

# IQBADCD 4 Channel Audio A to D Converter with Delay



## Module Description

The IQBADCD converts two analog stereo pairs, or four analog mono channels into two AES/EBU digital audio streams. Each analog input is sampled at 48 kHz, 44.1 kHz or 32 kHz with 24-bit resolution. Sampling can be free-running, clock and audio frame locked to a reference AES/EBU digital input audio stream or video locked in accordance with AES11 recommended practice. Video standard is automatically determined The analog input may be set to terminate at 600 R or >10k Ohms and is factory set to accept +24 dBu It has a variable range of +18 dBu to +24 dBu (+18 dBu to +12 dBu with link fitted) for a full-scale digital output..

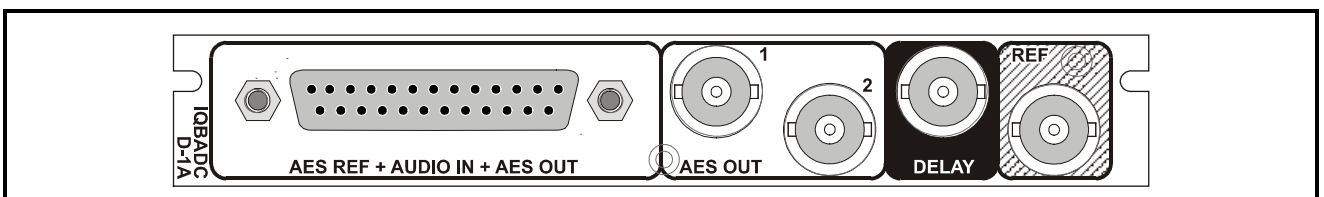
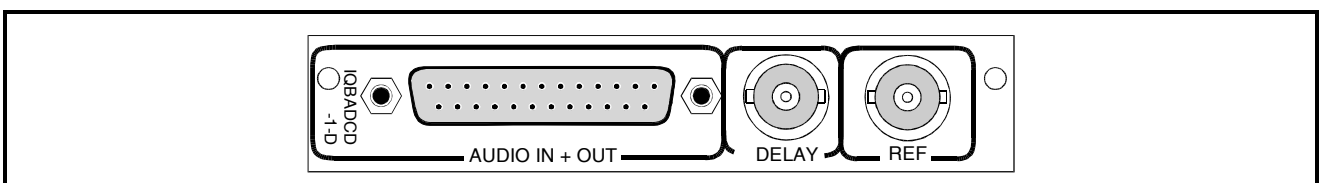
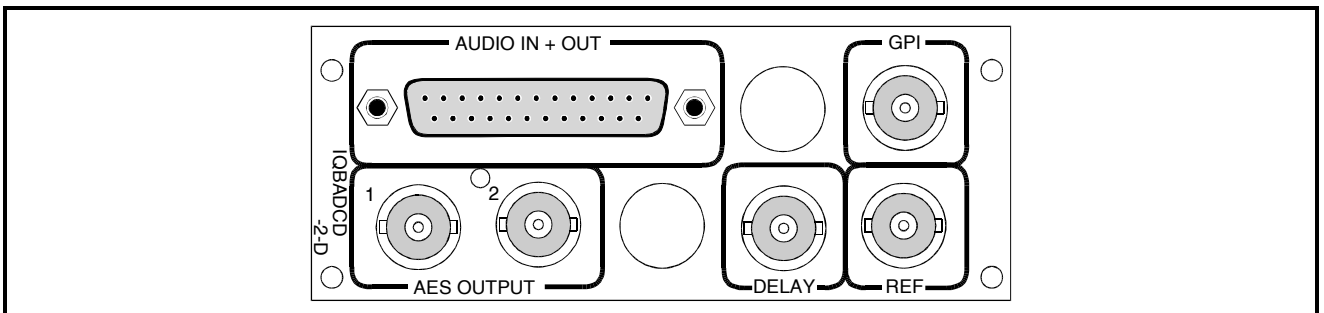
A delay of up to 450 ms may be inserted. Full remote control and monitoring is available via RollCall. Monitoring functions include reference presence indication, reference format and overflow warning.

A GPI input may be attached to any control function.

All analog audio connections are via a 25 D connector.

The AES/EBU outputs and reference are available in balanced ('D' (25D)) and unbalanced ('B' (BNC)) format on the same card

## REAR PANEL VIEWS



**This manual covers the following versions of the IQBADCD:**

IQBADCD-1 Dual Audio ADC with Delay. Balanced (2) outputs.

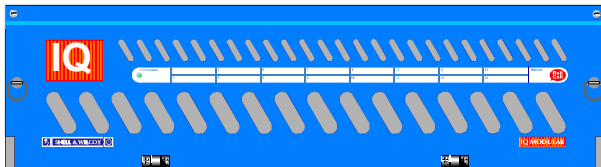
IQBADCD-1A Dual Audio ADC with Delay. Balanced (2) & Unbalanced (2) outputs.

IQBADCD-2A Dual Audio ADC with Delay. Balanced (2) & Unbalanced (2) outputs.

**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**

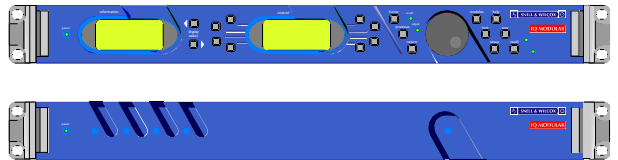
Rear panels **with** the suffix A may only be fitted into the 'A' style enclosure shown below.



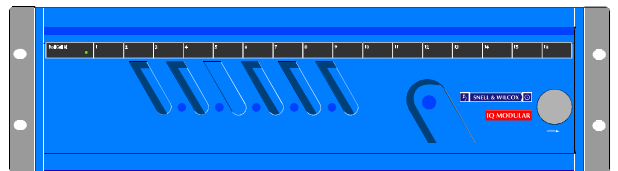
(Enclosure order codes IQH3A-E-0, IQH3A-E-P, IQH3A-0-0, IQH3A-0-P)

**'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)

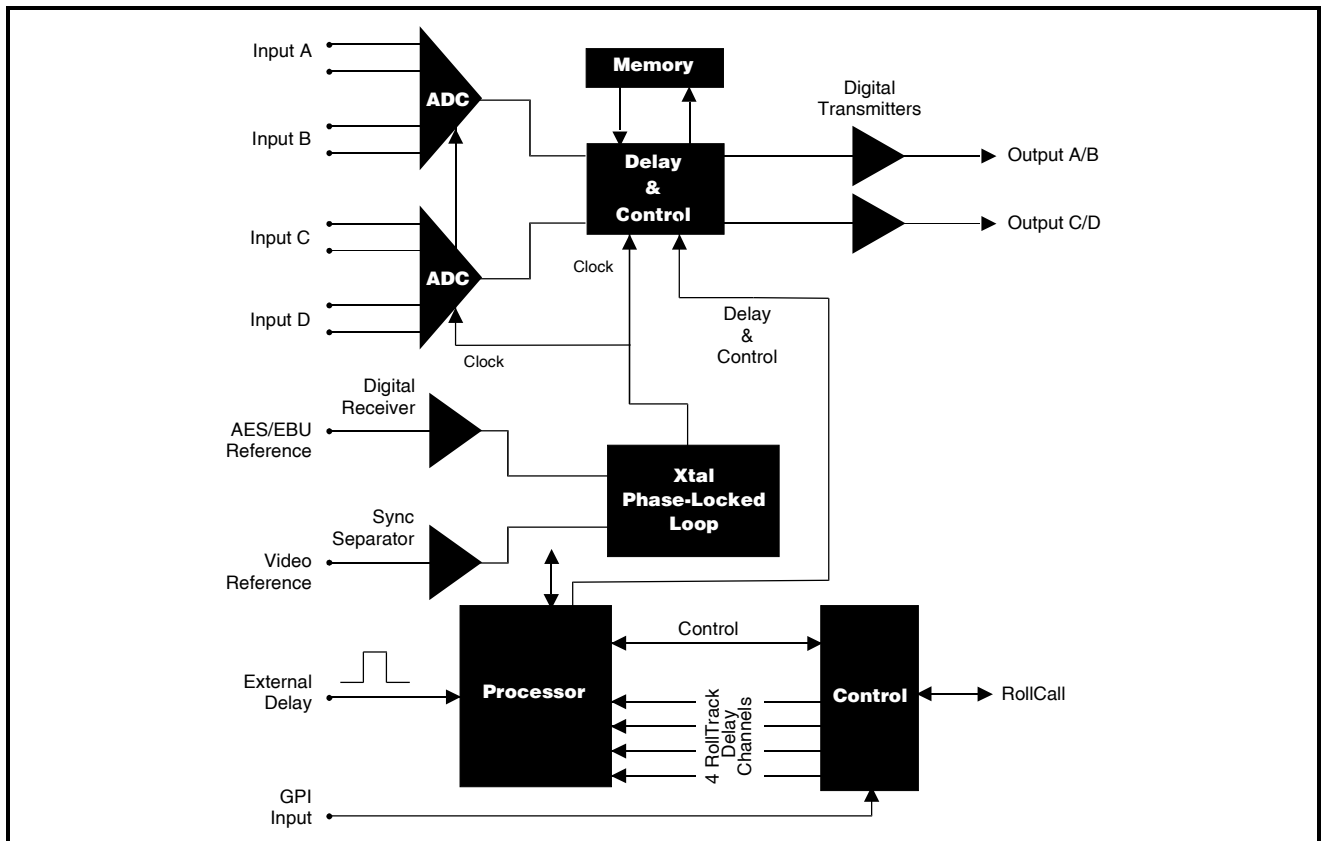


(Enclosure order codes IQH3N-0, IQH3N-P)



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

## BLOCK DIAGRAM



## Features

- Converts two stereo audio pairs into two digital audio streams
- 24-bit sampling resolution
- 48 kHz, 44.1 kHz and 32 kHz sampling frequencies
- Sampling can be free-running, or locked to an AES/EBU reference or video
- Input headroom adjustable +12 to +24 dBu
- Delay of up to 450 ms, adjustable in 1 ms steps
- Overflow indication
- Balanced and Unbalanced AES/EBU versions
- GPI inputs programmable to any control function
- RollCall control and monitoring

## TECHNICAL PROFILE

## Features

**Signal Inputs**

Analog Input .....	4 Channels (2 Pairs)
Analog Video Reference ....	Black Burst via BNC
Digital Audio Reference .....	48 kHz AES/ EBU Balanced via 25 way D
Digital Audio Reference .....	48 kHz AES/ EBU Unbalanced via BNC
Delay .....	TTL Signal via BNC
GPI .....	TTL Signal via BNC (-2 Version)

**Signal Outputs**

Digital Audio 1 .....	1 x AES/EBU output Balanced via 25 way D 1 x AES/EBU output Unbalanced via BNC (-2/-1A Versions)
Digital Audio 2 .....	1 x AES/EBU output Balanced via 25 way D 1 x AES/EBU output Unbalanced via BNC (-2/-1A Versions)
Card Edge Controls (also available via RollCall)	

## Specifications

Analog Input Level .....	24 dBu (17.5 V pk to pk) Headroom
Analog Input Impedance .....	>10 k ohms (Selectable 600 ohm termination)
Analog Reference Input Level	Black Burst at standard level $\pm 6$ dB
Analog Reference Input Standard	625/525 line
Digital Reference Balanced Input Standard	AES/EBU
Digital Reference Balanced Input Level	0.2 V to 7 V pk to pk into 110 ohms via 25 way D Maximum Cable Length 150 m
Digital Reference Unbalanced Input Standard	AES/EBU
Digital Reference Unbalanced Input Level	0.03 V to 5 V pk to pk into 75 ohms Maximum Cable Length 1000 m
Digital Balanced Output Level	Typically 4 V pk to pk into 110 ohms
Digital Unbalanced Output Level	Typically 1 V pk to pk into 75 ohms
Digital Path .....	32 kHz, 44.1 kHz and 48 kHz 20-bit
Total Harmonic Distortion + Noise	Better than 0.002% (-95 dB) at 700 Hz and -1 dBfs

**Sample Rate**

Headroom .....	+24 dBu to +18 dBu or +18 dBu to +12 dBu by pot and link
Reference Select .....	Free Run, AES/EBU or Video PAL/NTSC Auto Selected
Delay Time.....	0 ms to 450 ms in steps of 1ms
Mute.....	Mute either Output Pair On/Off
Control .....	Select Local or Remote
Indicators	
Overflow.....	0.2 dB or greater than headroom setting (Channels 1 & 2)
No Sync .....	Loss of Video Reference
Functions available via RollCall only	

**Delay Time**

Reporting .....	Video Standard (525/625)
Logging .....	Reference Loss, Input Format
Channel Status Editor .....	Channel Status original and destination names can be edited. Channel Status bytes 0, 1, 2 and 4 are all editable or can be automatically generated

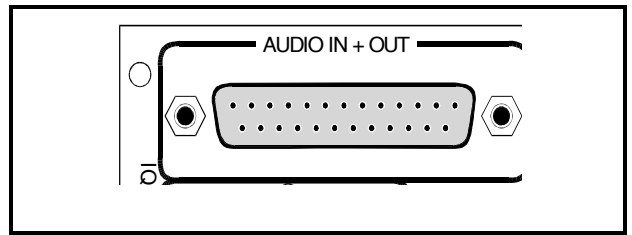
Noise Floor .....	Better than -106 dBfs (20 Hz to 20 kHz)
Channel Separation .....	Better than -100 dBfs at 10 kHz
Frequency Flatness.....	Better than +0.1 dBu to -0.3 dBu (20 Hz to 20 kHz with reference to 1 kHz)
Transport Delay .....	4 ms
Time to Change Delay .....	450 ms in 120 seconds (about 4ms per second)
Output Level Accuracy .....	better than -0.3 dB
Channel Amplitude Matching	better than $\pm 0.05$ dB
Digital Reference Input Frequency Pull-In Range	+2 Hz to -1 Hz
Sampling.....	48 kHz, 44.1 kHz or 32 kHz Free Running 48 kHz, 44.1 kHz or 32 kHz clock and frame locked to AES/EBU reference 48 kHz clock and frame locked to a PAL or NTSC video reference
Power Consumption	
Module Power Consumption	6 W max

INPUTS AND OUTPUTS

**Analog input**

All analog input and output connections plus the AES reference are made via this 25 way female D-type connector.

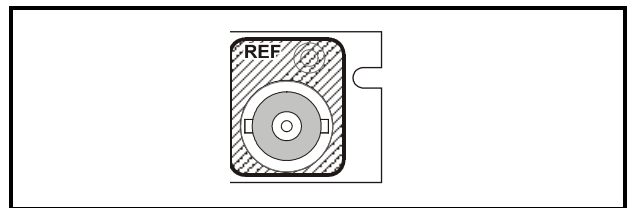
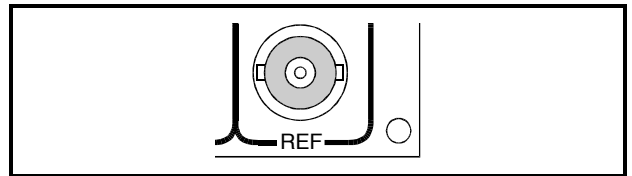
For connection data consult the tables on page 5.



**Reference Input**

A standard analog video/black burst reference or a digital audio reference signal may be connected to this BNC connector.

The signal is terminated internally at 75 Ohms.



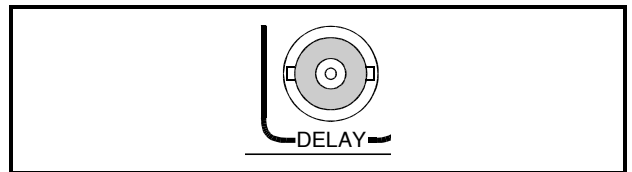
**Delay Input**

The input/output signal delay time may be set manually using the card edge control, via RollCall™ or may be set by a signal applied to this connector which should be TTL compatible.

The audio will be delayed for a period equal to the duration of the last active region of this signal. Either active positive or negative may be selected from the menu system.

*Note that if no pulse is detected the delay will be set to 0 ms.*

To activate audio delay control from this input it should be selected directly via RollCall™ item

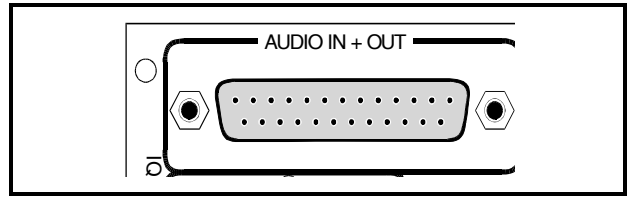


◀ **External Delay**

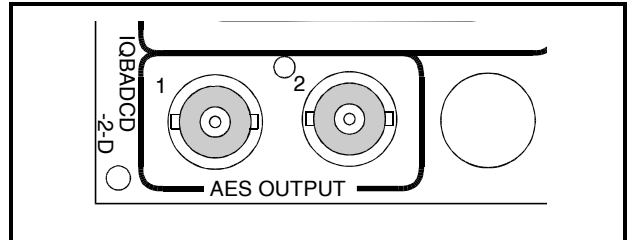
For more information see Appendix on page 16.

**Digital Output**

Digital outputs are made via this 25 way female D-type connector.  
 For connection data consult the tables on page 6.

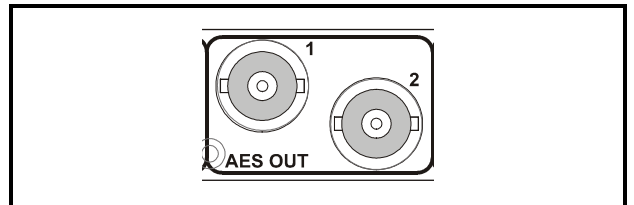


Unbalanced outputs are available from these BNC connectors.

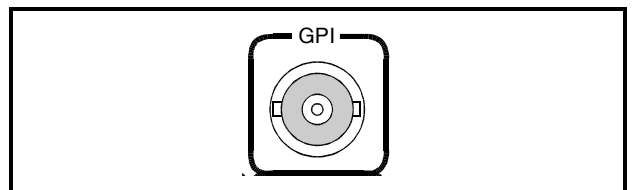


**GPI Connections**

This is used for accepting GPI information (from mechanical switch contacts, relay contacts etc.)  
 The resulting action that the unit takes may be programmed via RollCall.



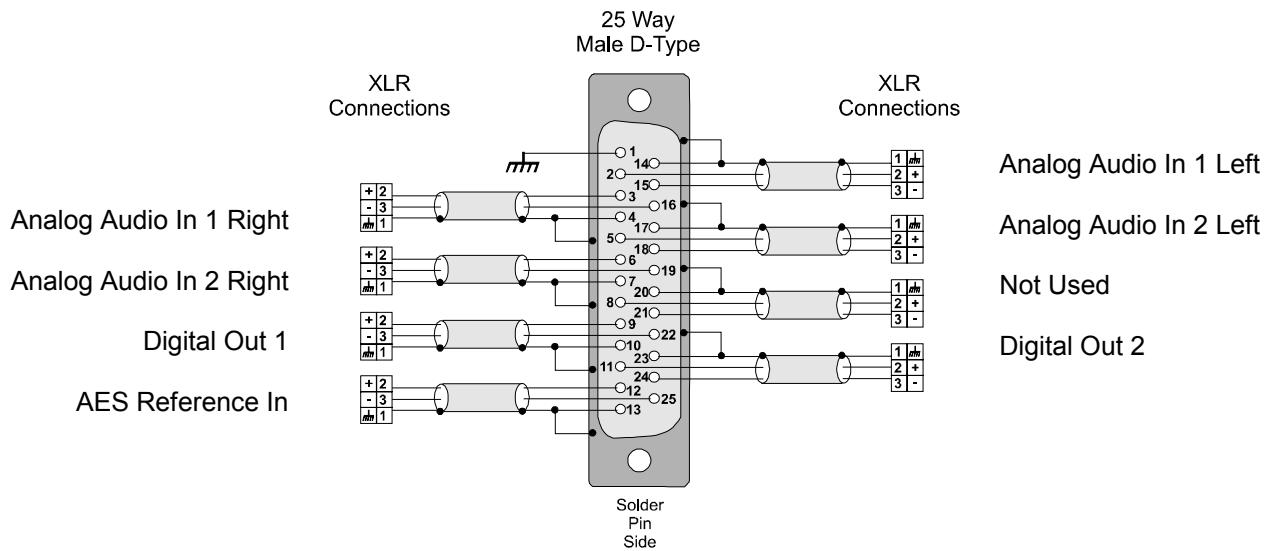
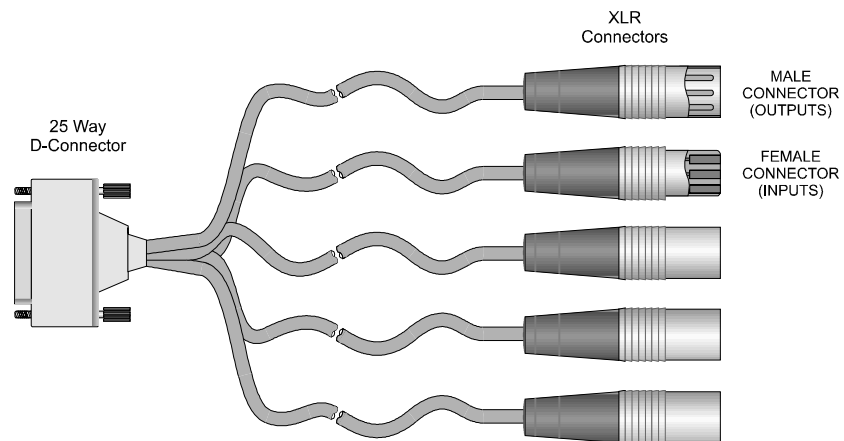
Operation is such that when the contact is closed the function is activated; when the contact is open, the function is de-activated.



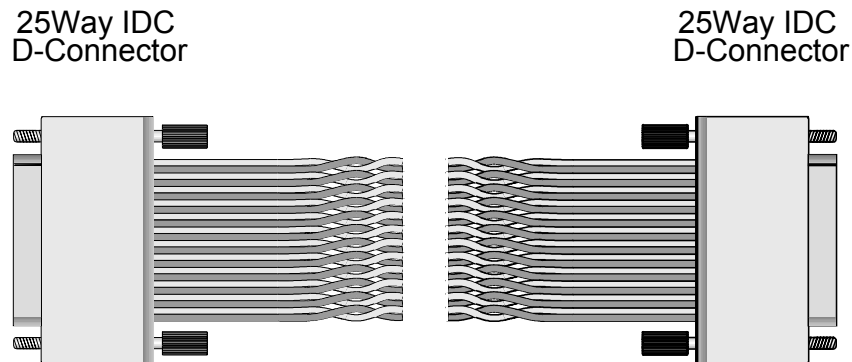
## 25 Way D Connection Details

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

Connection Details to XLR Connectors

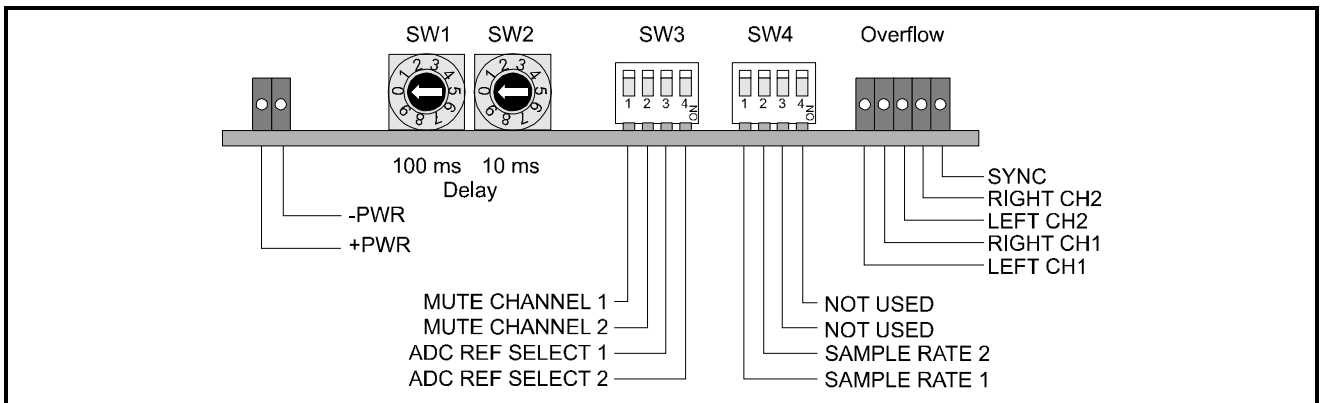


Connection Details via IDC connectors





CARD EDGE CONTROLS



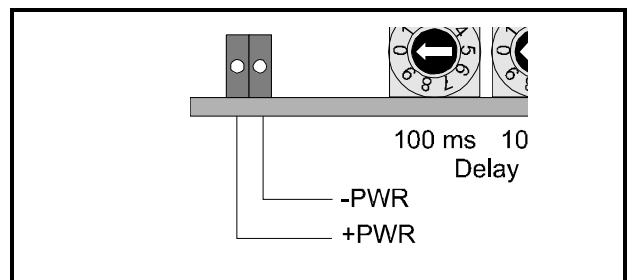
Adjustment of the settings of the **IQBADCD** is available either via card edge controls and/or via a more comprehensive remote control system using RollCall™

Note that the availability of some of the card edge controls will depend on the card version; see feature table for variations.

LED INDICATORS

**Power**

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

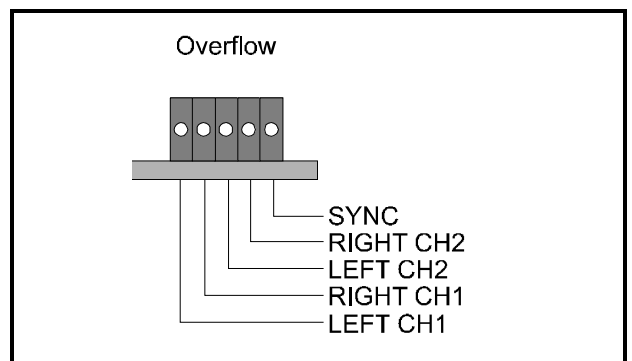


**Overflow**

These indicators become illuminated when bit overflow is detected on any of the 4 channels.

**Sync**

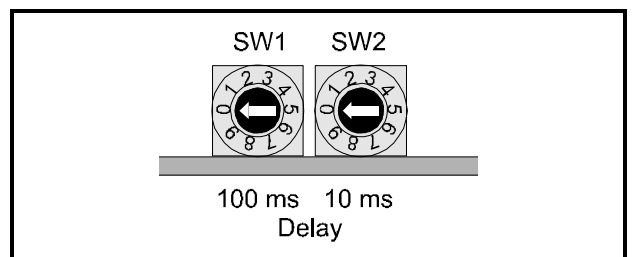
This indicator will become illuminated if no video reference is detected.  
(Not applicable to AES reference)



**Delay**

These two switches, SW1 and SW2 allow the delay period to be manually set. One switch adjusts the time in increments of 100 ms and the other in increments of 10 ms.

Also see `Delay Function` in the Appendix page 15

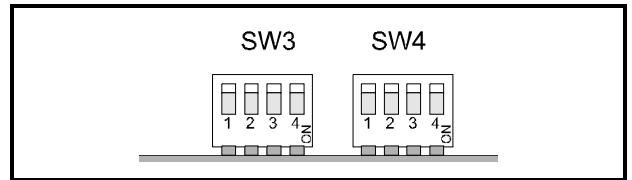


SW3

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

- Position 1      Enables the Mute function for channel 1
- Position 2      Enables the Mute function for channel 2
- Positions 3 & 4    ADC Reference Select  
(see below where 1 = ON)

ADC Reference	Pos 3	Pos 4
Internal	0	0
Video	1	0
AES/EBU	0	1
Internal	1	1



Channel Status

Currently the AES “...standard implementation...” is adopted. Status bytes 0 to 2 are configured to AES specifications. The standard implementation provides a fundamental level of implementation that is sufficient for general applications in professional audio or broadcasting.

SW4

This switch has 2 modes of operation depending on the delay time setting of SW1 and SW2.

1. When SW1 and SW2 are set to give a delay of less than 900 ms function is as follows:

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

- Positions 1 & 2    Clock Rate Select  
(see below where 1 = ON)

Clock Rate	Pos 1	Pos 2
48 kHz	0	0
44.1 kHz	1	0
32 kHz	0	1
48 kHz	1	1

Positions 3 & 4

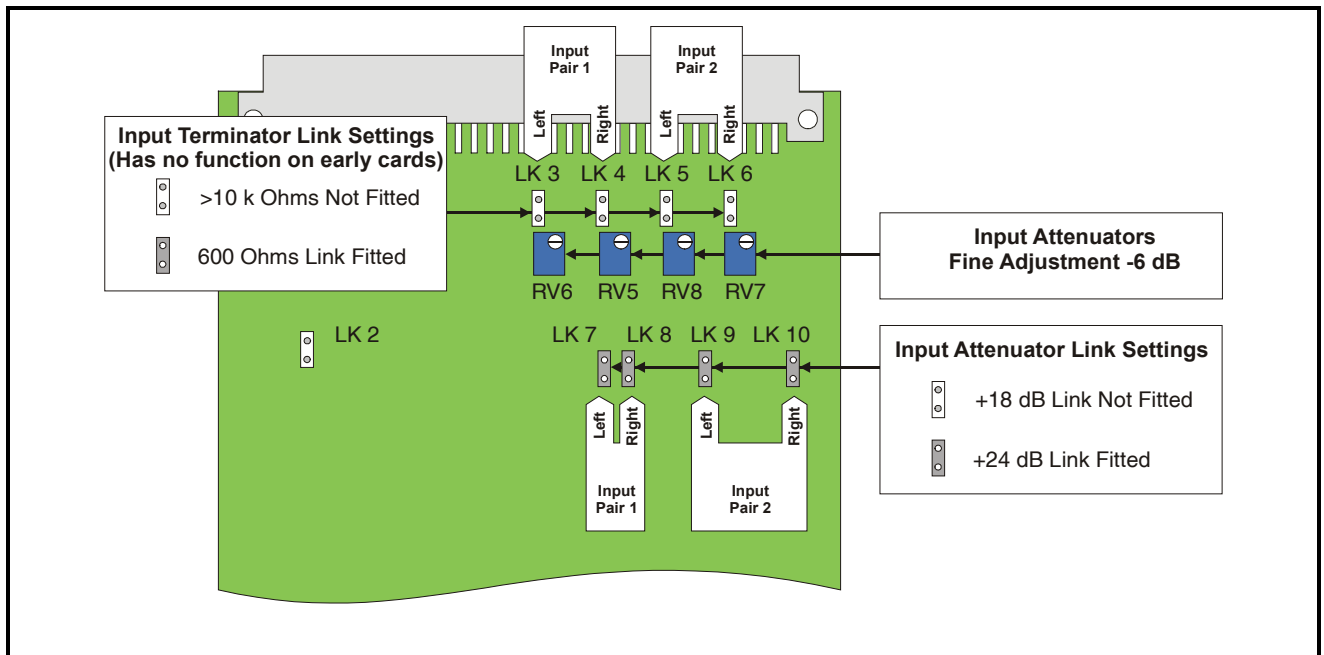
These positions are not used in this mode.

2. When SW1 and SW2 are set to give a delay of greater than or equal to 900 ms SW4 function is as follows:

- Position 1      Not used
- Position 2      Selects Manual Delay
- Position 3      Selects RollTrack Delay
- Position 4      Selects External Delay

Also see Appendix on page 17

## GAIN AND INPUT TERMINATION ADJUSTMENT

**Gain Adjustment**

The overall gain of a channel may be adjusted using links and a variable potentiometer.

The link provides a coarse adjustment of +18 dB (link not fitted) or +24 dB (link fitted).

The card is supplied with the link fitted as shown above, in the +24 dB position.

Adjusting the 10-turn potentiometer provides fine adjustment of -6 dB.

The card is supplied with the control set to the 0 dB position.

**Input Termination Setting**

The input impedance for the input channel may be set to HIGH (10,000 Ohms) or LOW (600 Ohms) by means of a link.

When the link is fitted the input impedance is 600 Ohms.

When the link is not fitted the input impedance is 10,000 Ohms.

The card is supplied in the HIGH (link not fitted) condition.

**Important Note**

On early versions of this card it is not possible to set the input impedance to 600 Ohms with this link and the input impedance will always be 10,000 Ohms.

The code on the white PCB assembly label will determine whether the card is an early or later version.

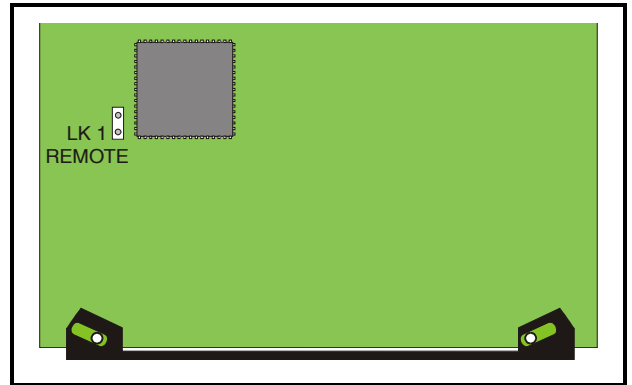
Early cards will be coded:  
SAANRBADCD1x

Later cards will be coded:  
SAANRBADCD1A, 1B, 1C etc.

### LK1 REMOTE

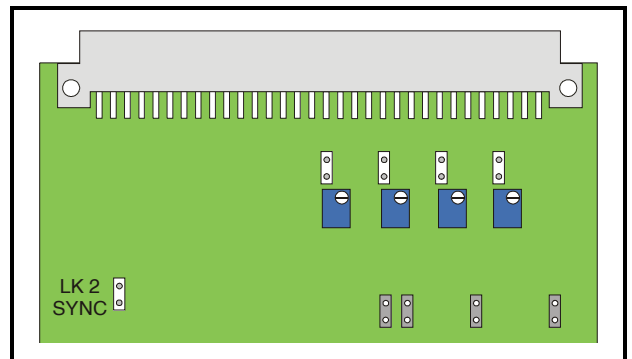
The unit will respond to both local and remote control, one system overriding the settings of the other. For cards using the RollCall™ remote control system, activating the card edge controls will override the remote control settings. The RollCall™ control panel will then follow these settings.

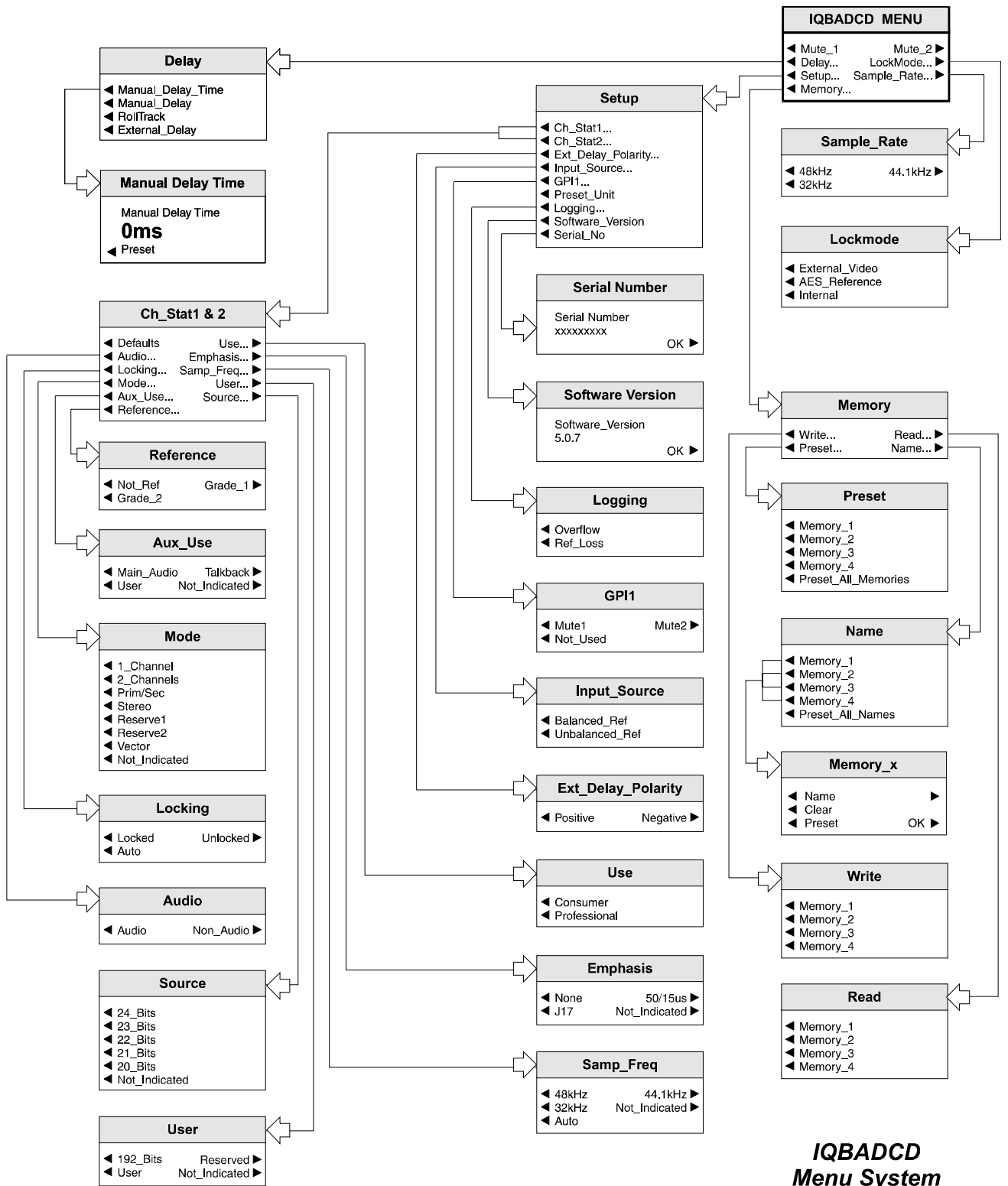
Note that in Mainframes where RollCall™ is not available the link LK1 (Remote) located near the center of the card should be set to the OFF (unconnected) position. This ensures that when the unit is powered-up the factory default settings of parameters not available as card edge adjustments, are loaded. With the link in the ON (connected) position card will power-up with the last settings sent by the remote control panel.



### LK2 SYNC

This allows the unit to accept either a high level e.g. 2 V reference sync input (link fitted) or standard e.g. 0.3 V level (link not fitted).





***IQBADCD  
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 the previous page 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.

**◀ Mute\_1**

When enabled this toggle function will mute channel 1 and the output will become silence.

**Mute\_2 ▶**

When enabled this toggle function will mute channel 2 and the output will become silence.

**◀ Delay**

This selection enables a sub-menu that allows the delay source and the delay between the input signal and the output signal to be set.

The total delay time will be the sum of the *enabled delay functions*.

Any of the following may be selected, by means of checkboxes:

1. No delay
2. Manual delay only
3. RollTrack delay only
4. External delay only
5. Manual delay+RollTrack delay
6. Manual delay+External delay
7. RollTrack delay+External delay
8. Manual delay+RollTrack delay+External delay

**◀ Manual\_Delay\_Time**

The spinwheel is used to adjust the delay time when this function is enabled. The time will be shown as a numerical value and by the bargraph display.

*Note that when the audio delay is being controlled remotely the bargraph will indicate the current delay setting.*

The range of adjustment is from 0 to 450 ms in increments of 1 ms. The preset value is 0 ms.

*Note that the total delay of the card is the transport delay (4 ms) added to the selected variable delays (Manual, RollTrack, External) This 4 ms transport delay will **not** be included in the delay time shown in the information display.*

**◀ Manual Delay**

When this function is selected the manual delay is added to the total delay.

**◀ RollTrack**

When this function is selected the value received via the RollTrack system on channels 14+15+16+17 is added to the total delay.

Data is transmitted at regular intervals from a RollTrack compatible device but if data is not received by this unit from a channel within 60 seconds, the delay time for that channel will assume a value of zero.

**◀ External Delay**

This selection allows an external TTL signal connected to the 'Delay' BNC to be added to the total delay.

This function can be set to respond to either a positive (active high) or negative (active low) pulse. Use the Ext Delay Polarity function in the Setup menu to select polarity.

**Lockmode ▶**

This selection reveals a sub-menu that allows the the standard and mode of the locking source to be set.

Selections are:

## ◀ External Video

Signal taken from the Ref Video BNC input

## ◀ AES Reference

If Balanced\_Ref is selected from the Input\_Source menu the reference will be taken from the 25 way D connector.

If Unbalanced\_Ref is selected from the Input\_Source menu the reference will be taken from the BNC Ref connector.

## ◀ Internal

Not locked to any external source

**◀ Setup**

This selection reveals a sub-menu that allows various functions to be set.

**◀ Ch\_Stat1 & CH\_Stat2**

This function allows channel status information for both Channel 1 and Channel 2 to be added using the following sub-menus.

Channel status for each audio channel carries information associated with that audio signal. The same channel status is inserted into both subframe 1 and 2.

Format follows that specified in the EBU document *“Specification of the Digital Audio Interface (The AES/EBU Interface) Tech. 3250-E, second edition August 1992.*

## ◀ Defaults

This item will return all settings for both channels to their default values.

Use ▶

This sub-menu allows the level of use to be set.

## ◀ Consumer

The signal will be identified as for “consumer use” conforming to IEC 958

## ◀ Professional

The signal will be identified as for “professional use” conforming to IEC 958

Default is to Professional

## ◀ Audio

This sub-menu allows the mode to be set to either **Audio** or **Non-Audio**.

Default is to **Audio**.

Emphasis ▶

This allows the audio emphasis characteristic to be set. Selections available are:

## ◀ None

No Emphasis applied

## 50/15µs ▶

Emphasis characteristic set to 50/15µs

## ◀ J17

Emphasis set to CITT J.17 (with 6.5 dB insertion loss at 800 Hz)

## Not\_Indicated ▶

Emphasis characteristic not indicated

Default is to Not\_Indicated

## ◀ Locking

This allows the lock state of the sampling frequency to be set.

Selections are:

## ◀ Locked

Sampling frequency locked

## Unlocked ▶

Sampling frequency unlocked

## ◀ Auto

Automatic selection; i.e. the locking status of the IQBADCD is inserted into the channel status.

Default is to Auto

Samp\_Freq ▶

This allows the sampling frequency to be set.

Selections are:

## ◀ 48 kHz

44.1 kHz ▶

## ◀ 32 kHz

Not\_Indicated ▶

## ◀ Auto

## ◀ Auto (Automatic Selection)

This inserts the actual sampling frequency of the IQBADCD into the channel status.

Default is to Auto

## ◀ Mode

The encoded channel mode may be set with this sub-menu.

## ◀ 1\_Channel

Single channel mode (monophonic)

## ◀ 2\_Channels

Two channel mode

## ◀ Prim/Sec

Primary/ secondary mode (sub-frame 1 is primary)

## ◀ Stereo

Stereophonic mode (channel 1 is left channel)

## ◀ Reserve1

Reserved for user-defined applications

## ◀ Reserve2

Reserved for user-defined applications

## ◀ Vector

Vector to byte 3. Reserved for future applications

## ◀ Not\_indicated

Mode not indicated

Default is to Stereo

## User ▶

This item defines the encoded user bits.

## ◀ 192\_Bits

192-bit structure. Preamble "Z" indicates the start of a block

## Reserved ▶

User bits are reserved

## ◀ User

User defined

## Not\_Indicated ▶

No user information indicated

Default is to Not\_Indicated

## ◀ Aux\_Use

This item defines the use of auxiliary sample bits.

## ◀ Main\_Audio

Auxiliary bits used for main audio sample data. Maximum audio sample word length is 24 bits.

## Talkback ▶

Auxiliary bits used for talkback (a single co-ordination signal)

Maximum audio sample word length is 20 bits.

## ◀ User

Auxiliary bits are for user-defined applications.

## Not\_Indicated ▶

Use of auxiliary sample bits not defined. Maximum audio sample word length is 20 bits.

Default is to Not\_Indicated

## Source ▶

This item indicates the encoded audio sample word length of the transmitted (source) signal.

## ◀ 24\_Bits

## ◀ 23\_Bits

## ◀ 22\_Bits

## ◀ 21\_Bits

## ◀ 20\_Bits

## ◀ Not\_Indicated

Default is to 24\_Bits

## ◀ Reference

This item indicates the source of sample frequency reference.

## ◀ Not\_Ref

Sample frequency not referenced to a fixed source.

## Grade\_1 ▶

Sample frequency is referenced to a grade 1 source.

## ◀ Grade\_2

Sample frequency is referenced to a grade 2 source.

Default is to Not\_Indicated



### ◀ Ext Delay Polarity

This selection allows the polarity of the external TTL signal connected to the `Delay` BNC to be selected as responding to either a **positive** (active high) or **negative** (active low) pulse.  
Default is to Positive

### ◀ Input\_Source

The reference source may be selected from either the

- ◀ Balanced\_Ref (via 25 way connector)
- ◀ Unbalanced\_Ref (via BNC connector)

Default is to Balanced\_Ref

### ◀ GPI 1

The GPI connector is used for accepting GPI information (from mechanical switch contacts, relay contacts etc.) The resulting action that the unit takes may be selected from this menu.

### ◀ Mute 1 & 2

The GPI signal will mute the selected channel; either Channel 1 or channel 2.

### ◀ Not\_Used

When selected the GPI input connection will be disabled.

Default is to Not\_Used

### ◀ 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.

### ◀ 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 parameters that may be selected for logging are as follows:

- ◀ Overflow
- ◀ Ref (Reference) Loss

### ◀ 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 No.

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

Select OK to return to the Setup Menu.

### Sample Rate ▶

Sampling rates of 48 kHz, 44.1 kHz or 32 kHz may be selected from this menu.

*Note that the external lock function is disabled if the 32 kHz or 44.1 kHz rates are selected.*

**◀ Memory**

All settings of the unit may be stored in any of 4 non-volatile memory locations. These locations may be read, saved, given a name or cleared to the preset names by selecting this function to reveal the sub-menus.

**◀ Write**

This will reveal a list of 4 memory locations. When a particular location is enabled, current settings will be saved in that memory location.

**Read ▶**

This will reveal a list of 4 memory locations. When a particular location is enabled, settings will be changed to the values contained in that memory location.

**◀ Preset**

This will reveal a list of 4 memory locations. When a particular location is enabled that memory location will be returned to the preset (default) condition.

Selecting **Preset\_All\_Memories** will return all memory locations to their preset values.

**Name ▶**

This will reveal a list of the 4 memory locations that may be given a specific name. Select the memory location and use the adjacent buttons to select the cursor position and the spinwheel to select the alphanumeric character.

Clear will clear the character underneath the cursor and OK will save the name; Preset will return the name to the preset or default name.

Selecting **Preset\_All\_Names** will return all memory locations names to their preset values.

## Appendix

### Delay Function

In addition, by selecting a delay of 900 ms or greater using the delay controls SW1 and SW2, the card switch SW4 positions 2, 3 and 4 change their operation to become "Manual delay", "RollTrack delay" and "External delay" on/off selection respectively.

Only when any of these switches are moved are their settings latched into memory (so that accidentally cycling through a delay of 900ms will not change the delay selection).

When the delay is set back to a value of less than 900ms or less the switches resume their normal operation of sample rate 2 selection.

***Note that when setting the delay greater than 900 ms with SW1 and SW2, the display will show a maximum value of 900 ms, not over 900 ms.***

## RollTrack Audio Delay Tracking

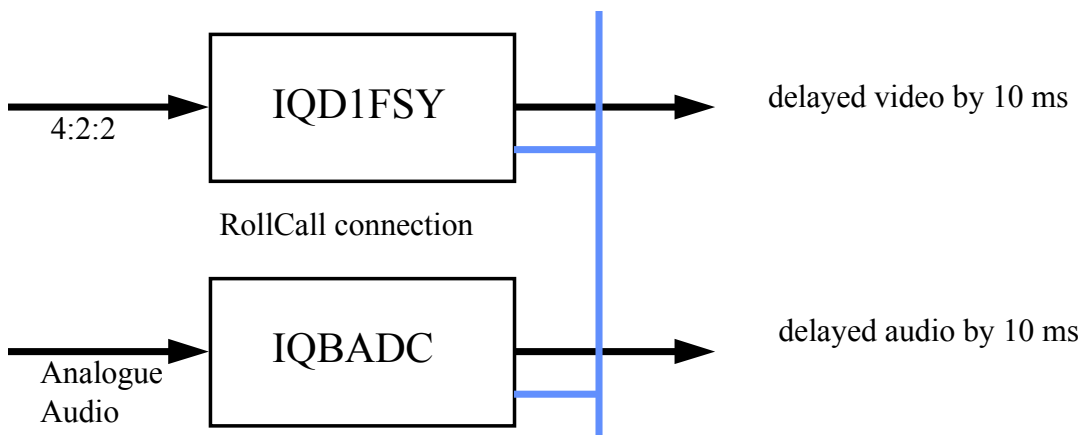
RollTrack is a feature of RollCall™ (Snell & Wilcox’s proprietary remote control system), that allows devices to communicate across the RollCall network with no direct user intervention.

RollTrack Audio Delay Tracking enables Snell & Wilcox RollCall™ compatible audio delay products to track delay introduced by RollCall™ compatible video processing products.

The current products that implement RollTrack Audio Delay Tracking are:

Audio Delay Modules	Video Modules	Other Products	
IQBAAD	IQD1FSY	ALCHEMIST	MDD3000
IQBADC	IQDMSDS	CPP100	MDD550
IQBDAC	IQDAFS	CPP200	MDD560
IQBDAD	IQDMSDS	NRS500	MDD570
IQBSYN	IQDMSDP	HD5050	MDD2000
IQBADCD	IQDSYN		

The simplest configuration is a single video unit and a single audio delay in a RollCall™ system. The audio delay will have the same delay as through the video path. If the delay changes the audio delay will track.



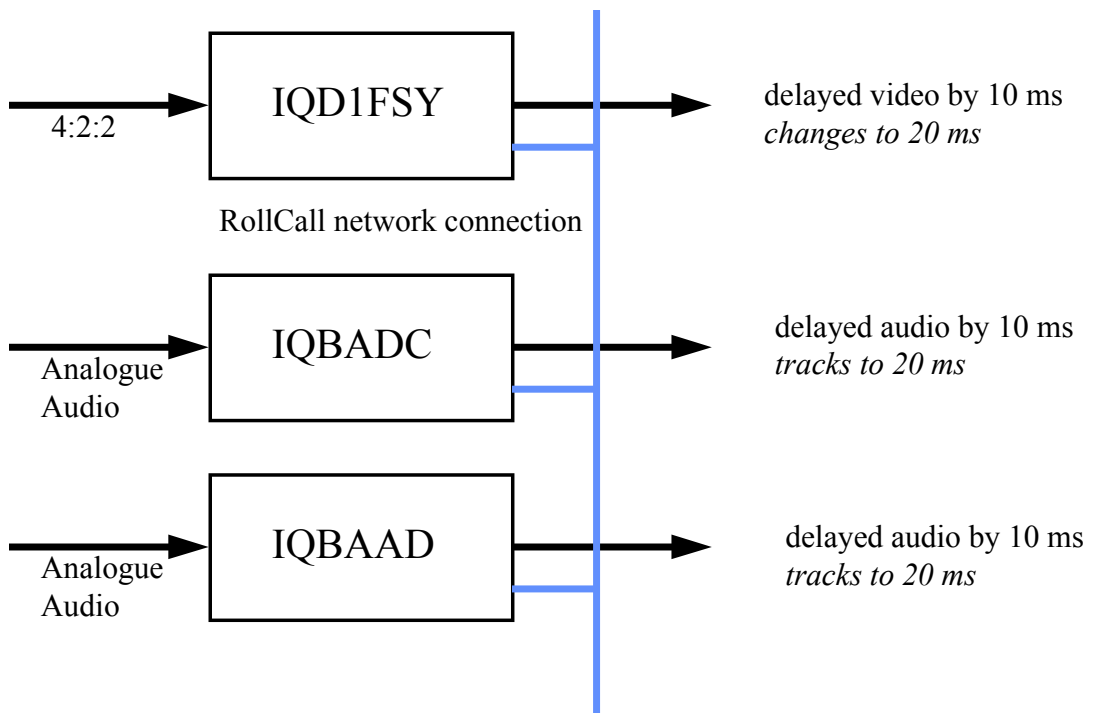
The next level of configuration is where there are multiple Frame Synchronizers (for example) each connected through RollCall™ to their own tracking Audio Delay. (It is worth stating that the synchronizers and audio delays do not have to be in the same enclosure; the addressing scheme, discussed later, allows for the units to be positioned anywhere in the RollCall™ domain.)

The maximum number of video units and audio delays in a RollCall™ system is set by the maximum limit of the number of modules in a RollCall™ network and is currently 3840 on a single network without bridges.

The unique identification of the destination unit (a decimal number) for various modules is as follows:

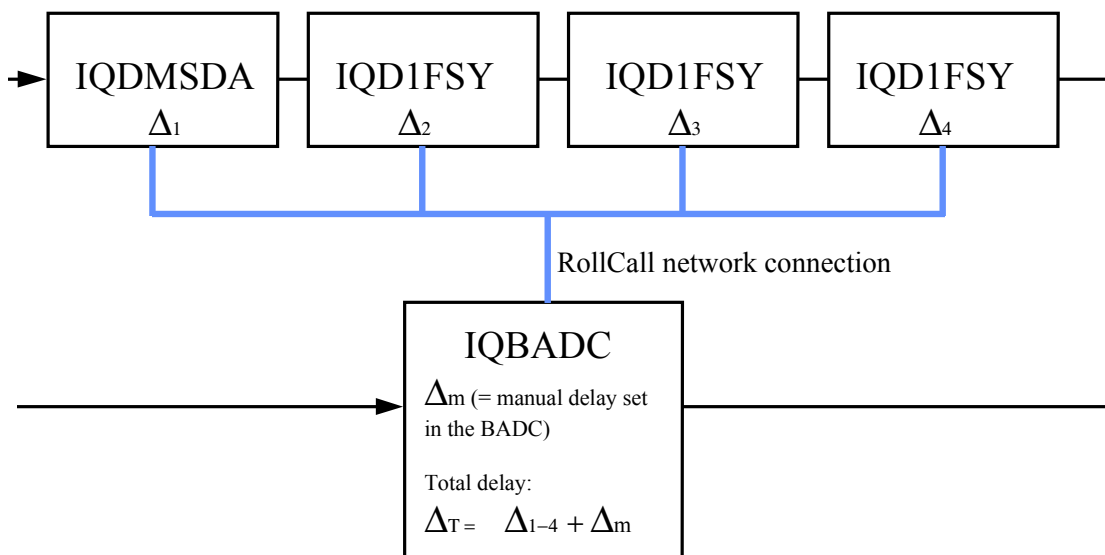
Module	ID
IQBADC	51
IQBDAC	52
IQBAAD	53
IQBDAD	54
IQBSYN	89
IQBADCD	107

The next level of complexity is a *vertical delay cluster* where a video unit can have up to eight audio delays tracking - of the same or different types.



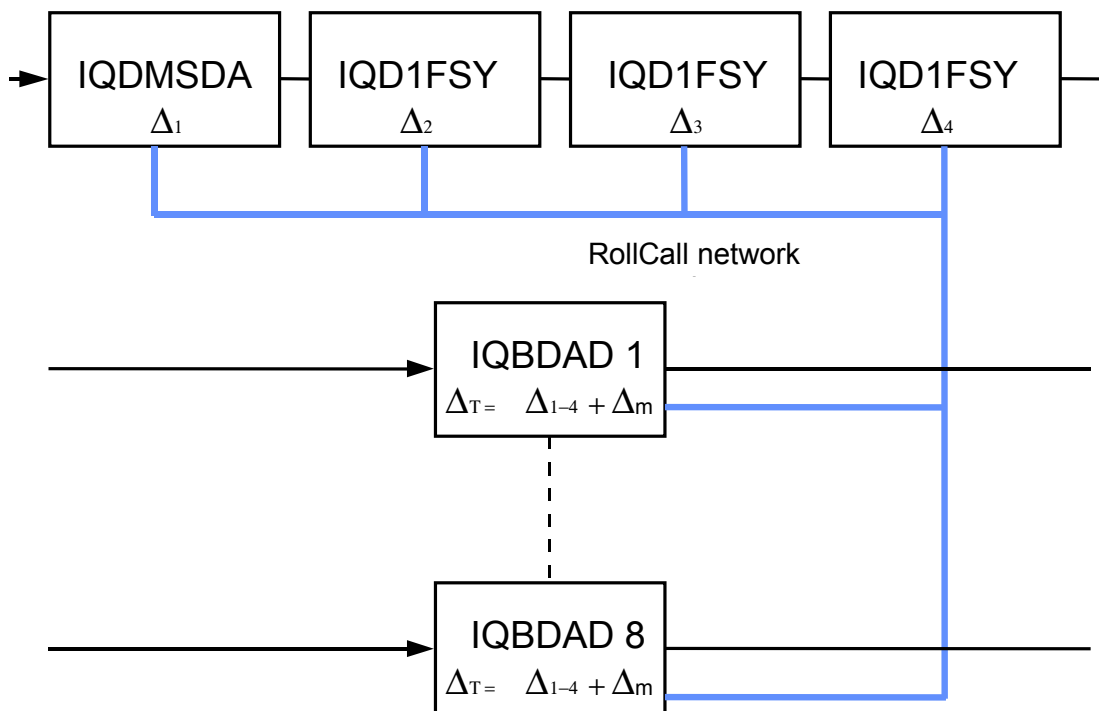
From one to eight audio delay products can be connected via RollCall™ to a single frame synchronizer, for example. If the synchronizer delay changes, then however many audio delays are connected will track the delay. The audio delays can also have a manual delay which will be added to the RollTrack delay.

The next level of complexity is a *horizontal delay cluster* where an audio delay can track up to four video units.



The total delay time through the audio delay is then the sum of the individual delays introduced by the video units plus the manual delay of the audio unit. The manual delay can be set to compensate for any fixed propagation delay in the video path or may be set to zero.

The next level of complexity is a *matrix delay cluster* where each audio delay (up to eight) can track up to four video units. This configuration is in effect a four by eight matrix of video units and audio delay units. The total delay time through the audio delay units is then the sum of the individual delays introduced by the video units plus the manual delay of the audio unit.



As any of the delay times change in the video path so will the audio delay time track this delay. A virtual connection is made between from, say, an IQD1FSY to an IQBDAD by:

- selecting the *Setup...* Menu of the IQD1FSY
- then selecting the *Audio\_Delay...* Menu
- then choosing from *Unit\_1* to *Unit\_8*
- then entering the unique network address of the IQBDAD in the form  $nnnn:xx:yy*z*d$  where  $nnnn$  = network address and in most cases will be 0000(hex);
- $xx$  = IQ enclosure address (hex);
- $yy$  = slot address of the IQBDAD (hex)
- $z$  = the connection (or channel) number (decimal) - see table below.
- $d$  = the unique identification of the destination unit (decimal) The ID entered must match the receiving units own ID or else the command will be ignored. If the ID value is set to 00, the receiving unit does not perform an ID match and will always accept the incoming command
- then selecting the *Delay...* Menu of the IQBDAD
- then selecting *RollTrack*

Example of Network Addresses with Channel Numbers and ID Numbers

	D1FSY 1	D1FSY 2	D1FSY 3	D1FSY 4
<b>Audio delay 1</b>	0000:10:01*14*54	0000:10:01*15*54	0000:10:01*16*54	0000:10:01*17*54
<b>Audio delay 2</b>	0000:10:03*14*54	0000:10:03*15*54	0000:10:03*16*54	0000:10:03*17*54
<b>Audio delay 3</b>	0000:10:05*14*54	0000:10:05*15*54	0000:10:05*16*54	0000:10:05*17*54
<b>Audio delay 4</b>	0000:10:07*14*54	0000:10:07*15*54	0000:10:07*16*54	0000:10:07*17*54
<b>Audio delay 5</b>	0000:10:09*14*54	0000:10:09*15*54	0000:10:09*16*54	0000:10:09*17*54
<b>Audio delay 6</b>	0000:10:0B*14*54	0000:10:0B*15*54	0000:10:0B*16*54	0000:10:0B*17*54
<b>Audio delay 7</b>	0000:10:0D*14*54	0000:10:0D*15*54	0000:10:0D*16*54	0000:10:0D*17*54
<b>Audio delay 8</b>	0000:10:0F*14*54	0000:10:0F*15*54	0000:10:0F*16*54	0000:10:0F*17*54

The most complex system would be an array of matrix delay clusters

