

IQBAXR D1 AES/EBU Audio Data Extractor

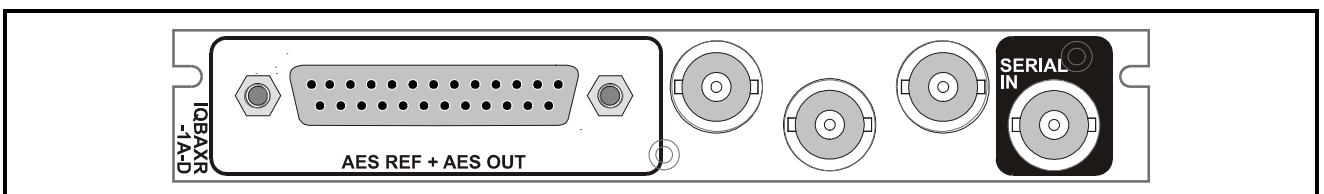
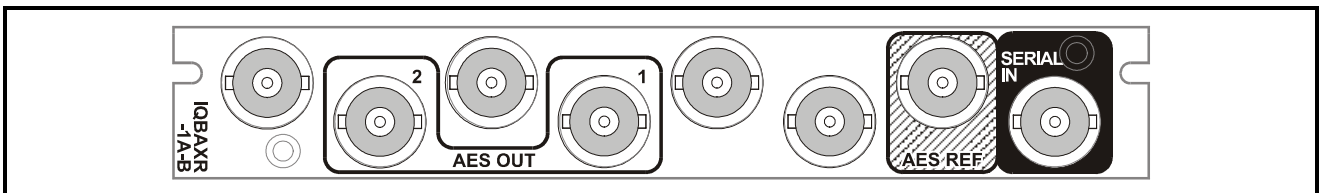
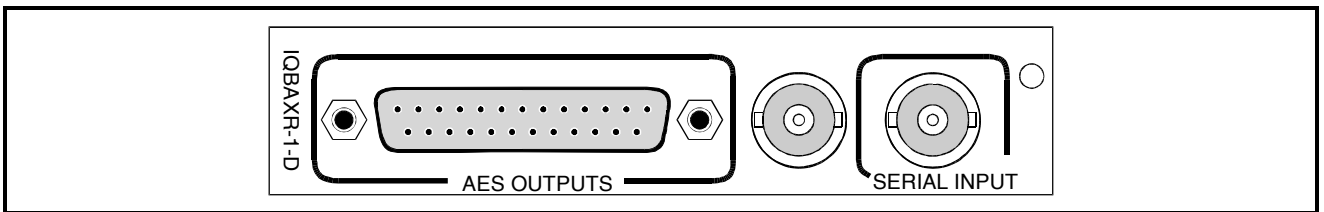
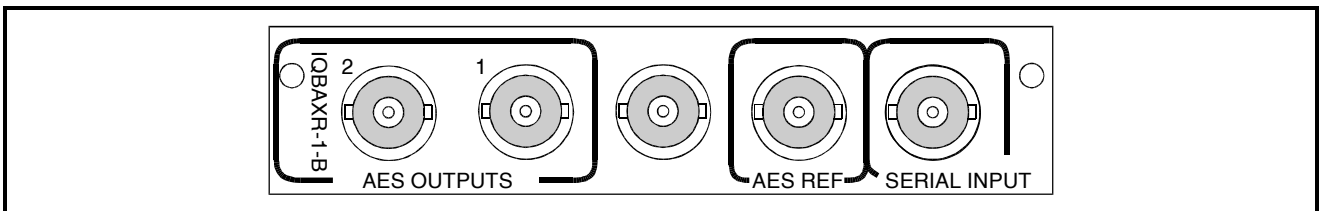


Module Description

The IQBAXR examines the SDI video input and reports EDH errors and audio data presence. It extracts up to two stereo pairs from the SDI video stream and re-assigns, deletes, or strips existing embedded audio data. Control may be by card edge controls or via the RollCall™ remote control system and status LED's indicate the correct

extraction of the selected audio channels. Four cards may be cascaded to extract all 16 AES/EBU channels. Each of the AES audio output channels may be independently assigned to any of the embedded stereo pairs. In this way the card can be configured to provide multiple outputs of the same stereo pair

REAR PANEL VIEWS



Versions of the module cards available are:

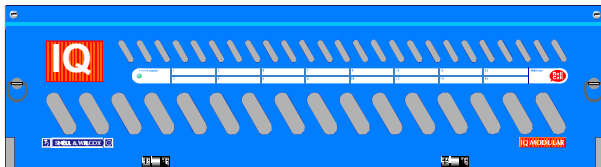
IQBAXR-1-D	Single width module with D-type connector
IQBAXR-1-B	Single width module with BNC connectors
IQBAXR-1A-D	Single width module with D-type connector
IQBAXR-1A-B	Single width module with BNC connectors

Note that this product is no longer available.

Note that there are two styles of rear panels available. They are not interchangeable between the two styles of enclosures. However, the cards may be fitted into any style of enclosure.

'A' Style Enclosure

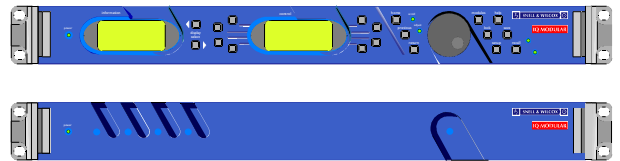
Rear panels **with** the suffix A may only be fitted into the 'A' style enclosure shown below.



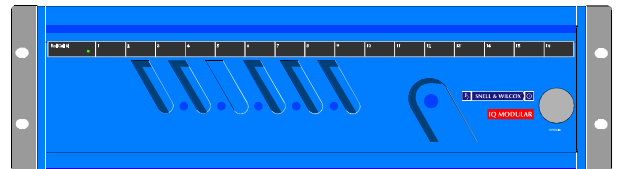
(Enclosure order codes IQH3A-E-O, IQH3A-E-P, IQH3A-N-O, IQH3A-N-P)

'O' Style Enclosures

Rear panels **without** the suffix A may only be fitted into the 'O' style enclosures shown below.



(Enclosure order codes IQH1S-RC-O, IQH1S-RC-AP, IQH1U-RC-O, IQH1U-RC-AP, Kudos Plus Products)

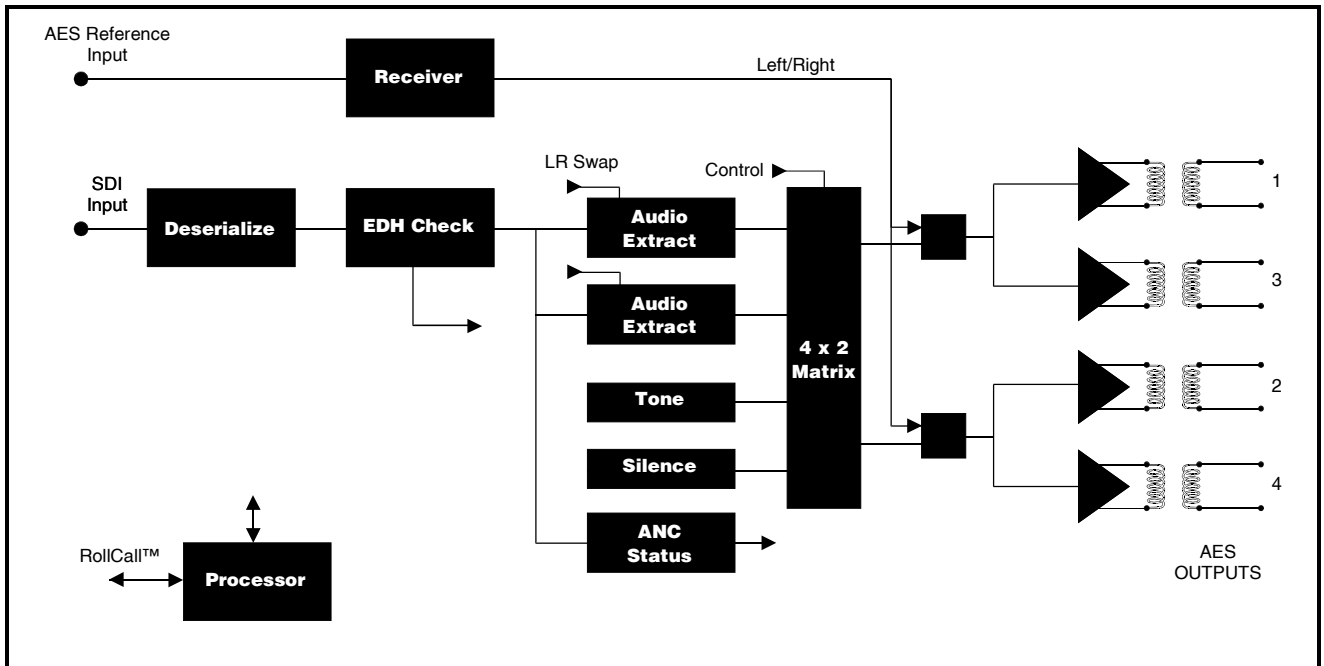


(Enclosure order codes IQH3N-O, IQH3N-P)



(Enclosure order codes IQH3U-RC-O, IQH3U-RC-P)

BLOCK DIAGRAM



Features

- 2 x 2 independently assignable digital AES stereo-pair outputs
- Output may be synchronized to an external AES reference signal (48 kHz only)
- Automatic 525 and 625 line operation
- EDH checking and reinsertion to SMPTE RP165
- Test-tone/silence output capability

TECHNICAL PROFILE

Features**Signal Inputs**

Digital..... 1 Serial Digital 4:2:2
AES Audio 1 AES Reference (48 kHz only)
Standards SMPTE 259M-C-1997, SMPTE
272M-A-1994

Signal Outputs

AES Audio 2 x 2 AES/EBU pairs Balanced
2 AES/EBU pairs Unbalanced
Standards AES3-1992

Specifications

Serial Input Return Loss..... Better than 20 dB to 270 MHz
Serial Input Receive length >200 m
AES Audio Reference Input Typically 1 V pk to pk unbalanced
into 75 Ohms (48 kHz only)
AES Audio Outputs Typically 3 V pk to pk into
110 Ohms
(Transformer Balanced) via 25 way
'D' connector)
Audio Delay 1.0 ms
Video Delay <0.01 μ s
Sampling 48 kHz synchronous to D1 video stream only

Power Consumption

Module Power Consumption
4.9W max

INPUTS

Serial Digital Video Input

The serial digital input to the unit is made via this BNC connector which terminates in 75 Ohms.



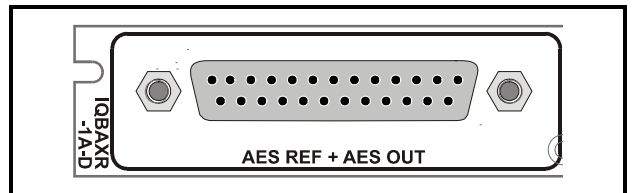
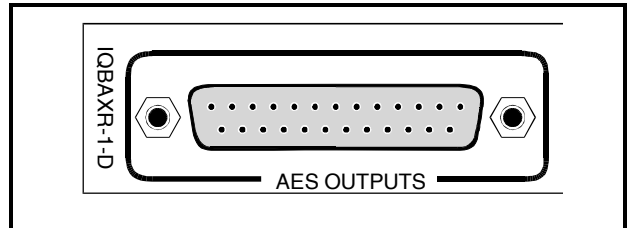
OUTPUTS

AES Outputs (-1-D versions)

AES audio connections are made via this 25 way female D-type connector. There are 4 balanced AES outputs and an unbalanced AES reference input.

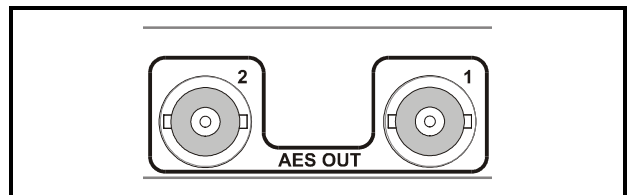
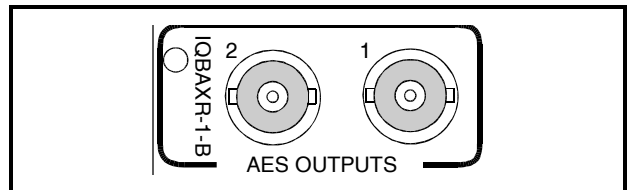
If a suitable AES reference signal is present the digital outputs will be frame-synchronised to this signal. (48 kHz only)

For connection data consult the tables on page 5.



AES Outputs (-1-B versions)

Two AES outputs are available via BNC connectors.



AES REF (Reference Input) (-1-B versions)

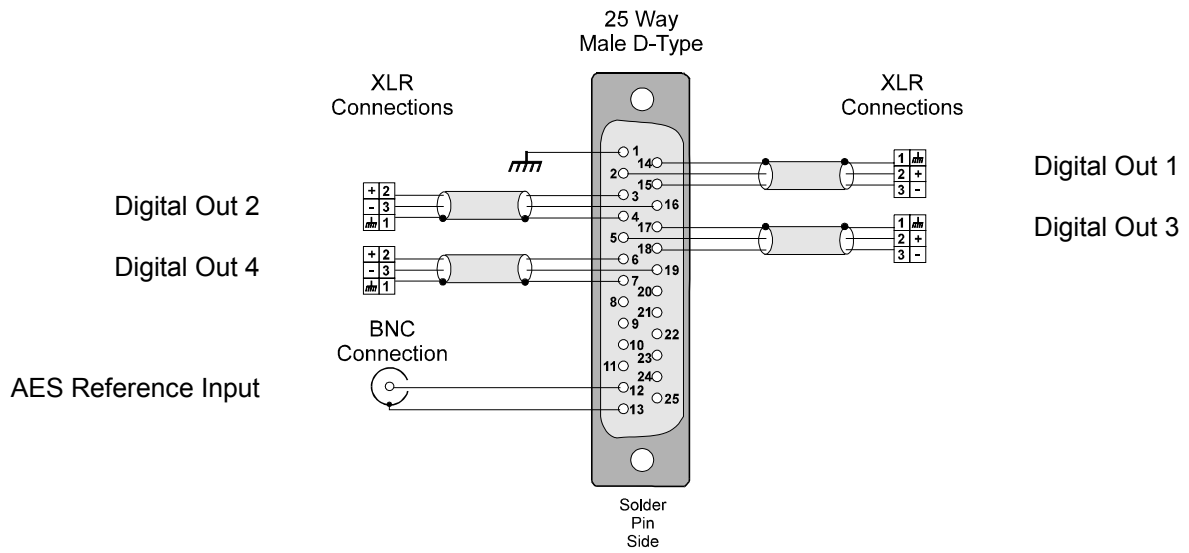
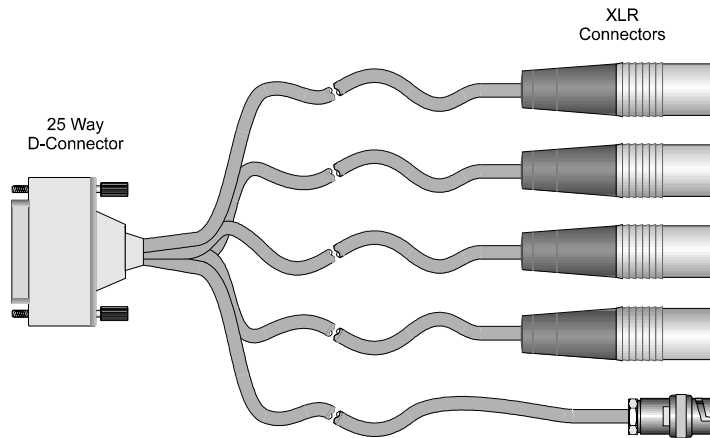
If a suitable AES reference signal is present at this connector the digital outputs will be frame-synchronised to this signal. (48 kHz only)



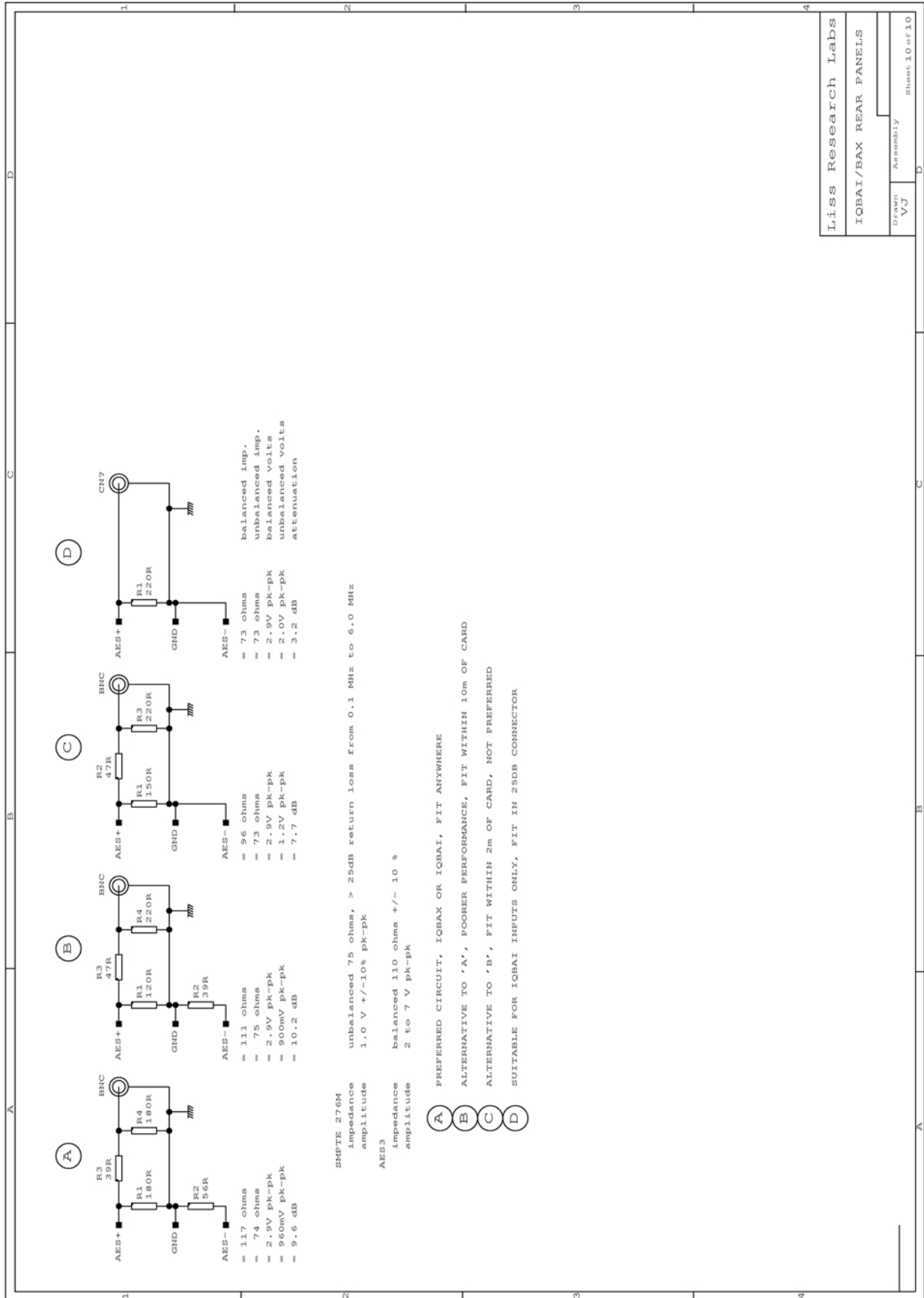
Connection Details

25 Way D Connector Pin Number	Description	Ribbon Cable Strand Number	Standard Pin Assignment
1	Chassis	1	CHASSIS
14	AES 1 GND	2	GND1
2	AES OUT 1 +	3	1+
15	AES OUT 1 -	4	1-
3	AES OUT 2 +	5	2+
16	AES OUT 2 -	6	2-
4	AES 2 GND	7	GND2
17	AES 3 GND	8	GND3
5	AES OUT 3 +	9	3+
18	AES OUT 3 -	10	3-
6	AES OUT 4 +	11	4+
19	AES OUT 4 -	12	4-
7	AES 4 GND	13	GND4 (CH)
20		14	GND5
8		15	5+
21		16	5-
9		17	6+
22		18	6-
10		19	GND6
23		20	GND7
11		21	7+
24		22	7-
12	AES Reference IN	23	8+
25		24	8-
13	AES Reference GND	25	GND8

Connection Details to XLR Connectors

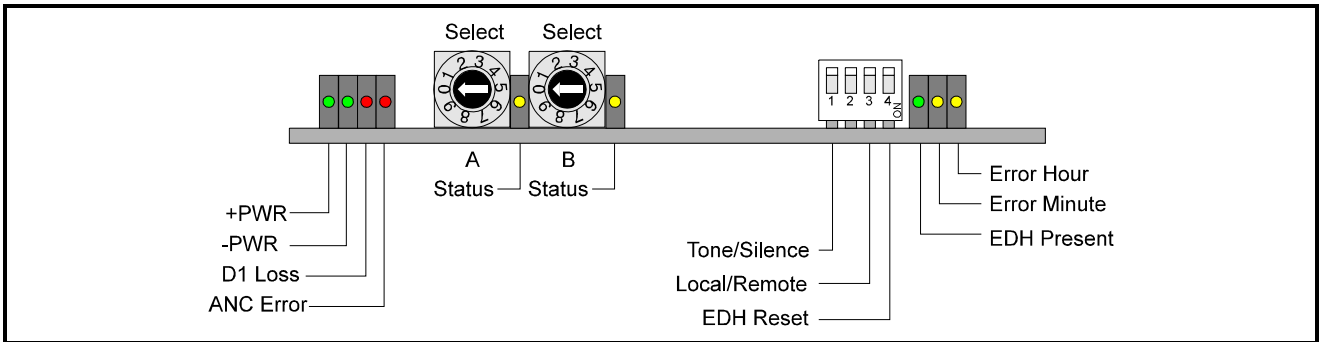


RESISTIVE IMPEDANCE MATCHING FOR CONVERTING BETWEEN 110 OHM AND 75 OHM



Liss Research Labs	
IQBAI/BAX REAR PANELS	
Drawn VJ	Assembly Sheet 10 of 10

CARD EDGE CONTROLS



Note that the unit will respond to both local and remote control, one system overriding the settings of the other. For cards using the RollCall™ remote control system, activating these switches will override the remote control settings. The RollCall™ control panel will then follow these settings.

Note that in Main-frames where RollCall™ is not available the DIL switch position 3, located at the front of the card, should be set to the UP (OFF) position. This ensures that when the unit is powered-up the factory default settings of parameters not available as card edge adjustments, are loaded. With the switch in the DOWN (ON) position the card will power-up with the last settings stored in the non-volatile memory.

LED INDICATORS

Power

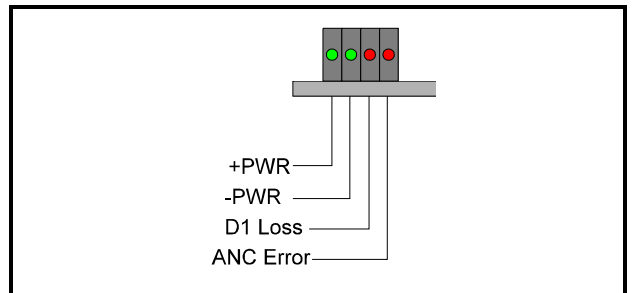
These two PWR indicators are illuminated when the positive and negative supplies are present.

D1 Loss

This LED will become illuminated when there is no D1 input.

ANC ERROR

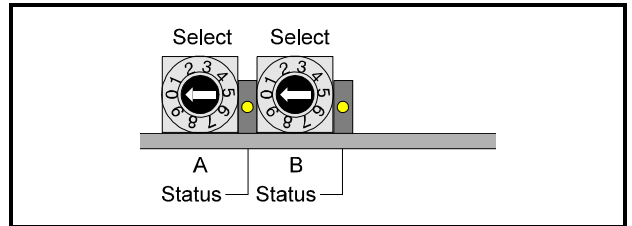
This LED will become illuminated for a short interval each time a checksum error is detected in the embedded ancillary data packets.



STATUS LED's

These LED's will

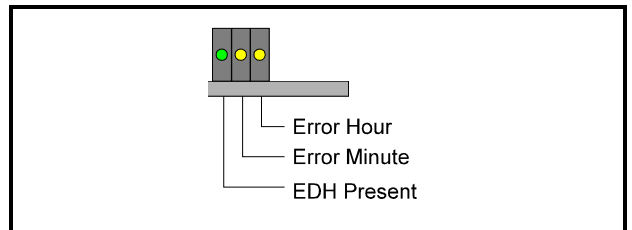
1. **Become illuminated** when Tone/Silence is selected
2. **Flash** if extraction has failed (output tone/silence)
3. **Will not be illuminated** if extraction is successful



EDH PRESENT / ERROR

This LED will become illuminated if the input D1 video has embedded EDH data.

This LED will also briefly blink off whenever the EDH checksum errors are detected.



EDH MINUTE / HOUR

These LED's provide the EDH error minute & hour history indicating occurrence of errors within their respective time periods.

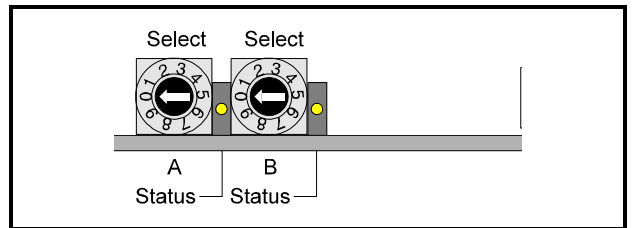
These LED's will remain OFF if no errors have occurred within their time period, or if the incoming D1 video does not contain EDH data.

BCD SELECT SWITCHES

These switches select which embedded channel or tone/silence is to be output.

Settings are as follows:

- 1 to 8 select stereo pair for extraction
- 1 group 1, pair 1/2
- 2 group 1, pair 3/4
- 3 group 2, pair 1/2
- 4 group 2, pair 3/4
- 5 group 3, pair 1/2
- 6 group 3, pair 3/4
- 7 group 4, pair 1/2
- 8 group 4, pair 3/4
- 9 test-tone
- 0 silence

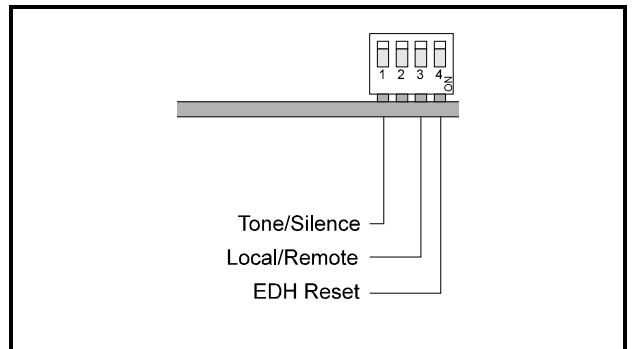


4-WAY DIP SWITCH

Setting to the DOWN (ON) position enables the function.

TONE / SILENCE

Selects tone (down) or silence (up) This will become the output if an extraction is unsuccessful.



REMOTE / LOCAL

Selects *RollCall*™ control, or local operation of the card

UP= local DOWN = remote

In **remote** mode the card will use settings saved in the non-volatile memory and follow *RollCall*™ commands.

In **local** mode the card will follow its switch settings on power-up, *RollCall*™ control can still override the settings.

EDH RESET

When enabled this will clear EDH error history.

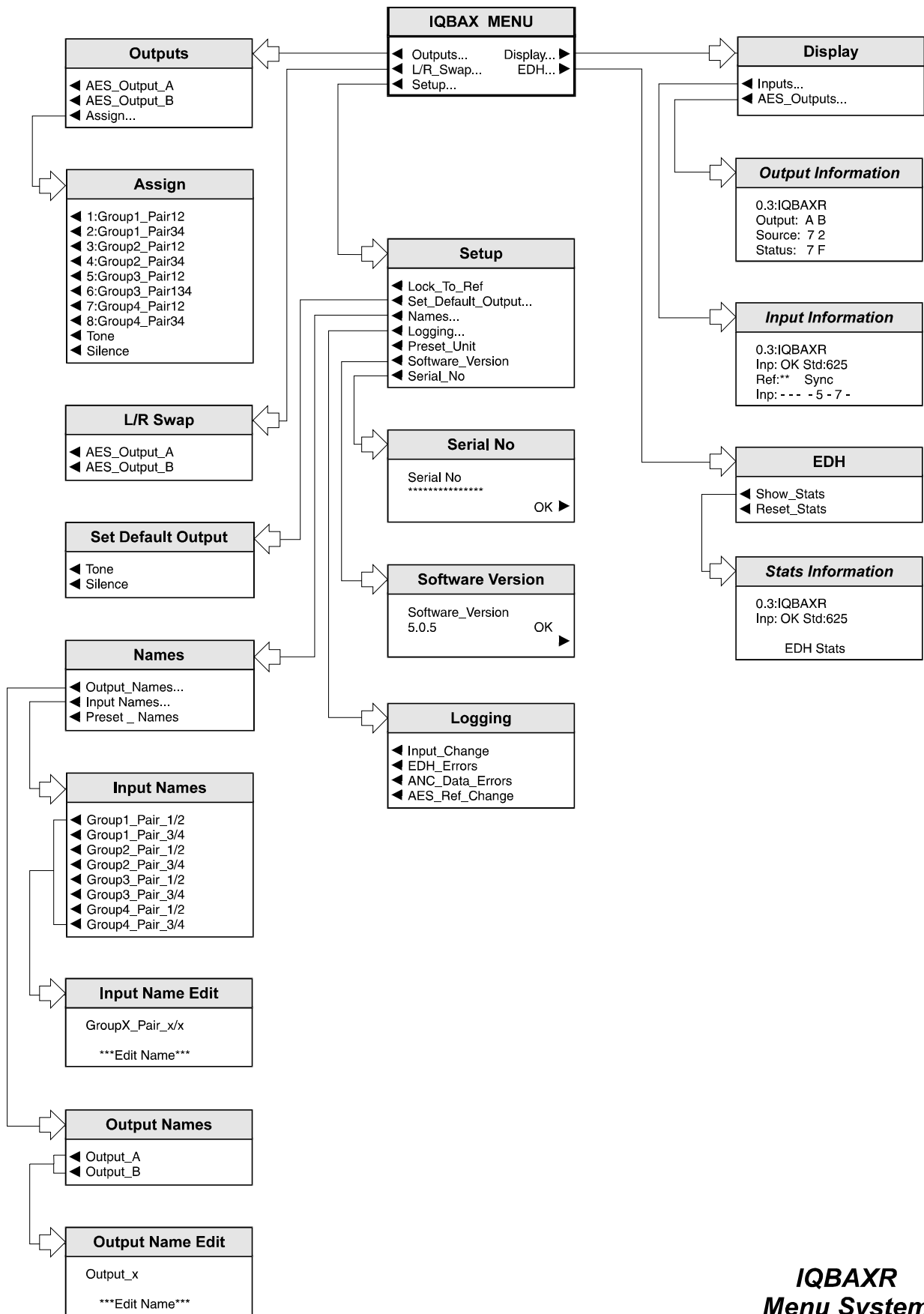
SMPTE 272M SUPPORT

The cards conform to SMPTE 272M-A

- A synchronous audio at 48 kHz; 20-bit audio data packets

The cards do not support SMPTE 272M-B,C,D,E,F,G,H,I,J

- B synchronous audio for composite video
- C 48 kHz synchronous, with audio & extended data packets
- D asynchronous audio
- E 44.1 kHz audio
- F 32 kHz audio
- G 32 kHz to 48 kHz continuous sampling rate range
- H audio frame sequence
- I time delay tracking (monitor only)
- J non-coincident 'Z' bits in a channel pair



***IQBAXR
Menu System***

OPERATION FROM AN ACTIVE CONTROL PANEL

The card may be operated with an active control panel via the RollCall™ network.

The menus available for this card are shown on page opposite and will appear in the Control display window.

Operational details for the remote control panel will be found in SECTION 1 of the Modular System Operator's Manual.

MENU DETAILS

(see IQ Menu System Opposite)

MAIN MENU

The main, or top level menu allows various sub-menus to be selected by pressing the button adjacent to the required text line.

Note that where a menu item is followed by three dots (...) this indicates that a further sub-menu may be selected.

Whenever a menu item is selected the parameters of that selection will be displayed in the Information window of the front panel. Where the selection is purely a mode selection and does not enable a sub-menu, the text will become reversed (white-on-black) indicating that the mode is active. If the mode is not available for selection the text will remain normal.

Outputs

The digital outputs are independently controlled. They can be set to any of the eight possible embedded audio addresses, or can be fixed to an internally generated test signal (tone or silence).

This menu allows either the AES_Output_A or AES_Output_B to be selected.

The assign item may then be selected which allows the output to be assigned to a group (1 or 2) and pair 1,2 or 3,4 or tone/silence.

The factory setting for the AES outputs are:

"AES_Output_A"	Group 1 channel-pair 12
"AES_Output_B"	Group 1 channel-pair 34

and the factory default names are:

Group 1, channels 1 & 2:	"Group1_Pair12"
Group 1, channels 3 & 4:	"Group1_Pair34"
Group 2, channels 1 & 2:	"Group2_Pair12"
Group 2, channels 3 & 4:	"Group2_Pair34"
Group 3, channels 1 & 2:	"Group3_Pair12"
Group 3, channels 3 & 4:	"Group3_Pair34"
Group 4, channels 1 & 2:	"Group4_Pair12"
Group 4, channels 3 & 4:	"Group4_Pair34"

L/R_Swap

Each digital output consists of two interleaved channels. These may be positionally swapped for both AES_Output_A and AES_Output_B independently.

Set-up**Lock_To_Ref**

The AES outputs from the IQBAXR extractor are mutually synchronised, in that their sample frames are co-timed.

If a suitable AES reference signal is present the digital outputs can be frame-synchronised to this signal by activating this function.

Factory setting is enabled.

Set_Default_Output

The AES outputs are always active. In the event of an extraction failure (due to there being no data at the targeted address) an internally generated signal of either **tone** or **silence** may be selected as the output.

Factory setting is silence.

Names

Default names are given to the AES outputs and the possible embedded inputs which are little more than relative descriptions. These names may be edited to provide more meaningful information related to the equipment installation.

To edit a name select either

Output_Names

or

Input_Names

or

Preset_Names (returns to default names)

Selecting **Input Names** will reveal a menu that allows an input location to be selected i.e.

Group 1, channels 1 & 2:	"Group1_Pair12"
Group 1, channels 3 & 4:	"Group1_Pair34"
Group 2, channels 1 & 2:	"Group2_Pair12"
Group 2, channels 3 & 4:	"Group2_Pair34"
Group 3, channels 1 & 2:	"Group3_Pair12"
Group 3, channels 3 & 4:	"Group3_Pair34"
Group 4, channels 1 & 2:	"Group4_Pair12"
Group 4, channels 3 & 4:	"Group4_Pair34"

Select the desired location (this will reveal an editing window) and edit the name using the spinwheel/push buttons.

Selecting **Output Names** will reveal a menu that allows an output location to be selected i.e.

Output_A

or

Output_B

Select the desired output (this will reveal an editing window) and edit the name using the spinwheel/push buttons.

Logging

If a logging device is attached to the RollCall™ network, information about various parameters will be reported to the logging device assigned in the Remote Control Interface system. (See Section 1, The RCIF Menu System)

The logging sub-menu allows the following information to be made available for logging:

Input_Change

EDH_Errors

ANC_Data_Errors

AES_Ref_Change

Factory preset is nothing enabled.

Preset_Unit

Selecting this item sets all adjustment functions that include a preset facility, to their preset values. Note that this is a momentary action and the text will not become reversed

Software Version

Selecting this item reveals a display showing the version of the software fitted in the module. Select OK to return to the System Menu.

Serial Number

Selecting this item reveals a display showing the serial number of the module. Select OK to return to the System Menu.

Display

The status of the reference input, the embedded data on the input D1 stream (select **Inputs**), and the extractor outputs (select **AES_Outputs**) may be monitored here.

The menu allows this information to be displayed in the LCD window.

EDH

The input D1 stream is continuously monitored for EDH errors. Basic information on this can be monitored and/or reset here.

The following functions may be selected:

Show_Stats	The information will be displayed in the LCD window
Reset_Stats	Data will be reset

Extractor Operation

The SMPTE 272M standard specification allows for up to four groups of digital audio to be embedded in a component D1 digital video stream.

Each group consists of two stereo pairs (four channels), giving a total of sixteen audio channels for all four groups.

A single IQBAXR module is capable of extracting one group of audio data (two stereo pairs, or four channels) so four IQBAXR cards are required to extract all sixteen possible channels.

The embedded AES audio data must be sampled at 48 KHz, clock synchronous to the video stream. Asynchronous operation is not supported.

The IQBAXR module contains two independent extractors, each one assignable to any of the 8 possible embedded audio pairs. If both extractors are set to the same address they both will output that extracted pair. Additionally, any output can provide an AES test tone (1 KHz, -20 dB) or 'digital silence'.

A total of exactly 1920 audio samples occur within one frame of 625-line video. For 525-line video the relationship is 8008 audio samples over five video frames.

The audio data is usually distributed evenly throughout each video frame, situated in the non-active picture regions between the end of one line and the start of the next. The majority of lines contain three audio samples, some four, and certain reserved lines may contain no samples. Other sample counts are also possible.

These differences in sample count between lines mean that some FIFO buffering is required to supply output audio samples during lines containing no samples, and to absorb the excess from lines with several.

An audio extractor should be able to process ancillary packets where ever and whenever they appear. However, there are usually practical and operational limitations such as the finite length of the extractor FIFO buffer, and the length of the audio delay introduced by the buffering process.

IQBAXR FIFO Buffer Length :

A FIFO buffer requires that before any samples are read out a minimum number must be written in. This number determines the latency (delay) and implies limitations on the embedded sample distribution. So-called 'smart buffers' make assumptions about the distribution of audio samples within the video frame and so can utilise smaller FIFOs. The 24-bit sample distribution given in SMPTE-272M for example requires a 'smart buffer' length of 57 samples with a read-write offset of 17 samples. A simple buffer however needs to be 80 samples long with 40 samples offset. In both cases the buffers can handle a maximum change in usage of 40 samples but the 'smart' buffer knows when this happens and so can use less memory and have a lower latency.

For any known sample distribution the required buffer capacity can be calculated. The simple buffer needs to be twice this in length.

SMPTE-272M, 24-bit example	40 samples
Panasonic D5 VTR, 625 lines	6 samples
Sony Digital Betacam, DVW-500P	5 samples
S&W IQBAI / BAIR inserter modules	14 samples
Tektronix TSG-422	7 samples
S&W MDD-3000 digital decoder	7 samples

The simple circular buffer employed in the IQBAXR is 192 samples long with a read-write offset of 48 samples (one millisecond delay), and can therefore accommodate a wide range of sample distributions.

