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# User Instruction Manual

## **IQOMU31 / IQOMB31**

3G/HD/SD-SDI Multiplexer for 4 AES/EBU Audio Streams with Fiber Optic Interfacing

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## Contact Details

### Customer Support

<b>United Kingdom (HQ)</b> +44 (0) 118 921 4214 (tel) +44 (0) 118 921 4268 fax)customersupport@snellgroup.com	
<b>Regional Support Contacts</b>	
<b>Snell USA</b> +1 818 556 2616 (tel) +1 818 556 2626 (fax) support.us@snellgroup.com	<b>Snell Germany</b> +49 (0) 6122 98 43 0 (tel) +49 (0) 6122 98 43 44 (fax) support.germany@snellgroup.com
<b>Snell Spain</b> +34 91 446 23 07 (tel) +34 91 446 17 74 (fax) support.spain@snellgroup.com	<b>Snell France</b> +33 1 41 95 30 50 (tel) +33 1 41 95 30 51 (fax) support.france@snellgroup.com
<b>Snell Asia Pacific</b> +852 2356 1660 (tel) +852 2575 1690 (fax) support.hk@snellgroup.com	<b>Snell India</b> +91 124 462 6000 (tel) +91 124 437 5888 (fax) support.india@snellgroup.com
<b>Snell Russia</b> +7 499 248 3443 (tel) +7 499 248 1104 (fax) support.russia@snellgroup.com	<b>Snell China</b> +86 10 6515 6158 (tel) +86 10 6515 5659 (fax) support.china@snellgroup.com

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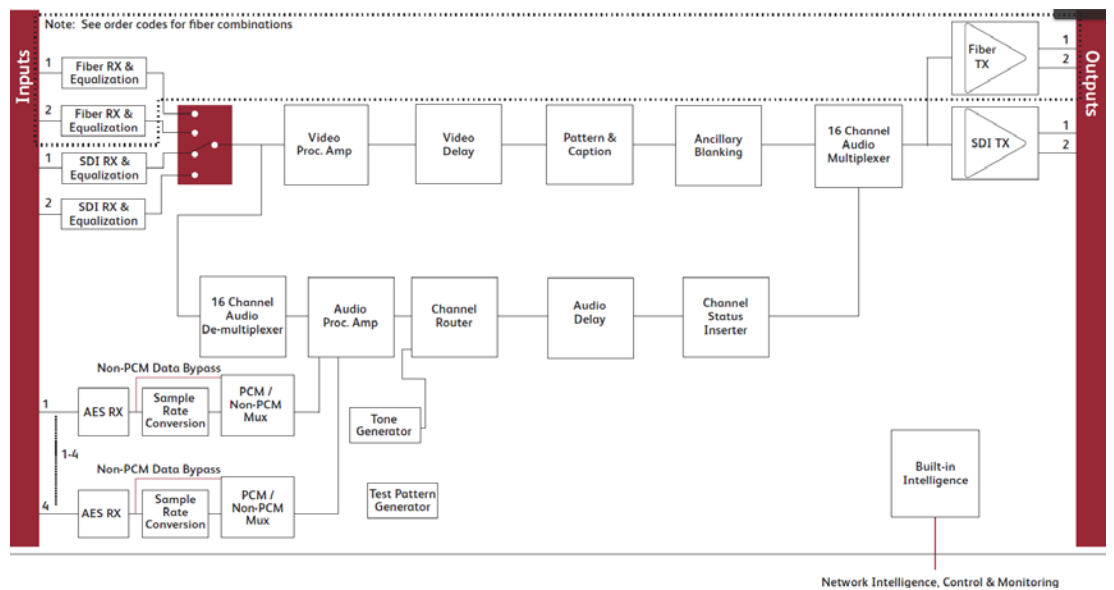
# 1. Introduction

## 1.1 Description

The IQOMU31 and IQOMB31 provide eight-channel digital audio multiplexing for 3 Gbit/s SDI, HD-SDI 1.5 Gbit/s or SD-SDI 270 Mbit/s signals. Including both SDI inputs, and a combination of fiber optic input and output options, the IQOMU31 and IQOMB31 enable increased connectivity distances for HD and 3 Gbit/s SDI signals. Audio processing features include audio delay, gain, invert, and channel level routing, while video delay and a video proc. amp are also included in the feature set.

The IQOMU31 and IQOMB31 are ideal as small-scale digital ingest modules where any digital audio source signal can be catered for, even combinations of embedded and external digital audio.

## 1.2 Block Diagram



## 1.3 Order Codes

**Note:**

Modules with “A” order codes (for example, IQOMU311T-1**A3**) can be fitted into either A- or B-style enclosures. Modules with “B” order codes (for example, IQOMU311T-1**B3**) can only be fitted into B-style enclosures. See page 7.

### 1.3.1 IQOMU31

IQOMU311(2)T-1A3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic output. 2 SDI inputs, 2 SDI outputs, 1(2) optical output(s), 2 unbalanced AES inputs.
IQOMU311(2)T-1B3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic output. 2 SDI inputs, 2 SDI outputs, 1(2) optical output(s), 2 unbalanced AES inputs.
IQOMU311(2)R-1A3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic input. 2 SDI inputs, 2 SDI outputs, 1(2) optical input(s), 2 unbalanced AES inputs.
IQOMU311(2)R-1B3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic input. 2 SDI inputs, 2 SDI outputs, 1(2) optical input(s), 2 unbalanced AES inputs.
IQOMU31TR-1A3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic transceiver. 2 SDI inputs, 1 optical input, 2 SDI outputs, 1 optical output, 2 unbalanced AES inputs.
IQOMU31TR-1B3	3G/HD/SD-SDI 4-channel AES multiplexer with fiber-optic transceiver. 2 SDI inputs, 1 optical input, 2 SDI outputs, 1 optical output, 2 unbalanced AES inputs.

### 1.3.2 IQOMB31

IQOMB311(2)T-1A3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic output. 1 SDI input, 2 SDI outputs, 1(2) optical output(s), 4 balanced AES inputs.
IQOMB311(2)T-1B3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic output. 1 SDI input, 2 SDI outputs, 1(2) optical output(s), 4 balanced AES inputs.
IQOMB311(2)R-1A3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic input. 1 SDI input, 2 SDI outputs, 1(2) optical input(s), 4 balanced AES inputs.
IQOMB311(2)R-1B3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic input. 1 SDI input, 2 SDI outputs, 1(2) optical input(s), 4 balanced AES inputs.
IQOMB31TR-1A3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic transceiver. 1 optical input, 1 SDI input, 2 SDI outputs, 1 optical output, 4 balanced AES inputs.
IQOMB31TR-1B3	3G/HD/SD-SDI 8-channel AES multiplexer with fiber-optic transceiver. 1 optical input, 1 SDI input, 2 SDI outputs, 1 optical output, 4 balanced AES inputs.

### 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

## 2. Technical Specification

<b>Inputs and Outputs</b>	
<b>Signal Inputs</b>	* <i>Optical I/O and control is determined by the type of SFP module fitted</i>
SDI Inputs	IQOMU31 x 2, IQOMB31: x 1
Input 1 Cable Length	Up to 70m Belden 1694A @ 3 Gbit/s Up to 160m Belden 1694A @ 1.5 Gbit/s >350m Belden 1694A @ 270 Mbit/s
Input 2 Cable Length	Up to 60m Belden 1694A @ 3 Gbit/s Up to 100m Belden 1694A @ 1.5 Gbit/s Up to 100m 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)
Optical Inputs*	3 Gbit/s HD-SDI, 1.485 Gbit/s HD-SDI or 270 Mbit/s SD-SDI (asynchronous operation available at other frequencies)  * <i>Optical I/O and control is determined by the type of SFP module fitted</i>
Connector/Format	LC
Standard	SMPTE 297-2006
Inputs	Up to 2
<b>Signal Outputs</b>	
SDI Outputs	x 2
Optical Outputs*	3 Gbit/s HD-SDI, 1.485 Gbit/s HD-SDI or 270 Mbit/s SD-SDI (asynchronous operation available at other frequencies)  * <i>Optical I/O and control is determined by the type of SFP module fitted</i>
Connector/Format	LC
Standard	SMPTE 297-2006
Outputs	Up to 2
<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>Controls</b>	
<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, TX Laser off
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



Pattern Select	100% Color Bars, 75% Color Bars, SMPTE Bars, Tartan Bars, Black, Pluge, Ramp, H Sweep, Pulse & Bar, Multi-burst
Input Select	Serial 1, Serial 2, RX 1*, RX 2*
Manual Freeze	On/Off
Freeze	Field/Frame
Video Delay Frames	0–9 F
VANC Data	Blank VANC
SD VANC Data	Line blanking (six controls)
ProcAmp Enable	On/Off
Black Level	±100 mV in 0.8 mV steps
Hue Adjust	±180° in steps of 1°
Master Video Gain	+6 to -120 dB in 0.1 dB steps
Y-Gain	+6 to -120 dB in 0.1 dB steps
Cb/Cr Gain	+6 to -120 dB in 0.1 dB steps
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
TX Laser Disable	On/Off
<b>Audio Controls</b>	
<b>Embedder Assignment</b>	
Group 1–4 Enable	On/Off
Pair 1–8 Source L/ Non-PCM	Dis-embed 1_1 to 8_2, AES 1–4, Tone, Silence
Pair 1–8 Source R	Dis-embed 1_1 to 8_2, AES 1–4, Tone, Silence
Pair 1–8 Stereo	Link channel pairs
Pair 1–8 Polarity L/R	On/Off
Pair 1–8 Gain L/R	+12 dB to -72 dB in 0.1 dB steps
Pair 1–8 Non-PCM	On/Off
<b>Processed Audio Delay Control</b>	
Course Manual Delay	Up to 1.75s in 5ms steps
Fine Manual Delay	+/- 0.25s in 0.5ms steps
<b>Tone</b>	
Frequency L/R	100 Hz to 10 kHz in 100 Hz steps
Channel Ident	On/Off
HANC Data	Blank HANC (Removes all HANC data).
	<i>Note: audio removed when embedders disabled</i>
<b>Audio Monitoring</b>	
Silence Detect	0 to -80 dB in 1 dB steps
Signal Overload Detect	0 to -80 dB in 1 dB steps
Warning Timer	1 to 20 seconds in 1-second steps

**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
EDH/CRC Reset	Resets all EDH/CRC counts
RollTrack Index	Up to 70 RollTrack destinations
Optical Logging*	Tx Laser Bias High Warning  Tx Power Low Warning  Tx Power High Warning  Laser Wavelength  Input 1 (2) Rx Power High Warning  Input 1 (2) Rx Power Low Warning  Input 1 (2) Rx Power Measurement
RollTrack Sources	Unused, Video Delay, Audio Delay, Input Present, Input Loss, Input Rate/Std, Output Freeze, Output Unfreeze, Embedded Audio (Pairs 1–8) PCM, Embedded Audio (Pairs 1–8) Non-PCM, Embedded Audio (Pairs 1–8) Loss, AES Audio (Pairs 1–4) PCM, AES Audio (Pairs 1–4) Non-PCM, AES Audio (Pairs 1–4) Loss, Tx Laser Bias High Warning*, Input 1 (2) Rx Power High Warning*, Input 1 (2) Rx Power Low Warning*

**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/75ohm panel jack on standard Snell 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)

**Optical 1310 nm Tx**

Wavelength	1310 nm
Spectral width (FWHM)	>1.5 nm (typ)
Output power	-2 dBm ( $\pm 1$ dBm)
Extinction ratio	>7.5:1 (typ)
Transmission distance	Up to 30 Km

**Optical Rx**

Input wavelength range	Min. 1260 nm  Max. 1620 nm
Optical power input range	> -3 dBm  < -18 dBm
Detector damage threshold	+3.5 dBm

**Video Standards**

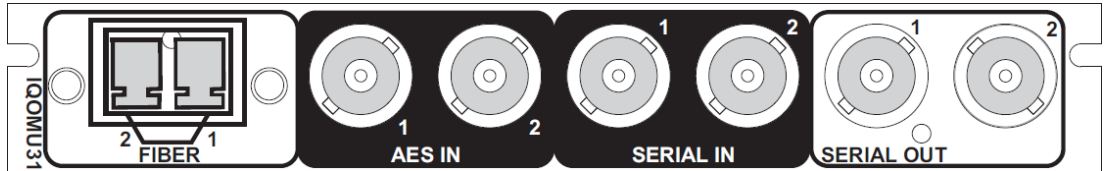
Video Standards	1125(1080)/50p (A & B), 1125(1080)/59p (A & B) 750(720)/50p, 750(720)/59p, 1125(1080)/25i, 1125(1080)/29i, 625(576)/25i, 525(480)/29i
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Typical Video Delay	SD: 70 us
	HD: 38 us
	3G-A: 19 us
	3G-B: 40 us
Factory Default	Resets all module 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 Module Information	Software restart of the module. Reports following module information: Software version, Serial number, Build number, KOS version, Firmware version, PCB version
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 us
	HD: 28 us
	3G-A: 15 us
	3G-B: 25 us
<b>Digital Audio Input (Balanced)</b>	
Connector/Format	25 W D
Sample Frequency	25–96 kHz (48 kHz for Reference)
Input Cable Length	>500m of RG59 cable
Impedance	75 Ohms
Standard	AES3id, SMPTE 272M-A-1994
	SMPTE 299M
Output Sampling	48 kHz frame locked
<b>Power Consumption</b>	
Module Power Consumption	9.5 W (A Frames)
	9.5 PR (B Frames)

### 3. Connections

**Note:** Optical I/O and control is determined by the type of SFP module fitted.

#### 3.1 IQOMU31 Rear Panel View



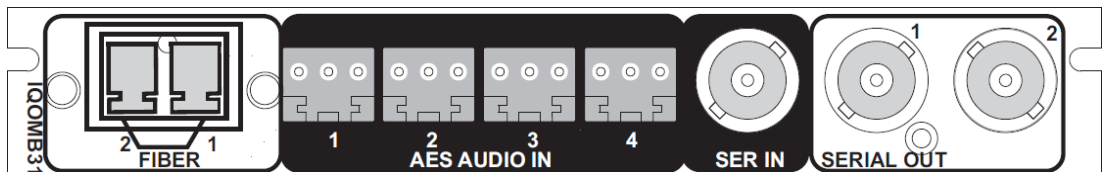
##### 3.1.1 Input Connections

Label	Description	Connector
FIBER	Optical input.	1 x dual SFP.
AES IN	AES audio inputs.	2 x unbalanced BNC.
SERIAL IN	SDI inputs.	2 x BNC.

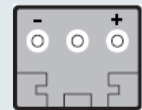
##### 3.1.2 Output Connections

Label	Description	Connector
FIBER	Optical output.	1 x dual SFP.
SERIAL OUT	SDI outputs.	2 x BNC.

#### 3.2 IQOMB31 Rear Panel View



**Note:** The polarity of the balanced analog audio screw terminal connectors is shown opposite.



##### 3.2.1 Input Connections

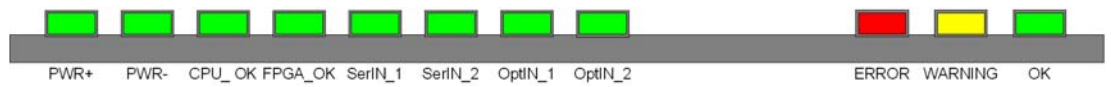
Label	Description	Connector
FIBER	Optical input.	1 x dual SFP.
AES AUDIO IN	AES audio inputs.	4 x balanced screw terminal.
SERIAL IN	SDI input.	1 x BNC.

##### 3.2.2 Output Connections

Label	Description	Connector
FIBER	Optical output.	1 x dual SFP.
SERIAL OUT	SDI outputs.	2 x BNC.

## 4. Card Edge LEDs

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



LED	Color	State	Indication
PWR +	Green	Illuminated	A positive power supply is present.
PWR -	Green	Illuminated	A negative power supply is present.
CPU_OK	Green	Flashing	The CPU is running.
FPGA_OK	Green	Illuminated	The unit is booting. The LED stays illuminated until the SDI is enabled.
		Flashing	The FPGA is running.
Ser_IN 1 Ser_IN 2	Green	Illuminated	A valid input is present (SDI).
Opt_IN 1 Opt_IN 2	Green	Illuminated	A valid input is present (fiber).
ERROR	Red	Illuminated	Board fault conditions. When the unit is booting, the LED is illuminated until the SDI is enabled.
WARN	Yellow	Illuminated	Board warning conditions. The LED is illuminated if one or more of the SDI inputs is invalid.
OK	Green	Illuminated	The module is operating correctly.

## 5. Operation Using the RollCall Control Panel

The RollCall Control Panel enables you to control the IQ modules through various different screens.

See the *RollCall Control Panel Installation & Operator's Manual* for information on installation and setup of the RollCall Control Panel.

### 5.1 Information Window

The Information Window at the top of each screen displays information about the audio and video status of the module.

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

#### 5.1.1 Input Status

When **Input Status** is selected, the video input status is displayed.



Information	Status	Description	Standard
IN1:	OK	SDI input signal OK	Shows the detected video input standard, for example, 1080/29i (blank if input is lost).
IN2:	FAIL	SDI input signal failed	
	LOST	No signal received	
	MISM	Mismatch format detected	
FIB1:	OK	Fiber input signal OK	Shows the detected video input standard, for example, 1080/29i (blank if input is lost).
FIB2:	FAIL	Fiber input signal failed	
	LOST	No signal received	
	MISM	Mismatch format detected	

#### 5.1.2 Video Status

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



Information	Status	Description	Standard
IN1:	OK	Input signal OK	Shows the detected video input standard, for example, 1080/29i (blank if input is lost).
IN2:	FAIL	Input signal failed	
FIB1:	LOST	No signal received	
FIB2:	MISM	Mismatch format detected	

Information	Status	Description	Standard
OUT:	OK	Output signal OK	Shows the selected video output standard, for example, 1080/29i.
	BLK	Output signal is black	
	FRZ	Output signal is frozen	
	PAT	Output is a pattern	A \$ symbol indicates that the caption is enabled (blank if disabled).

### 5.1.3 Audio Input Status

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

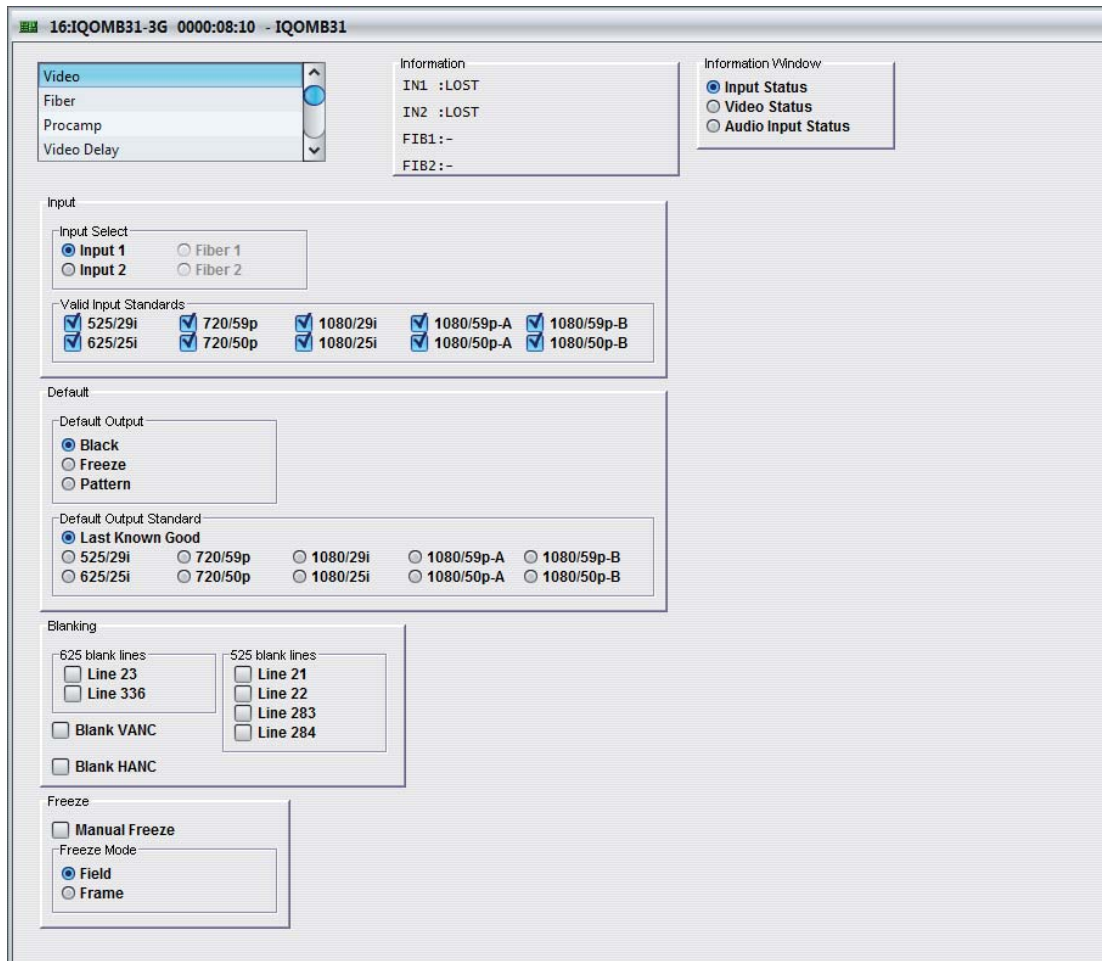


Information	Status	Description
Audio Embed Input	P	Channel is a PCM audio input.
	?	No audio input detected.
Audio AES Input	D	Signal is data, such as non-PCM or DolbyDigital.
	E	Signal is Dolby E.
	V	V bit present

## 5.2 Video

The **Video** screen enables you to specify the settings for the video inputs:

- Selection of SDI or fiber inputs
- Valid input standards
- Default output standard
- Ancillary blanking
- Freeze options
- Default output



### 5.2.1 Input Select

The **Input Select** control Enables the selection of either SDI Input 1, SDI Input 2, Fiber option 1, or Fiber option 2, where applicable.

### 5.2.2 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



### 5.2.3 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

### 5.2.4 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.

### 5.2.5 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.

### 5.2.6 Freeze

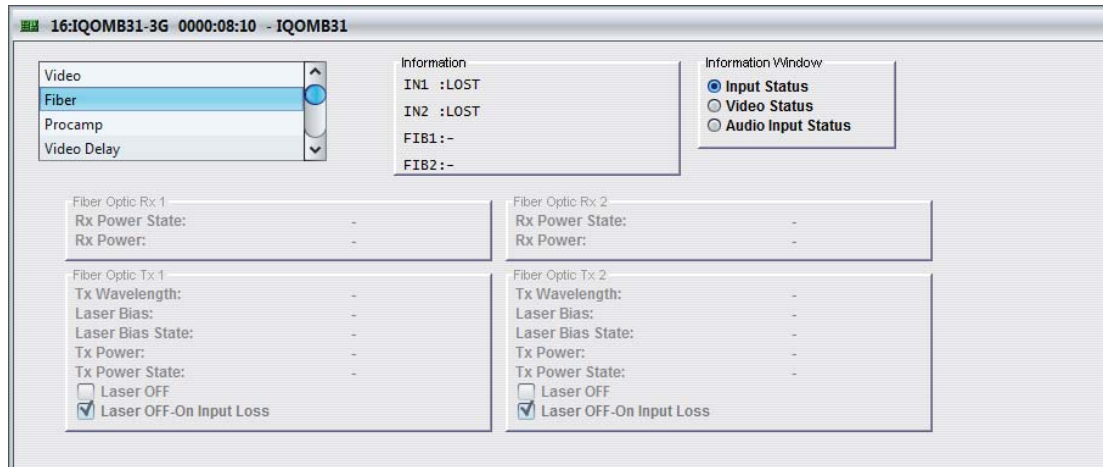
The **Manual Freeze** control freezes/pauses the output. Freeze type can be specified as either **Field** or **Frame**.

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

### 5.3 Fiber

The **Fiber** screen displays information about each of the fiber optic receivers (Rx) and transmitters (Tx).

The controls are duplicated for the Fiber Optic Rx options 1 and 2.



#### 5.3.1 Fiber Optic Rx 1 and Fiber Optic Rx 2

The following receiver parameters are displayed:

- **Rx Power State:** Displays the state of the received signal (options include OK, WARN:HI, WARN:LO, FAIL:LO and FAIL:HI).
- **Rx Power:** Displays the signal level received at the input (in dBm).

#### 5.3.2 Fiber Optic Tx 1 and Fiber Optic Tx 2

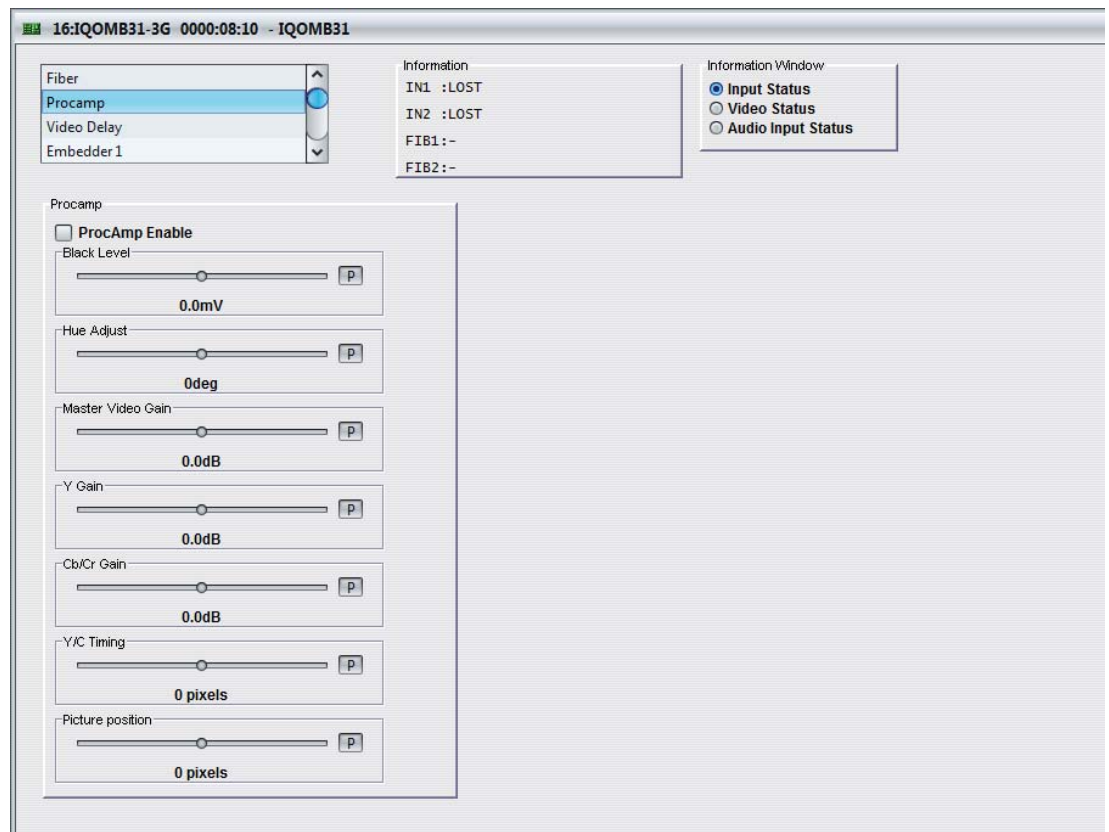
The following transmitter parameters are displayed:

- **Tx Wavelength:** Displays the wavelength of the transmitted output signal (either 1310 nm or 1550 nm).
- **Laser Bias:** Displays the bias level (in mA).
- **Laser Bias State:** Displays the bias state (options include OK, WARN:HI, WARN:LO, FAIL:LO and FAIL:HI).
- **Tx Power:** Displays the signal level of the transmitted output signal (in dBm)
- **Tx Power State:** Displays the state of the transmitted output signal (options include OK, WARN:HI, WARN:LO, FAIL:LO and FAIL:HI).
- **Laser OFF:** Enables the laser for the fiber optic output to be turned off manually.
- **Laser OFF-On Input Loss:** When selected, enables the laser for the fiber optic output to be turned off automatically when the signal is lost at the associated fiber optic receiver input. This option is enabled by default. If a default output (Firewall feature) via the Fiber Optic Tx on input loss is required, this option must be un-ticked.

## 5.4 Procamp

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

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



### 5.4.1 Procamp Enable

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

### 5.4.2 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.

### 5.4.3 Hue Adjust

The **Hue Adjust** 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.

#### 5.4.4 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.

#### 5.4.5 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.

#### 5.4.6 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.

#### 5.4.7 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.

#### 5.4.8 Picture Position

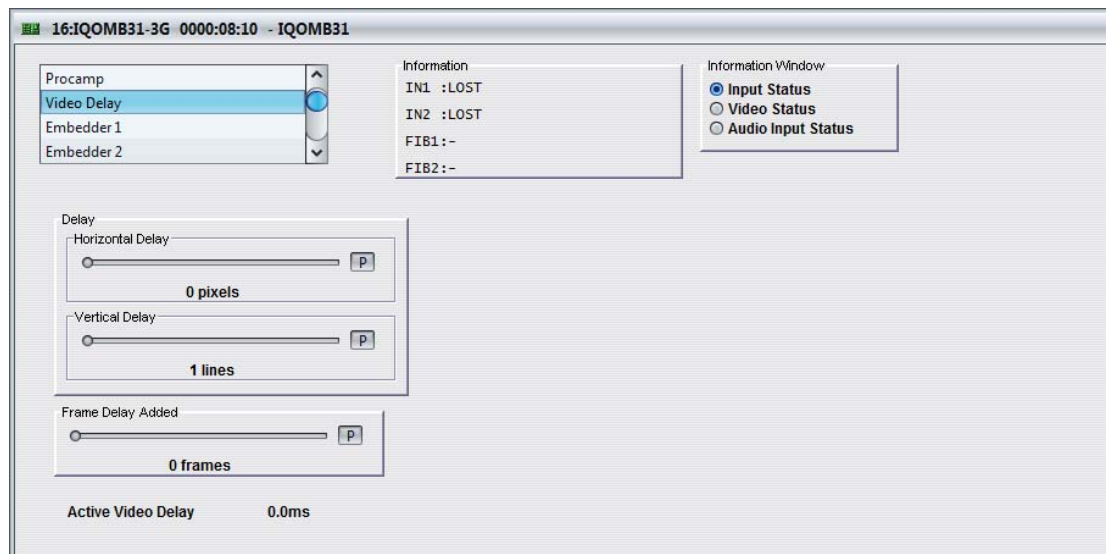
The **Picture Position** control allows the picture position to be adjusted over a range of:

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

The preset value is 0.

## 5.5 Video Delay

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



### 5.5.1 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.

### 5.5.2 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.

### 5.5.3 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.

### 5.5.4 Active Video Delay

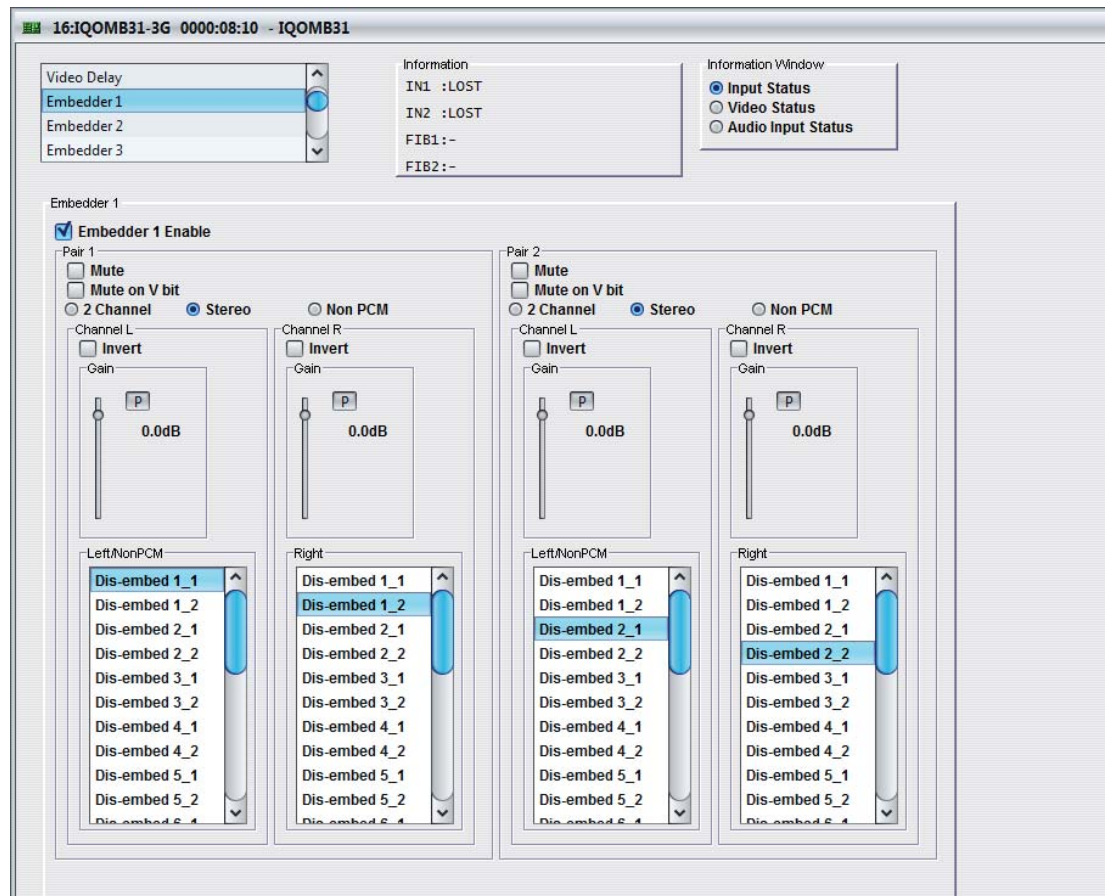
The total active video delay (in ms) is displayed at the bottom of this screen.

## 5.6 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.

### 5.6.1 Embedder N Enable

This option, when checked, enables the embedder group.

## 5.6.2 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.

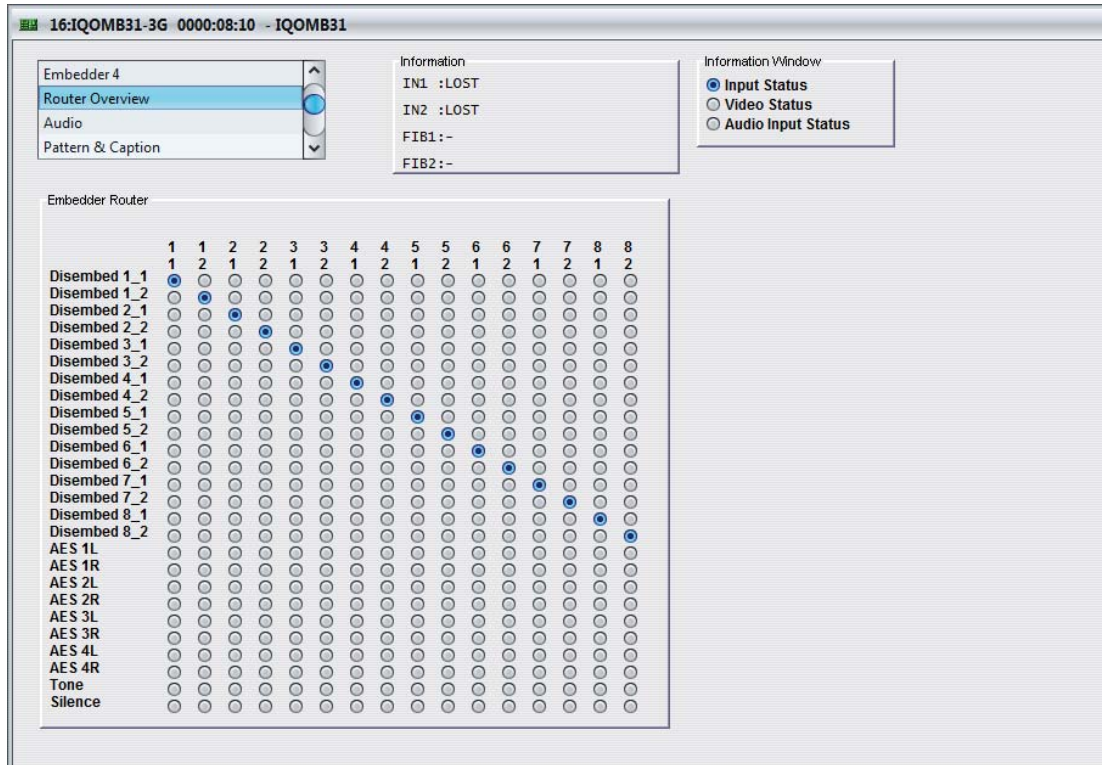
If set to PCM mode and a Non-PCM source is selected, silence will be embedded.

- **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.

### 5.7 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.

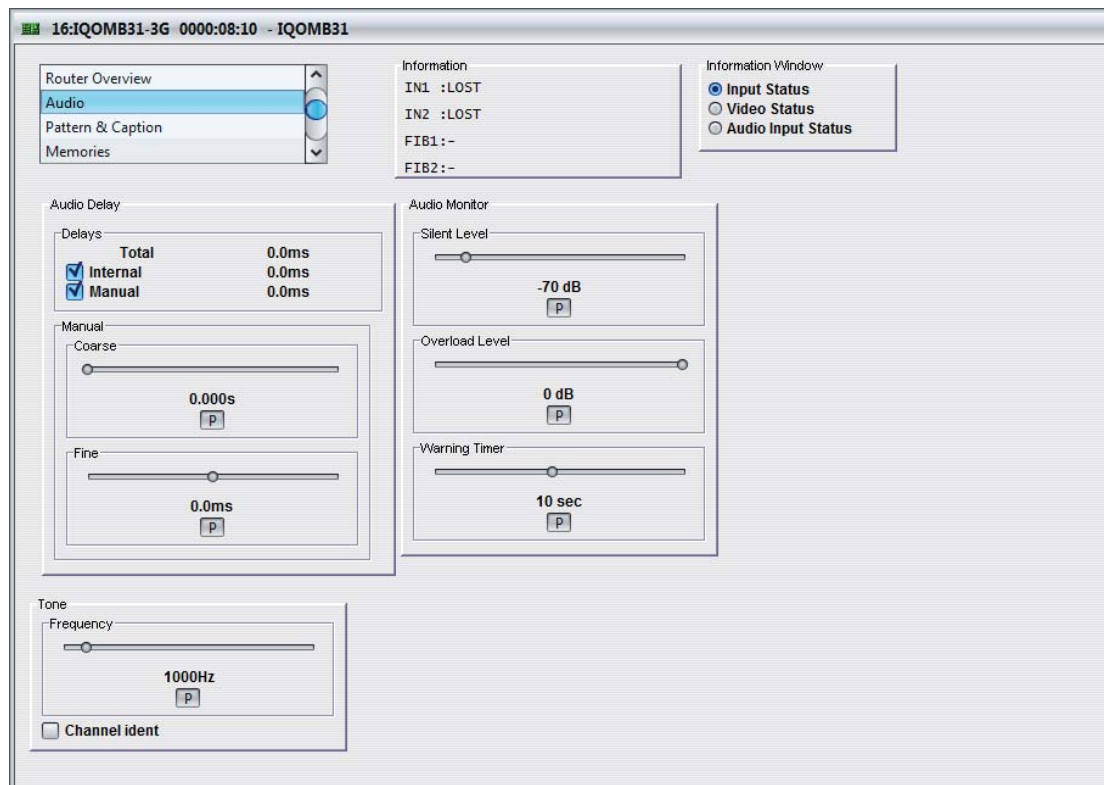
To specify a route on this screen, simply select it from the matrix.





## 5.8 Audio

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



### 5.8.1 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.

### 5.8.2 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 Course:** 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.

### 5.8.3 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.

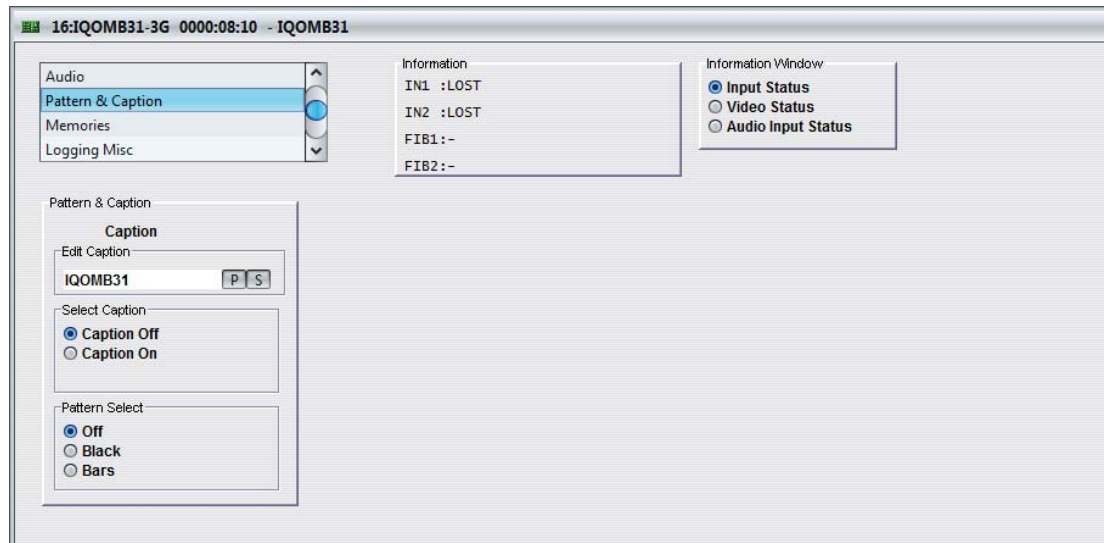
### 5.8.4 Audio Monitor

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 for 0 to 20 seconds and the preset value is 10 seconds.

## 5.9 Pattern & Caption

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



### 5.9.1 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.

### 5.9.2 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.

### 5.9.3 Pattern Select

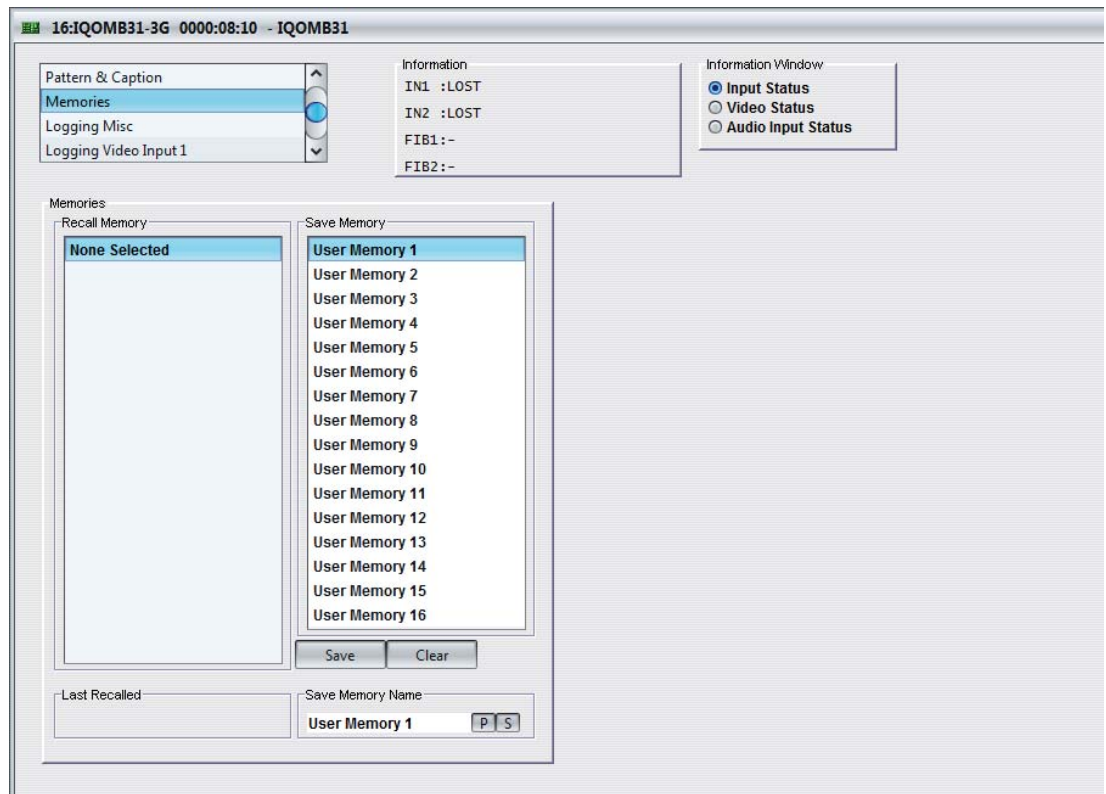
The radio buttons enable / disable pattern generation. The options are:

- Off
- Black
- Bars

## 5.10 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.



### 5.10.1 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” – that is, whether a log value has been enabled or disabled.

### 5.10.2 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.

### 5.10.3 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.

#### 5.10.4 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**).

## 5.11 Logging

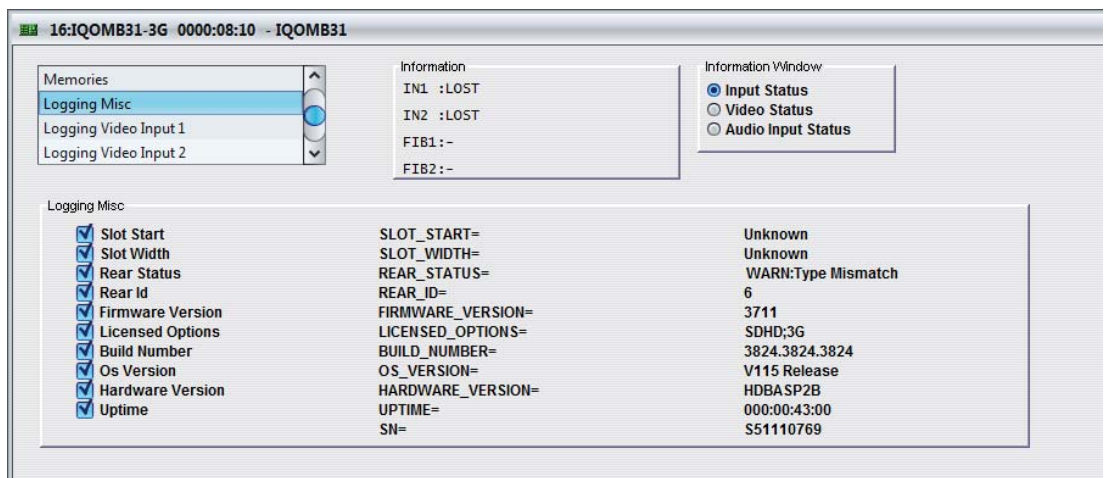
Information about several parameters can be made available to a logging device that is connected to the RollCall network.

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.

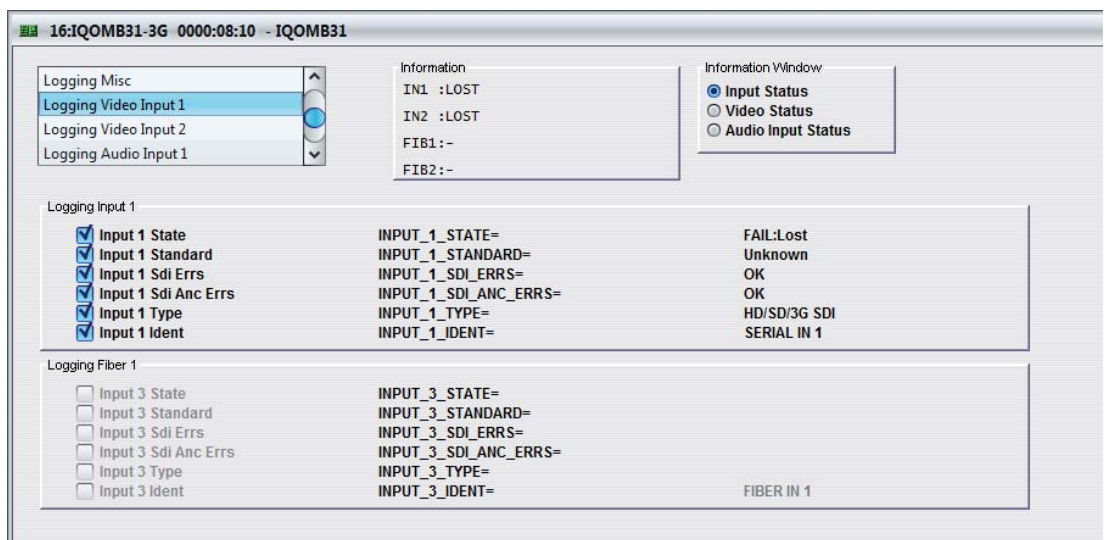
### 5.11.1 Logging Misc

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



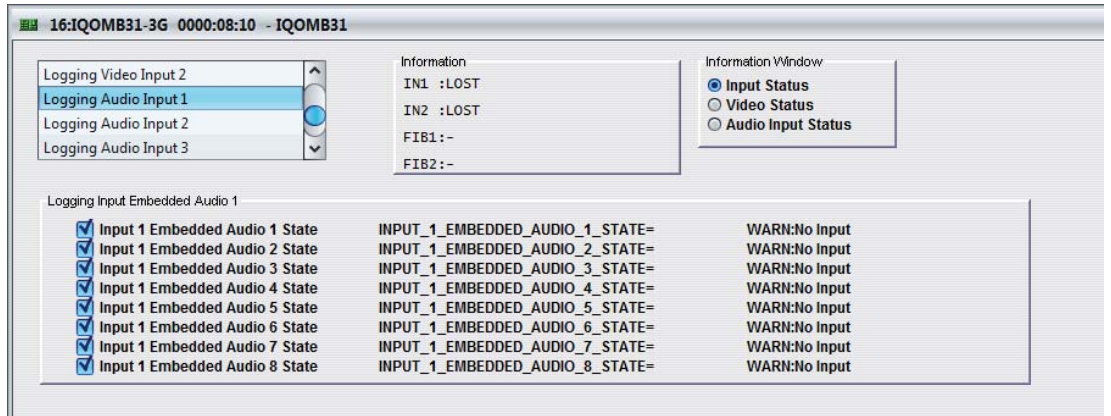
### 5.11.2 Logging Video Input 1 and Logging Video Input 2

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



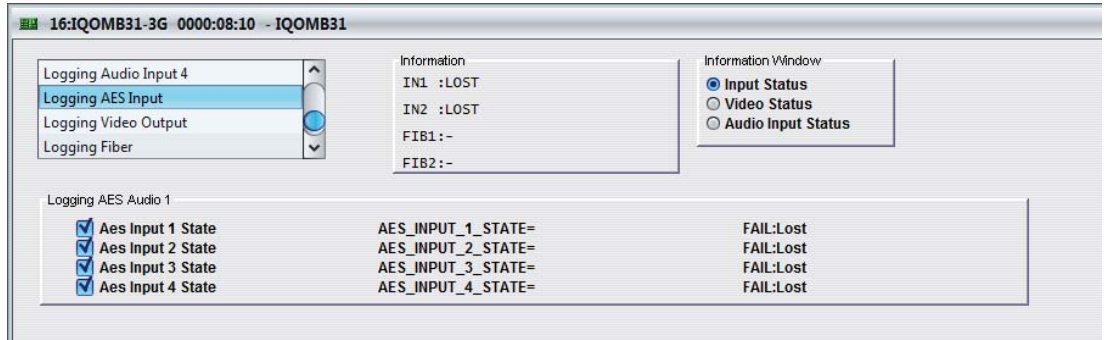
### 5.11.3 Logging Audio Input 1 to Logging Audio Input 4

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



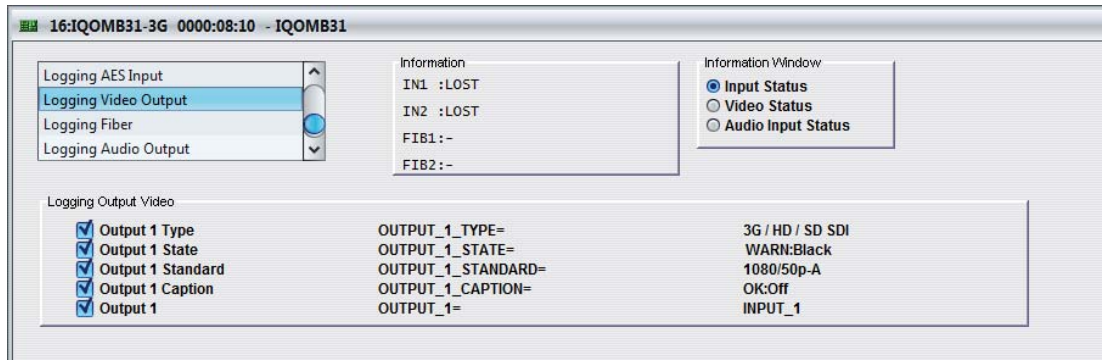
### 5.11.4 Logging AES Input

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



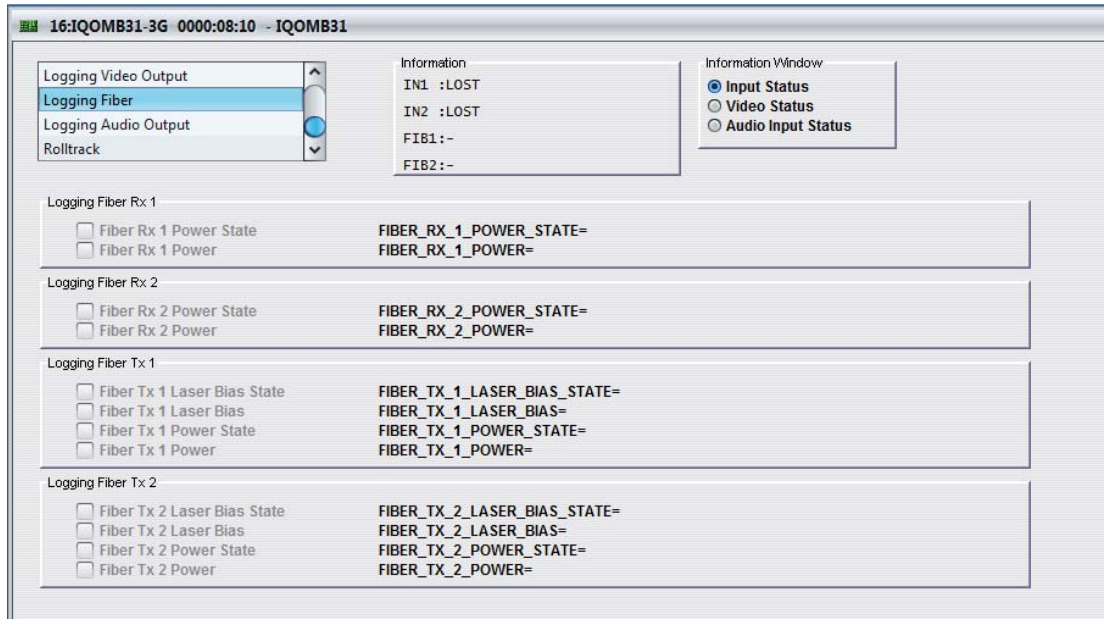
### 5.11.5 Logging Video Output

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



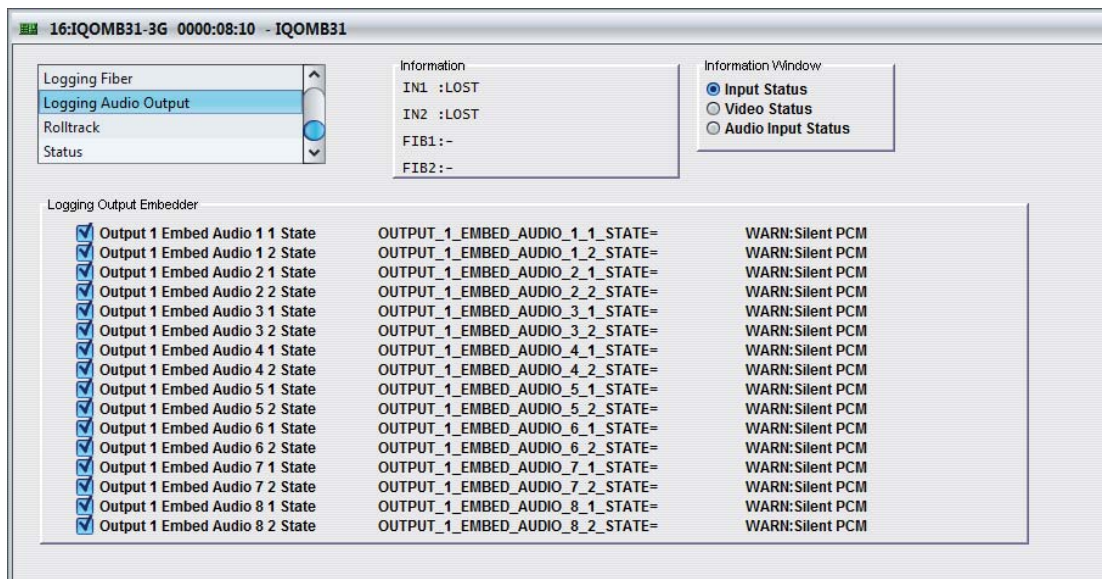
### 5.11.6 Logging Fiber

The **Logging Fiber** screen displays the current log values for the fiber optic receivers and transmitters.



### 5.11.7 Logging Audio Output

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





### 5.11.8 Log Field Descriptions

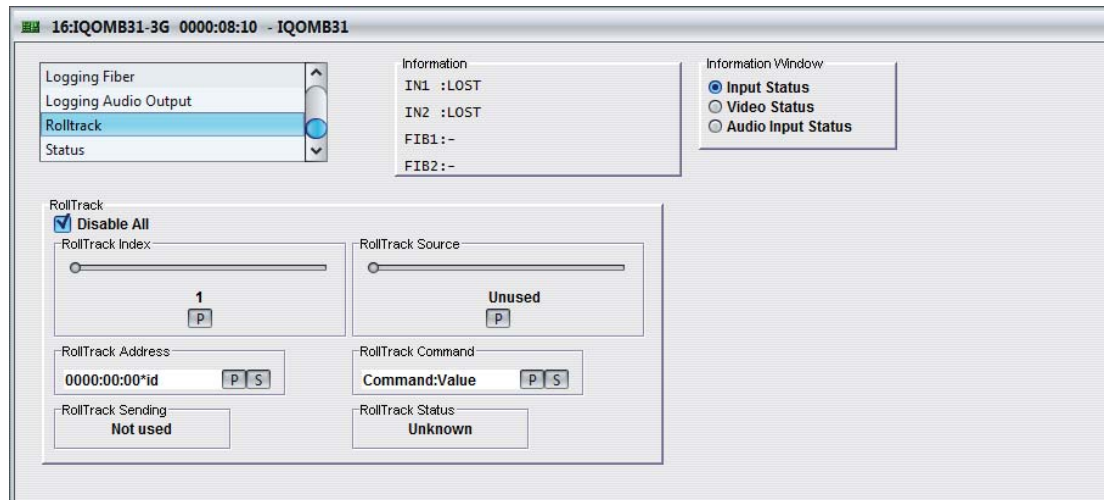
Log Field	Description
SLOT_START=	Displays the rear panel slot start (boot-up) number.
SLOT_WIDTH=	Displays the rear panel slot width. For example, 1 or 2.
REAR_STATUS=	Display the status of the rear panel. Valid values are: <ul style="list-style-type: none"> <li>• OK</li> <li>• FAIL:Lost</li> </ul>
REAR_ID=	Displays a rear panel identifier number.
FIRMWARE_VERSION=	Displays the FPGA version.
LICENSED_OPTIONS=	Displays any specially licensed options, if applicable.
BUILD_NUMBER=	Displays the build number.
OS_VERSION=	Displays the operating system name and version. For example, KOS V115.
HARDWARE_VERSION=	Displays the hardware version number.
UPTIME=	Displays the time since the last restart in the format ddd:hh:mm:ss.
SN=	Displays the module serial number, which consists of an S followed by eight digits.
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_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>
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.

Log Field	Description
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=	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>
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= OUTPUT_N_STATE=	3G / HD / SD SDI <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= OUTPUT_N_CAPTION=	Displays the current output video standard. <ul style="list-style-type: none"> <li>• OK:Off</li> <li>• WARN:On</li> </ul>
OUTPUT_N= FIBER_Rx_N_POWER_STATE=	Displays the relevant input source for the output video. <p>These fields display the power status. Valid values are:</p> <ul style="list-style-type: none"> <li>• OK</li> <li>• WARN:HI</li> <li>• WARN:LO</li> <li>• FAIL:LO</li> <li>• FAIL:HI</li> </ul>
FIBER_Rx_N_POWER= FIBER_Tx_N_LASER_BIAS_STATE=	Displays the power level of the receiver input, in dBm. <p>These fields display the laser bias status. Valid values are:</p> <ul style="list-style-type: none"> <li>• OK</li> <li>• WARN:HI</li> <li>• WARN:LO</li> <li>• FAIL:LO</li> <li>• FAIL:HI</li> </ul>
FIBER_Tx_N_LASER_BIAS=	Displays the bias level, in mA.

Log Field	Description
FIBER_Tx_N_POWER_STATE=	These fields display the power status. Valid values are: <ul style="list-style-type: none"><li>• OK</li><li>• WARN:HI</li><li>• WARN:LO</li><li>• FAIL:LO</li><li>• FAIL:HI</li></ul>
FIBER_Tx_N_POWER=	Displays the power level of the transmitter output, in dBm.
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>

## 5.12 RollTrack

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



### 5.12.1 Disable All

When checked, all RollTrack items are disabled.

### 5.12.2 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.

### 5.12.3 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.

### 5.12.4 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-defined 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.

### 5.12.5 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.

### 5.12.6 RollTrack Sending

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

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

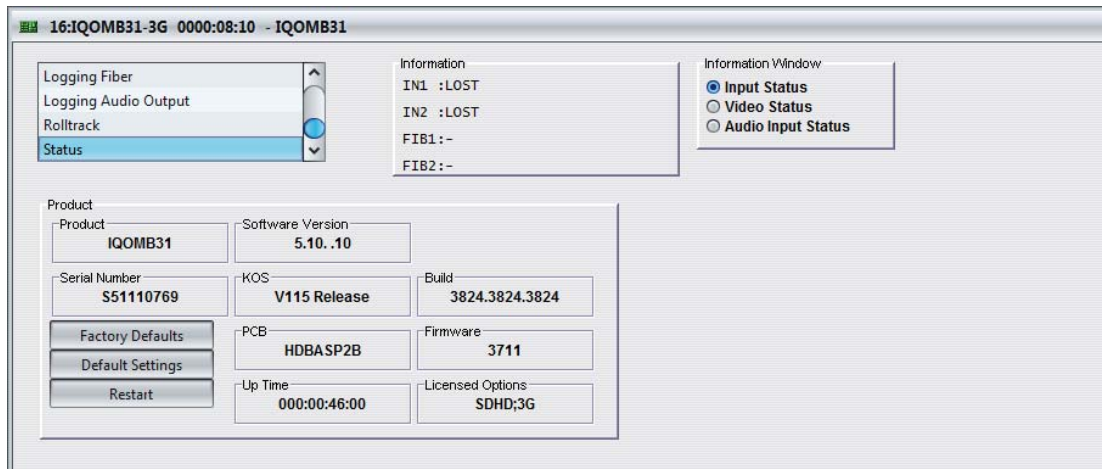
### 5.12.7 RollTrack Status

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

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

### 5.13 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 Number:** 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.

#### 5.13.1 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.

#### 5.13.2 Default Settings

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

#### 5.13.3 Restart

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