX3248-2A

Network Intelligence, Control & Monitoring

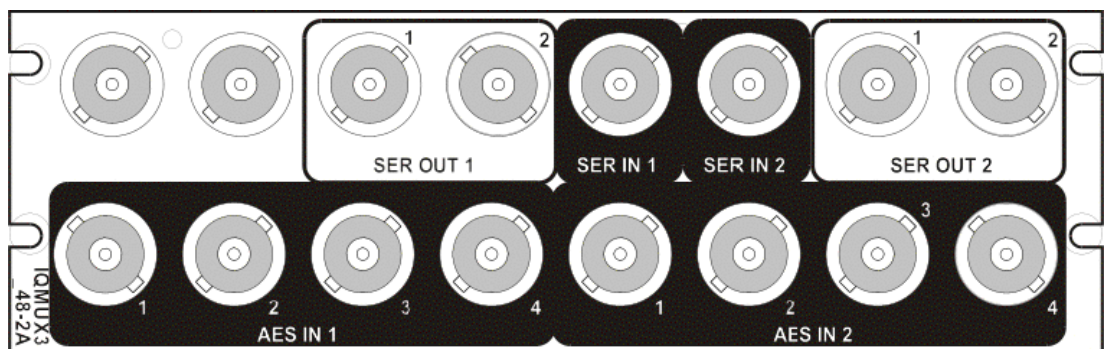
## 1.2 Order Codes

**Note:** Modules with “A” order codes (for example, IQMUX3248-2A) can be fitted into either A- or B-style enclosures. Modules with “B” order codes (for example, IQMUX3248-2B) can only be fitted into B-style enclosures. See page 7.

The following product order codes are covered by this manual.

<b>IQMUX3248-2A</b> <b>IQMUX3248-2B</b>	HD/SD-SDI Dual 8-channel AES Multiplexer. 2 SDI outputs per input, 4 Unbalanced AES inputs per channel.
<b>IQMUX3248-2A3</b> <b>IQMUX3248-2B3</b>	3G/HD/SD-SDI Dual 8-channel AES Multiplexer. 2 SDI outputs per input, 4 Unbalanced AES inputs per channel.
<b>IQMUX3249-1A</b> <b>IQMUX3249-1B</b>	HD/SD-SDI Dual 8-channel AES Multiplexer. 1 SDI output per input, 4 Balanced AES inputs per channel.
<b>IQMUX3249-1A3</b> <b>IQMUX3249-1B3</b>	3G/HD/SD-SDI Dual 8-channel AES Multiplexer. 1 SDI output per input, 4 Balanced AES inputs per channel.
<b>IQMUX32-3G</b>	3G Upgrade for IQMUX32 HD/SD-SDI Dual 8-channel AES Multiplexer to operate with 3 Gbit/s SDI signals.

## 1.3 Rear Panel View



**IQMUX3248-2A(B)/IQMUX3248-2A(B)3**



**IQMUX3249-1A(B)/IQMUX3249-1A(B)3**

### 1.4 Enclosures

The module 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 IQMUX32 provides the following features:

- Dual 8-channel 3G/HD/SD-SDI multiplexer capable of embedding asynchronous or synchronous AES inputs
- 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 each 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 and delay
- PCM and non-PCM detection and reporting
- Handles Dolby E and PCM audio present in the same group
- Able to pass all ancillary data without corruption inc. VANC metadata
- Independent HANC and VANC blanking control
- Input loss detection – default output of black/pattern/freeze
- Up to 3 frames of video delay and 2 seconds of audio delay per channel
- Video controls including video gain and offset
- In-built test pattern and tone generators for each channel
- Up to 2 active HD/SD-SDI outputs per channel
- 16 x user memories, save/recall/rename
- Rollcall control and monitoring compatible



## 2. Technical Specification

<b>Inputs and Outputs</b>	
<b>Signal Inputs</b>	
SDI Inputs	1 per Channel
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 200 m Belden 1694A @ 270 Mbit/s
Unbalanced Digital Audio	4 x AES/EBU, AC3, Dolby E (BNC)
Balanced Digital Audio	4 x AES/EBU, AC3, Dolby E (25-Way D-Type)
<b>Signal Outputs</b>	
SDI Outputs	x2 per channel (unbalanced) 1 per channel (balanced)
<b>Controls</b>	
<b>Indicators</b>	
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)
<b>Video Controls</b>	
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
Manual Freeze	On/Off
Freeze	Field/Frame
Video Delay Frames	0 - 3 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 4, Tone, Silence
Pair 1 to 8 Source R	Dis-embed 1_1 to 8_2, AES 1 to 4, 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

#### 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	16 x Save, Recall, Rename
Memory Naming	User configurable naming of memories 1 - 16
Information Window	Video Input Status, Audio Input Status, Audio AES 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

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	SD: 70 $\mu$ s HD: 38 $\mu$ s 3G-A: 19 $\mu$ s 3G-B: 40 $\mu$ s
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	Typical delay (input lock): 2 lines

## 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

## Power Consumption

Module Power Consumption	11 W max (A Frames) 10 PR (B Frames)
--------------------------	---

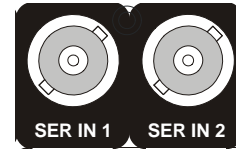
## 3. Connections

This section describes the physical input and output connections used by the IQMUX32.

### 3.1 IQMUX3248-2A(B) / IQMUX3248-2A(B)3

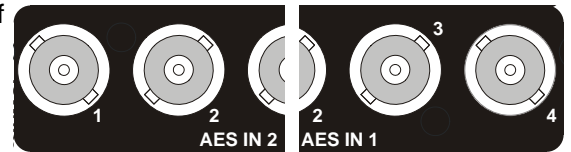
#### 3.1.1 Serial In

Serial digital input connection to the module is made by means of two BNC connectors (one for each channel) which terminate in 75 Ohms.



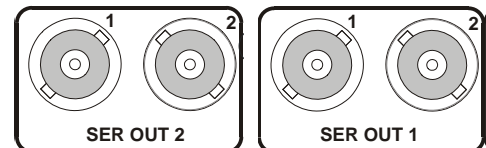
#### 3.1.2 AES In

AES input to the module is made by means of eight BNC connectors (four for each channel) which terminate in 75 Ohms.



#### 3.1.3 Serial Out

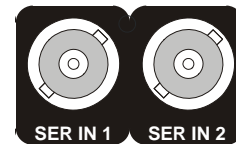
SDI output from the module is made by means of 4 BNC connectors (two for each channel).



### 3.2 IQMUX3249-1A(B) / IQMUX3249-1A(B)3

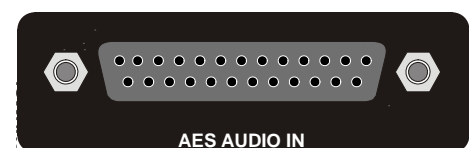
#### 3.2.1 Serial In

Serial digital input connection to the module is made by means of two BNC connectors (one for each channel) which terminate in 75 Ohms.



#### 3.2.2 AES In

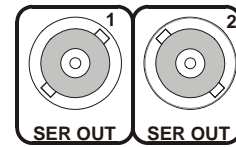
AES input to the balanced models is made by means of 25-way D-type connector.



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		

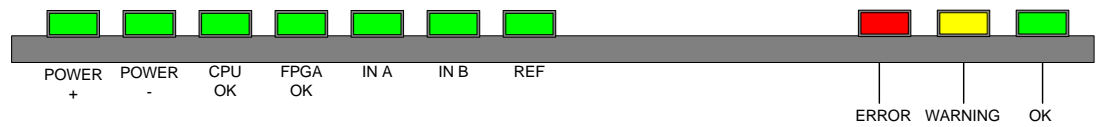
### 3.2.3 Serial Out

SDI output from the balanced models is made by means of two BNC connectors (one for each channel).



## 4. Card Edge Controls

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



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

## 5. Controlling the IQMUX32 from the RollCall Control Panel

### 5.1 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**, **Audio Input Status** or **Audio AES Status** to display the corresponding information.

#### 5.1.1 Video Status

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



Name	Status	Description	Standard
IN1:	<b>OK</b>	Input signal received	Detected video input standard is displayed, e.g. <b>1080/29i</b> (Blank if input lost).
IN2:	<b>FAIL</b>	Input signal failed	
	<b>LOST</b>	No signal received	
	<b>MISM</b>	Mismatch format detected	
OUT1:	<b>OK</b>	Output signal delivered	Selected video output standard is displayed, e.g. <b>1080/29i</b> . A \$ symbol indicates that the caption is enabled. (Blank if disabled)
OUT2:	<b>BLK</b>	Black output delivered	
	<b>FRZ</b>	Frozen output delivered	
	<b>PAT</b>	Pattern output delivered	

#### 5.1.2 Audio Input Status

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



Name	Status	Description
<b>Audio Embed Input 1</b>	<b>P</b>	Channel is a PCM audio input.
-----	<b>?</b>	No audio input is detected.
	<b>D</b>	Signal is data (non-PCM, Dolby, etc.).
<b>Audio Embed Input 2</b>	<b>E</b>	Signal is Dolby E.
-----	<b>V</b>	V bit present on audio channel.

### 5.1.3 Audio AES Status

When **Audio AES Status** is selected, the status of the AES audio inputs is displayed where:



Name	Status	Description
<b>Audio AES Input 1</b>	<b>P</b>	Channel is a PCM audio input.
-----	<b>?</b>	No audio input is detected.
<b>Audio AES Input 2</b>	<b>D</b>	Signal is data (non-PCM, Dolby, etc.).
-----	<b>E</b>	Signal is Dolby E.
-----	<b>V</b>	V bit present on audio channel.



## 5.2 Video 1 / 2

The **Video 1 / 2** screens enable you to specify the settings for the serial data input for processing channels 1 and 2:

- 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.Video delay settings

The settings on the **Video 1** and **Video 2** pages are identical.



### 5.2.1 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.

### 5.2.2 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
- Default Output Standard

### 5.2.3 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.

### 5.2.4 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.

### 5.2.5 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.

### 5.2.6 Horizontal Delay

The **Horizontal Delay** slider bar may be used 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.

### 5.2.7 Vertical Delay

The **Vertical Delay** slider bar to add up to 1 frame of vertical delay in steps of 1 line. The preset value is 0.

### 5.2.8 Frame Delay Added

The **Frame Delay Added** slider may be used to add up to 3 additional frames of delay.

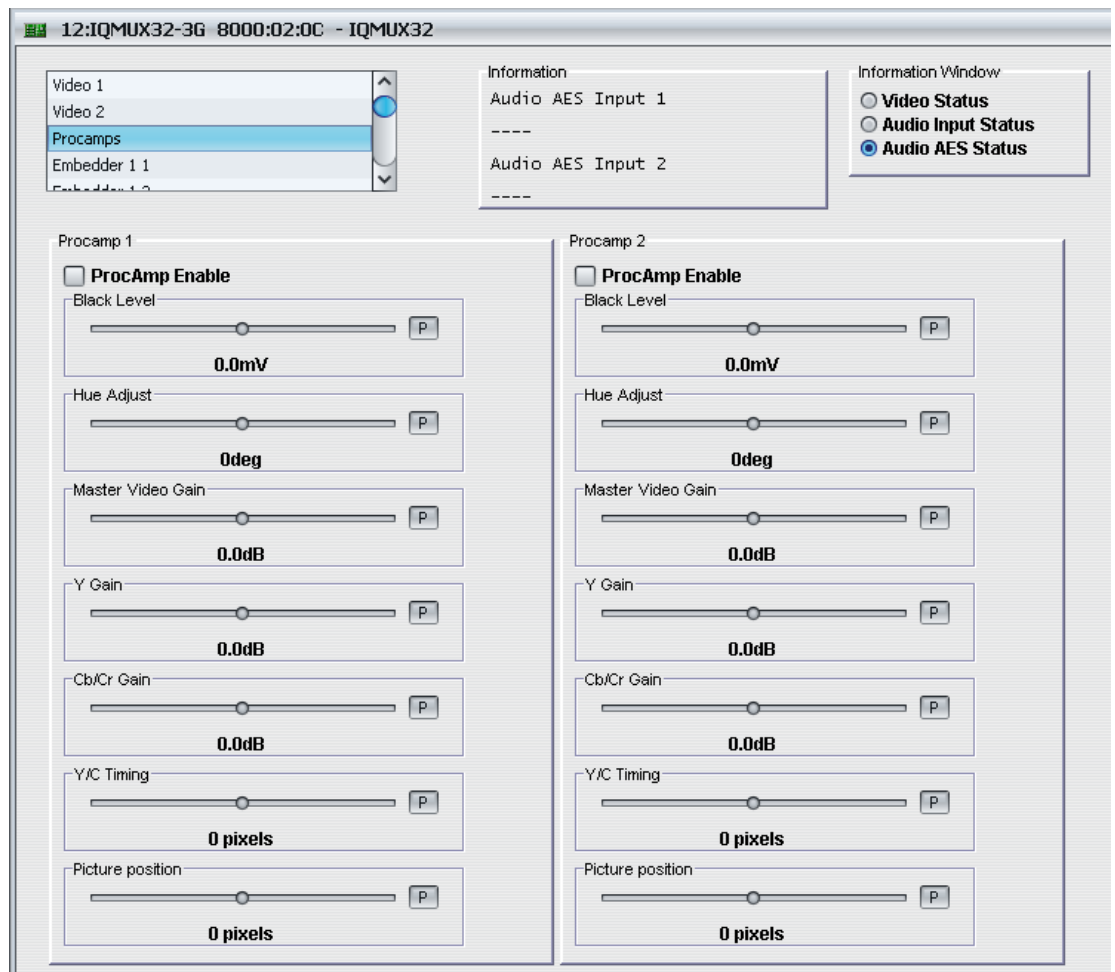
The delay of non-PCM audio, or 'pass-through' audio is also set by this control.

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

## 5.3 Procamps

The **Procamps** screen enables the processing amplifier settings to be adjusted for channels 1 and 2:

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



### 5.3.1 Procamp Enable

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

### 5.3.2 Black Level

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

### 5.3.3 Hue Adjust

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

### 5.3.4 Master Video Gain

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

### 5.3.5 Y Gain

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

### 5.3.6 Cb/Cr Gain

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

### 5.3.7 Y/C Timing

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

- $\pm 8$  pixels in 2 pixel steps in SD
- $\pm 16$  pixels in 2 pixel steps in HD/3G

The preset value is 0.

### 5.3.8 Picture Position

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

- $\pm 8$  pixels in 2 pixel steps SD
- $\pm 16$  pixels in 2 pixel steps HD/3G

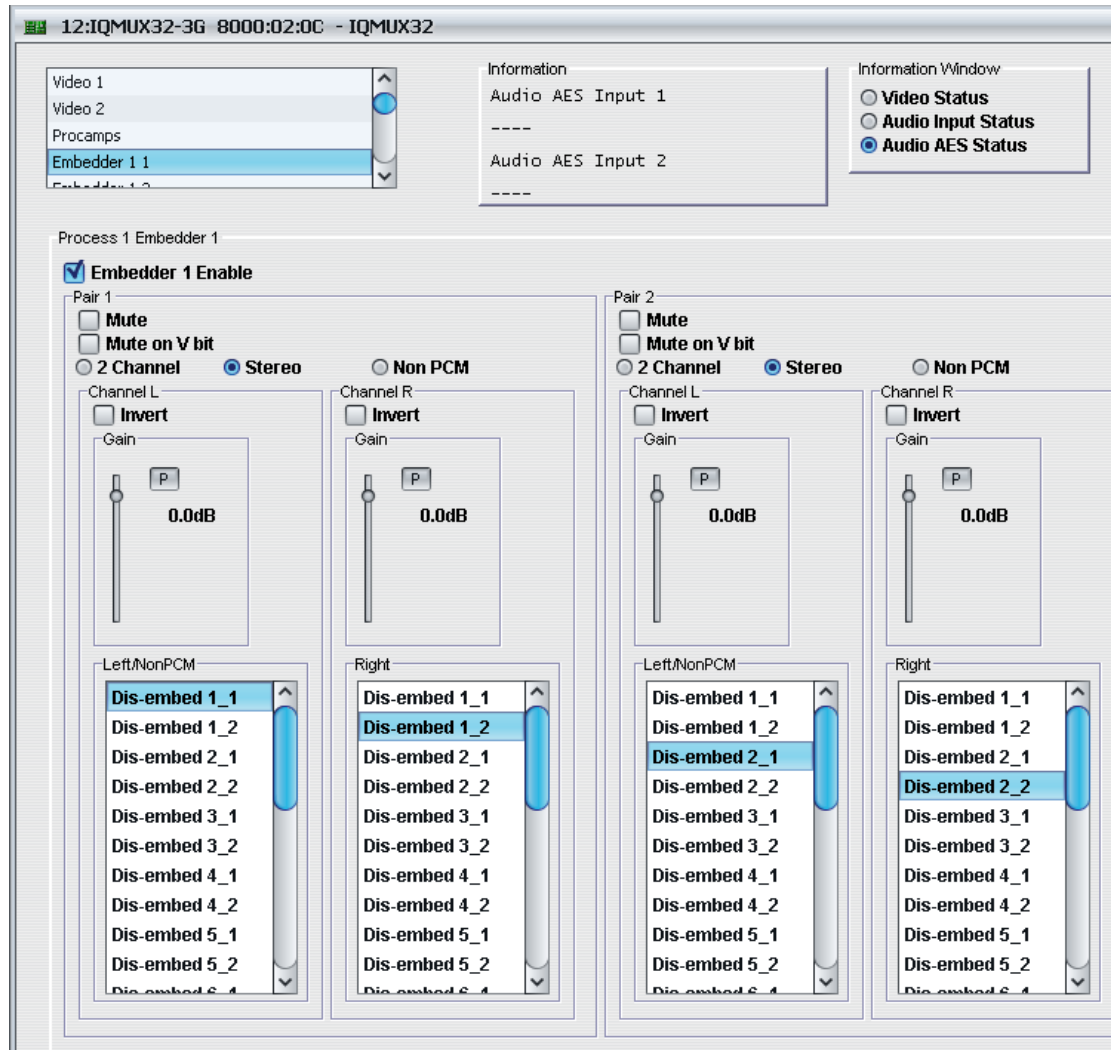
The preset value is 0.

### 5.4 Embedder 1 to Embedder 4

Each of the two processing channels of the module has four embedder groups. 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.

#### 5.4.1 Embedder N Enable

This option, when checked, enables the embedder group.

### 5.4.2 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.

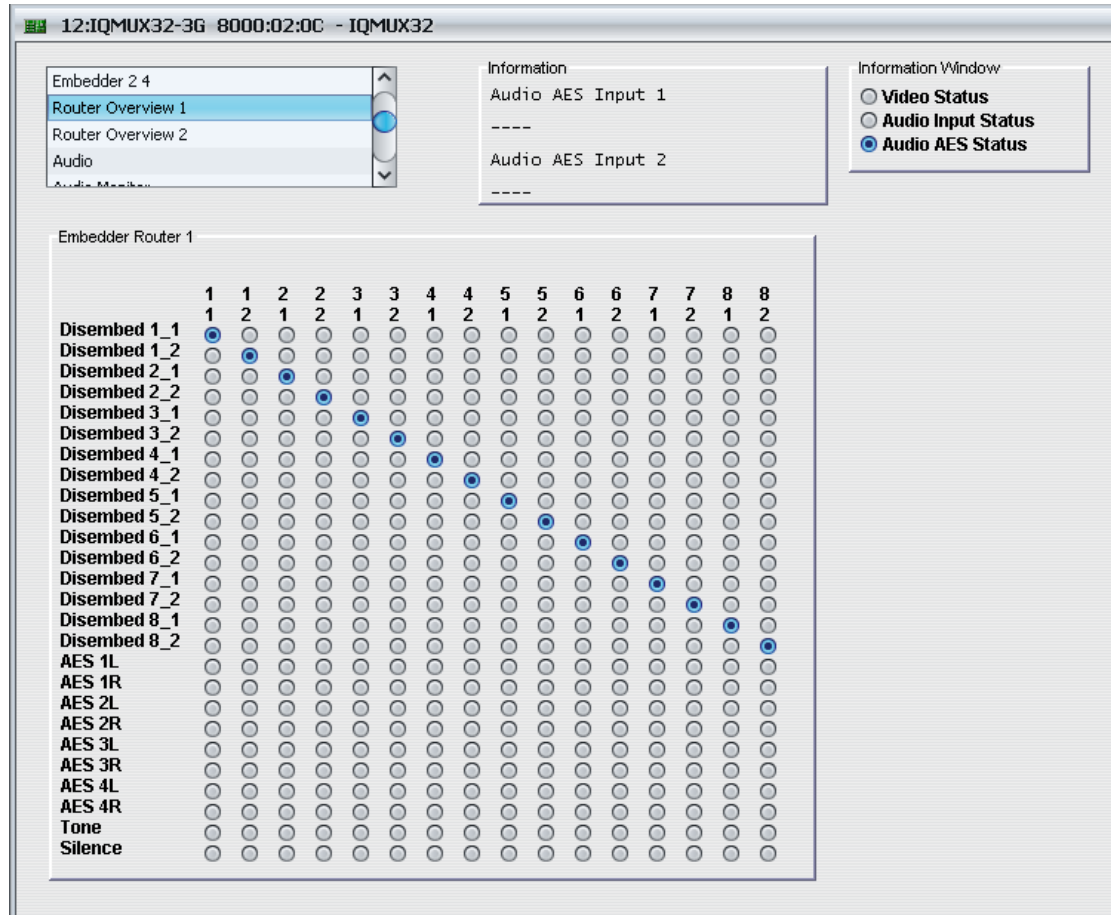
If set to PCM mode and a Non-PCM source is selected, silence will be embedded.

- **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.

### 5.5 Router Overview 1/2

The **Router Overview 1/2** screens provide an overview of the embedder routing specified of the Embedder 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.

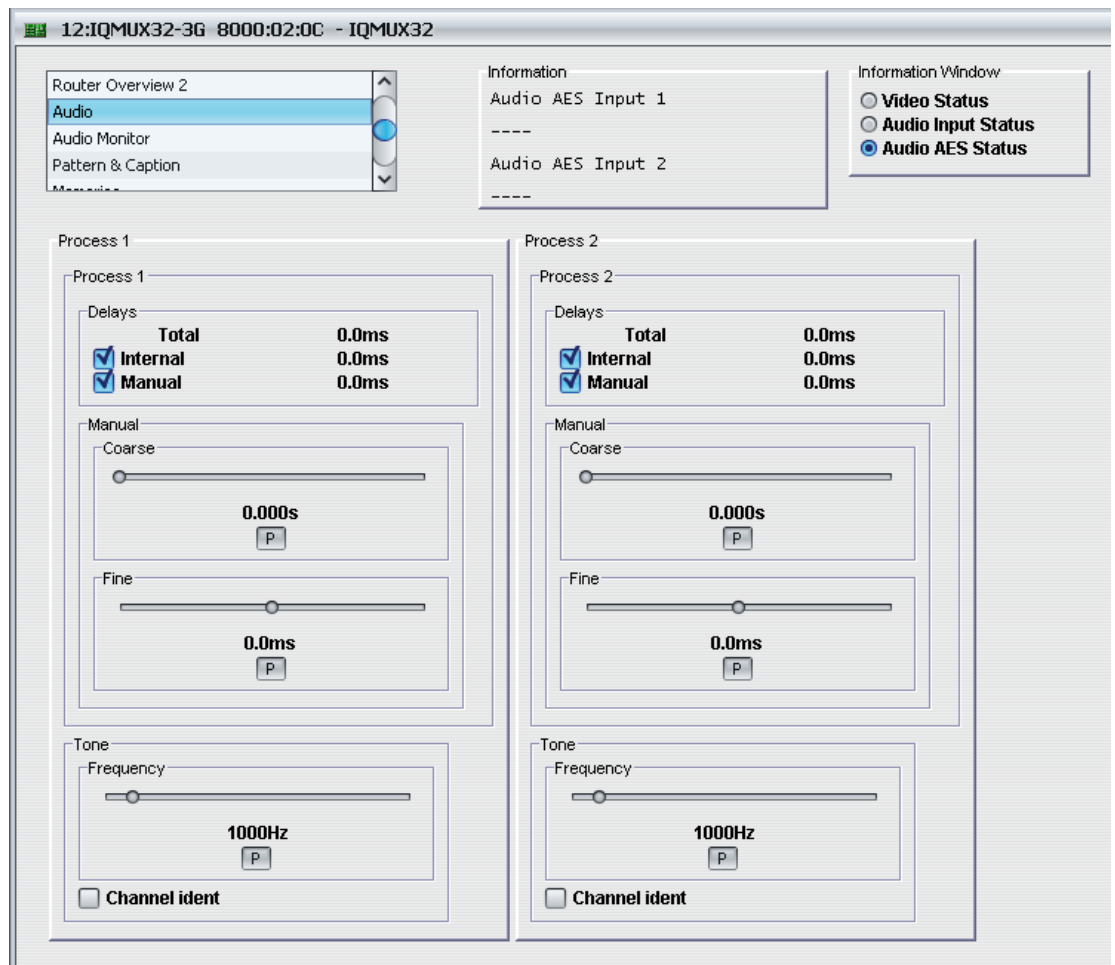
To specify a route on this screen, simply select it from the matrix.



## 5.6 Audio

The **Audio** screen enables the module audio settings for processing channels 1 and 2 to be configured.

The controls are duplicated for processing channels 1 and 2



### 5.6.1 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.

### 5.6.2 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  $\pm 0.25$  s in 0.5 ms steps. The preset value for this control is 0.



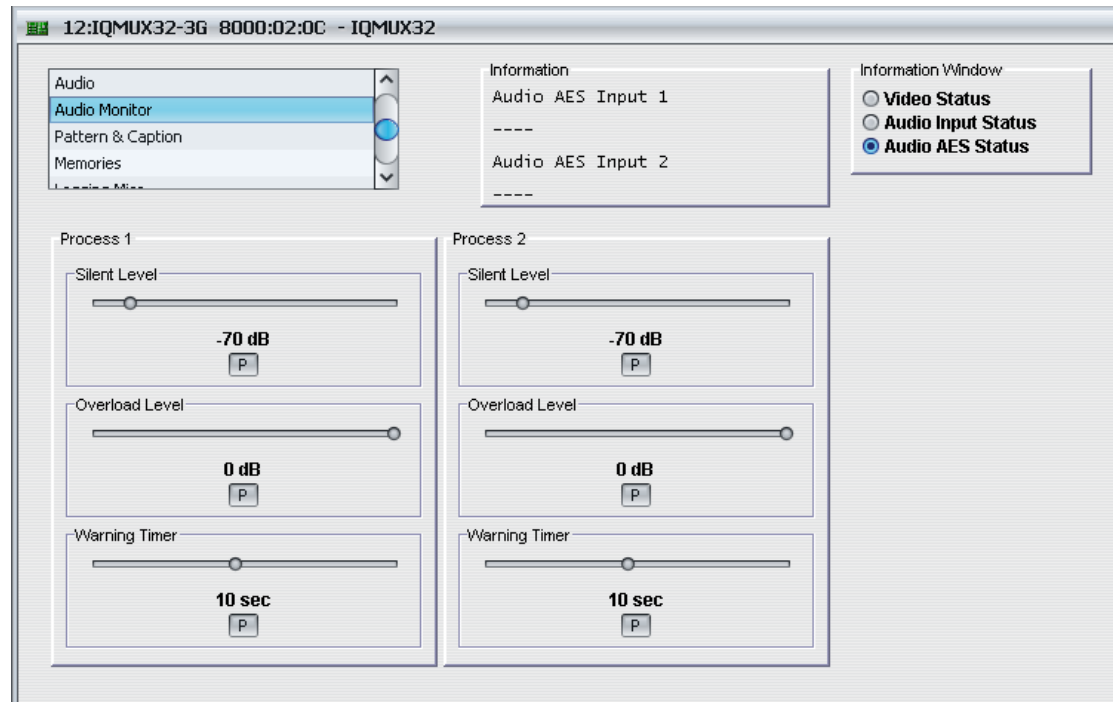
### 5.6.3 Tone

- **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.

## 5.7 Audio Monitor

The **Audio Monitor** screen enables 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.

The controls are duplicated for processing channels 1 and 2.



### 5.7.1 Silent Level

This slider bar may be used 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.

### 5.7.2 Overload Level

This slider bar may be used 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.

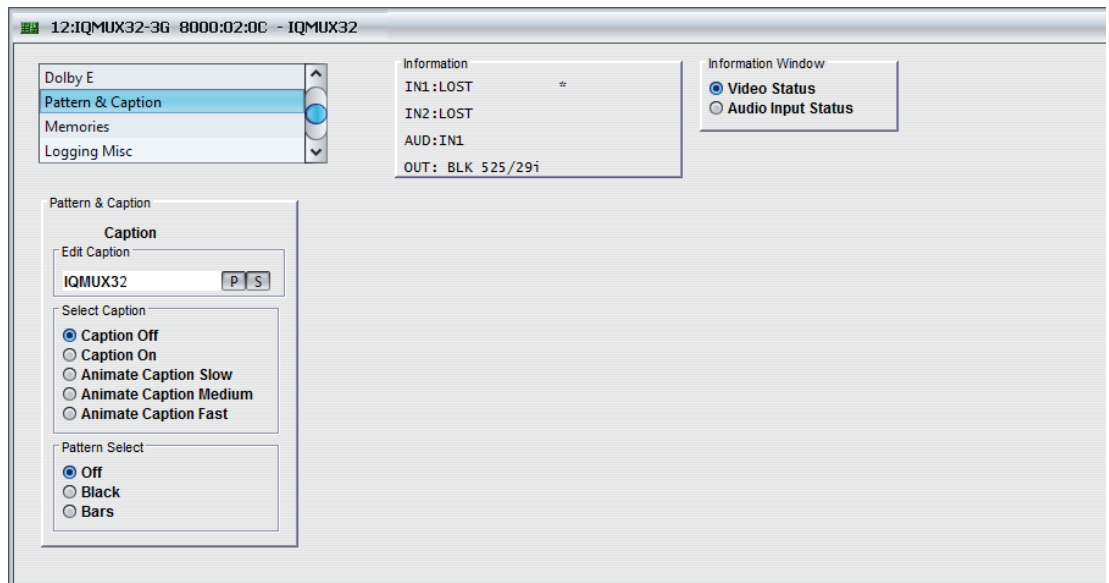
### 5.7.3 Warning Timer

This slider bar may be used 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.

## 5.8 Pattern & Caption

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

The controls are duplicated for processing channels 1 and 2.



### 5.8.1 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.

### 5.8.2 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.

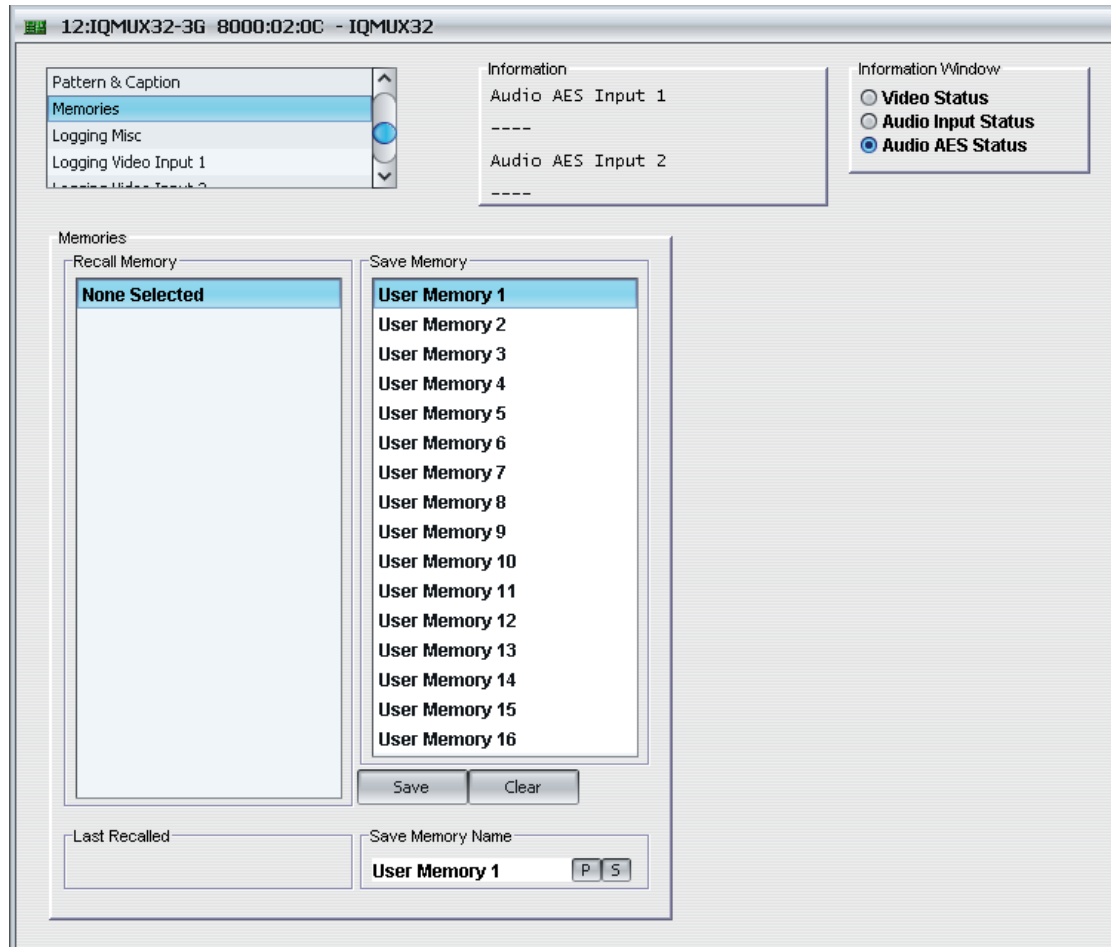
### 5.8.3 Pattern Select

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

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

### 5.9 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.



#### 5.9.1 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.

#### 5.9.2 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.

#### 5.9.3 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.

### 5.9.4 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**).

### 5.10 Logging

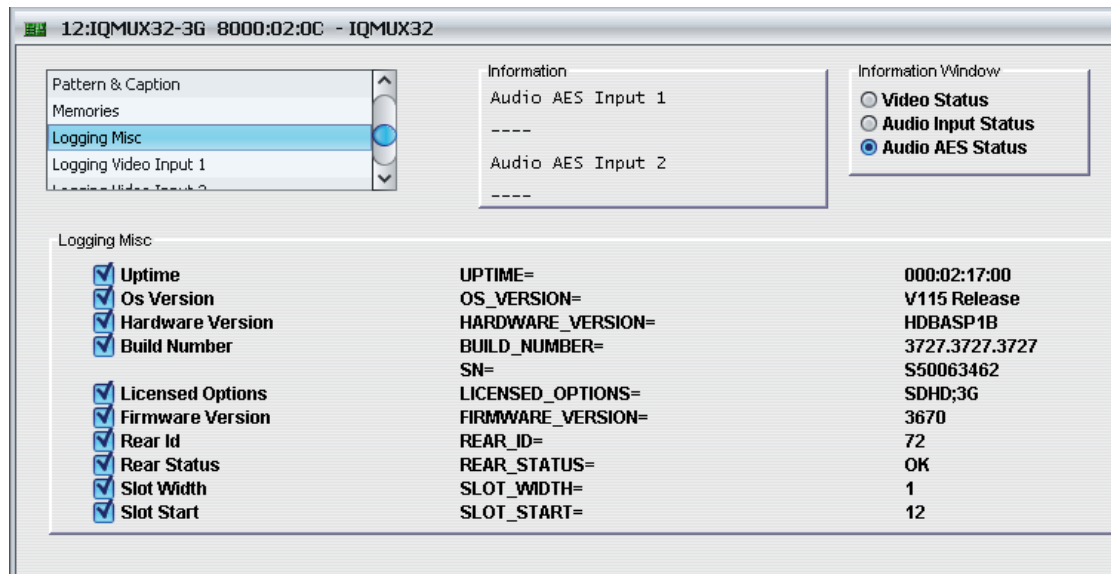
Information about several parameters can be made available to a logging device that is connected to the RollCall network.

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.

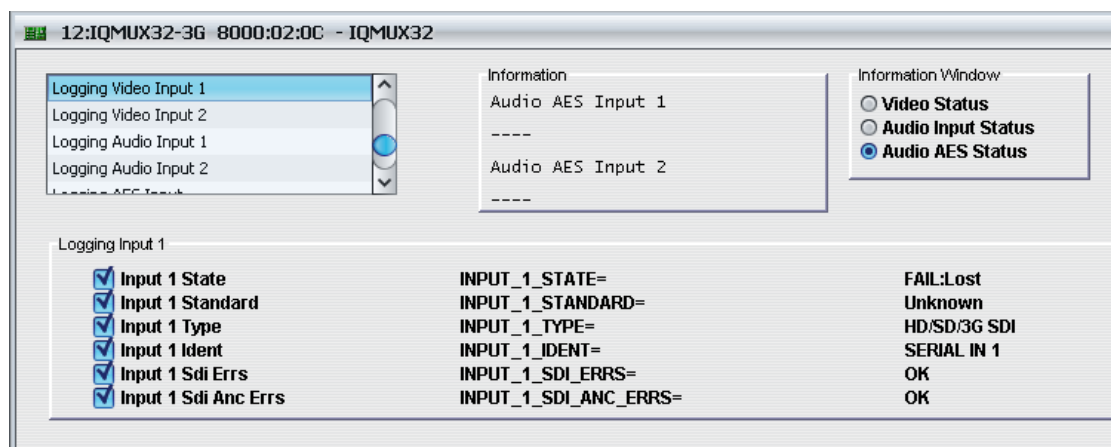
#### 5.10.1 Logging Misc

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



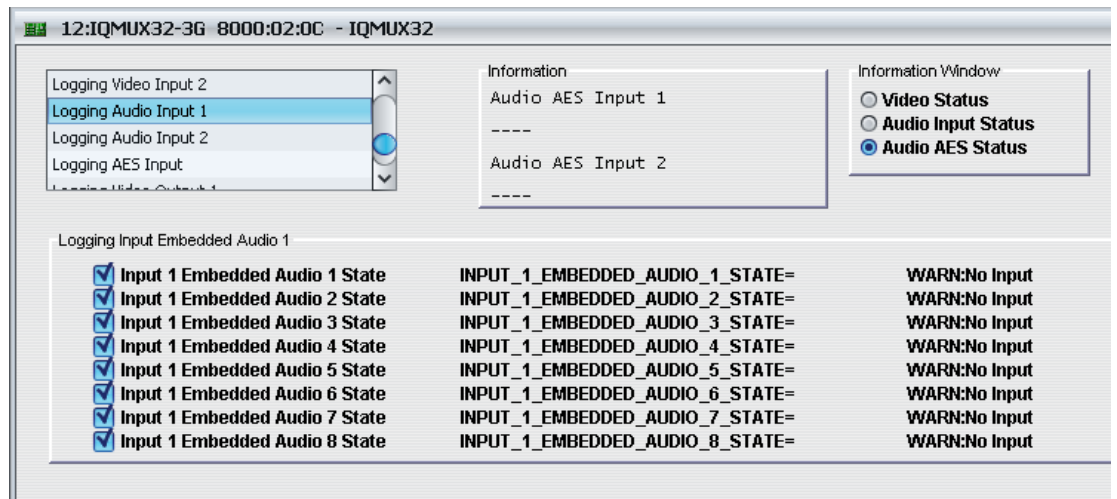
#### 5.10.2 Logging Video Input 1/2

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



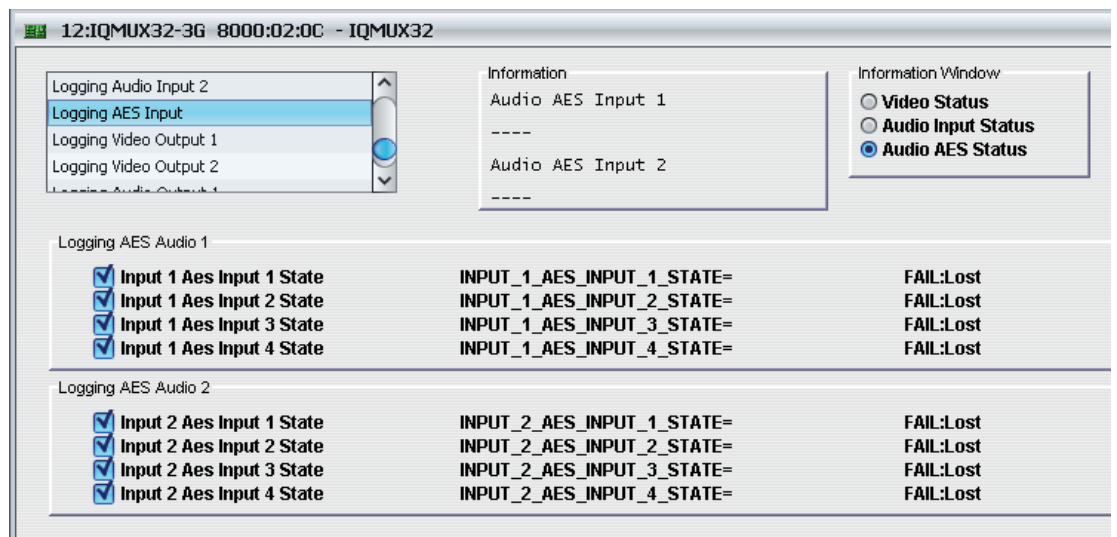
### 5.10.3 Logging Audio Input 1/2

The **Logging Audio Input 1/2** screens display the current log values for the eight audio pairs on the relevant audio input.



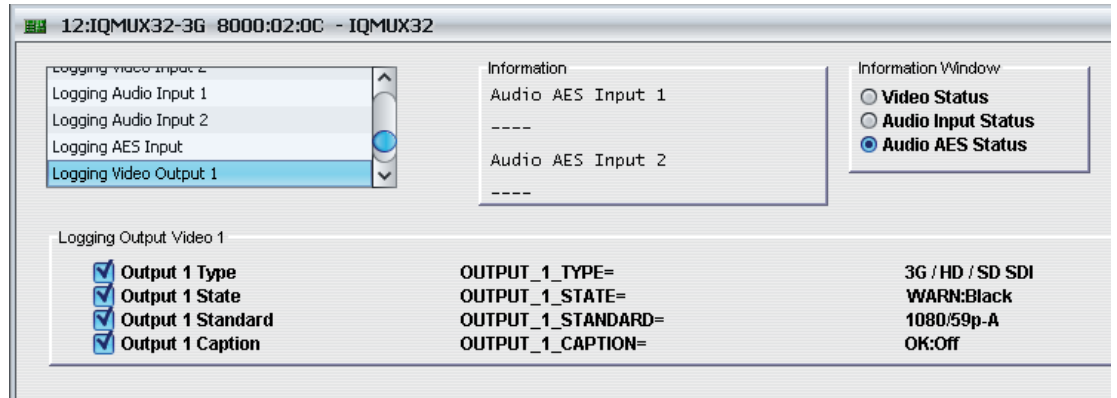
### 5.10.4 Logging AES

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



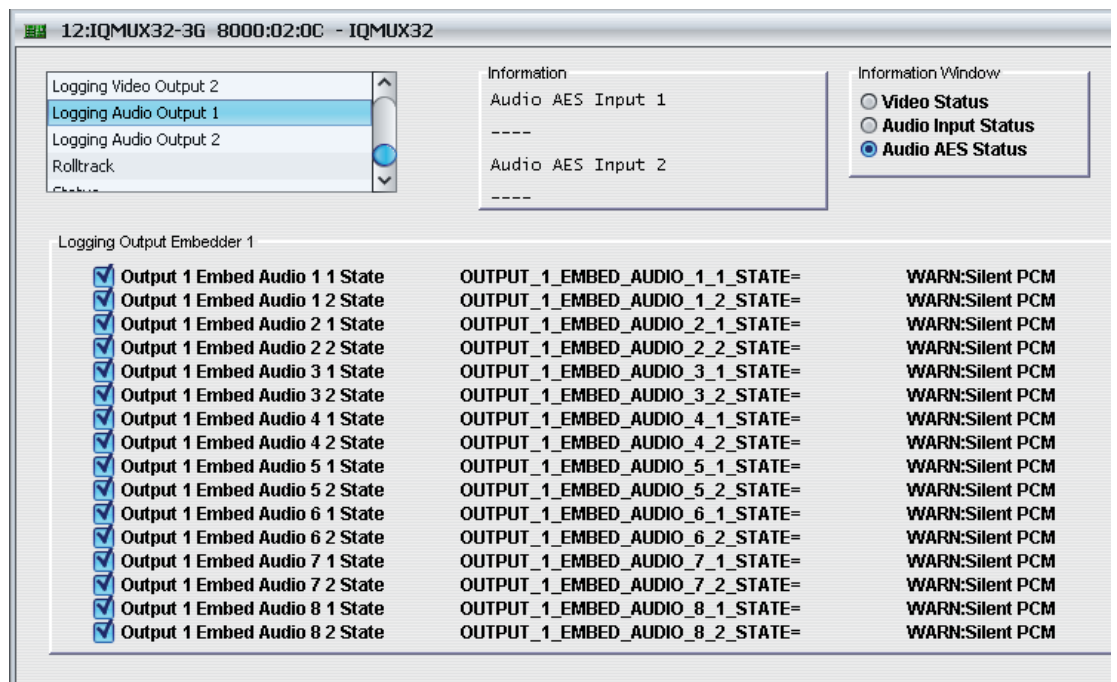
### 5.10.5 Logging Video Output 1/2

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



### 5.10.6 Logging Audio Output 1/2

The **Logging Audio Output 1/2** screens display the current log information for the relevant audio output.





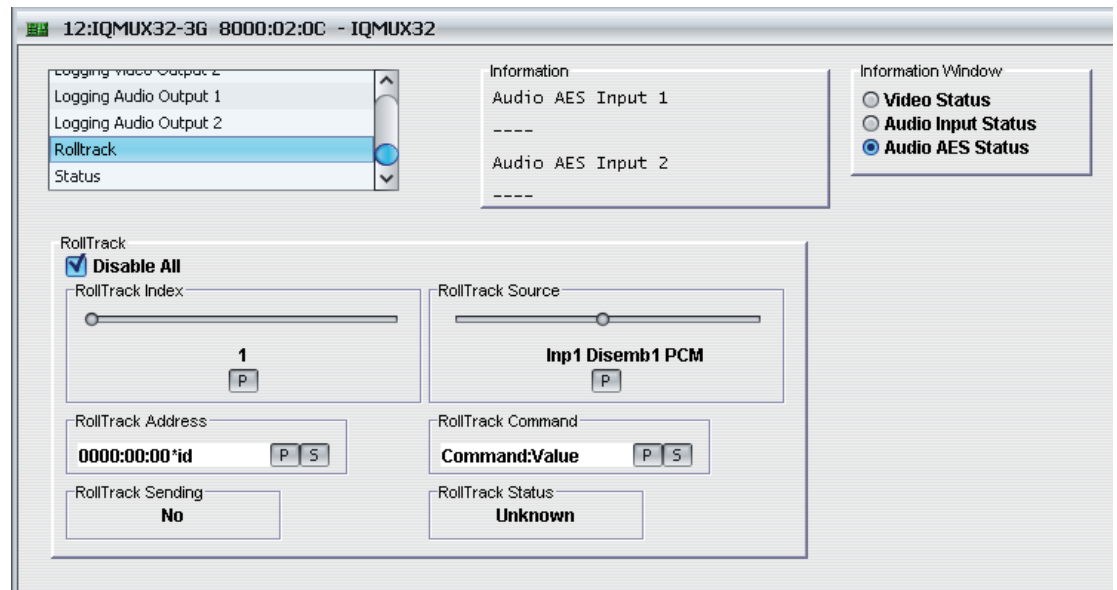
### 5.10.7 Log Field Descriptions

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"> <li>• OK</li> <li>• FAIL:Lost</li> </ul>
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"> <li>• OK</li> <li>• WARN:Mismatch</li> <li>• FAIL:Lost</li> </ul> <p><b>Note:</b> WARN:Mismatch indicates that the input and output standards are not the same.</p>
INPUT_N_STANDARD=	This displays the current input signal standard. For example, 1080/29i.  If the input standard is not recognized or supported the field will display: WARN:Unknown
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=	Displays SDI errors. Valid values are: <ul style="list-style-type: none"> <li>• OK</li> <li>• WARN</li> </ul>
INPUT_N_SDI_ANC_ERRS=	Displays ANC errors. Valid values are: <ul style="list-style-type: none"> <li>• OK</li> <li>• WARN</li> </ul>

Log Field	Description
INPUT_1_EMBEDDED_AUDIO_1_STATE= to INPUT_1_EMBEDDED_AUDIO_8_STATE= -----	These fields display the current embedded input audio state. Valid values are: <ul style="list-style-type: none"> <li>• OK:PCM</li> <li>• OK:Data</li> <li>• OK:DolbyE</li> <li>• WARN:No Input</li> <li>• FAIL:Lost</li> </ul>
INPUT_2_EMBEDDED_AUDIO_1_STATE= to INPUT_2_EMBEDDED_AUDIO_8_STATE=	These field display the current AES input status. Valid values are: <ul style="list-style-type: none"> <li>• OK:PCM</li> <li>• OK:Data</li> <li>• OK:DolbyE</li> <li>• WARN:No Input</li> <li>• FAIL:Lost</li> </ul>
INPUT_N_AES_INPUT_N_STATE=	These field display the current AES input status. Valid values are: <ul style="list-style-type: none"> <li>• OK:PCM</li> <li>• OK:Data</li> <li>• OK:DolbyE</li> <li>• WARN:No Input</li> <li>• FAIL:Lost</li> </ul>
OUTPUT_N_TYPE=	3G / HD / SD SDI
OUTPUT_N_STATE=	<ul style="list-style-type: none"> <li>• OK</li> <li>• WARN:Pattern</li> <li>• WARN:Black</li> <li>• WARN:Freeze</li> </ul>
OUTPUT_N_STANDARD=	Displays the current output video standard.
OUTPUT_N_CAPTION=	<ul style="list-style-type: none"> <li>• OK:Off</li> <li>• WARN:On</li> </ul>
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"> <li>• OK:PCM</li> <li>• OK:Data</li> <li>• OK:DolbyE</li> <li>• WARN:Silent PCM</li> <li>• WARN:Overload PCM</li> <li>• FAIL:Input Lost</li> </ul>

## 5.11 RollTrack

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



### 5.11.1 Disable All

When checked, all RollTrack items are disabled.

### 5.11.2 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.

### 5.11.3 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.

### 5.11.4 RollTrack Address

This item enables the address of the selected destination unit 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.

### 5.11.5 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.

### 5.11.6 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.

### 5.11.7 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.

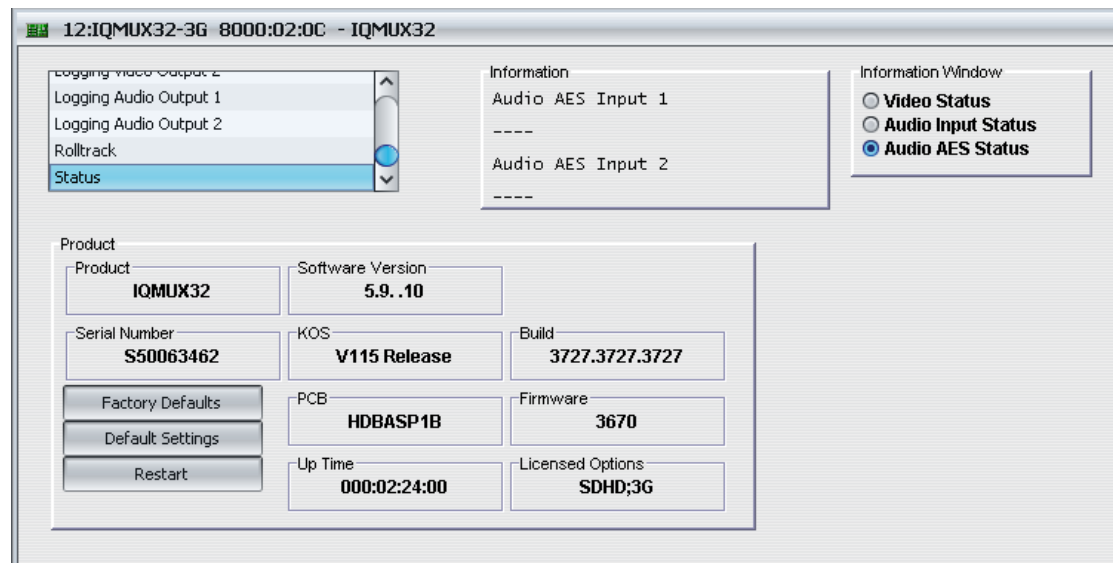
**Timeout** RollTrack message sent but acknowledgement not received. This could be because the destination unit is not at the location specified.

**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.

## 5.12 Status

The **Status** screen displays basic information about the module, such as the serial number and software versions. Use the functions on the screen to restart the module or return all settings to their factory or default settings.



- **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.

### 5.12.1 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.

### 5.12.2 Default Settings

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

### 5.12.3 Restart

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