

IQDARCM/-R Fixed Mode Aspect Ratio Converter

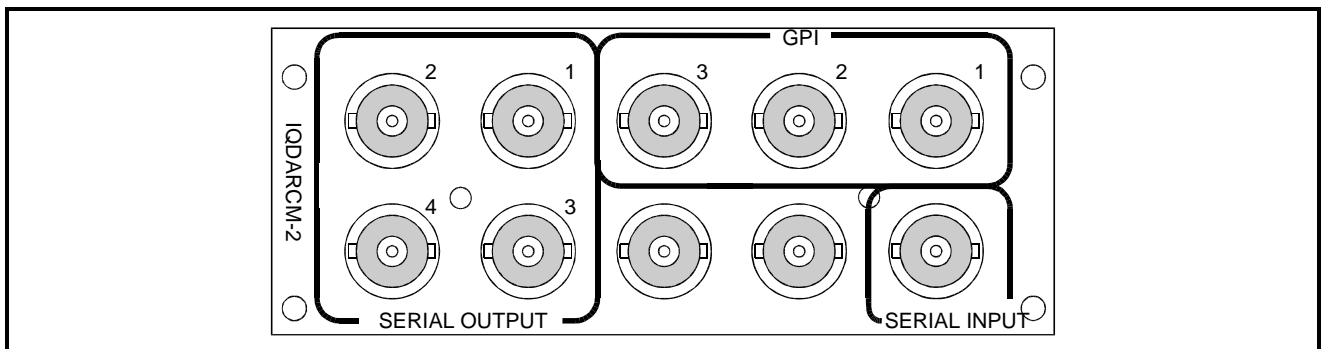
Module Description

The IQDARCM is a 10 bit, aspect ratio converter ideal for applications requiring fixed mode conversion. Comprehensive selections of up and down conversion modes are available. A proprietary vertical-temporal filter uses all picture lines to maximise the vertical resolution without motion artefact.

Key features

- Fixed conversions
- Letterbox, pillar box, edge crop, anamorphic
- Fixed delay of 1 frame
- All 10 bit processing
- Auto 525/625 detection
- Transparent vertical interval
- Ancillary data passed
- RollCall and GPI control

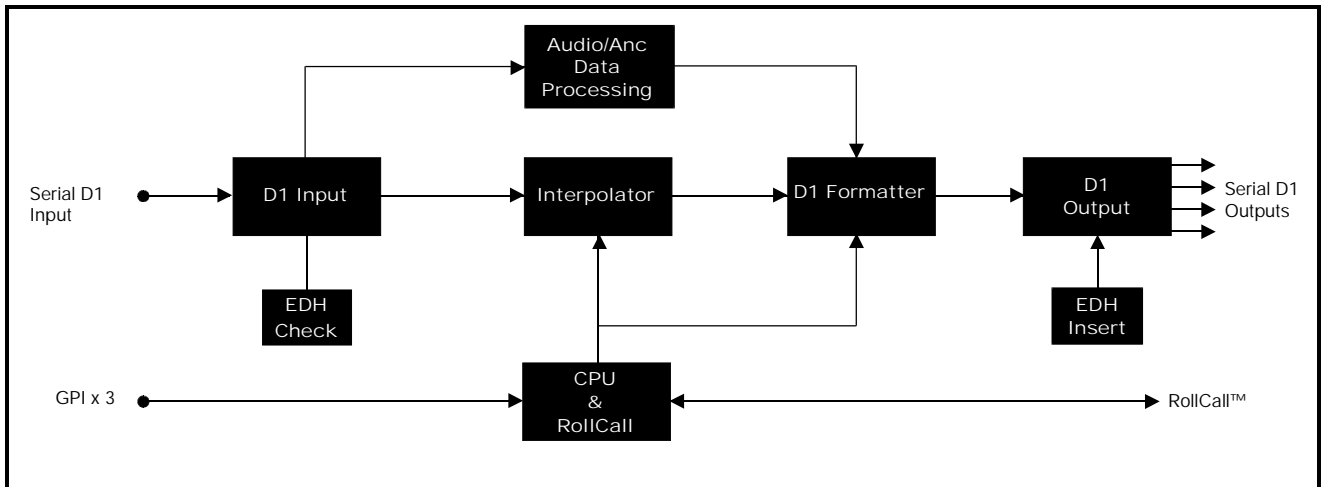
REAR PANEL VIEW



Versions of the module cards available are:

IQDARCM-2	Fixed Mode Aspect Ratio Converter four outputs	Double width module
IQDARCM-2-R	Fixed Mode Aspect Ratio Converter four outputs (no pan & tilt)	Double width module

BLOCK DIAGRAM



Features

- Aspect ratio conversion using vertical-temporal filtering
- 8 fixed up and down conversion modes
- Pan and Tilt position adjustment (not available on -R version)
- 10 bit data path
- Wide frequency response
- Horizontal enhancer
- Background colour control
- Frame Freeze
- 3 GPI inputs for rapid control
- Fixed 1 frame or minimum delay modes
- Automatic 525 / 625 operation
- Transparent to horizontal and vertical interval data
- EDH checking and insertion to SMPTE RP165
- RollCall remote control and monitoring

TECHNICAL PROFILE

Features

Signal Inputs

Serial Digital..... 1 x SDI
 GPI 3 Closing Contact style

Signal Outputs

Serial Digital..... 4 x SDI

Controls

Conversion Mode Select Terms

AA *Active image aspect ratio with reference to 9 (4:3 is 12:9 = 12)*
 B *Display Format*
P for pillar-box
L for letter-box
F for full-frame
 CC *Raster aspect ratio with reference to 9 (4:3 is 12:9 = 12)*

Conversion Mode Select

Input	Output	Comment (output)
12F12	12P16	16:9 pillar-box
12F12	14P16	16:9 pillar-box vertically cropped
16L12	12F12	Side cropped
16L12	14L12	Side cropped 14:9 letterbox
16L12	16F16	Full 16:9 picture
16F16	12F12	Side cropped
16F16	14L12	Side cropped 14:9 letterbox
16F16	16L12	16:9 letter box

Freeze Freeze Input
 Preset Unit..... Returns all settings to factory defaults

Additional Controls via RollCall™ Remote Control System

Pan control (upconversion) Adjustment across input active picture (not available on -R version)
 Pan control (down conversion) Adjustment within output active picture (not available on -R version)
 Tilt control (up conversion). Adjustment across input active picture (not available on -R version)
 Tilt control (down conversion) Adjustment within output active picture (not available on -R version)
 Zoom 95%, 98%, Full , 102%, 105%
 Bypass..... Passes input through unprocessed
 Enhancer Off, De-Enhance, Low, Medium, High.
 Vertical Data Preserve Line 21(525) 23(625) Preserve Video Index
 Minimum Delay On, Off
 Output Standard Auto, 625, 525
 Default Output Black, Black and Border, Border
 EDH..... Show/Reset Statistics
 RollTrack 1 to 8 units controlled
 Logging..... Input Change, EDH Errors
 Ratio Terminology..... WRT9 , PB/LB, Ratio
 Background Border colour control
 Black, Blue, Red, Green, White, Grey or two user defined RGB
 GPI configuration Select the function of each GPI input from a predefined list of options

Specifications

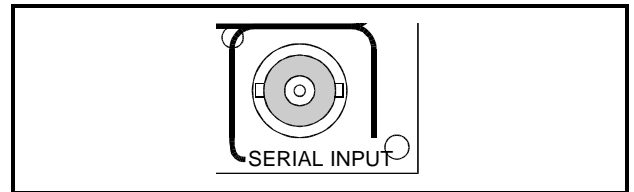
Serial Input Return Loss..... Better than 15 dB to 270 MHz
 Maximum Input Cable length
 >200 m (PSF1/2 or equiv. cable)
 Serial Output Level 800 mV ±10%

Output Return Loss..... Better than -15 dB to 270 MHz
 Output Jitter < 0.2UI
 Delay 1 Frame

INPUTS

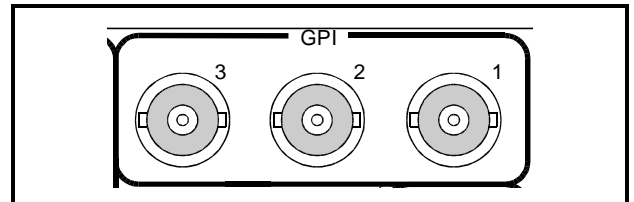
Serial Digital Video Input

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

**GPI**

These inputs will accept an external signal such as a contact closure and will activate a function selected via the RollCall remote control system.

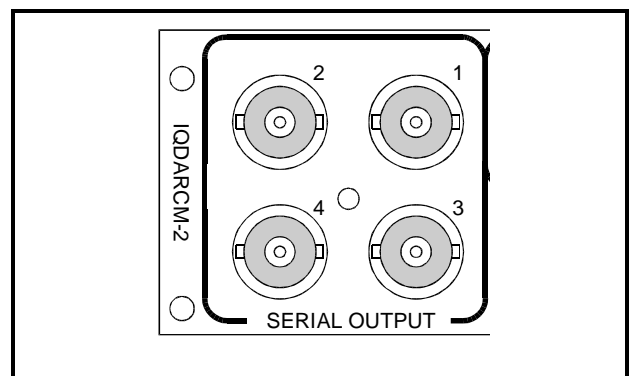
When enabled the interface will respond to a closed contact event from the BNC GPI input and enable the item selected from the **GPI/GPI_Function** menu item.



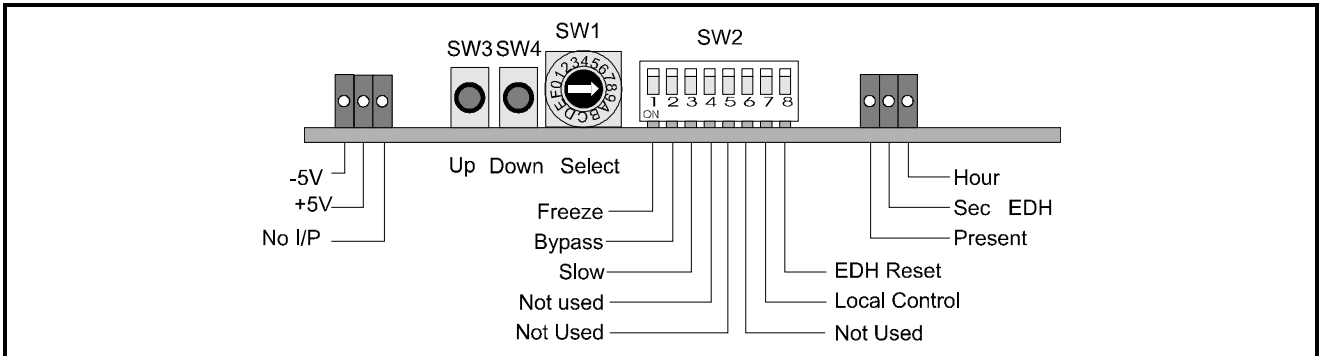
OUTPUTS

Serial Digital Video

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



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.

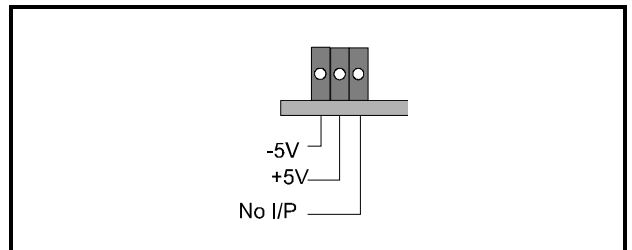
LED INDICATORS

+5V and -5V

When illuminated these LED's indicate that the +5 V and -5 V supplies are present.

No I/P

The **No I/P** LED will be continuously illuminated when the unit is not receiving an input signal.

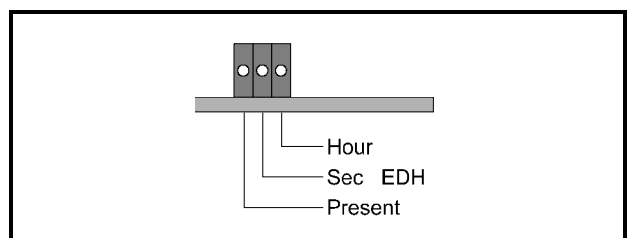


EDH Reporting

The **Present** LED will be illuminated if EDH data is present on the incoming signal.

The **Hour** LED indicates that an error has occurred in the last hour and the **Sec** LED indicates that an error has occurred in the last second.

Note that SW2/8 resets these indicators.



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

SWITCHES

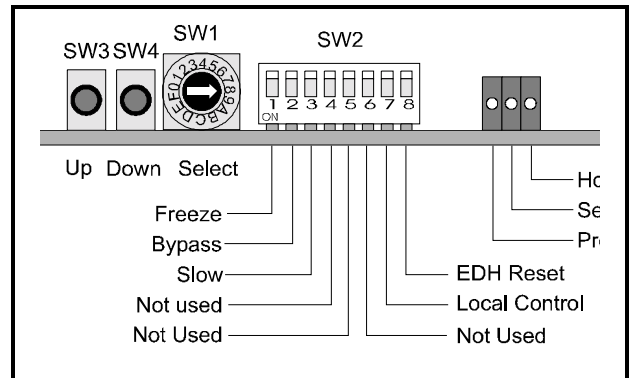
Two push buttons, a Hex switch and a 8 way DIL switch allow various functions and modes to be set.

The DIL switch SW2 selects a particular function and the Hex switch SW1 selects a mode or variable parameter.

The push buttons SW3, SW4 allow the value of the selected function/parameter to be adjusted.

The Mode select switch SW1 may select a mode or a parameter that may be adjusted.

Note that to select the preset value both buttons should be pressed together.



These switches allow the module to be operated when an active front panel is not available.

More detailed information about these functions will be found under *MENU DETAILS* starting on page 10.

FUNCTION AND MODE SELECTIONS

DIL SWITCH FUNCTIONS SW2

By setting these switches various modes of operation may be selected. (Down is ON and Up is OFF)

Position 1

Setting this to ON provides a **Freeze** frame picture.

Position 2

Setting to ON selects the **Bypass** mode. The input signal will pass through the electronics of the unit unprocessed.

Position 3

This function allows the transition speed during aspect ratio changes, to be selected.

- Slow: (ON) The change takes approximately 1 second
- Fast: (OFF) The change is within 2 frames

Positions 4, 5 and 6

These positions are not used.

Position 7

When set to ON (Down) this allows the unit to operate under **local control**.

Note that in Main-frames where RollCall™ is not available this switch should be set to the ON position. 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 UP position the card will power-up with the last settings sent by the remote control panel.

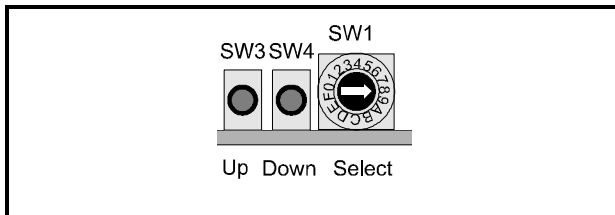
Position 8

Setting this to the ON position resets the **EDH** log indicators.

SW1

This HEX switch selects a parameter that may be adjusted with the push-buttons SW3 and SW4.

Note that SW4 decreases a setting and SW3 increases a setting. Continual pressure on the button will cause the setting to change continuously, the rate of change increasing with time. Pressing both together sets functions to their default values.



Position 0

This allows the **Aspect Ratio** to be selected.

Selections available are;

Pass (Output the same as input aspect ratio)

12F12->12P16
 12F12->14P16
 12F12->16F16
 16L12->12F12
 16L12->14L12
 16F16->12F12
 16F16->14L12
 16F16->16L12

Default setting is to Pass

When in Minimum Delay mode default is to

Pass

12F12 > 12P16
 16F16 > 12F12

For more details of the aspect ratio conversions see page 12.

Position 1 (not available on -R version)

This position allows the **Pan** function to be enabled.

The amount of Pan is variable within the active picture in steps of 148 ns

Default is centralised

Position 2 (not available on -R version)

This position allows the **Tilt** function to be enabled.

The amount of Tilt is variable in steps of 2 lines.

Default is centralised

Position 3

This position selects a fixed zoom function.

Selections are: 95%
 98%
 Full (100%)
 102%
 105%

Note that zoom values below 100% are zoom-out functions and the background area increases to compensate for the reduced picture size. Values above 100% are zoom-in functions

Position 4

This allows **Horizontal Enhancement** to be applied to the processed signal. The range of adjustment is off, de-enhance, low, medium and high.

Default setting is to Off.

Position 5

This position has no function

Position 6

This position sets the **Output Standard**

Selections are:

Auto The output standard will be the same as the input standard. If there is no input signal the output signal will become the default output signal (see below) in the last used operating standard
 625 The output standard will be 625 regardless of input standard
 525 The output standard will 525 regardless of input standard

Note that if the input standard is not the same as the standard selected above an error message will appear in the information window and the output will become the default output signal.

Default is to Auto

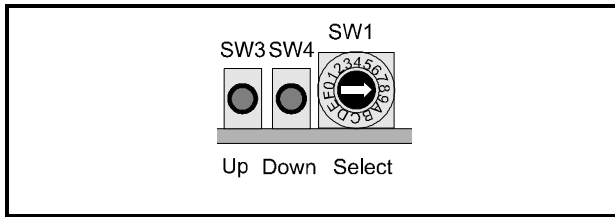
Position 7

This position sets the **Default Output** (the signal output when there is no input to the unit)

Selections are:

Black
 Black + Background
 Background

Note that the colour of the background will be that set up by the border colour function.



Position 8

This allows the **Border Colour** (the unused area outside the picture) to be selected.

Selections are:

Colour	Level
Black	0%
Blue	100%
Red	100%
Green	100%
White	100%
Grey	21%
User A	See below for level settings
User B	See below for level settings

Position 9

This allows the level of the **Red** colour used for the border to be set up for User A.

Note that level settings are from 0 to 1024 units.

Default is to 0 i.e. black

Position A

This allows the level of the **Green** colour used for the border to be set up for User A.

Note that level settings are from 0 to 1024 units.

Default is to 0 i.e. black

Position B

This allows the level of the **Blue** colour used for the border to be set up for User A.

Note that level settings are from 0 to 1024 units.

Default is to 0 i.e. black

Position C

This allows the level of the **Red** colour used for the border to be set up for User B.

Note that level settings are from 0 to 1024 units.

Default is to 0 i.e. black

Position D

This allows the level of the **Green** colour used for the border to be set up for User B.

Note that level settings are from 0 to 1024 units.

Default is to 0 i.e. black

Position E

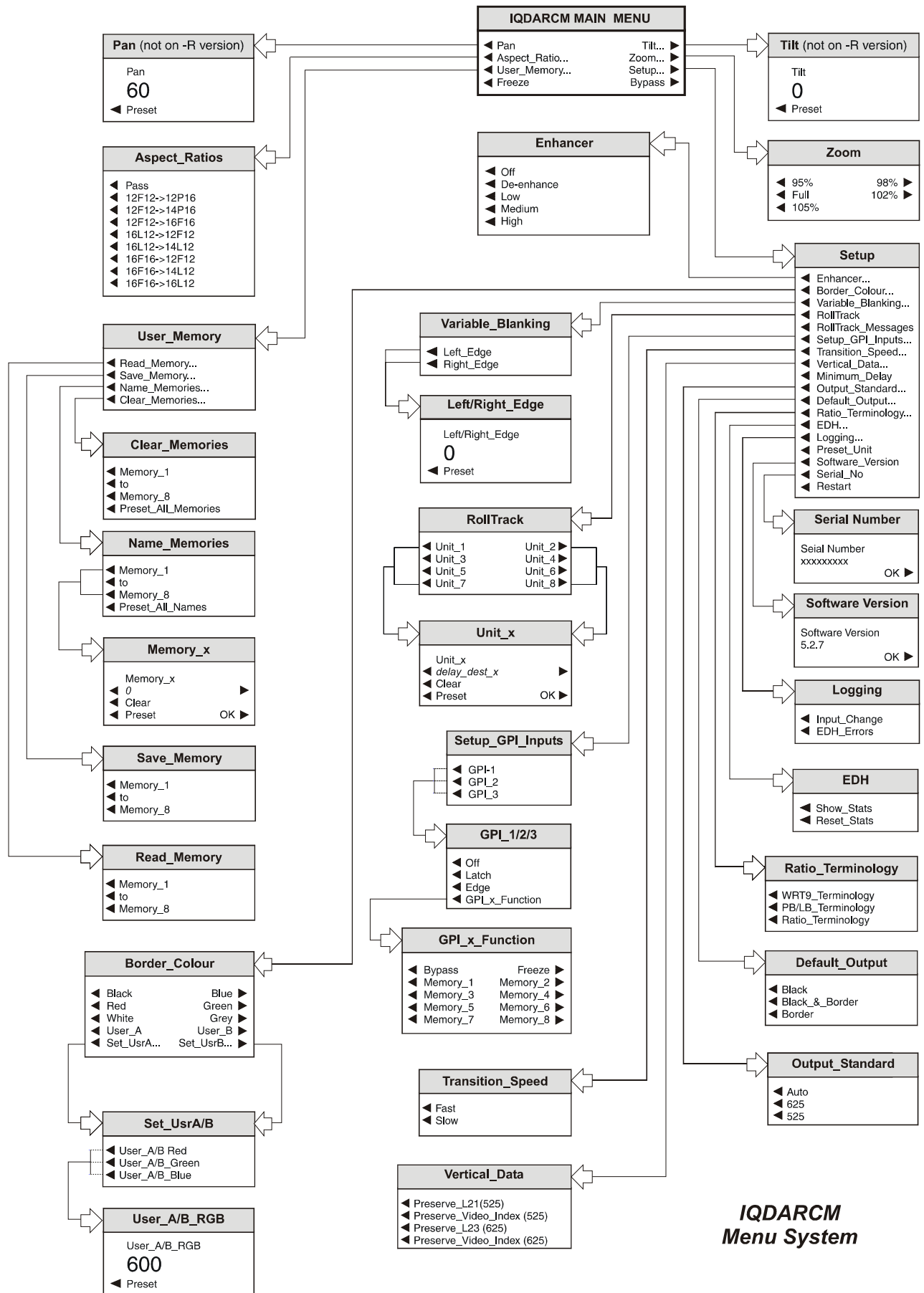
This allows the level of the **Blue** colour used for the border to be set up for User B.

Default is to 0 i.e. black

Note that level settings are from 0 to 1024 units.

Position F

In this position pressing SW1 and SW2 together sets all parameters to the **default/preset** conditions.



***IQDARCM
Menu System***

OPERATION FROM AN ACTIVE CONTROL PANEL

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

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

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

MENU DETAILS (see IQ Menu System Drawing)**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.

◀ Pan (not available on -R version)

This position allows the **Pan** function to be enabled.

Selecting this item reveals a display showing the pan amount. Rotating the spin-wheel will adjust this value.

The amount of Pan is variable within the active picture.

(not available on -R version) Tilt ▶

This position allows the **Tilt** function to be enabled.

Selecting this item reveals a display showing the Tilt amount. Rotating the spin-wheel will adjust this value.

The amount of Tilt is variable within the active picture in steps of 2 lines.

◀ Aspect Ratios

This function allows the following input-to-output aspect ratio conversions to be selected:

Pass (Output the same as input aspect ratio)

12F12->12P16

12F12->14P16

12F12->16F16

16L12->12F12

16L12->14L12

16F16->12F12

16F16->14L12

16F16->16L12

When in Minimum Delay mode default is to

Pass

12F12 > 12P16

16F16 > 12F12

Default setting is to Pass

Description Field

PB Pillar-box

LB Letter-box

FH Full Height

RollCall menu AABCC

Where AA = Active image aspect ratio with reference to 9 (4:3 is 12:9 = 12)

B = Display format P for pillar-box
L for letter-box
F for full-frame

CC = Raster aspect ratio with reference to 9 (4:3 is 12:9 = 12)

See next page for full details of the conversions.

CONVERSION DETAILS

Input		Transformation	Output	
4:3	16:9		4:3	16:9
		Description: 4:3 to 16:9 PB Menu: 12F12 to 12P16 Ratios: V: 1 H: ¾		
		Description: 4:3 to 14:9 PB Menu: 12F12 to 14P16 Ratios: V: 7/6 H: 7/8	Active image is vertically cropped	
		Description: 4:3 to 16:9 FH Menu: 12F12 to 16F16 Ratios: V: 4/3 H: 1		
		Description: 16:9 to 4:3 LB Menu: 16L12 to 12F12 Ratios: V: 4/3 H: 4/3		Active image is side cropped
		Description: 16:9 to 14:9 LB Menu: 16L12 to 14L12 Ratios: V: 8/7 H: 8/7		Active image is side cropped
		Description: 16:9 to 4:3 FH Menu: 16F16 to 12F12 Ratios: V: 1 H: 4/3		Active image is side cropped
		Description: 16:9 to 14:9 LB Menu: 16F16 to 14L12 Ratios: V: 6/7 H: 8/7		Active image is side cropped
		Description: 16:9 to 4:3 LB Menu: 16F16 to 16L12 Ratios: V: ¾ H: 1		

Zoom ►

This menu selects a fixed zoom function.

Selections are:

95%
98%
Full (100%)
102%
105%

Note that zoom values below 100% are zoom-out functions and the background area increases to compensate for the reduced picture size. Values above 100% are zoom-in functions

◀ User_Memory

All settings of the unit may be stored in any of 8 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-menu.

◀ Read_Memory

This will reveal a list of 8 memory locations. When a particular location is enabled, settings will be changed to the values contained in that memory location.

◀ Save_Memory

This will reveal a list of 8 memory locations. When a particular location is enabled, current settings will be saved in that memory location.

◀ Name_Memories

This function will allow each of the 8 memory locations to be named.

It will reveal a list of the 8 memory locations that may be given a specific name. To rename a memory location when operating in a particular standard:

Select the memory location to be renamed e.g.

◀ Memory_1

To compile/edit the text the right ► and left ◀ buttons adjacent to the upper text line in the menu should be used to select the character position in the text and the spinwheel used to select the character.

The ◀ **Clear** function blanks out the selected character.

The ◀ **Preset** function loads the default text.

O.K. ► saves the caption text and returns to the main menu.

◀ Preset_All_Names

Selecting this function will reset all the memory names to their default names.

◀ Clear_Memories

This will reveal a list of the 8 memory locations that may be selected and individually cleared to their default settings or all using Preset_All_Names.

Set_Up ►

◀ Enhancer

This allows Horizontal enhancement to be applied to the processed signal. The non-linear process prevents enhancement of low amplitude signals typical of noise.

The range of enhancement adjustment is off, De-Enhance, low, medium and high. Default is to Off.

◀ Border Colour

This allows the **Border Colour** (the unused area outside the picture) to be selected.

Specific colours may be selected or two custom set-ups are available from User_A and User_B items.

Selections are:

Black
Blue
Red
Green
White
Grey
User_A
User_B
Set_Usr_A
Set_Usr_B

◀ User_A and User_B

This selects either User_A or User_B

◀ Set_Usr_A and Set_Usr_B

This function allows custom settings of red, green and blue to be adjusted.

Note that level settings are from 0 to 1024.

◀ Variable Blanking

This function allows the left and right horizontal blanking edges to be moved into the active picture in downconversion modes.

◀ Left Edge

The left edge may be moved from 0 to 40 pixels in 20 steps (each single step is 2 pixels)

◀ Right Edge

The left edge may be moved from 0 to -40 pixels in 20 steps (each single step is 2 pixels)

◀ RollTrack

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 called **RollTrack**.

For more detailed information, see the RollTrack section (Appendix) at the end of this manual.

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

Selecting **RollTrack** provides a sub-menu that allows up to 8 audio delays to be selected as a destination.

◀ Unit_1	Unit_2▶
◀ Unit_3	Unit_4▶
◀ Unit_5	Unit_6▶
◀ Unit_7	Unit_8▶

When a unit is selected a further sub-menu then appears to allow the code to be set up.

To edit the text the buttons adjacent to the upper text line in the menu are used to select the character position in the text and the spinwheel used to select the character.

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

(The right ▶ and left ◀ 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 of this manual.

The full network address has five sets of numbers.

For example: 0000:10:01*14*51

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.

The fifth set (51) is the board type identification.

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.

◀ RollTrack Messages

Selecting this item will cause messages to appear in the information window if the unit has **failed** to communicate RollTrack messages to the selected destination.

This could occur if an incorrect RollTrack address has been entered or the intended destination device is not available.

◀ Setup_GPI_Inputs

The three GPI connectors are 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.

The required GPI input should be selected:

- ◀ GPI-1
- ◀ GPI-2
- ◀ GPI-3

The GPI input has four user selectable modes of operation:

- ◀ Off

Function inactive

- ◀ Latch

When the contact is closed the function is activated; when the contact is open, the function is de-activated.

- ◀ Edge

(Edge-triggered) With each open-to-closed trigger the GPI function is toggled between activated and de-activated.

- ◀ GPI_x_Function

The action resulting from the selected GPI input being activated may be programmed from this list:

Setting	Action
◀ Bypass	Function inactive
◀ Freeze	Enables the freeze function
◀ Memory_x ▶	Selects a memory location

◀ Transition_Speed

This function allows the transition speed during aspect ratio changes, to be selected.

- ◀ Fast: The change is within approximately 2 frames
- ◀ Slow: The change takes approximately 1 second

◀ Vertical_Data

- ◀ Preserve_Line_21 (525)

When highlighted line 21, and 283 is passed through unprocessed, when not highlighted they are blanked.

- ◀ Preserve_Video_Index (525)

When highlighted line 14 and 277 chroma is passed through unprocessed; when not highlighted the chroma information on these lines is blanked.

- ◀ Preserve_Line_23 (625)

When highlighted, line 23 and 336 in PAL mode, are passed through unprocessed, when not highlighted they are blanked.

- ◀ Preserve_Video_Index (625)

When highlighted line 11 and 324 chroma is passed through unprocessed; when not highlighted the chroma information on these lines is blanked.

◀ Minimum_Delay

This mode produces the minimum input/output delay (approx <2 lines) and may be used where audio delay problems may exist and cannot be compensated for.

Note that in this mode only aspect ratio conversions are available:

12F12 > 12P16 and 16F16 > 12F12

◀ Output_Standard

- Auto The output standard will be the same as the input standard. If there is no input signal the output signal will become the default output signal (see below) in the last used operating standard
- 626 The output standard will be 625 regardless of input standard
- 526 The output standard will 525 regardless of input standard

Note that if the input standard is not the same as the standard selected above an error message will appear in the information window and the output will become the default output signal.

Default is to Auto

◀ Default_Output

This position sets the **Default Output** (the signal output when there is no input to the unit)

- ◀ Black
- ◀ Black_&_Border
- ◀ Background

Note that the colour of the background will be that set up by the border colour function.

◀ Ratio_Terminology

This function allows three types terminology to be selected that describes the aspect ratios.

- ◀ WRT9_Terminology
- ◀ PB/LB_Terminology
- ◀ Ratio_Terminology

◀ EDH

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

◀ 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.

◀ Reset_Stats (Statistics)

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

◀ 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 Change

When activated, a change of input 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.

◀ Restart

This function allows the unit to reboot and all power-up settings to be enabled. This is an easier method than switching the mains power on and off.

◀ Freeze

Enabling this toggle function provides a **Freeze** frame picture.

Bypass ▶

This toggle function selects the **Bypass** mode. When enabled the input signal will pass through the electronics of the unit unprocessed.

RollTrack Audio Delay Tracking

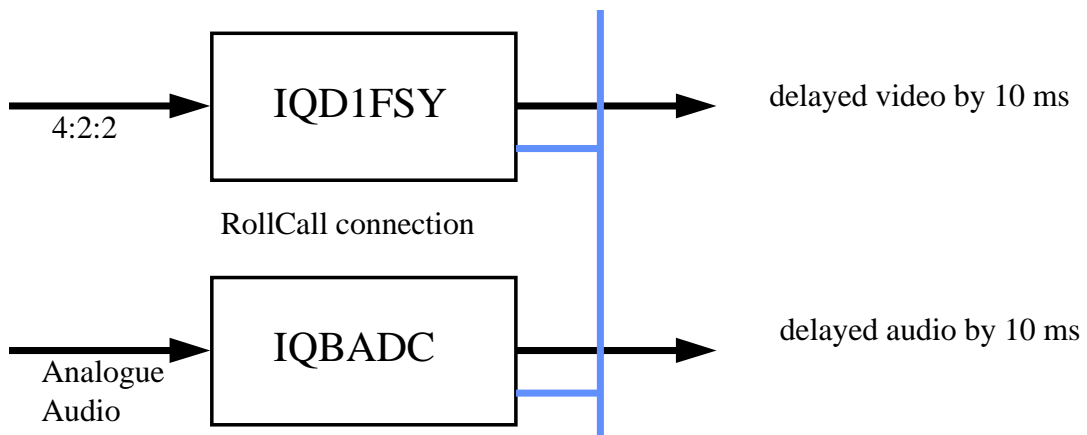
RollTrack is a feature of RollCall™ (Snell & Wilcox's proprietary remote control system), that allows devices to communicate across the RollCall network with no direct user intervention.

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.



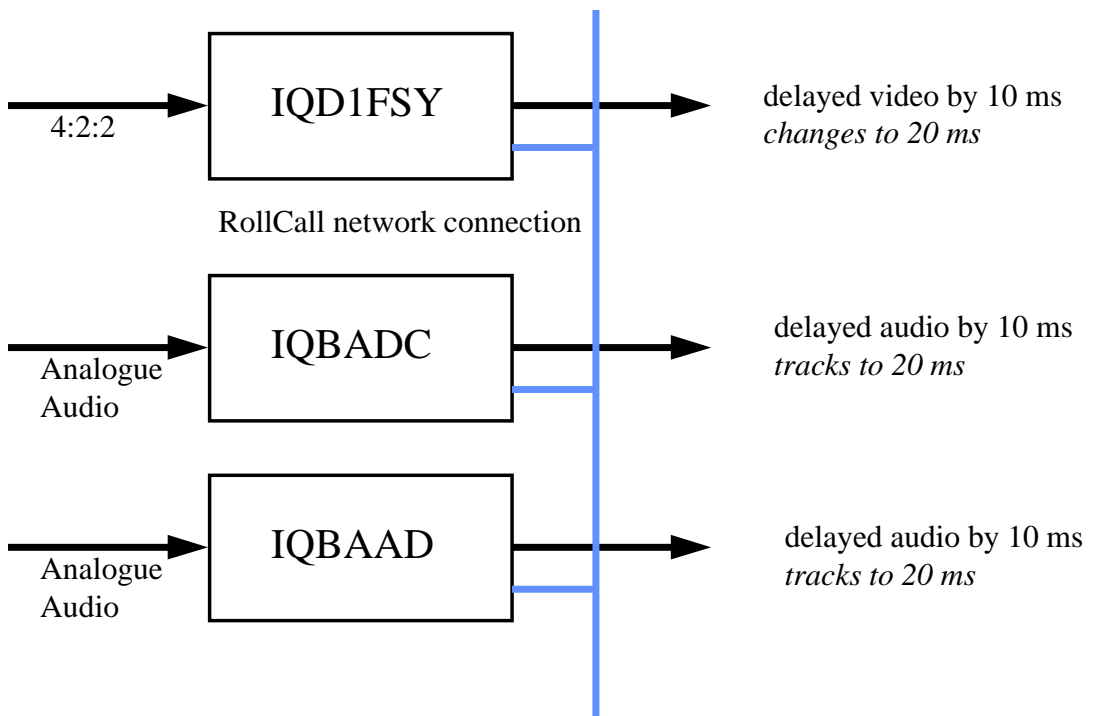
The next level of configuration is where there are multiple Frame Synchronizers (for example) each connected through RollCall™ to their own tracking Audio Delay. (It is worth stating that the synchronizers and audio delays do not have to be in the same enclosure; the addressing scheme, discussed later,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

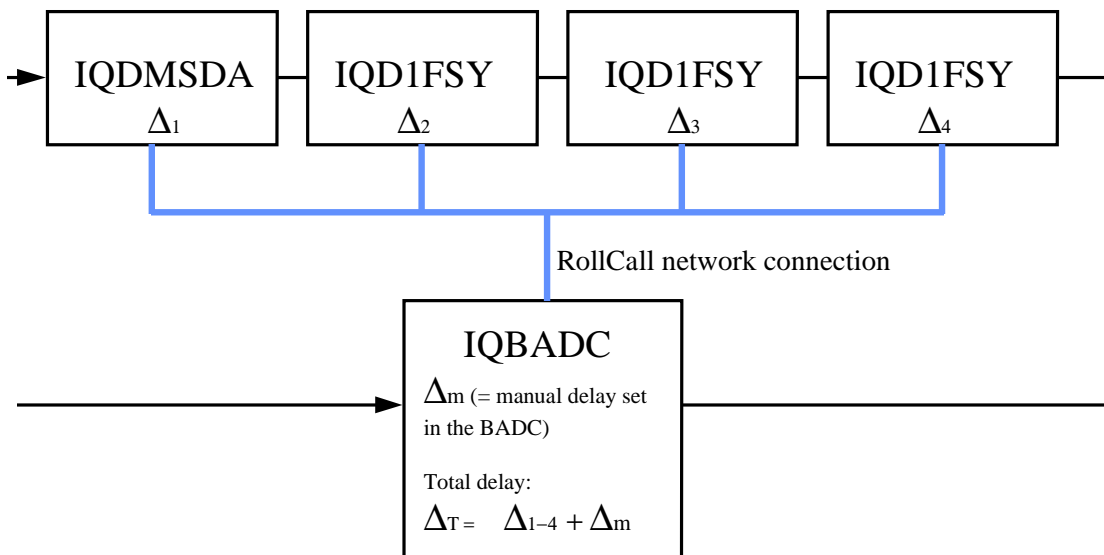
Module	ID
IQBADC	51
IQBDAC	52
IQBAAD	53
IQBDAD	54
IQBSYN	89
IQBADCD	107

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.



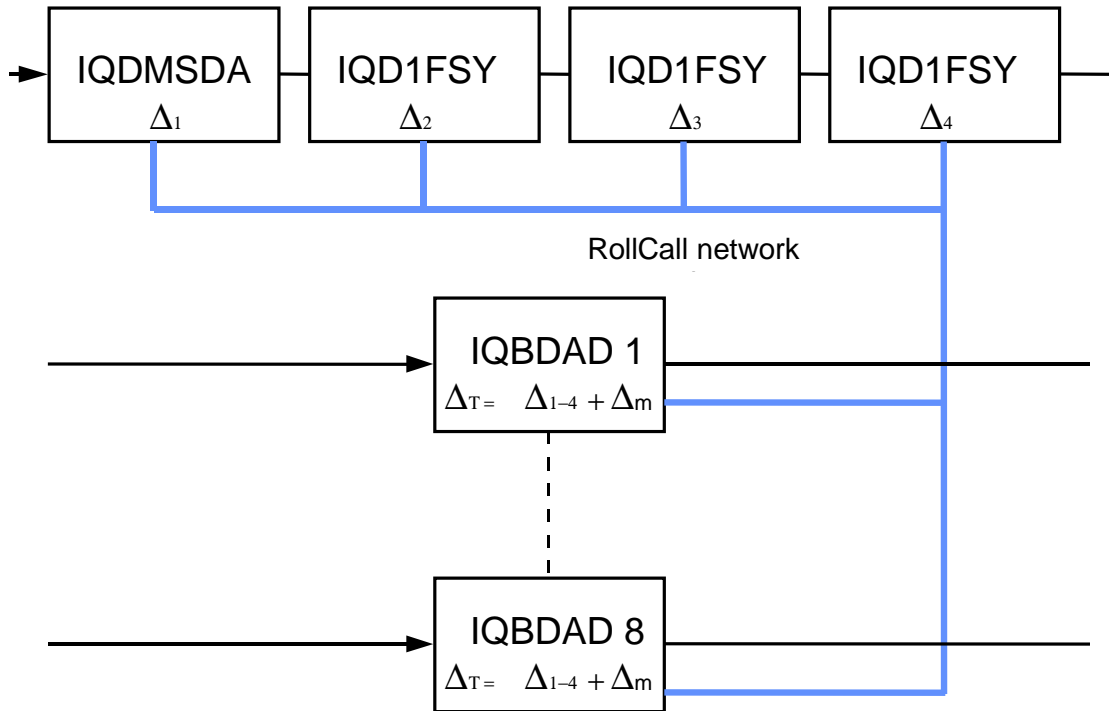
From one to eight audio delay products can be connected via RollCall™ to a single frame synchronizer, for example. If the synchronizer delay changes, then however many audio delays are connected will track the delay. The audio delays can also have a manual delay which will be added to the RollTrack delay.

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

