

IQBAX D1 AES/EBU Audio Data Extractor

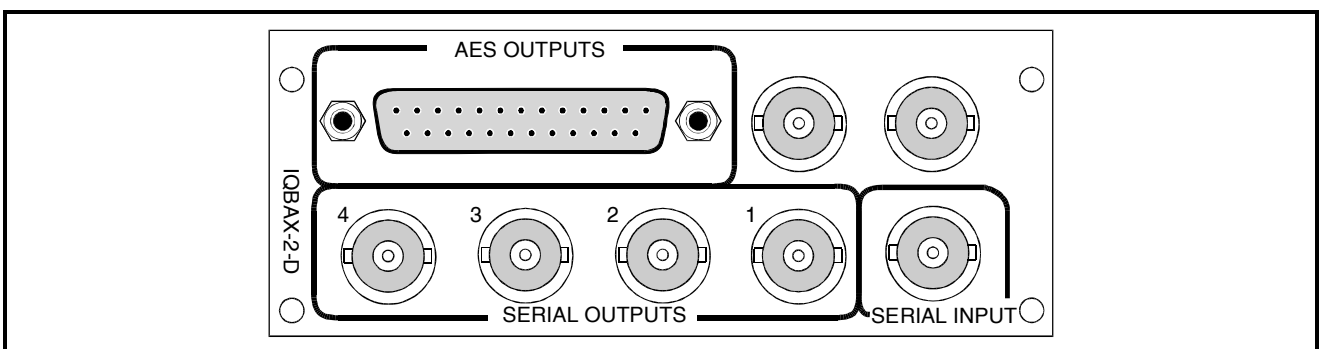
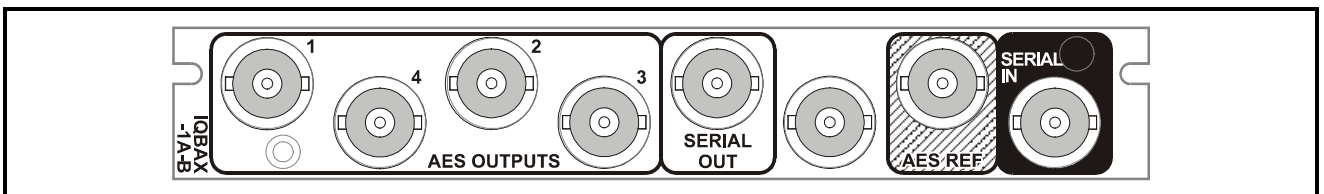
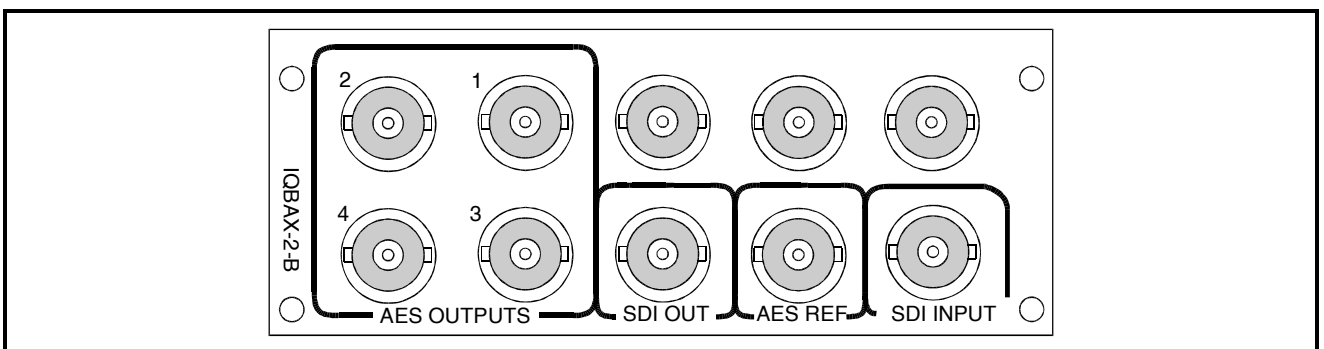


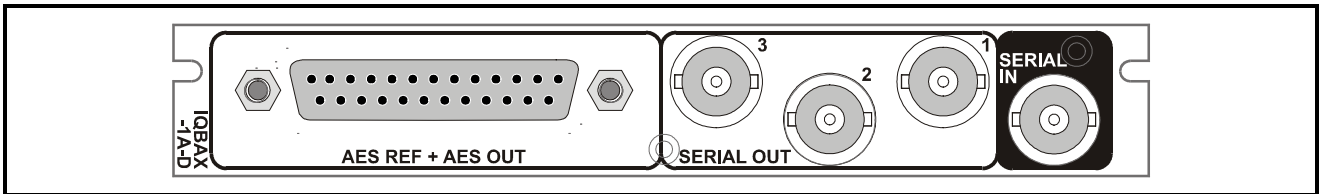
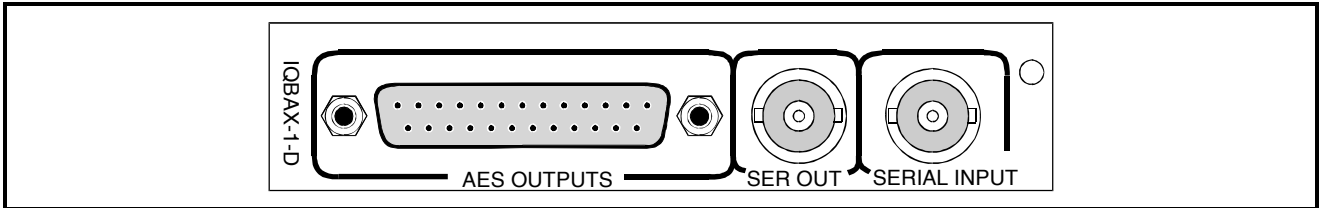
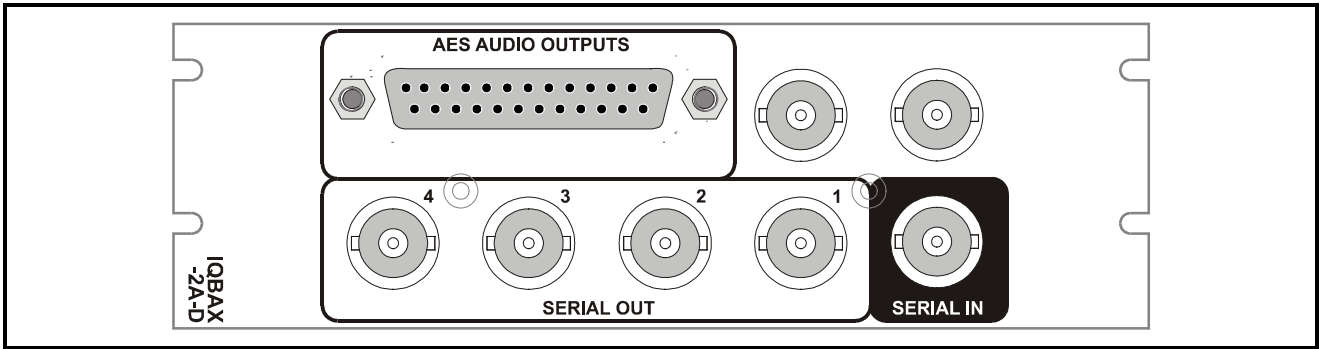
Module Description

The IQBAX examines the SDI video input and reports EDH errors and audio data presence. It extracts up to four 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. Two 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. SDI video outputs provide regenerated copies of the input SDI video stream and EDH checking & checksum re-insertion is to SMPTE RP 165

REAR PANEL VIEWS





Versions of the module cards available are:

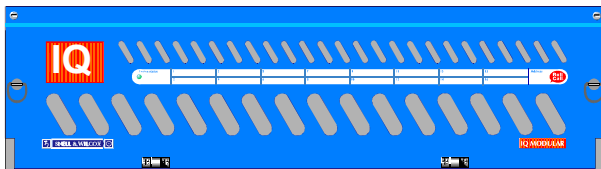
IQBAX-2-D	4 Balanced AES Outputs, 4 Serial Digital Outputs	Double width module
IQBAX-2A-D	4 Balanced AES Outputs, 4 Serial Digital Outputs	Double width module
IQBAX-2-B	4 Unbalanced AES Outputs, 1 Serial Digital Output	Double width module
IQBAX-1A-B	4 Unbalanced AES Outputs, 1 Serial Digital Output	Double width module
IQBAX-1-D	4 Balanced AES Outputs, 1 Serial Digital Output	Single width module
IQBAX-1A-D	4 Balanced AES Outputs, 3 Serial Digital Output	Single width module

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

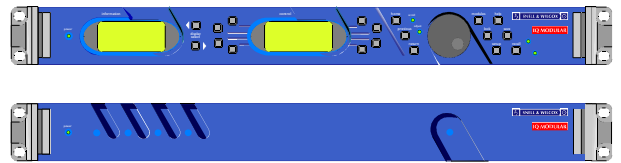
Rear panels **with** the suffix A may only be fitted into the 'A' style enclosure shown below.



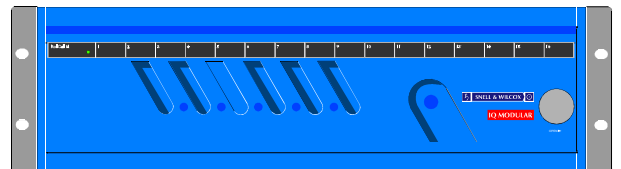
(Enclosure order codes IQH3A-E-0, IQH3A-E-P, IQH3A-0-0, IQH3A-0-P)

'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-0, IQH1S-RC-AP, IQH1U-RC-0, IQH1U-RC-AP, Kudos Plus Products)

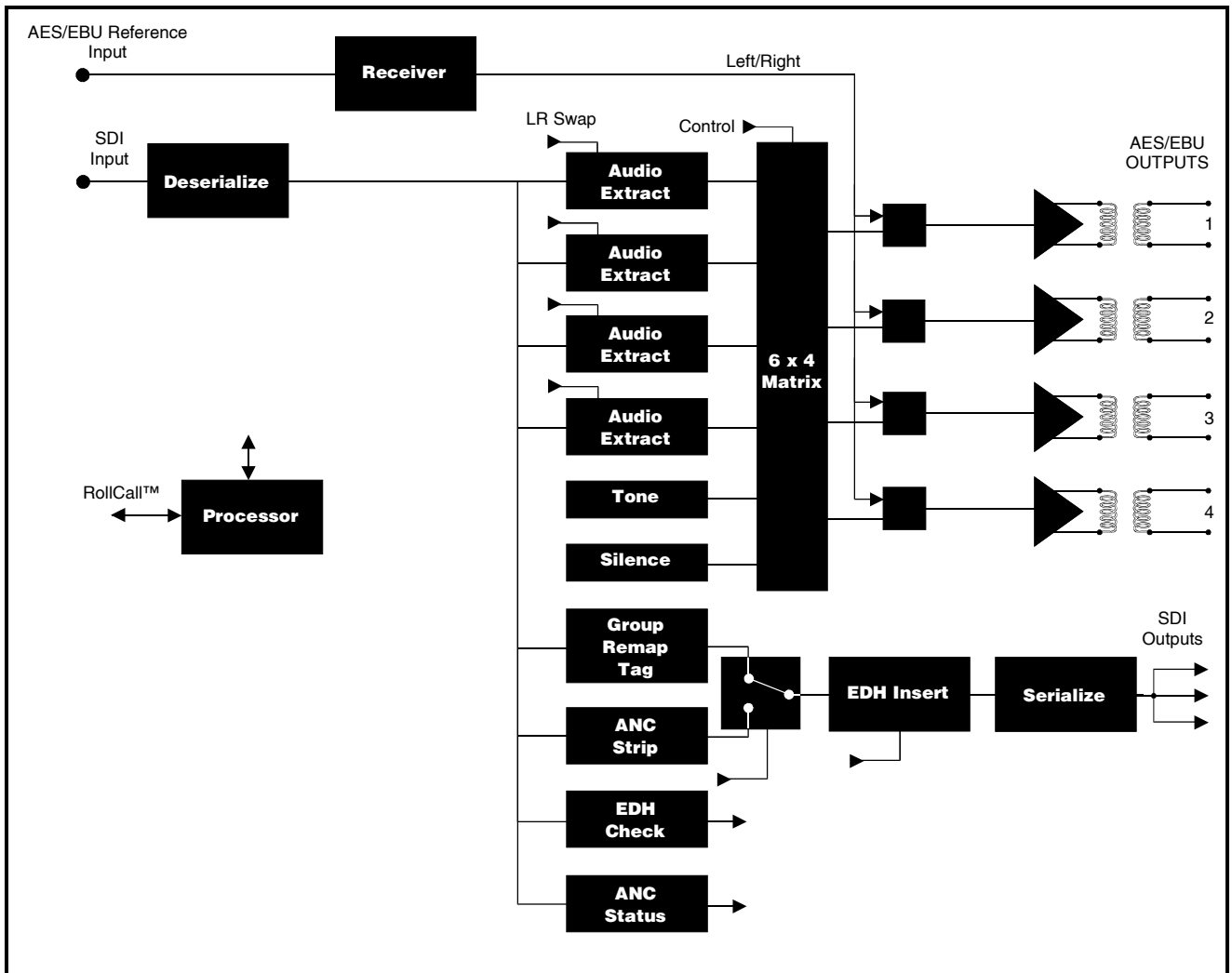


(Enclosure order codes IQH3N-0, IQH3N-P)



(Enclosure order codes IQH3U-RC-0, IQH3U-RC-P)

BLOCK DIAGRAM



Features

- Four independently assignable digital AES stereo pair outputs
- Up to three regenerated serial 4:2:2 outputs
- Automatic 525 and 625 line operation
- EDH checking and reinsertion to SMPTE RP165
- Ancillary space strip option
- Audio group remapping/deletion
- AES reference input
- Test-tone/silence output capability

TECHNICAL PROFILE

Features**Signal Inputs**

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

Signal Outputs

Digital..... Up to 3 Serial Outputs
 AES Audio 4 pairs (8 channels)
 Standards SMPTE 259M-C-1997, SMPTE
 272M-A-1994, 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)
 Serial Output Return Loss.. Better than 20 dB to 270 MHz
 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 0.75 μ s
 Sampling..... 48 kHz synchronous to D1 video
 stream

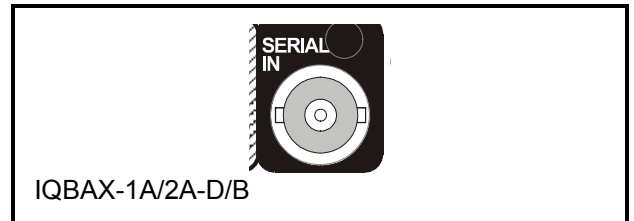
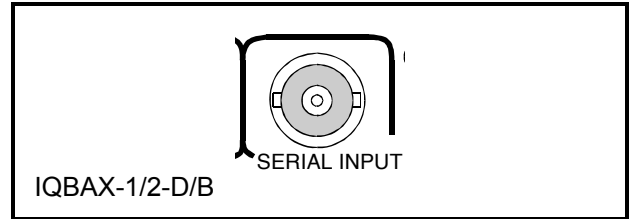
Power Consumption

Module Power Consumption
 7.2 W max

INPUTS

Serial Digital Video Input

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

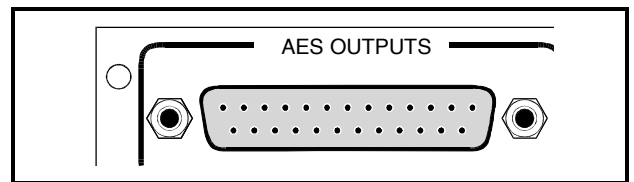
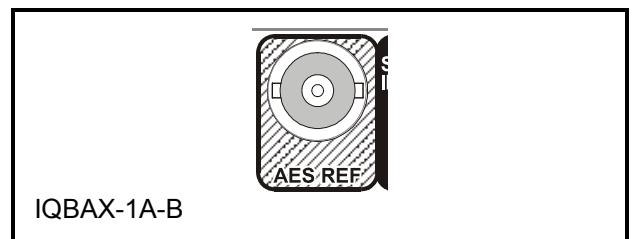


AES Reference Input

The unbalanced AES reference input connection is made via the 25 way female D-type connector on – D versions and via a 75 Ohm BNC connector on – B versions.

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 6.



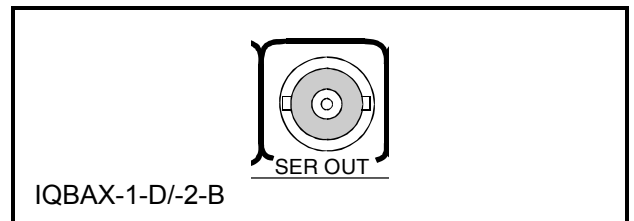
OUTPUTS

AES Audio Outputs

AES audio output connections are made via the 25 way female D-type connector. There are 4 balanced AES outputs available.

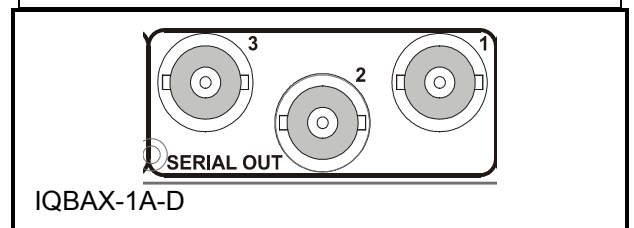
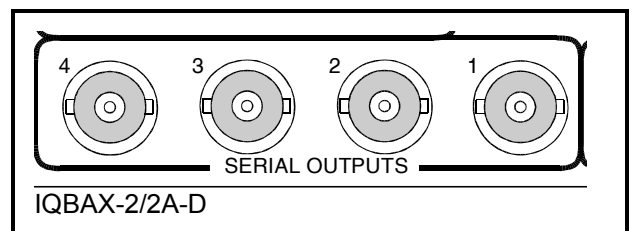
If a suitable AES reference signal is present the digital outputs will be frame-synchronised to this signal. (48 kHz only).

For connection data consult the tables on page 6.



Serial Digital Video

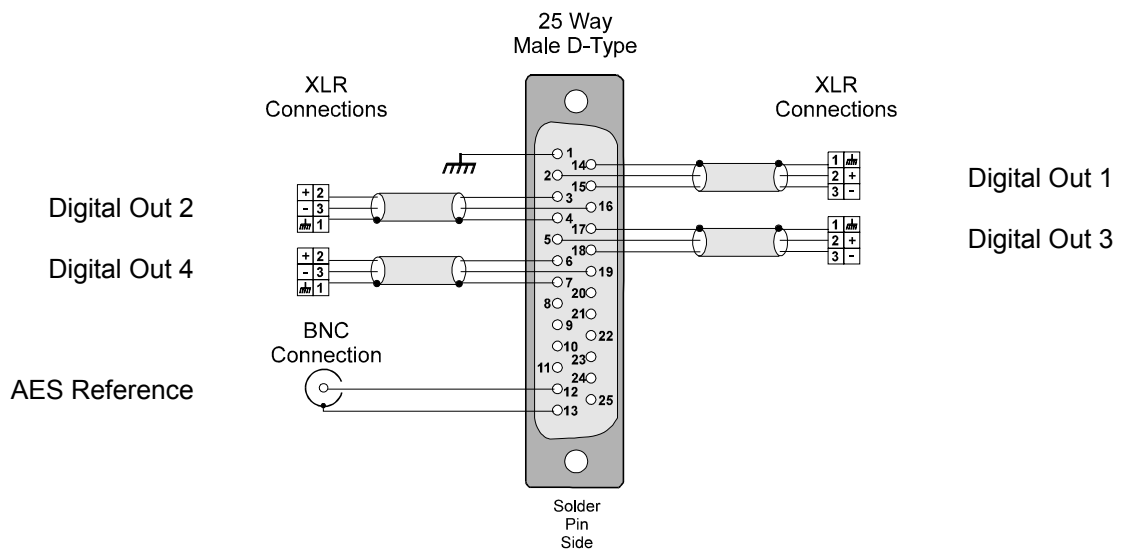
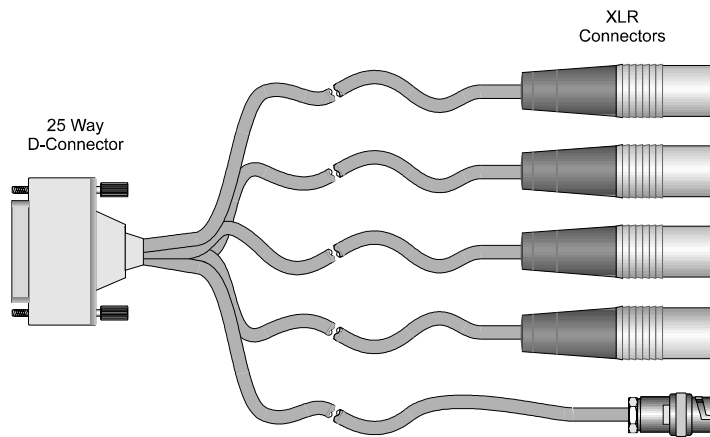
These are the four (-2 version) or one (-1 version) isolated Serial Digital outputs of the unit via BNC connectors for 75 Ohms.



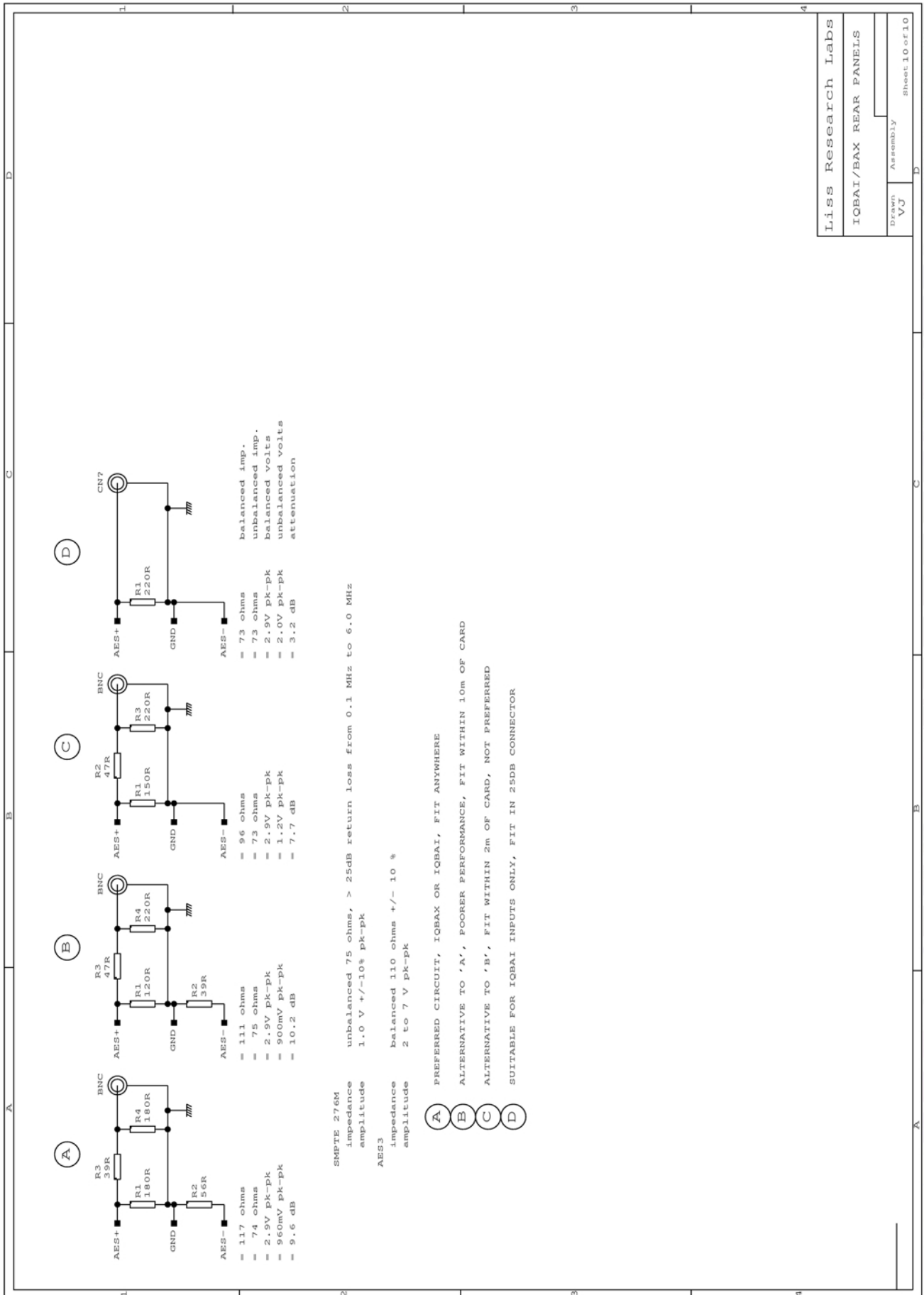
Connection Details

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

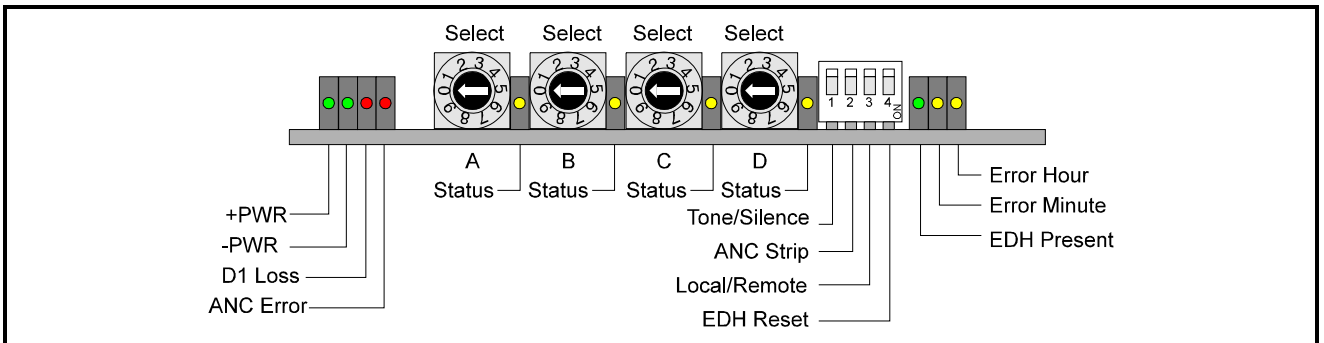


RESISTIVE IMPEDANCE MATCHING FOR CONVERTING BETWEEN 110 OHM AND 75 OHM



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 card should be set to the LOCAL position using the DIL switch (position 3 to OFF). This ensures that when the unit is powered-up the factory default settings of parameters not available as card edge adjustments, are loaded. When set to the REMOTE position the card will power-up with the last settings sent by the remote control panel.

LED INDICATORS

PWR (Power)

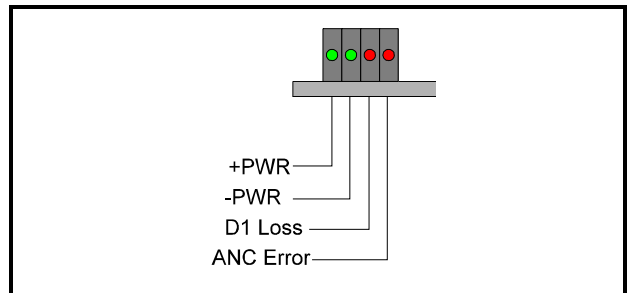
These two PWR indicators are illuminated when the positive and negative supplies are present.

D1 Loss

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

ANC ERROR

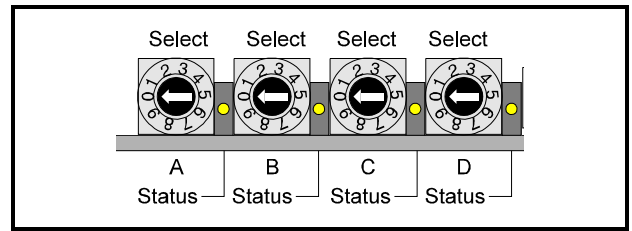
This LED has no function on this unit.



STATUS LED's

These LED's will

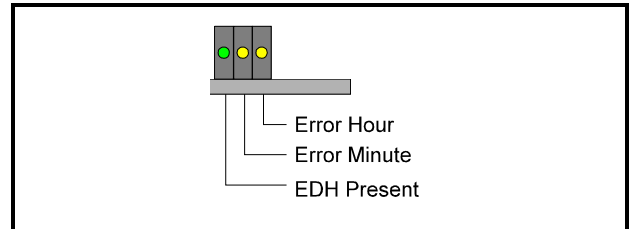
1. **Become illuminated** when either Tone or Silence is selected.
2. **Flash** if there is no AES at the selected address.
3. **Will not be illuminated** if the extractor channel is working.



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.

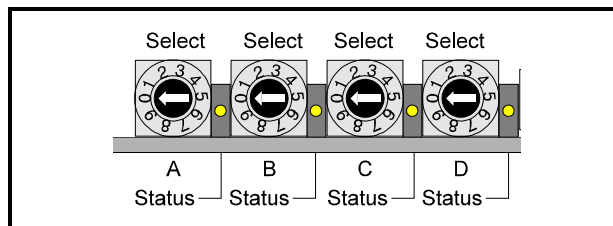
These LED's will remain OFF if no errors have occurred within their time period, or if the incoming D1 video does not contain EDH data.

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 Pair 1
- 2 Pair 2
- 3 Pair 3
- 4 Pair 4
- 5 Pair 5
- 6 Pair 6
- 7 Pair 7
- 8 Pair 8
- 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) for the output in the event of an extraction failure.

ANC STRIP

When enabled this function will cause all embedded ancillary data (except for EDH) to be wiped from the D1 outputs.

REMOTE / LOCAL

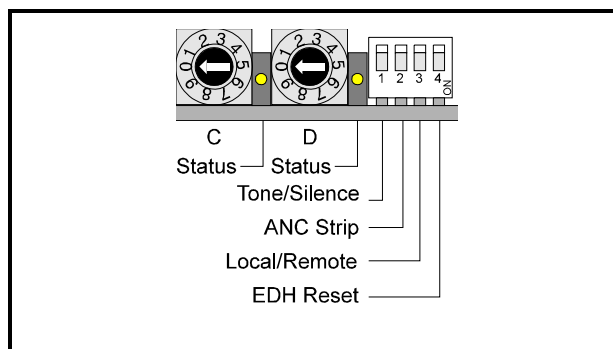
Selects RollCall control, or local operation of the card
 UP= local DOWN = remote

In **remote** mode all other switches are ignored and 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. Note that RollCall can still override the switch settings.

EDH RESET

When enabled this will clear EDH error history.



SMPTE 272M SUPPORT

The cards conform to SMPTE 272M-A

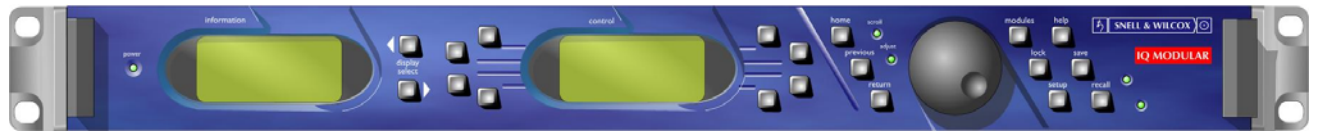
- A synchronous audio at 48 kHz; 20-bit audio data packets

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

Operation from an Active Control Panel

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

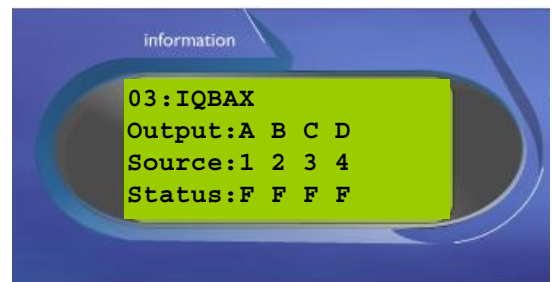


All operational parameters and selections are made using a system of menus displayed in two LCD windows.

Operational details for the remote control panel can be found in the Modular System Operator's Manual.

Information Window

The Information window has four lines of text indicating the current state of the unit.

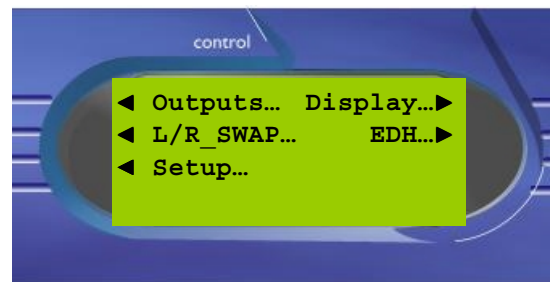


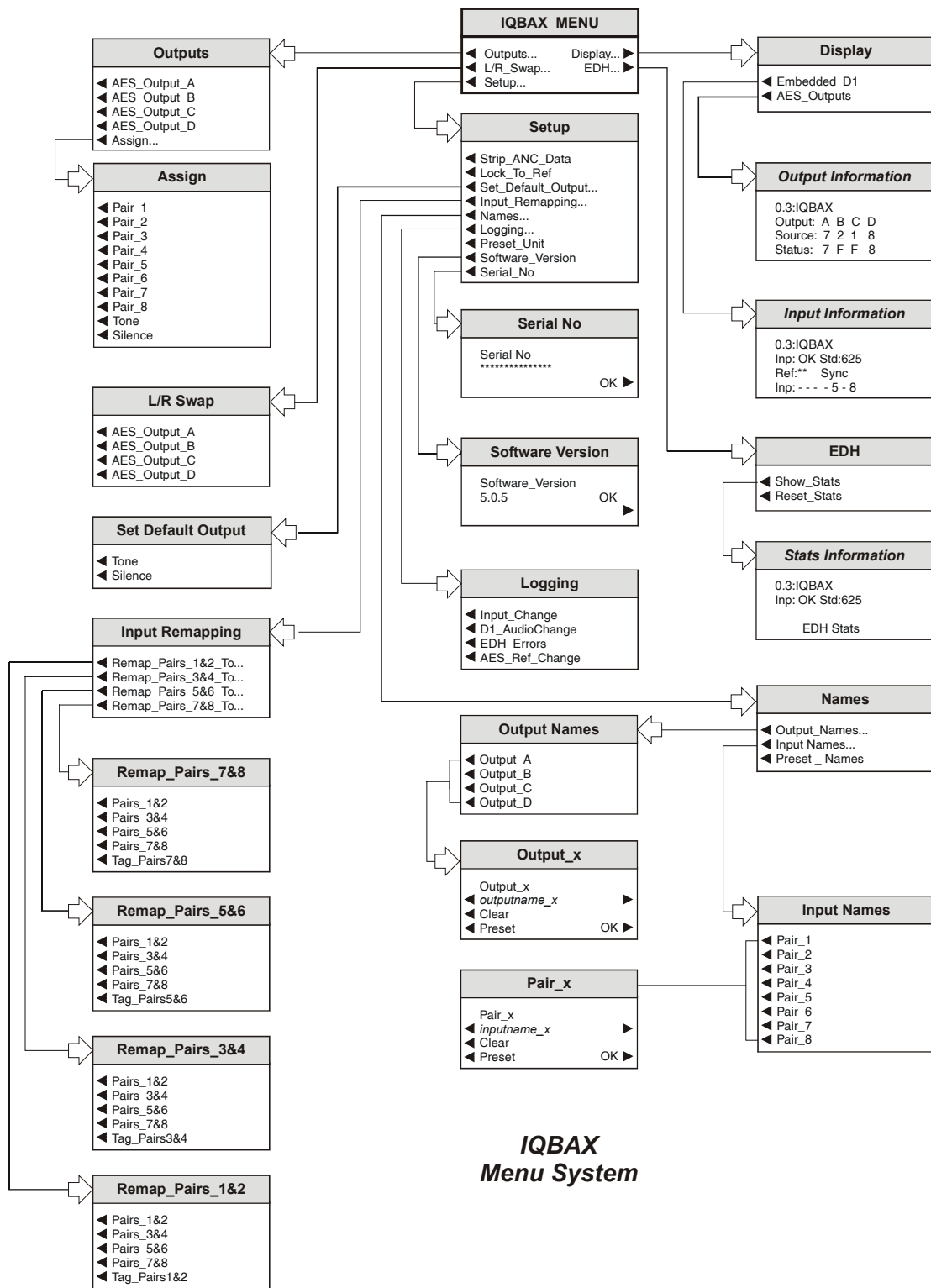
Control Window

The Control window displays all Selection Menus and sub-menus.

The selection is made by pressing the button adjacent to the required item.

The menu structure is detailed in the following pages.





**IQBAX
Menu System**

MENU DETAILS

(see IQBAX Menu System Opposite)

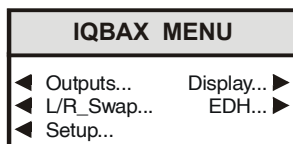
MAIN MENU

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.

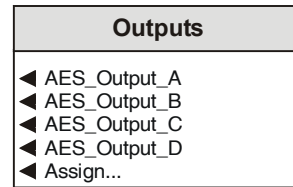
Whenever a menu item is selected the parameters of that selection will be displayed in the Information window of the front panel. Where the selection is purely a mode selection and does not enable a sub-menu, the text will become reversed (white-on-black) indicating that the mode is active. If the mode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

TOP LEVEL MENU



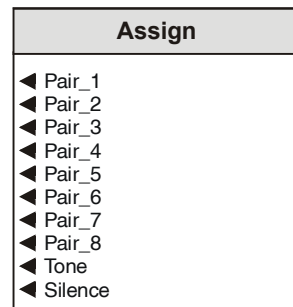
◀ Outputs

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 each of the outputs to be selected.

The **◀ Assign** item may then be selected which allows the output to be assigned to a pair or to tone/silence.



The factory settings for the AES outputs and names for the embedded addresses are as shown above.

◀ **L/R_Swap**

Each digital output consists of two interleaved channels. By selecting the item they may be positionally swapped.

L/R Swap
◀ AES_Output_A
◀ AES_Output_B
◀ AES_Output_C
◀ AES_Output_D

◀ **Setup**

Setup
◀ Strip_ANC_Data
◀ Lock_To_Ref
◀ Set_Default_Output...
◀ Input_Remapping...
◀ Names...
◀ Logging...
◀ Preset_Unit
◀ Software_Version
◀ Serial_No

◀ **Stri_ANC_Data**

When set (text highlighted) this 'toggle' function will result in the stripping of all embedded ancillary data on the input D1 stream.

◀ **Lock_To_Ref**

The AES outputs from the IQBAX 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 it by activating this function.

Factory setting is enabled.

◀ **Set_Default_Output**

Set Default Output
◀ Tone
◀ Silence

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 to be the output.

Factory setting is silence.

◀ **Input_Remapping**

Embedded data cannot be destroyed accidentally, but if it is required that an inserter embed audio at an occupied address the data already present can be either moved to another address or deleted. The IQBAX Extractor can only perform this function by discrete audio data groups (1 group = 2 stereo-pairs).

Input Remapping
◀ Remap_Pairs_1&2_To...
◀ Remap_Pairs_3&4_To...
◀ Remap_Pairs_5&6_To...
◀ Remap_Pairs_7&8_To...

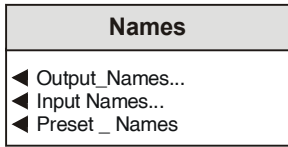
This function reveals sub-menus that allow the remapping to be carried out by selecting items from the list.

Remap_Pairs_7&8
◀ Pairs_1&2
◀ Pairs_3&4
◀ Pairs_5&6
◀ Pairs_7&8
◀ Tag_Pairs7&8

The factory preset settings are as shown above.

◀ **Names**

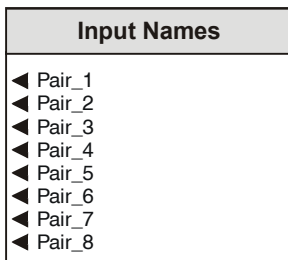
Default names are given to the AES outputs and the possible embedded inputs which are little more than relative descriptions. These names may be edited to provide more meaningful information related to the equipment installation.



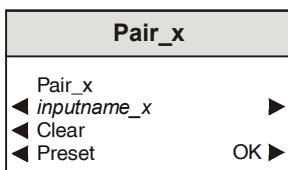
To edit a name select either

- ◀ 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.

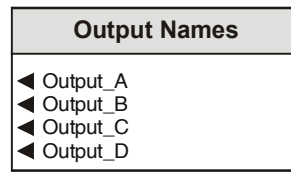


Select the desired location (this will reveal an editing window) and edit the name using the spinwheel/push buttons.

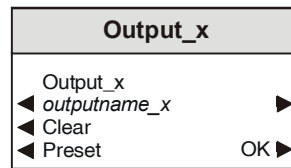


◀ **Output Names**

This will reveal a menu that allows an output location to be selected.

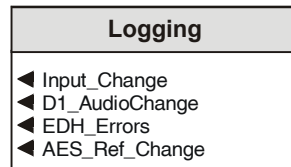


Select the desired output (this will reveal an editing window) and edit the name using the spinwheel/push buttons.



◀ **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.



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**

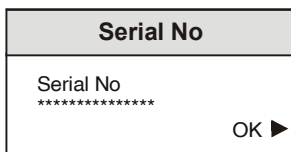
Selecting this item reveals a display showing the version of the software fitted in the module.



Select OK to return to the System Menu.

◀ **Serial Number**

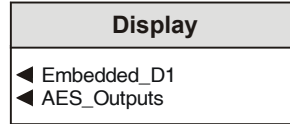
Selecting this item reveals a display showing the serial number of the module.



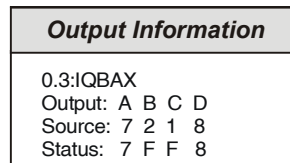
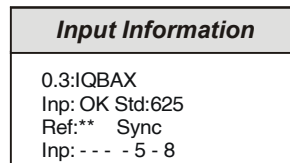
Select OK to return to the System Menu.

◀ **Display**

The status of the reference input, the embedded data on the input D1 stream (select ◀ **Embedded_D1**), and the extractor outputs (select **AES_Outputs**) may be monitored here.

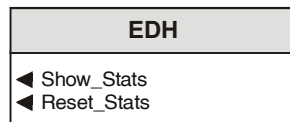


The menu allows this information to be displayed in the LCD window.



◀ **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** EDH data will be reset.

RollCall PC Control Panel Screens for the IQBAX

Mapping

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).

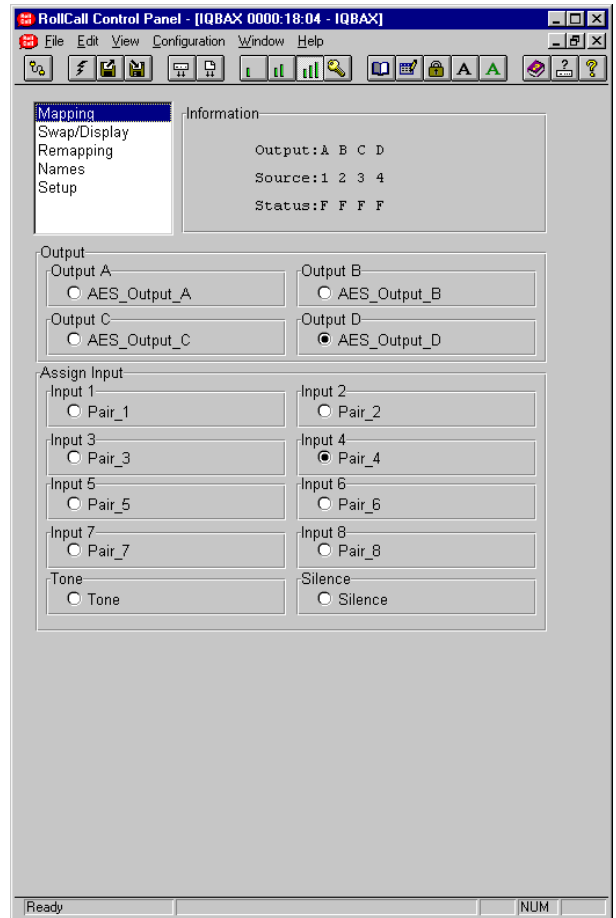
Output

This allows an output to be selected.

Assign Input

This allows the selected output to be assigned to an input pair (1 to 8) or to tone/silence.

The factory settings for the AES outputs and names for the embedded addresses are as shown on the screen opposite.



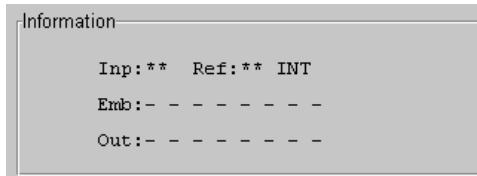
Swap/Display

Display

This allows the type of information shown in the Information window, to be selected.

Inputs

When selected information about the inputs will be displayed. (See screen opposite).



- Inp:** This will show the status of the input.
****** Indicates no valid input signal present.
OK Indicates valid input signal present.
- Ref:** This will show the status, standard and source of the reference signal.
****** Indicates that valid reference signal is not present.
625 or **525** indicate the standard of a valid reference signal.
INT indicates that the unit is not locked to an external reference signal.

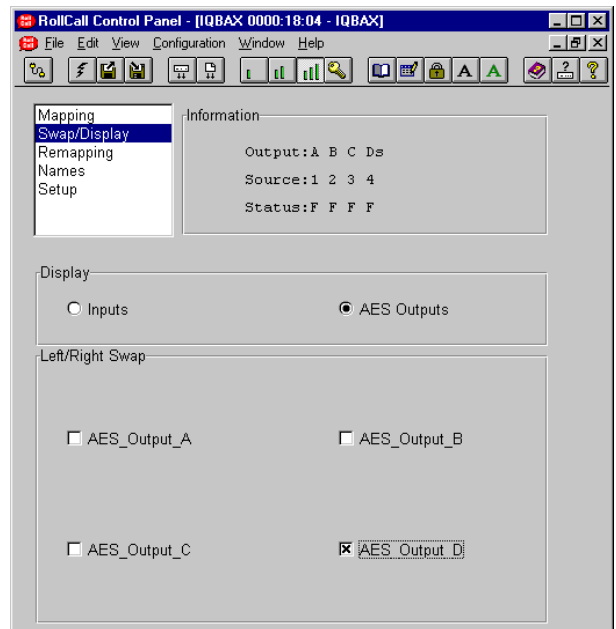
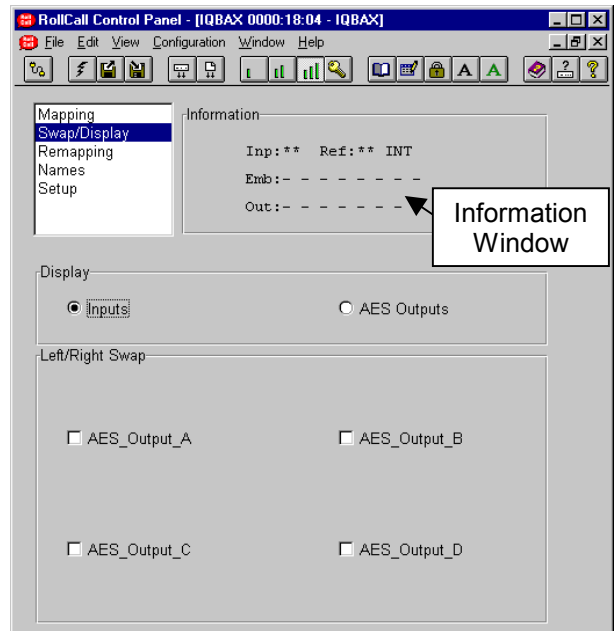
Emb: This lists the embedded input pairs.

Out: This shows the output mapping.

AES Outputs

When selected information about the AES outputs will be displayed. (See screen opposite).

- Output:** This lists the outputs. An **s** after the output letter indicates that the output has been swapped.
- Source:** This shows which pair has been extracted for the output.
- Status:** This shows the status of the extracted signal used for the output.
F indicates a failed extraction.
4 this number shows the pair that has been successfully extracted and used for the output.
S shows that silence has been selected for the output.
T shows that a Tone has been selected for the output.



Left/Right Swap

Each digital output consists of two interleaved channels. These may be positionally swapped for all outputs by checking the box.

*Note that if a channel has been swapped an **s** character will be inserted after the output letter in the information window (Ds in the example above).*

Remapping

Embedded data cannot be destroyed accidentally, but if it is required that an inserter embed audio at an occupied address the data already present can be either moved to another address or deleted. The IQBAX Extractor can only perform this function by discrete audio data groups (1 group = 2 stereo-pairs).

This function allows the remapping to be carried out by selecting items from the list.


The factory preset setting is as follows:


Remapping: one-to-one (group 1 to group 1, group 2 to group 2, etc.) Tagging (deletion): none.

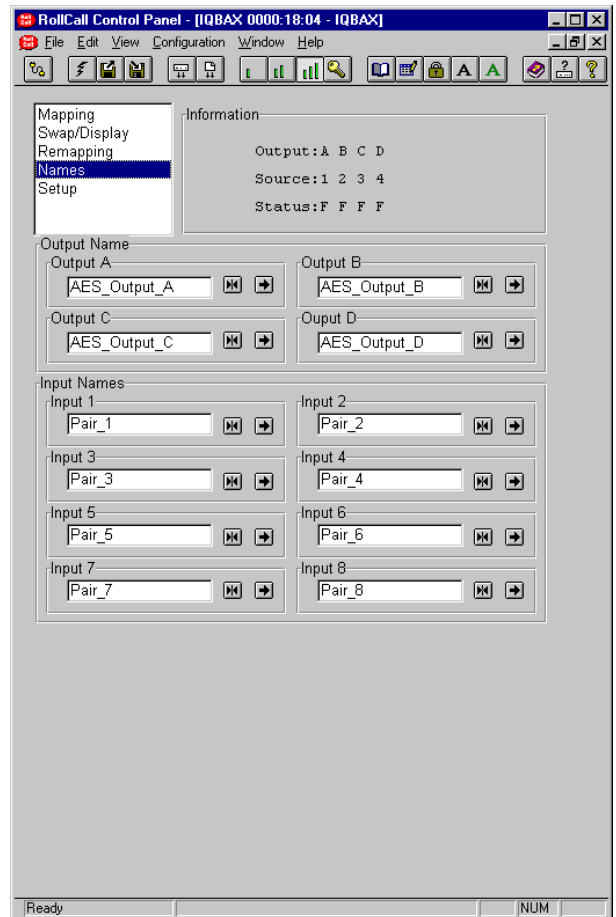


Names

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 change the text, type the new text in the text area and then select  (return).

Selecting Preset  will return the text to the default text (as shown opposite).



Setup

Preset Unit

Selecting this item sets all adjustment functions that include a preset facility, to their preset values.

Preset Names

Selecting this item will return the text of all namable items to the default names.

Logging

If a logging device is attached to the RollCall™ network, information about a checked parameter will be reported to the logging device assigned in the Remote Control Interface system.

Options

Lock to reference

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

If a suitable AES reference signal is present the digital outputs can be frame-synchronized to it by checking this function. Factory setting is enabled.

Strip ANC Data

When checked all embedded ancillary data on the input D1 stream will be stripped.

Software version

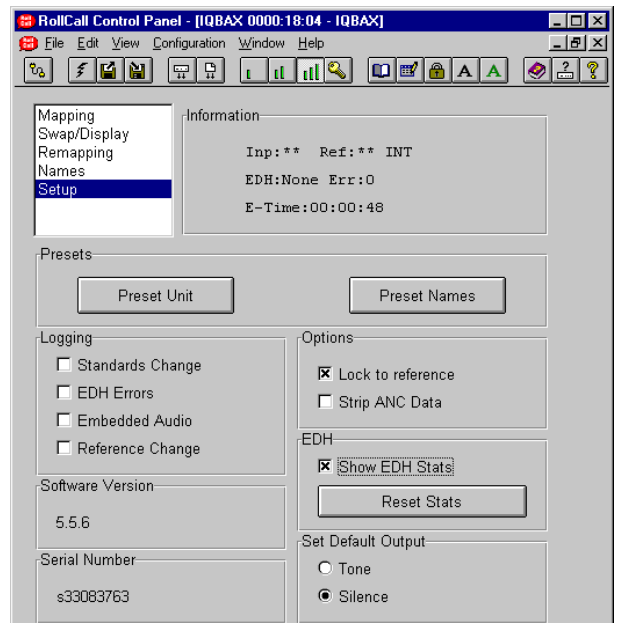
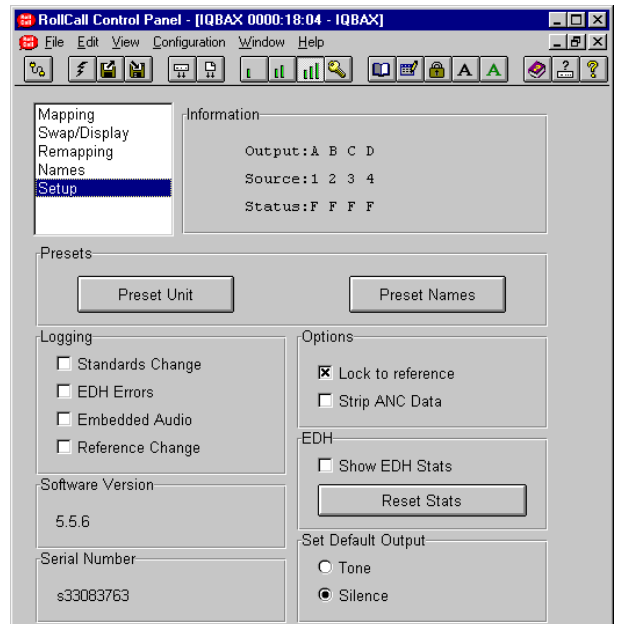
This item shows the version of the software fitted in the module.

Serial Number

This item shows the serial number of the module.

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 to be the output. Factory setting is to silence.



EDH

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

The following functions may be selected:

Show EDH Stats

When checked EDH statistics will be displayed in the information window

Reset Stats

When selected all EDH data will be reset to zero.

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 IQBAX module is capable of extracting four stereo pairs, or eight channels, so two IQBAX 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 IQBAX module contains four independent extractors, each one assignable to any of the possible embedded audio pairs. If any of the extractors are set to the same address they all 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.

IQBAX 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.

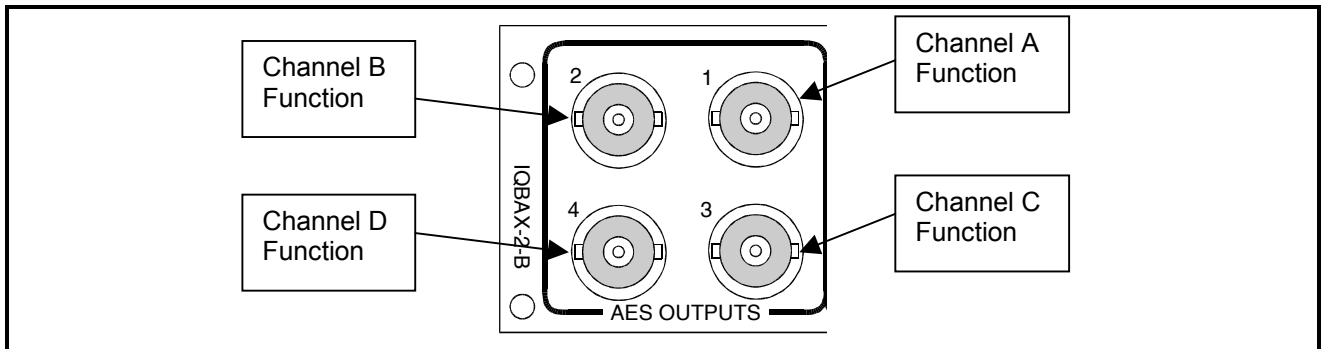
For any known sample distribution the required buffer capacity can be calculated. The simple buffer needs to be twice this in length

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 IQBAX 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.

Addendum

ALLOCATION OF OUTPUT CHANNEL NUMBERS



Note that regardless of the numbering of the BNC connectors on the rear panel of the -2-B version, the output channel allocations will be relative to the **physical position** of the BNC connectors, as shown above.

Manual Revision Record

Date	Version No.	Issue No.	Change	Comments
190897	1	1		First Issue
280302	1	2	Menu changes and now includes information for the 3A enclosure modules	New manual issued
010403	1	3	Power consumption added to techspec	New manual issued
230904	1	4	Updated. Corrections, templates added, new menus	New issue released
240205	1	5	Not available note added	New issue released