

IQD1FSY D1 Frame Synchroniser



Module Description

The IQD1FSY-1 and IQD1FSY-2 are D1 Serial Frame synchronisers with a 10-bit data path.

The IQD1FSY-1 is a single width module providing 2 outputs, the IQD1FSY-2 is a double width module providing 4 outputs and the -E versions include EDH monitoring and insertion..

Functional Description

These modules accept a serial D1 data stream as an input, store the data and provide either a

delayed output or an output of a new D1 data stream which is locked to an analogue reference signal.

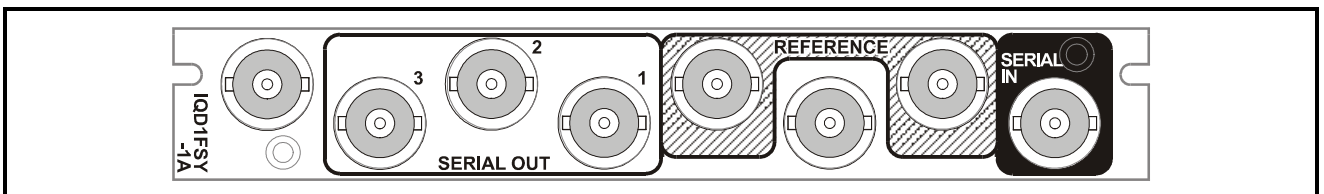
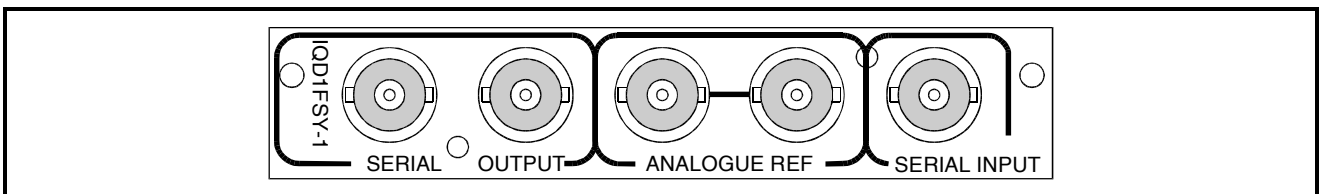
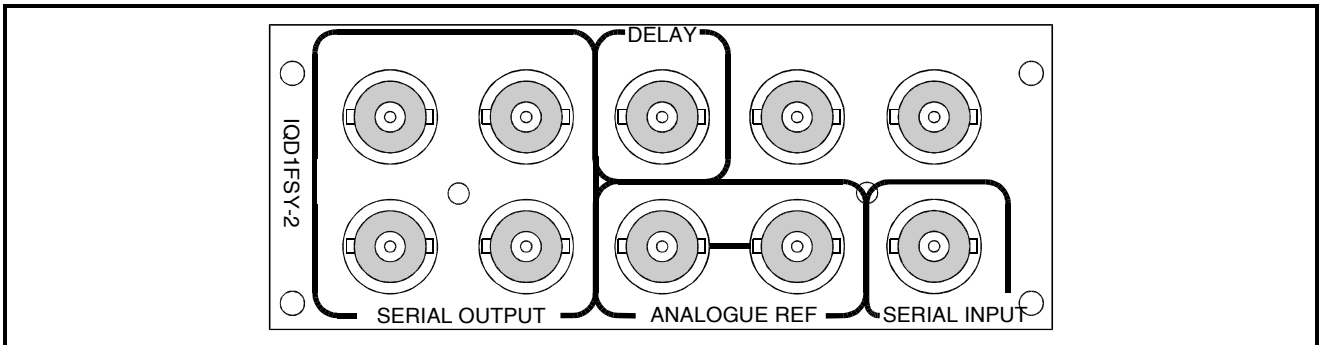
The genlock phase of the output signal with respect to the reference is fully adjustable.

The IQD1FSY-D option provides up to 2 frames of delay when in the delay mode.

All models operate with both 525 and 625 systems, and switching is automatic.

From software version 6.06 onwards the IQD1FSY is compatible with switchers/routers using line 6 (625) or line 9 (525) for vertical interval switching.

REAR PANEL VIEWS



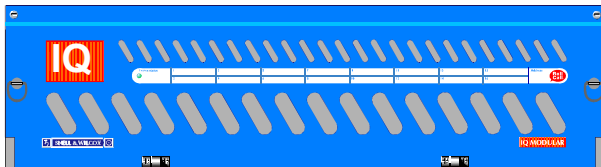
Versions of the module cards available are:

IQD1FSY-2-D-E	D1 Frame Synchroniser 4 outputs (4 field) with EDH	Double width module
IQD1FSY-2-0-E	D1 Frame Synchroniser 4 outputs with EDH	Double width module
IQD1FSY-1-D-E	D1 Frame Synchroniser 2 outputs (4 field) with EDH	Single width module
IQD1FSY-1-0-E	D1 Frame Synchroniser 2 outputs with EDH	Single width module
IQD1FSY-1A-D-E	D1 Frame Synchroniser 3 outputs (4 field) with EDH	Single width module
IQD1FSY-1A-0-E	D1 Frame Synchroniser 3 outputs with EDH	Single width module

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

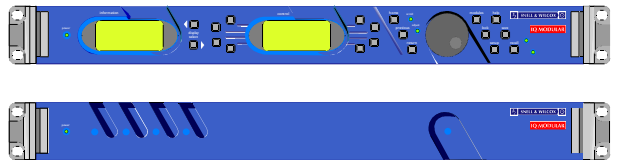
Rear panels **with** the suffix A may only be fitted into the 'A' style enclosure shown below.



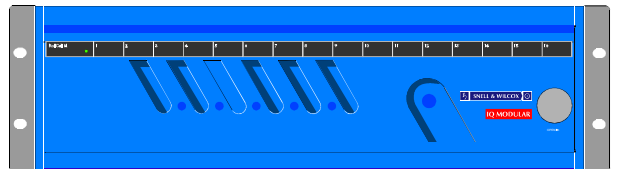
(Enclosure order codes IQH3A-E-O, IQH3A-E-P, IQH3A-N-O, IQH3A-N-P)

'O' Style Enclosures

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

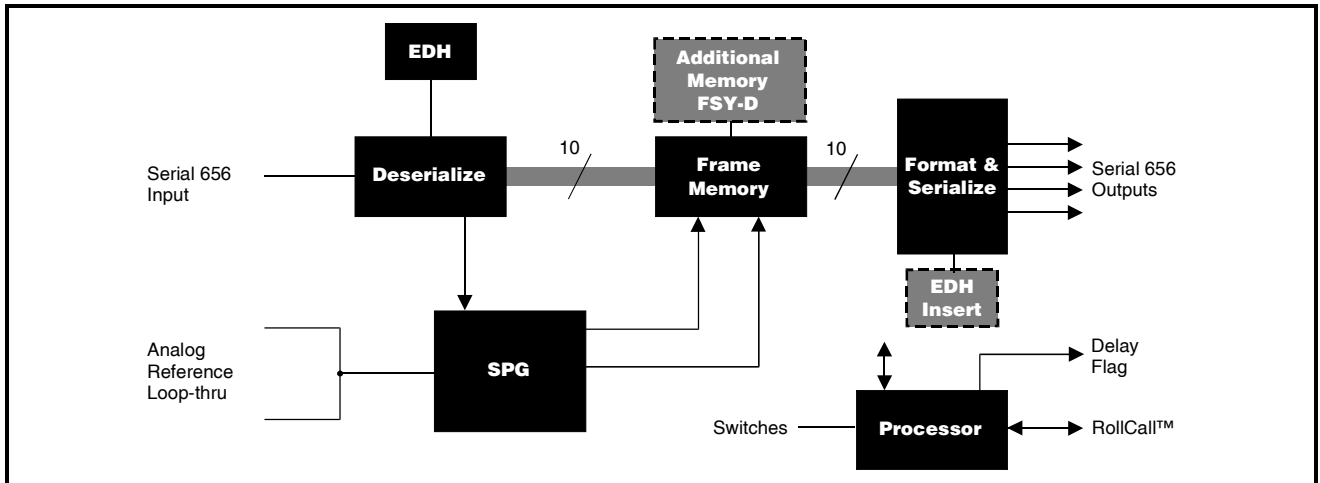


(Enclosure order codes IQH1S-RC-O, IQH1S-RC-AP, IQH1U-RC-O, IQH1U-RC-AP, Kudos Plus Products)



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

BLOCK DIAGRAM

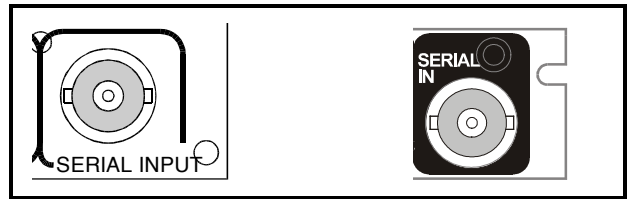


Features

- 10-bit serial 4:2:2 frame synchronizer
- Genlock to analog black
- Built in hysteresis over frame wrap point
- EDH monitoring and insertion as standard
- Picture position and YC timing adjustment
- May be used as a programmable delay - card edge or RollCall remote control
- Minimum delay 28µs, maximum delay 1 frame
- Provides RollTrack automatic tracking delay to IQ audio delay modules
- External TTL delay flag output
- Free-run possible (stability better than 20 ppm)
- Frame freeze

SERIAL INPUT

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

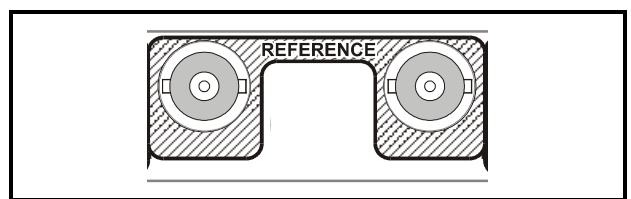
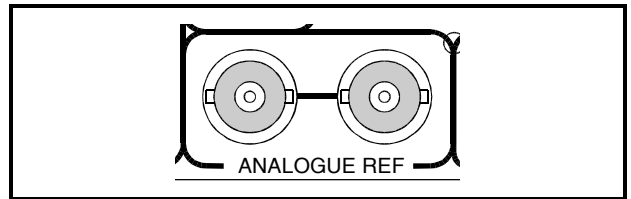


ANALOGUE REFERENCE INPUT

The external sync input to the unit is made via the passive loop-through BNC connectors for 75 Ohms.

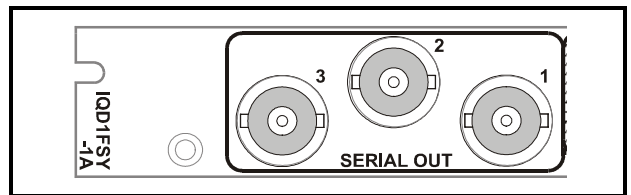
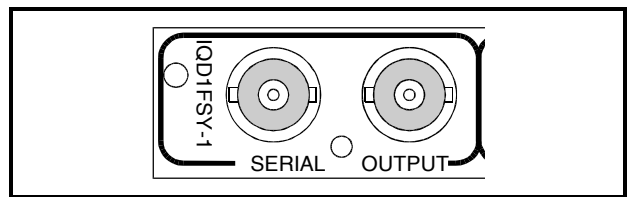
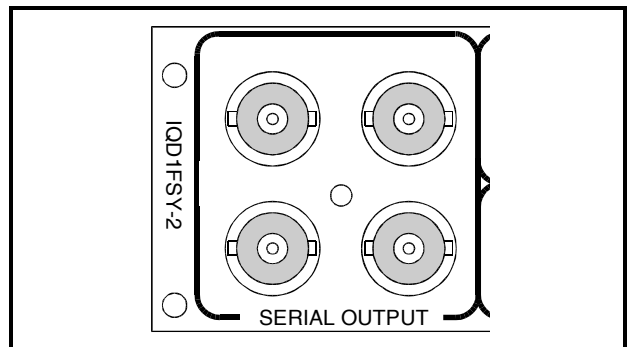
The external sync signal must be the same line standard as the D1 input.

Note that if the loop-through facility is not used the unused socket must be fitted with a 75 Ohm terminator.



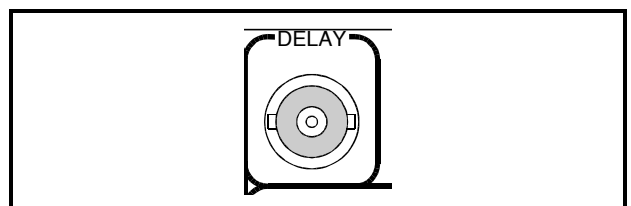
SERIAL OUTPUTS

These are the two, three or four isolated Serial Digital outputs of the unit via BNC connectors for 75 Ohms.

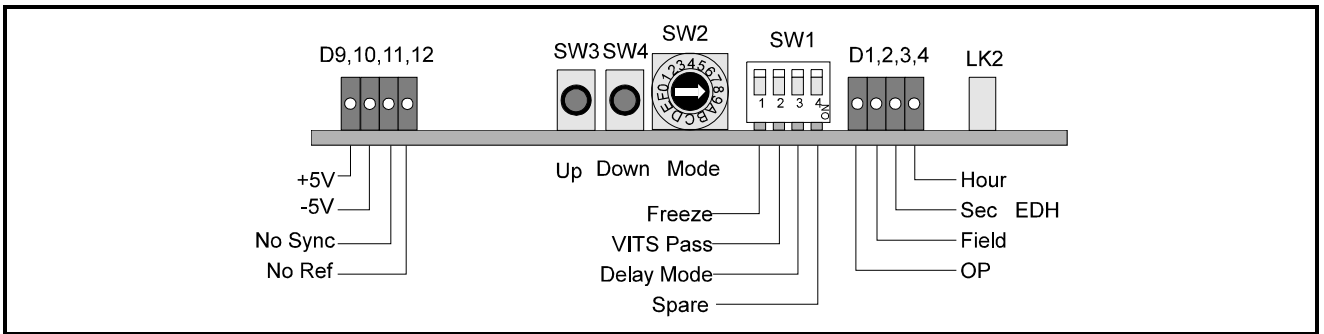


DELAY (-2 versions only)

In the delay mode the output signal will be delayed from the input signal by a selected time. This connector provides an output signal which is low (0V) for the duration of the delay time and high (+5V) at other times. Output is TTL compatible for use with audio tracking-delay units.



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 remote link, LK2, located at the front of the card, should be removed. This ensures that when the unit is powered-up the factory default settings of parameters not available as card edge adjustments, are loaded. With LK2 fitted the card will power-up with the last settings sent by the remote control panel.

SW1

By setting these switches various modes of operation may be selected.

Position 1

Setting this to ON provides a freeze frame picture.

Note that if operating in the synchronise mode in the hysteresis region (OP LED illuminated) a frozen picture will contain a repeated line.

Position 2

Setting to ON allows the VITS signal to pass through the unit; in the OFF position VITS signals are blanked out.

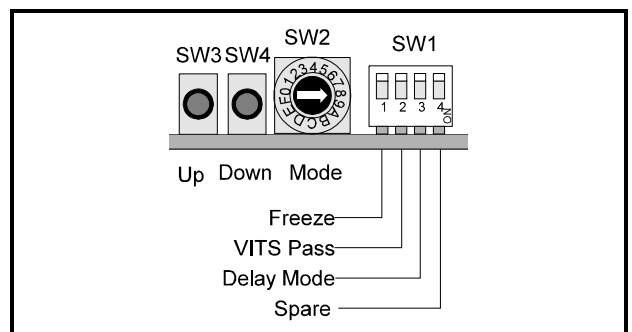
Note that in the 525 standard VITS lines are from line 10 and 273 and in the 625 standard from line 6 and 319 inclusive.

Position 3

Setting to ON enables the delay mode; OFF selects synchronise mode.

Position 4

This position has no function on this unit



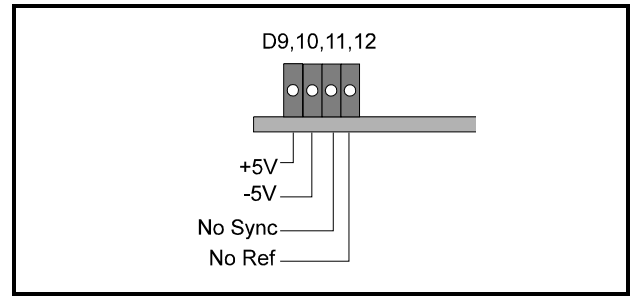
LED INDICATORS

When illuminated D9 and D10 indicate that the +5V and the -5V power supplies are present.

When LED D11 is illuminated this indicates that the input PLL is not locked. This normally means that there is no input signal present or the signal is invalid.

Note that under these conditions the unit will generate an output signal of D1 colour black or frame freeze as selected by SW2 and SW3. When powered-up with no input signal the unit will generate D1 black in the last detected line standard.

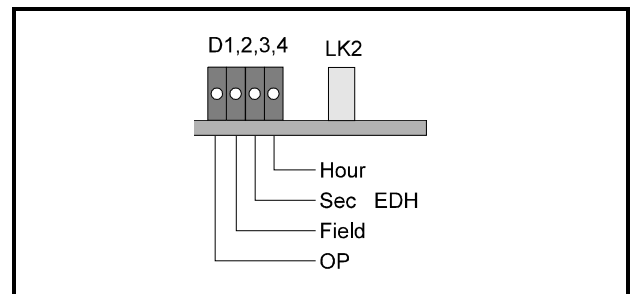
When LED D12 is illuminated this indicates that there is no input signal present, or an invalid signal, at the EXT SYNC connector.



OP

D1 indicates that the unit is operating in the hysteresis region in synchronise mode. It is an indication that a frame is about to be dropped or repeated.

Note that if the unit is set to freeze mode when this LED is illuminated, one line in the output frame will be repeated, disturbing the interlace sequence.



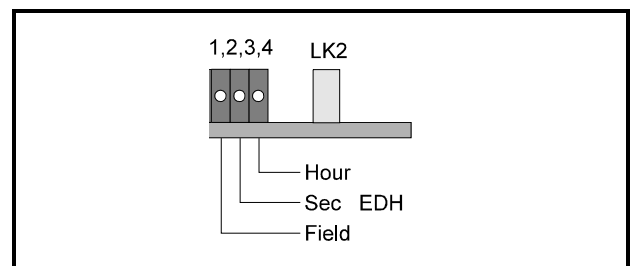
EDH REPORTING (-E versions only)

D2, D3 and D4 indicate that EDH errors have occurred.

D2 indicates that an error has occurred in the last field

D3 indicates that an error has occurred in the last second

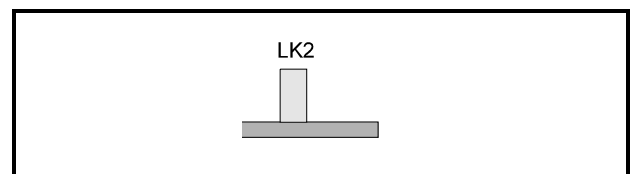
D4 indicates that an error has occurred in the last hour

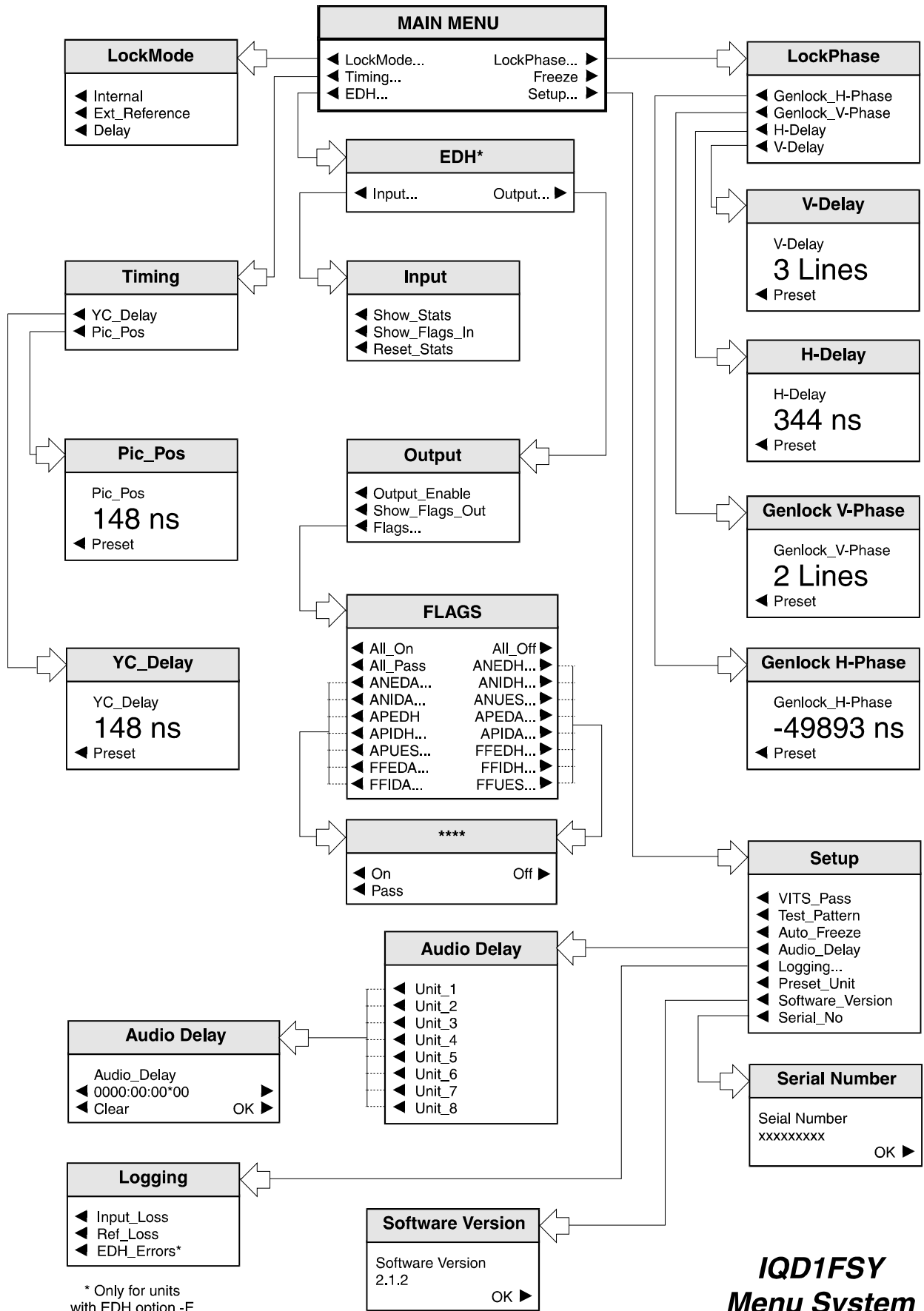


LINK LK2

This link allows the default settings not available with the card edge controls, to be set at power-up.

Note that this link should always be fitted when the unit is controlled via RollCall™





* Only for units with EDH option -E

IQD1FSY 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 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 IQD1FSY 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.

Lock Mode

This allows the method that the card may be locked (or not) to an external reference signal.

Internal

In this mode the output signal will be locked to the internal clock generator.

Ext Reference

This selection locks the output signal to the signal connected to the Ext Sync input connector.

The standard of the reference signal determines the standard of the output signal.

In the absence of a reference signal the standard of the output signal will be the same as the input signal.

If the reference signal and input signal are of different standards the output will be black in the standard of the reference signal.

Note that to change the horizontal and vertical phasing between the external sync signal and the output signal select Lock Phase in the Main menu.

Delay

When this mode is selected the output signal will appear after the input signal with a time delay. When not selected the module will operate in the synchronise mode.

Note that to change the horizontal and vertical delay between the input signal and the output signal select Lock Phase in the Main menu. This function is only available when the delay mode is selected.

Timing

This allows two signal timing adjustments to be made:

- Chrominance-to-luminance timing of the output signal
- Horizontal picture position (relative to syncs)

YC_Delay

Selecting this item reveals a display showing the timing of the chrominance signal relative to the luminance signal, in nanoseconds. Rotating the spin-wheel will adjust this value.

Range is from -296 ns to +296 ns in 148 ns steps.

Selecting **Preset** returns the setting to the preset value.

Pic_Pos

Selecting this item reveals a display showing the timing of the picture position relative to the normal value, in nanoseconds. Rotating the spin-wheel will adjust this value.

Range is from -296 ns to +296 ns in 148 ns steps.

Selecting Preset returns the setting to the preset value.

EDH (-E version only)

This selection reveals a sub-menu that allows various Input or Output EDH parameters to be enabled.

Input

This sub-menu allows input signal EDH information to be displayed in the information window.

Detect

Selecting this function (text reversed) turns ON the EDH detection system and 'EDH:OK' will appear in the information window.

Show Stats (Statistics)

When this function is enabled (text reversed) the information window will display the number of errors from the time the function was enabled. The elapsed time in hours, minutes and seconds is also displayed.

Show Flags In

When this function is activated the information window will display the status of the various input flags.

Three error checking data locations are shown:

AP Errors during the active picture

AN Ancillary data errors

FF Full Field errors

These locations are followed by a five digit number of logical 1's and 0's indicating the status of the error flags.

The error flags are (from left to right)

EDH - error detected here: Signifies that a serial transmission data error was been detected. In the case of ancillary data, this means that one or more ANC data blocks did not match its checksum.

EDA - error detected already: Signifies that a serial transmission data error has been detected somewhere upstream. If device B receives a signal from device A and Device A has set the EDH flag, when B re transmits the data to device C, the EDA flag will be set and the EDH flag will be cleared if there is no further error in the data.

IDH - internal error detected here: Signifies that a hardware error unrelated to serial transmission has been detected within a device. This is provided specifically for devices which have internal data error checking facilities, as an error reporting mechanism.

IDA - internal error detected already: Signifies that an IDH flag was received and there was a hardware device failure somewhere upstream.

UES - unknown error status: Signifies that a serial signal was received from equipment not supporting this error-detection mechanism.

Reset Stats (Statistics)

Selecting this function will reset the EDH error count and the timer shown in the information window, to zero.

Output

This sub-menu allows output signal EDH flags to be set and the information displayed in the information window.

Output Enable

Selecting this item (text highlighted) will enable EDH generation onto the output data stream.

Show Flags Out

When this function is activated the information window will display the status of the various output flags.

Three error checking data locations are shown:

AP

Errors during the active picture

AN

Ancillary data errors

FF

Full Field errors

These locations are followed by a five digit number of logical 1's and 0's indicating the status of the error flags as in 'Show Flags In'

Flags

This function reveals a sub-menu of flags that may be set on the output data.

ALL On sets all available flags to the ON state.

All Off sets all flags to the OFF state.

All Pass allows all input signal flags to be passed through, unchanged, to the output.

A particular flag may be selected from the list (see below) and another sub-menu will be revealed that allows the flag to be set to ON, to OFF or pass through from the input to the output.

List of Flags

ANEDH	Ancillary Data: Error Detected Here
ANEDA	Ancillary Data: Error Detected Already
ANIDH	Ancillary Data: Internal Device Error Detected Here
ANIDA	Ancillary Data: Internal Device Error Detected Already
ANUES	Ancillary Data: Unknown Error Status
APEDH	Active Picture: Error Detected Here
APEDA	Active Picture: Error Detected Already
APIDH	Active Picture: Internal Device Error Detected Here
APIDA	Active Picture: Internal Error Detected Already
APUES	Active Picture: Unknown Error Status
FFEDH	Full Field: Error Detected Here
FFEDA	Full Field: Error Detected Already
FFIDH	Full Field: Internal Device Error Detected Here
FFIDA	Full Field: Unknown Error Status
FFUES	Full Field: Unknown Error Status

Lock Phase

This menu allows various phasing/delay adjustments to be made.

Note that the H-Delay and V-Delay adjustments will only be available when the Delay selection has been made in the Lock Mode menu.

Genlock H Phase

Selecting this item reveals a display showing the horizontal timing of the output signal relative to the reference sync signal, in nanoseconds. Rotating the spin-wheel will adjust this value.

Selecting Preset returns the setting to zero. (Output coincident with reference)

Genlock V Phase

Selecting this item reveals a display showing the vertical timing of the output signal relative to the reference sync signal, in TV lines. Rotating the spin-wheel will adjust this value. Range is ± 50 lines in 1 line steps.

Selecting Preset returns the setting to zero. (Output coincident with reference)

H Delay

Selecting this item reveals a display showing the horizontal timing of the output signal relative to the input signal, in nanoseconds. Rotating the spin-wheel will adjust this value.

Selecting Preset returns the setting to the minimum horizontal delay.

V Delay

Selecting this item reveals a display showing the vertical timing of the output signal relative to the input signal, in TV lines. Rotating the spin-wheel will adjust this value. Range is from 1 line to 624 or 525 lines in 1 line steps.

Selecting Preset returns the setting to the minimum vertical delay.

Freeze

This function produces a freeze-frame picture.

Setup

This menu allows various system parameters to be set.

VITS Pass

Activating this item allows the Vertical Interval Test Signals of the input signal to pass through the module. When this item is not active VITS signals will be blanked from the signal.

Note that in the 525 standard VITS lines are from line 10 and 273 and in the 625 standard from line 6 and 319 inclusive.

Test Pattern

Activating this item provides a simple ramp test pattern output signal.

Auto Freeze

When this item is active and the input signal is lost, a freeze frame picture will be produced. When inactive a colour black signal will be produced under these conditions.

Audio Delay

This function allows the value of the delay time produced by this module to be sent, via the RollCall™ network, to audio delay units connected on the same network. This enables compatible audio delay units to produce an audio delay dependent on this and other similar units. The audio delay unit will dynamically follow or track the received delay-time information allowing processed video signals to be timed correctly with audio signals. This automatic tracking system via the RollCall™ network is call **RollTrack**.

The destination for the delay information is set by the network code address as follows:

Selecting Audio Delay in the Set-up menu provides a sub-menu that allows up to 8 units (mainframes enclosures etc.) to be selected as a destination.

A further sub-menu then appears to allow the code to be set up using the adjacent push buttons to edit the text.

(The left and right hand buttons select the cursor position and the spinwheel selects the character; the clear button sets the text line to all zero's and the OK button accepts the network address)

For more detailed information see the RollTrack section, page 15, of this manual.

The full network address has four sets of numbers.

For example: 0000:10:01*14

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 (14) separated by an * is the channel number.

Note that only channel numbers 14, 15, 16 & 17 should be used for audio delay cards.

Once a destination address for a unit has been set the OK function will return to the unit menu to allow another address to be set if required.

Logging

If a logging device is attached to the RollCall™ network, information about various parameters can be made available to such a device.

Selecting this item reveals a display that allows information about three parameters to be made available for logging.

Input Loss

When activated, a loss of input signal condition will be available for the logging device.

Ref Loss

When activated, a loss of External reference signal condition will be available for the logging device.

EDH Errors

When activated, EDH error reports will be available for the logging device.

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 Setup Menu.

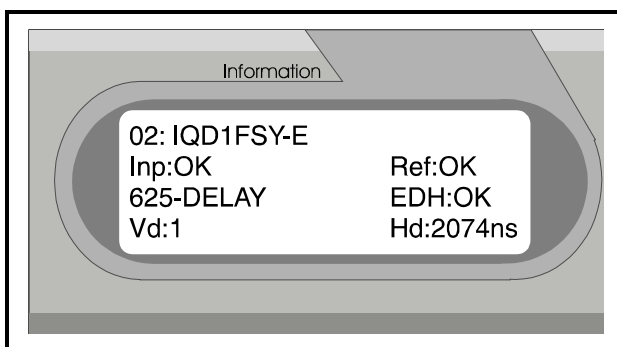
Serial Number

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

THE INFORMATION WINDOW

The parameters of the selected item in the Control window will be displayed in the Information window.

An example is shown below:



The first line shows the name of the module card. This name can be changed using RollCall™ and the Remote Control Interface Menu.

The second line shows that the signal input and the reference input are receiving valid signals; if there is no signal or the signal is invalid it will show Inp:** or Ref:**

This text may be followed by the following abbreviations:

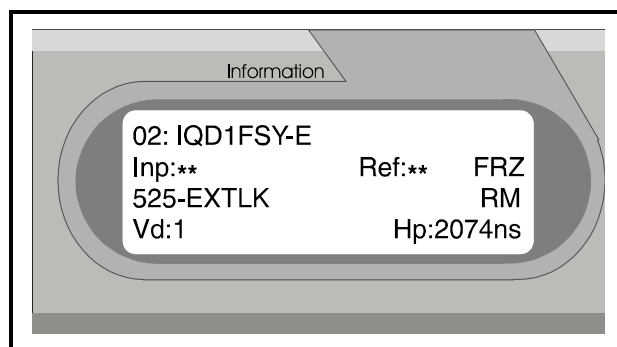
- FRZ** Unit has been set to the Freeze mode; the output picture is frozen
- AFZ** Unit has lost the input signal and the Auto Freeze mode activated; output picture is frozen
- PAT** Unit has been set to enable the test pattern signal as the output
- BLK** Unit has lost the input signal and the Auto Freeze mode is not activated; output picture will be black

The third line shows that the module is operating in the Delay mode (could be Ext Reference lock or Internal Lock mode) and that the line standard is 625 (could be 525).

Note that this text will be followed by RM if the unit is in the Roll mode.

The fourth line shows that in the Delay mode the Vertical Delay is 1 Line (could be Vp, the genlock vertical phase in synchronise mode) and that the Horizontal Delay is 2047 ns (could be Hp, the genlock horizontal phase).

In the next example the module is in the Freeze mode (FRZ), the Roll mode (RM), the External Lock mode (EXTLK) and both the input and reference signal have been lost (indicated by the * symbols)



RollTrack Audio Delay Tracking

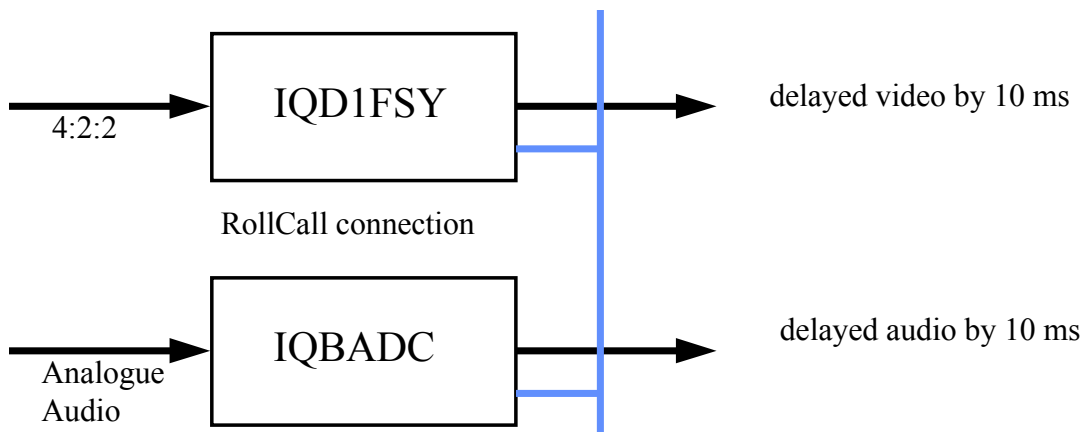
RollTrack is a feature of RollCall™ (Snell & Wilcox's proprietary remote control system), that allows devices to communicate across the RollCall network with no direct user intervention.

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.



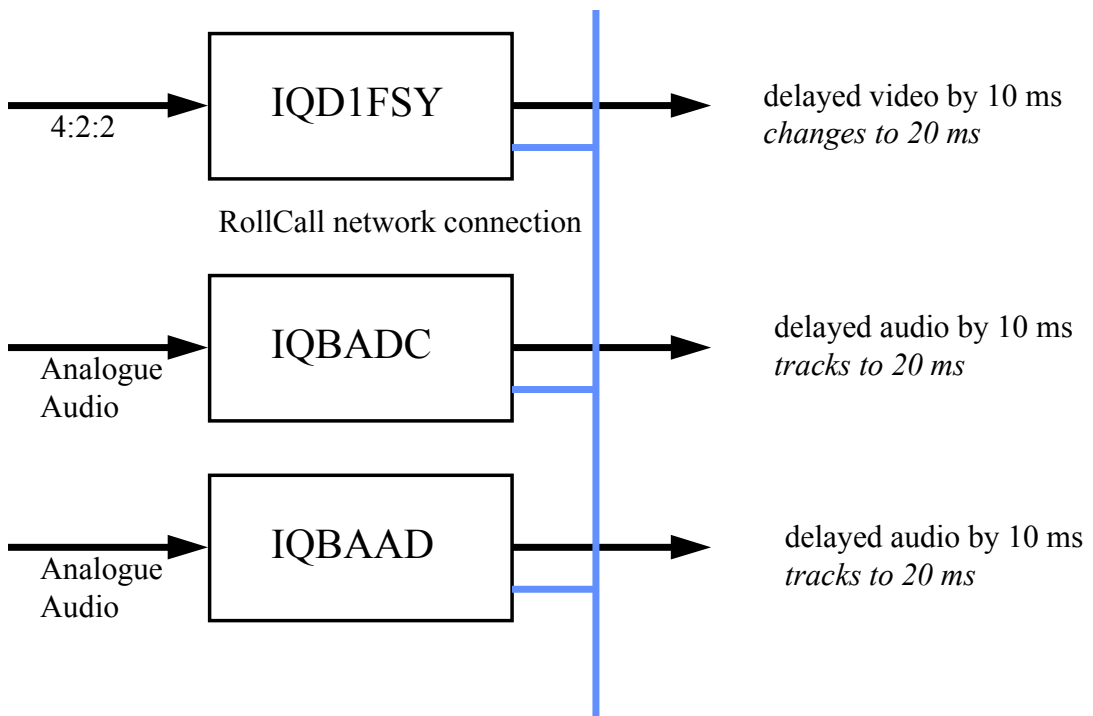
The next level of configuration is where there are multiple Frame Synchronizers (for example) each connected through RollCall™ to their own tracking Audio Delay. (It is worth stating that the synchronizers and audio delays do not have to be in the same enclosure; the addressing scheme, discussed later,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

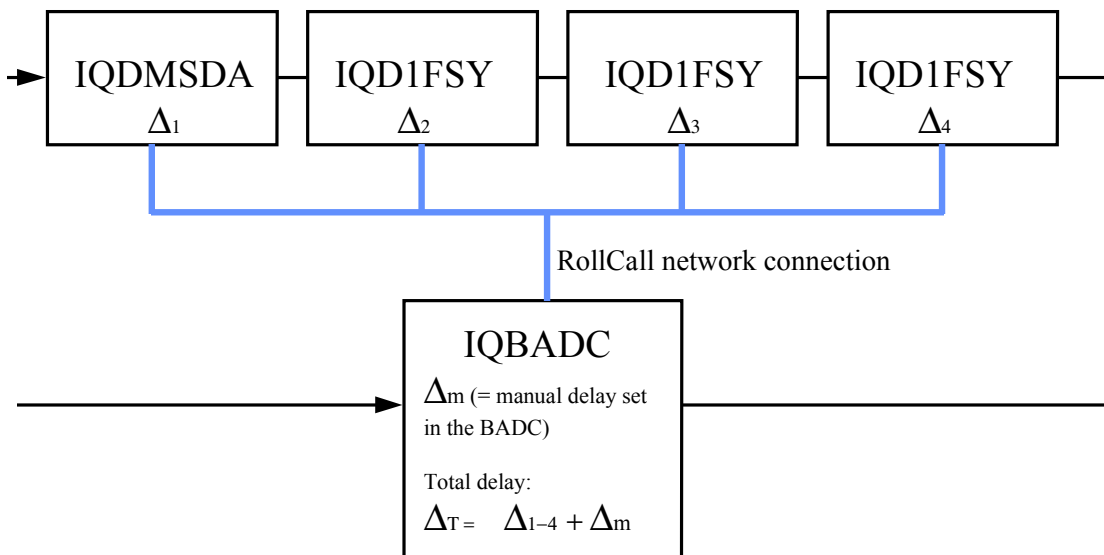
Module	ID
IQBADC	51
IQBDAC	52
IQBAAD	53
IQBDAD	54
IQBSYN	89
IQBADCD	107

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.



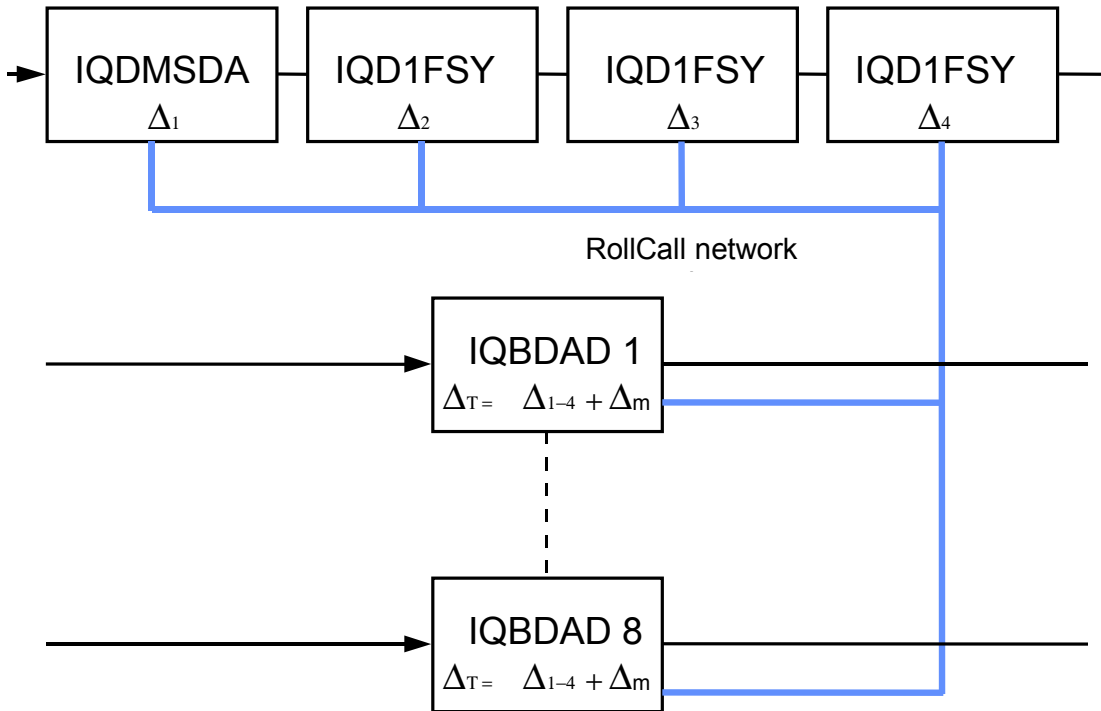
From one to eight audio delay products can be connected via RollCall™ to a single frame synchronizer, for example. If the synchronizer delay changes, then however many audio delays are connected will track the delay. The audio delays can also have a manual delay which will be added to the RollTrack delay.

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

