

IQBSYD Dual Digital Audio Synchroniser with 2 x 2 Router



Module Description

The IQBSYD synchronises and sample rate converts the sampling of two input stereo channels to either a 48 kHz AES/EBU reference or video black. Digital audio sample rates of 32, 44.1 and 48 kHz are automatically detected, however input sample rates between 25 and 55 kHz may be applied. All internal processing is at 20-bit, with the final result after rate conversion of 24 bits at 48 kHz. In the absence of a reference the output will be re-sampled to an internal reference of 10 ppm, or optionally 1 ppm stability. A 2x2 cross-point switch follows the synchroniser. An additional mode allows this switch to be configured as a cross-fader with both X and V fade patterns available.

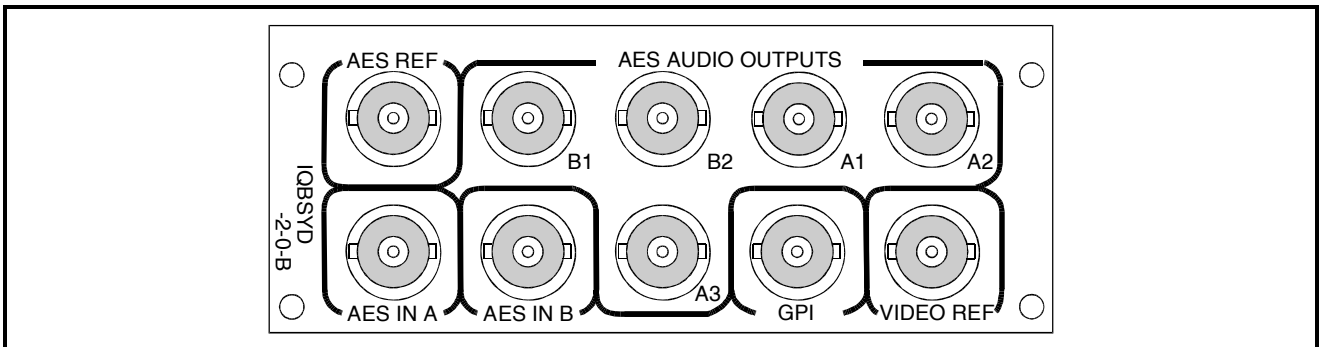
For added flexibility, three outputs are provided for output A and two for output B. The AES/EBU inputs are capable of receiving digital audio from either up to 150 m of AES approved quality cable for balanced inputs, or up to 500 m of RG59B or equivalent cable for unbalanced inputs.

A GPI port is included, and is RollCall controlled only. The GPI port will enable the user to change the output assignments for either or both of the outputs with a closed contact (level or pulse) trigger.

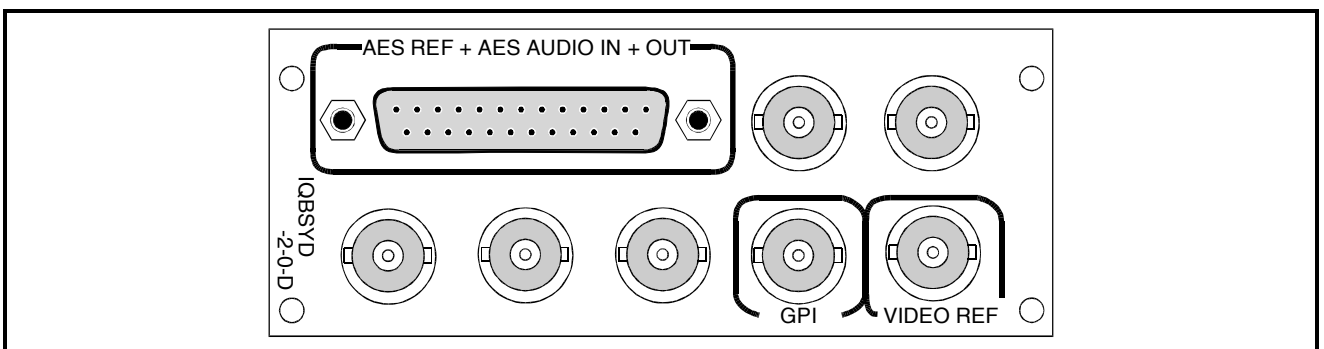
RollCall provides full remote control and monitoring.

REAR PANEL VIEWS

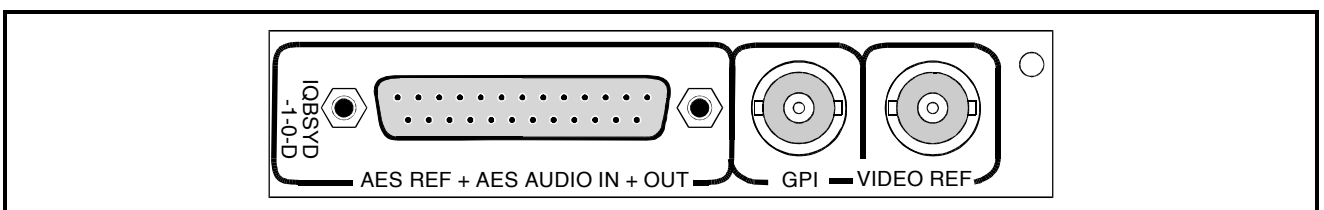
Unbalanced Audio Interfaces



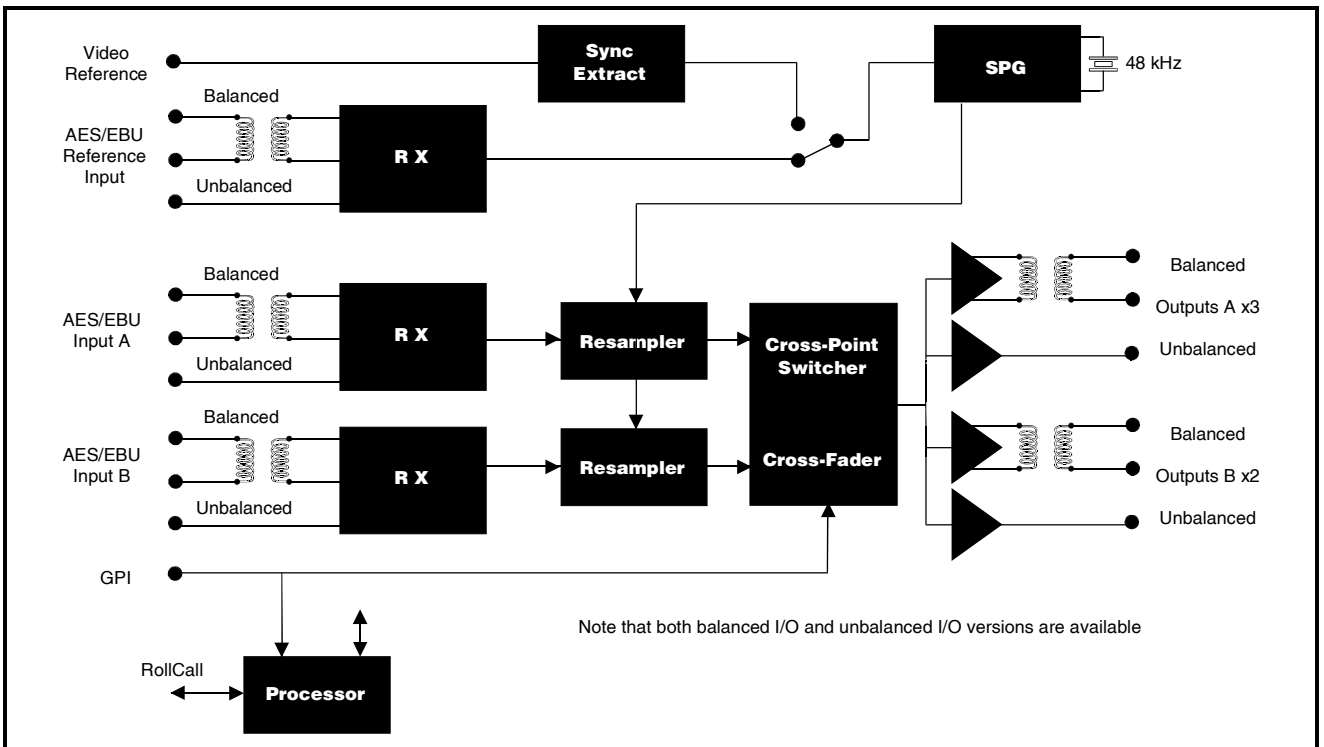
Balanced Audio Interfaces



Balanced Audio Interfaces



BLOCK DIAGRAM



Versions of the module cards available are:

IQBSYD-2-0-D	AES I/O connections via 25 way 'D' connector	Double width module
IQBSYD-2-0-B	AES I/O connections via BNC connectors	Double width module
IQBSYD-1-0-D	AES I/O connections via 25 way 'D' connector	Single width module
IQBSYD-1-S-D	AES I/O connections via 25 way 'D' connector 1 ppm Xtal	Single width module
IQBSYD-2-S-B	AES I/O connections via BNC connectors 1 ppm Xtal	Double width module
IQBSYD-2-S-D	AES I/O connections via 25 way 'D' connector 1 ppm Xtal	Double width module

Features

- Dual Stereo 20 bit re-sampling to 48 kHz AES/EBU reference or video black
- Output via 2x2 cross-point or cross-fader (X or V-fading user selectable)
- Automatic 32, 44.1 and 48 kHz input detection
- Built in reference generator with Grade 1 reference option
- Peak Programme Meter with adjustable 0dBu reference
- GPI Interface for closed contact function activation (RollCall user selectable only)
- Low Level Indicator (below -66 dBFS)
- Channel Status monitor for AES receiver and transmitter
- Channel Status editor for Destination and Origin, can be inserted or be transparent
- Output digital silence when there is no input present.
- 2 Transformer coupled balanced inputs (-D types)
- Optional 2 Transformerless unbalanced inputs (-B types)
- Transformer coupled balanced outputs (-D types)
- Optional Transformerless unbalanced outputs (-B types)
- Four memory locations for storage and recall of selected parameters
- Can receive digital audio from up to 150 m of AES cable (balanced inputs) or 500 m RG59B or equivalent (unbalanced inputs)
- RollCall remote control and reporting

TECHNICAL PROFILE

Features

Signal Inputs

AES/EBU Digital Audio	2 Channel + reference (2 Stereo Pairs) Balanced via 25way D (-D version) Unbalanced via BNC (-B Version)
Video Reference	525 or 625 line video black via BNC connector
GPI control (RollCall enabled)	Pulse, Level or closed contact input for function
Standards	AES3-1992

Signal Outputs

AES Digital Audio	3 + 2 Serial Digital Balanced (-D versions) 3 + 2 Serial Digital Unbalanced (-B versions)
Standards	AES3-1992

Card Edge Controls (also available via RollCall)

Configure outputs.....	Configure outputs from any of the two inputs or output silence
Fade type.....	X-fade or V-fade
Fading period.....	Select fading period from 0 to 3 seconds in 0.2 second steps, common for both outputs A and B
Lock select.....	Free run or lock to AES or Video

Indicators

Peak Level.....	Illuminates when input A or B peaks at 0 dBFS
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Specifications

Input/Output Impedance.....	Balanced 110 Ohm Unbalanced 75 Ohm
Input Cable Length.....	Balanced, >150 m of AES3 Cable Unbalanced, 500 m of RG59 or Equivalent
Output level.....	Balanced 3 V pk to pk typical Unbalanced 1 V \pm 0.1 V pk to pk
Insertion Delay.....	Approx. 900 μ s
Signal Input Sample Frequency	25 to 55 kHz
Reference Input Sample Frequency	48 kHz
Output Sampling	48 kHz frame locked to 48 kHz AES/EBU Reference, 48 kHz frame locked to PAL video reference, 48 kHz frame locked to every 5th frame of an NTSC video reference (Conforms to AES11 – 1997 spec)

Low Level.....	Illuminates when input A or B falls below -66 dBFS
Sync Loss	Illuminates when locking source is lost
Error on inputs A and B.....	Illuminates when there is an error on the AES inputs
Power OK	+5V, -5V

Functions Available via RollCall™ Only

Input Sample Rate Detect..	Automatic 32, 44.1, 48 kHz detection
GPI port control.....	Enable GPI control, and GPI trigger type selectable from: - High or low level trigger Positive or negative pulse trigger GPI Activation's selectable from: - Fade between Input A and Input B -> output A Fade between Input A and Input B -> output B Synchronous fade both outputs A and B
Fading period	Independently select the fading period from 0 to 3 seconds in 0.2 second steps for outputs A and B
Channel Status Monitor.....	Displays Channel Status information for both receiver and transmitter
Channel Status Editor	Origin and Destination editor, can be inserted or be transparent
Peak Programme Meter	Scale of 0 - 7, in 4 dB steps, adjustable 0 dBu reference ('4') -10 to -24 dBFS.

THD+N.....	< -117 dB at 700 Hz (24-bits)
Fader Law	X – Fade = Linear V – Fade = Audio log taper
Fader cut-off level	-48 dBFS
Digital reference Input Pull-In Range	+2 Hz to -2 Hz
Free run stability Grade 2...	\pm 10 ppm
Optional Grade 1 DTCXO ..	\pm 1 ppm max w.r.t. nominal frequency at +25°C

Power Consumption

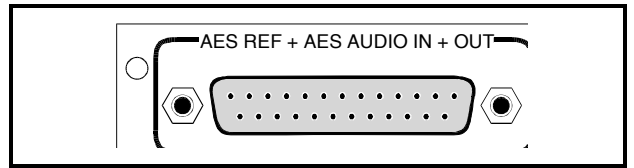
Module Power Consumption	3.9W max
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INPUTS AND OUTPUTS

(-D versions)

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

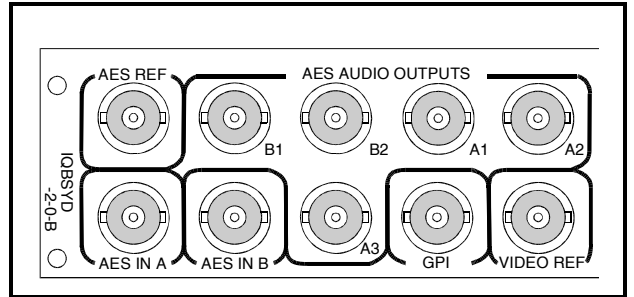
For connection data consult the tables on page 5.



(-B versions)

All AES input and output connections are made via these BNC connectors.

For connection data consult the tables on page 5.



GPI Input

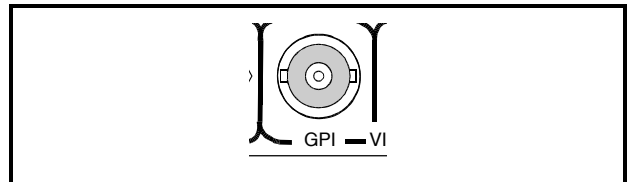
This BNC connector accepts control signal inputs from various devices to enable fade commands.

GPI Input

This function may only be selected via the RollCall remote control system.

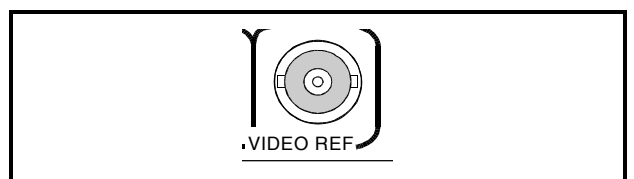
For more details see **GPI_Setup** on page 17.

When selected the interface will respond to an event from the BNC GPI input and enable the item selected from the GPI_Setup menu.



Video Reference Input

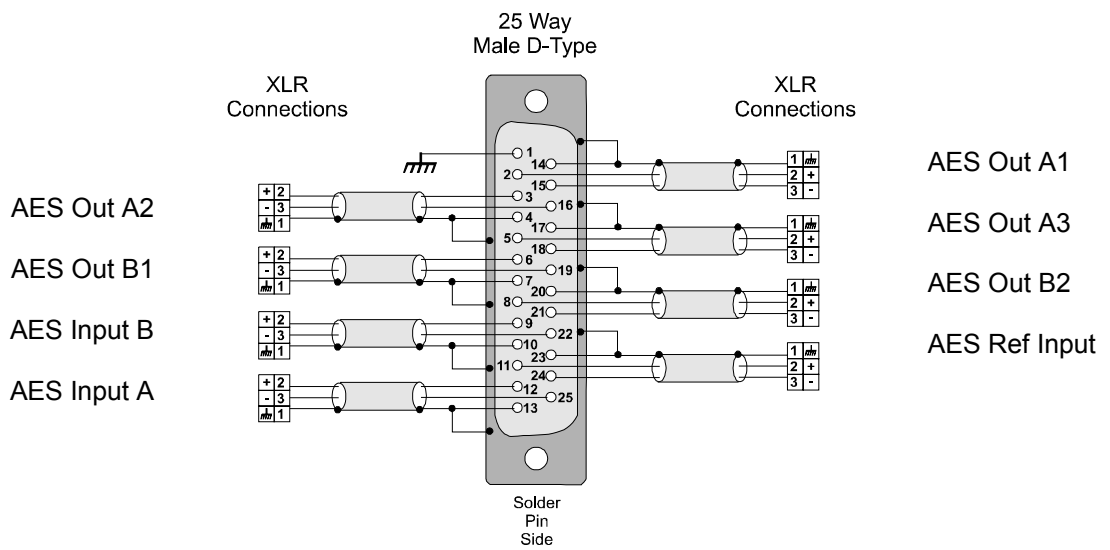
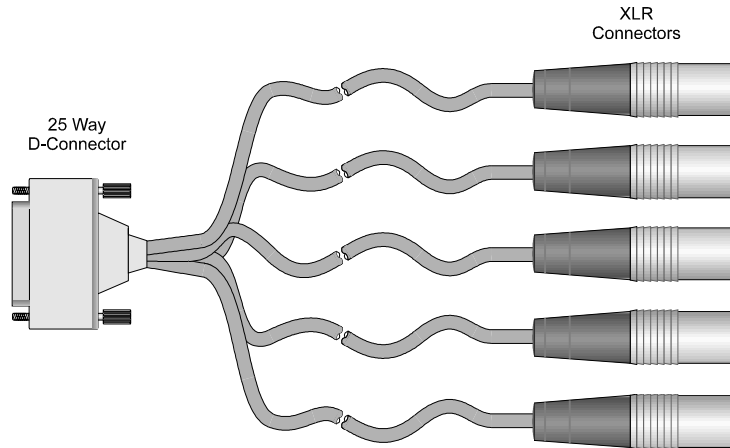
A standard analog video or black burst reference signal may be connected to this BNC connector. The signal is terminated internally at 75 Ohms.



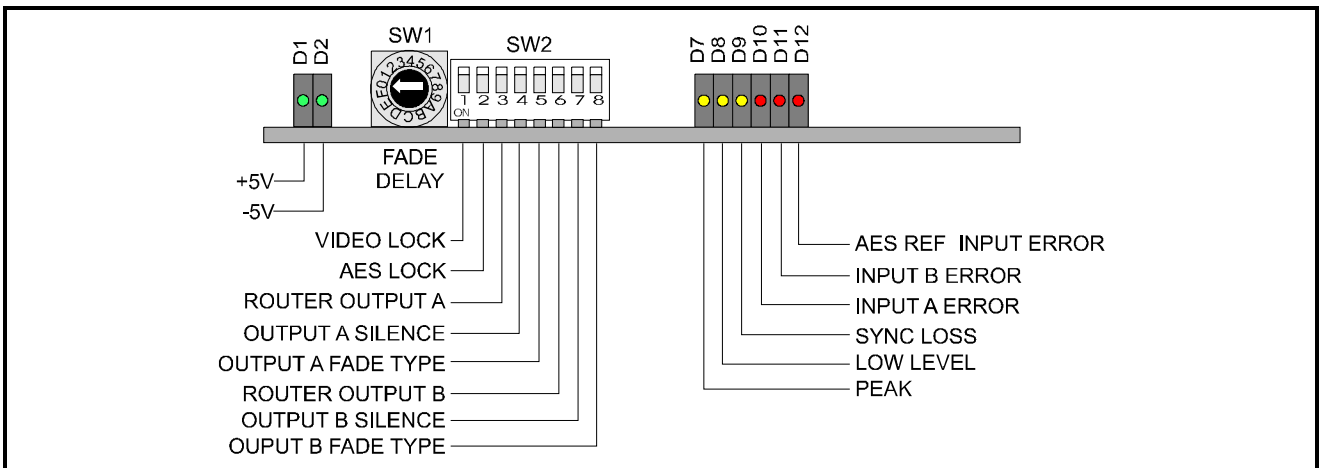
Connection Details (-D Versions)

25 Way D Connector Pin Number	Description	Ribbon Cable Strand Number	Standard Pin Assignment
1		1	CHASSIS
14	AES OUT A1 Ground	2	GND1
2	AES OUT A1 +	3	1+
15	AES OUT A1 -	4	1-
3	AES OUT A2 +	5	2+
16	AES OUT A2 -	6	2-
4	AES OUT A2 Ground	7	GND2
17	AES OUT A3 Ground	8	GND3
5	AES OUT A3 +	9	3+
18	AES OUT A3 -	10	3-
6	AES OUT B1 +	11	4+
19	AES OUT B1 -	12	4-
7	AES OUT B1 Ground	13	GND4
20	AES OUT B2 Ground	14	GND5
8	AES OUT B2 +	15	5+
21	AES OUT B2 -	16	5-
9	AES IN B +	17	6+
22	AES IN B -	18	6-
10	AES IN B Ground	19	GND6
23	AES REF IN Ground	20	GND7
11	AES REF IN +	21	7+
24	AES REF IN -	22	7-
12	AES IN A+	23	8+
25	AES IN A-	24	8-
13	AES IN A Ground	25	GND8

Example of Connection Details to XLR Connectors (-D Versions)



CARD EDGE CONTROLS



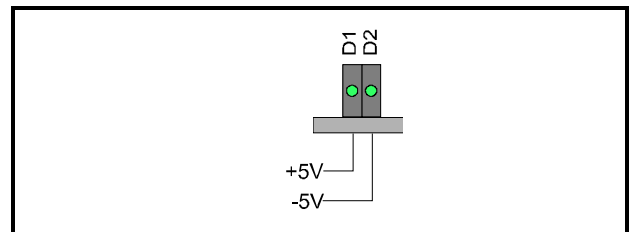
Adjustment of the settings of the **IQBSYD** is available either via card edge controls and/or via a more comprehensive remote control system using RollCall™

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 D1 and D2

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



Peak Power D7

This indicator will become illuminated when the peak digital value is detected on the Right or Left channels.

Low Level D8

This indicator will become illuminated when the input level falls below -66 dBFS.

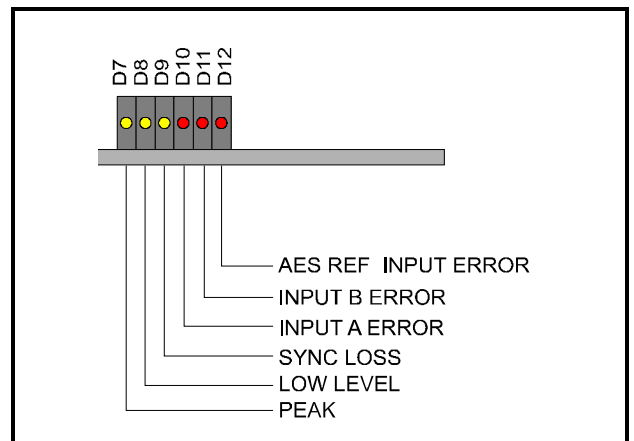
Sync Loss D9

This indicator will become illuminated when the unit is not locked to either the Video or the AES reference signal.

Error LED's D10, 11 and 12

These error LED's will become illuminated when any of the following errors occur on the specific AES input. (Reference, Input A and Input B)

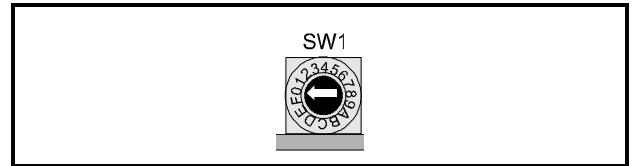
- Locking Error
- Parity
- Confidence
- Validity



Fade Delay SW1

When a fade is activated this switch is used to adjust the delay. (For both channels)

When set to 0 the delay is 0 sec. (Frame Switching)
 Each clockwise increment (0 to F) increases the delay by 0.2 sec up to a maximum of 3.0 seconds.



SW2

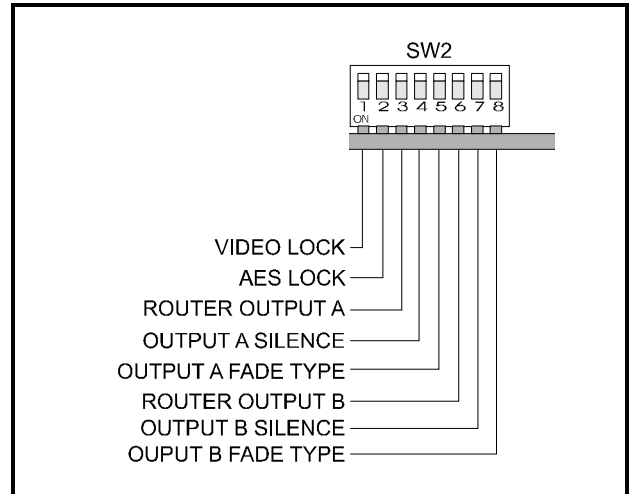
Position 1 Video Reference Lock

This allows the unit to lock to the Video Reference signal by setting to the ON (down) position.

Position 2 AES Reference Lock

This allows the unit to lock to the AES Reference signal by setting to the ON (down) position..

When **both** positions 1 and 2 are set to OFF (up) or ON (down) position the function will be in the Internal mode and the unit will not be locked to either the Video Reference signal or the AES reference signal.



Lock Mode	Position 1	Position 2
Video Lock ON	ON	OFF
AES Lock ON	OFF	ON
Video & AES Lock OFF (Freerun)	OFF	OFF
Video & AES Lock ON (Freerun)	ON	ON

Position 3 Router Output A Input Select

When this position is set to the ON Input B is routed through to Output A

When this position is set to the OFF Input A is routed through to Output A

Position 4 Output A Silence

When set to the ON position Output A will fade to silence with the fade time set by the Fade Delay control.

Position 5 Output A Fade Type

When set to the ON position the fade function will be a fade down from one signal to silence and then a fade up from silence to the other signal during a time period set by Fade Delay control. (V-fade)

When set to the OFF position the fade function will be a cross fade from one signal to the other signal during a time period set by Fade Delay control. (X-fade)

Position 6 Router Output B Input Select

When this position is set to the ON Input B is routed through to Output B

When this position is set to the OFF Input A is routed through to Output B

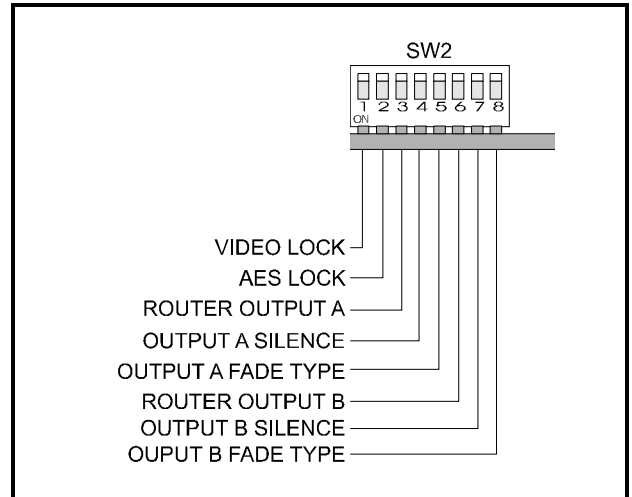
Position 7 Output B Silence

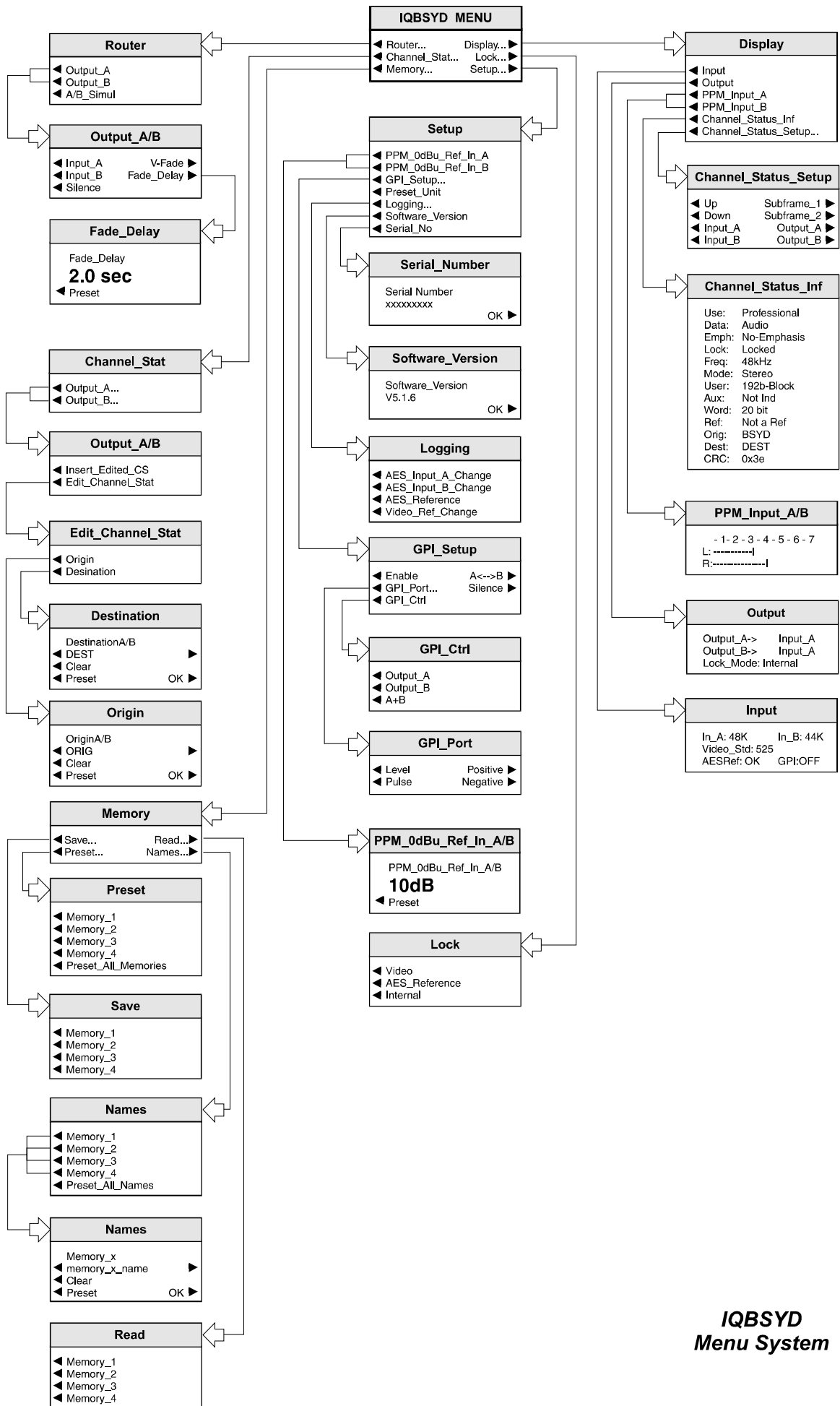
When set to the ON position Output B will fade to silence with the fade time set by the Fade Delay control.

Position 8 Output B Fade Type

When set to the ON position the fade function will be a fade down from one signal to silence and then a fade up from silence to the other signal during a time period set by Fade Delay control. (V-fade)

When set to the OFF position the fade function will be a cross fade from one signal to the other signal during a time period set by Fade Delay control. (X-fade)





***IQBSYD
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 IQBSYD Menu System on previous page)

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.

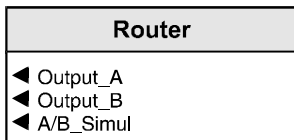
Whenever a menu item is selected the parameters of that selection will be displayed in the Information window of the front panel. Where the selection is purely a mode selection and does not enable a sub-menu, the text will become reversed (white-on-black) indicating that the mode is active. If the mode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

◀ Router...

This reveals a sub-menu that allows assignment of any of the two inputs to any of the two outputs.

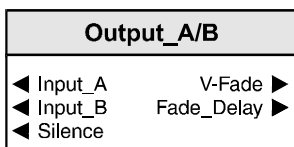
Selecting the **A/B Simul** function will simultaneously fade each output to its assigned input. The fade time allocated to each output will be maintained.

Note that even though both fades will begin at the same time each fade will end after a period set by the individual Fade Delay setting.



◀ **Output_A/B**

Selecting either Output_A or Output_B will reveal the following menu that allows the assignment to be made to the outputs.



◀ **Input_A**

This will assign Input A to selected output.

◀ **Input_B**

This will assign Input B to selected output.

◀ **Silence**

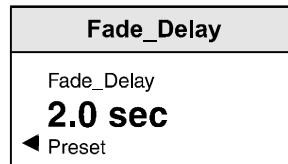
When enabled the selected output will fade to silence during a time period set by the Fade Delay control.

V-Fade ▶

When highlighted the fade action will be a fade down from one signal to silence then fade up from silence to the other signal during a time period set by Fade Delay control.

When not highlighted action will be a cross fade from one signal to the other signal during a time period set by Fade Delay control. (X-Fade)

Fade_Delay ▶

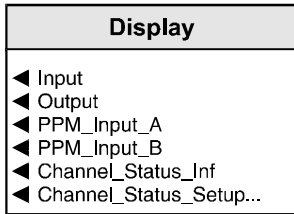


This function will reveal a numerical display of time in seconds for the fade time when fading from one signal to the other. The spinwheel adjusts the time in steps of 0.2 second from 0 to 3 seconds.

Default is to 0.

Display... ▶

This menu allows information about the input/output signal and channel status to be displayed in the LCD window.



◀ Input

Use this item to select the inputs for interrogation. This menu will show the source of the reference signal and the sampling rate of the AES/EBU input signals. If no input is detected ** will be displayed. If the input sampling rate is not that of the recognised standards then ?? will be displayed.

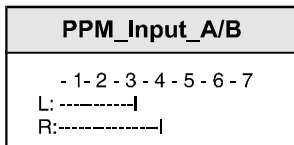
◀ Output

This menu will display the output mapping, presently selected by the user.

◀ PPM_Input_A

◀ PPM_Input_B

This selection will reveal a bargraph display showing the peak level of the left and right input channels of input A and B



The scale is divided into 8 equal divisions, each representing a 4 dB level increment. The 0 dB point is defined as 4 and maybe set to between -10 dBFS and -24 dBFS using the **PPM_0 dBFS_Reference** in the **Setup** menu.

This metering function follows standard Peak Programme characteristics.

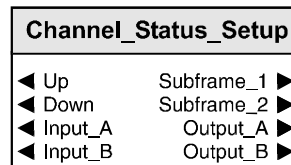
◀ Channel_Status_Inf

Selecting this item will display information about the channel status, examples of which are shown below:

Use: Professional/ Consumer
 Data: Audio/Non-Audio
 Emph: No-Emphasis/Not Ind/50/15µs/CCIT J.17
 Lock: Locked/Unlocked
 Freq: 48kHz/44.1kHz/32kHz/Not Ind
 Mode: Stereo/Monaural/2-Channel/Pri/Sec/Not Ind
 User: HDLC/192b-Block/User/Not Ind
 Aux: Not Ind/TalkBack/Main Audio
 Word: 24/ bits/23 bits/22 bits/21 bits/20 bits/19 bits/18 bits/17 bits/16 bits
 Ref: Not a Ref/Grade 2/Grade 1
 Dest: Dest
 Orig: BSYD
 CRC: 0x3e

◀ Channel_Status_Setup..

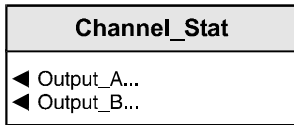
Selecting this window will reveal a sub-menu which will allow the channel status information for the inputs (sub-frames 1 and 2) and outputs to be viewed.



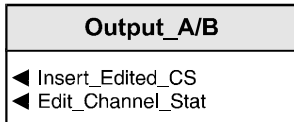
Note that the Up and Down push buttons selections should be used for this function as the spinwheel will not be operational.

◀ Channel_Stat.

This selection enables a sub-menu that allows the channel status to be routed; also the destination and origin can be edited.



Selecting an output will reveal the following menu:

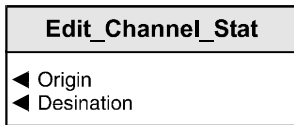


◀ Insert_Edited_CS

Enabling this function will allow new/edited channel status information (use the ◀ **Edit_Channel_Stat** item below) to be inserted in the data stream of either Output A or Output B.

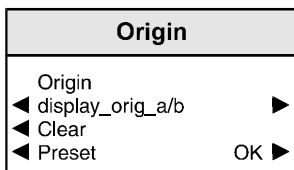
◀ Edit_Channel_Stat

This item allows channel status information of the origin or the destination to be changed/edited.



◀ Origin

This allows the originating channel status information to be changed.



The text may be edited by using the push buttons to select the position in the text and the spinwheel to select the new text character.

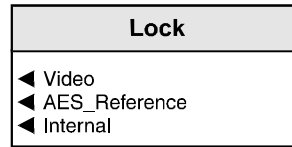
Select ◀ OK to save the text, ◀ Clear to clear the text or ◀ Preset to return to the default (BSYD) text.

◀ Destination

This allows the destination channel status information to be changed in a similar way.

Lock... ▶

This selection reveals a sub-menu that allows the option to reframe the input(s) to either a Video Reference or an AES reference. If the locking input signal is lost then the next available input is used to reframe. If no inputs are detected then digital silence at 48 kHz will be generated.



Selections available are:

◀ Video

The unit will lock to the signal at the Video Reference connector.

◀ AES_Reference

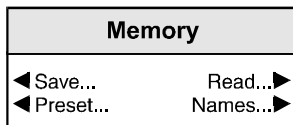
Unit will lock to the AES Reference (via D connector or AES Ref BNC)

◀ Internal

The unit will not be locked to any external signal and will freerun.

◀ Memory

This function reveals a sub-menu that allows control of the memory functions.



◀ Save

This function reveals a sub-menu that allows the settings of all items to be saved. Up to 4 different set-ups may be saved in the 4 memory locations. They can all be renamed using the **Names** menu

◀ Read Memory

This function reveals a sub-menu that allows 4 different settings of all items to be recalled from the 4 memory locations as saved in the **Save** function.

◀ Preset

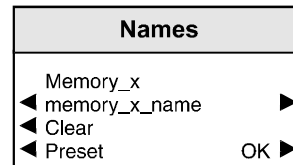
This selection allows individual (select the location memory number), or all, (select Preset_All_Memories), memory locations to be preset to their default (factory) settings.

◀ Names

This selection allows the naming of memory 1 to 4 locations.

To name a memory location select:

◀ Names to reveal the sub-menu.



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.

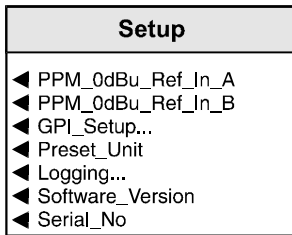
The ◀ **Preset** function loads the default text, for example, Memory_1.

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

Setup... ▶

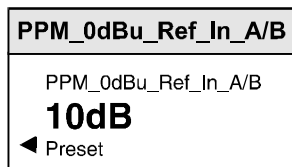
Silence ▶

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



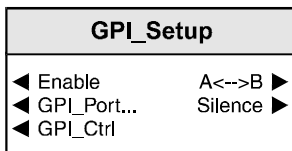
- ◀ PPM_0dBu_Ref_In_A
- ◀ PPM_0dBu_Ref_In_B

These selections will reveal a numerical display of dB that sets the 0 dBU reference point for Input A and input 2.



- ◀ GPI_Setup

The unit may be configured to respond in different ways to various types of signals connected to the GPI input using this menu.



- ◀ Enable

When this item is highlighted the GPI function is active; when not highlighted the function is disabled.

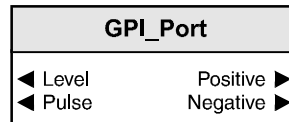
A<-->B ▶

When enabled the fade action initiated by the GPI signal will be between Input A and Input B.

When enabled the action initiated by the GPI signal will be to fade the output to silence. When triggered again the output will fade back to the previous input.

- ◀ GPI_Port...

This allows the GPI port to respond to the following types of signal:



- ◀ Level/Pulse

Either **Level** or **Pulse** may be selected.

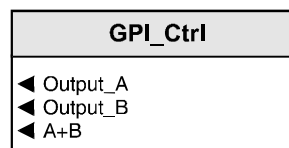
If **Level** is selected the response will be to a change of DC level i.e. from a low to a high or from a high to a low. The polarity may be set from the Positive/Negative function below.

If **Pulse** is selected response will be to a pulse waveform. The polarity may be set from the Positive/Negative function below.

Positive/Negative ▶

The polarity of the Level or Pulse function above may be set with this item. Either **Positive** or **Negative** may be selected.

- ◀ GPI_Ctrl...



- ◀ Output_A/B

Selecting either Output_A or Output_B from this menu allows the fade action initiated by the GPI to be applied to the selected output.

- ◀ A+B

Selecting A+B from this menu allows the fade action initiated by the GPI to be applied to both outputs at the same time.

◀ 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:

Logging
◀ AES_Input_A_Change
◀ AES_Input_B_Change
◀ AES_Reference
◀ Video_Ref_Change

◀ 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 System Menu.

Appendix

FADE FUNCTIONS (Enabled By GPI Commands)

Actions

All fade functions are intended to simulate the effect of mechanical operations and will respond alternately to the GPI input signals e.g. if Pulse/Positive action has been selected to control a fade from Input A to Input B the first positive pulse received will perform a fade from Input A to input B; the next positive pulse received will perform a fade from Input B to Input A; the next positive pulse received will perform a fade from Input A to input B etc.

This action also applies to the Level methods of control.

All fades will occur during the time set by the **Fade Delay** function.

Level

In this case the fade will occur when the input level passes through a threshold level. If Positive has been selected the fade will occur when the signal changes from a low level to a high level; if negative has been selected the fade will occur when the signal changes from a high level to a low level. (A low level is defined as below 1.16 V and a high level defined as greater than 2 V.)

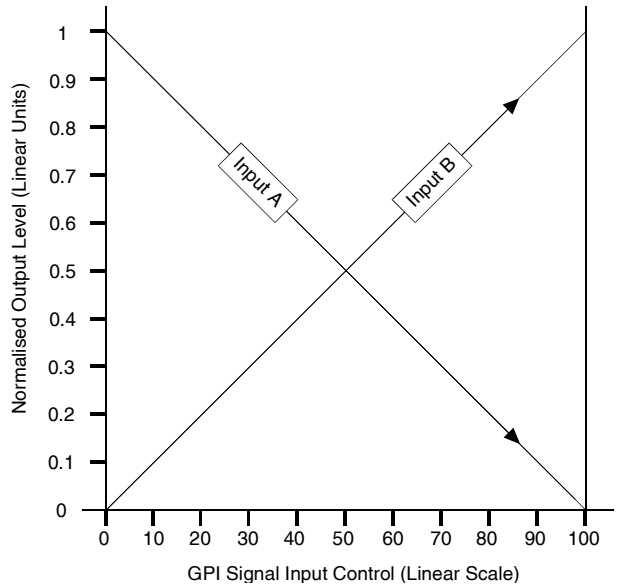
Pulse

In this case the fade will occur when a pulse signal is received. If Positive has been selected the fade will occur when a positive going signal is received; if negative has been selected the fade will occur when a negative going signal is received.

Fade Laws

Cross Fade (X-Fade)

When a cross fade is performed between two signals under the control of a GPI signal, the output will follow the characteristics of the graph below.

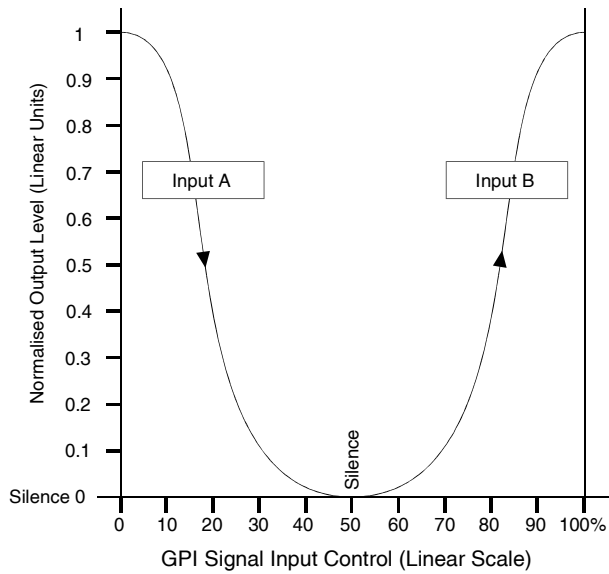


In **Level** mode the above action will occur automatically in a time determined by the Fade Delay setting each time the threshold is passed.

In **Pulse** mode the above action will occur automatically in a time determined by the Fade Delay setting each time a pulse of the correct polarity is received.

V-Fade

When a V-Fade is performed between two signals under the control of a GPI signal, the output will follow the characteristics of the graph below.



In **Level** mode the output will fade up (to maximum) or down (to silence) automatically in a time determined by the Fade Delay setting each time the threshold is passed.

In **Pulse** mode the output will fade up (to maximum) or down (to silence) automatically in a time determined by the Fade Delay setting each time a pulse of the correct polarity is received.

