



# IQDCO Changeover Switch

## Module Description

The IQDCO is a passive changeover switch with SDI video presence detection. Both inputs are monitored for carrier presence, SDI lock, standard, EDH, and embedded audio presence. The condition for switch over is fully programmable. For example, carrier loss, the absence of embedded audio or any logical combination of conditions may trigger switchover.

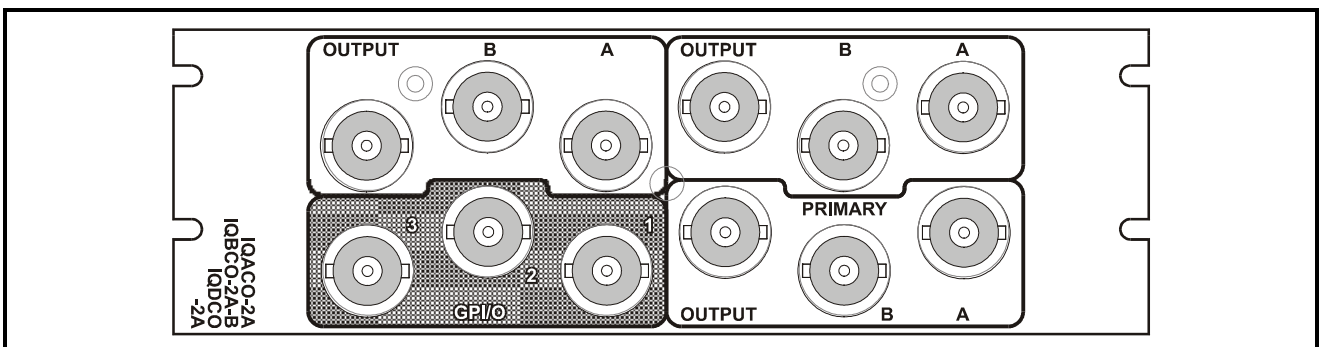
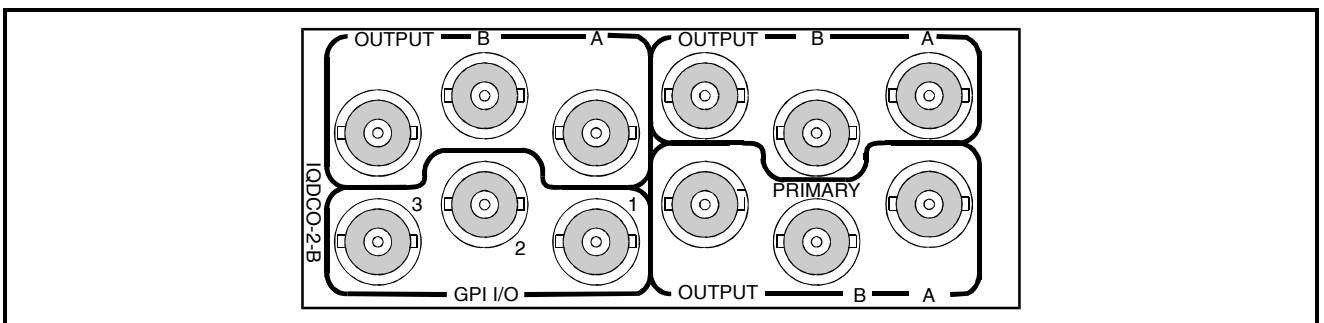
The units include three GPI/O's that provide additional trigger inputs or tally outputs. In event of power loss input A is automatically selected. For

additional security the relay switch is mounted in the rear panel assembly (-2 only) thus enabling the module to be removed from the chassis without breaking the connectivity of input A to output.

RollCall remote and card edge controls are available.

All fault or warning conditions can be reported and logged over RollCall...

## REAR PANEL VIEW



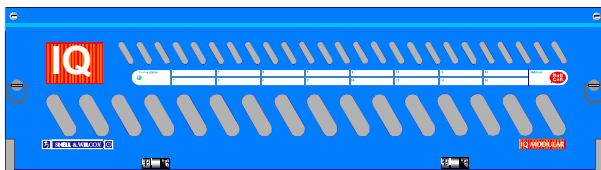
Versions of the module cards available are:

IQDCO-2	IQDCO	SDI Changeover Switch	Double width module
IQDCO-2A	IQDCO	SDI Changeover Switch	Double 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**

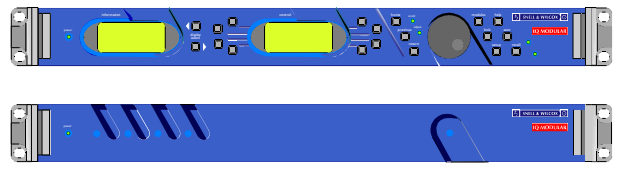
Rear panels **with** the suffix A may only be fitted into the ‘A’ style enclosure shown below.



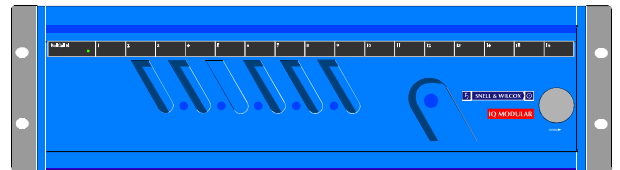
(Enclosure order codes IQH3A-E-0, IQH3A-E-P, IQH3A-0-0, IQH3A-0-P)

**‘O’ Style Enclosures**

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



(Enclosure order codes IQH1S-RC-0, IQH1S-RC-AP, IQH1U-RC-0, IQH1U-RC-AP, Kudos Plus Products)



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



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

## Operational Overview

The IQDCO offers great flexibility in determining the conditions that can cause the switch to change from A to B and B to A. These conditions are set using a sequence of 5 RollCall programmable rules. Each rule is evaluated in turn with rule 1 taking the highest priority. If the rule is evaluated as true then the selected action will take place – the actions available are to select input A or select input B.

All of the rules are based on a definition of whether one of the inputs is either 'OK' or 'Error'. The default definition of 'OK' is simply that the input is present, though it is possible to qualify this definition with other tests such as for a particular line standard, embedded audio presence or valid EDH. 'Error' is automatically defined as the converse of 'OK'.

Having chosen a definition of 'OK' the sequence of rules can now be programmed. Each rule of the 5 available may be programmed to one of many conditions such as 'A\_is\_OK', 'B\_in\_Error', 'GPI\_1\_Closed', etc. Remember that each rule has only one action so it is necessary to set at least two rules to toggle the switch. It is also important to understand the difference between testing for 'OK' and testing for 'Error'. In dual redundant installations where signals on A and B inputs are of equal priority it would be normal to test for the 'Error' condition so avoiding unnecessary switches when a previously failed input returns to good. However where the switch is used to enable a backup source it would be normal to test for the 'OK' condition on the main input.

Example:

To set up a simple changeover function based on the following two rules - if A is present select input A and if A is not present select B – requires 'Rule\_1' to be set to 'Select\_A' if 'A\_is\_OK', and 'Rule\_2' to be set to 'Select\_B' if 'A\_in\_error'. In this example the unit will not check whether input B is present before switching over; if such a check is required then change 'Rule\_2' to 'Select\_B' if 'B\_is\_OK'.

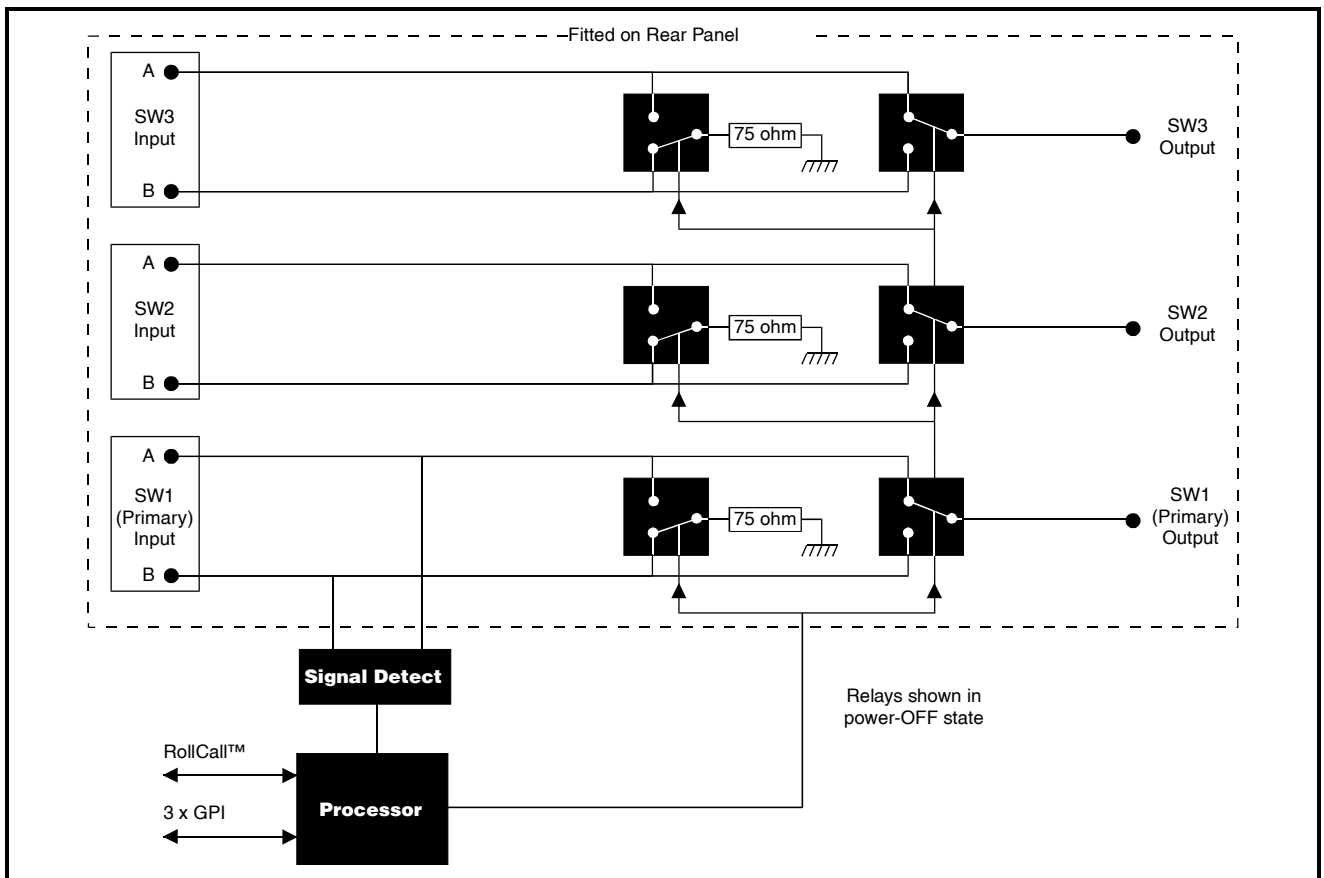
The rules also permit actions based on the state of the external GPI's. If, say a closed contact on GPI\_1 is required to override any signal detection process set 'Rule\_1' to 'Select\_B' if 'GPI\_1\_Closed'. If signal detection as in the above example is required to have higher priority than GPI sensing then apply the GPI test under 'Rule\_3'.

Under each rule it is possible to set a time delay. This is the length of time that the rule must be evaluated as true for before activating the action. If the rule is evaluated as false before the set time expires the action will be prevented and the time reset.

Any of the three GPI ports may be set as tally outputs and the condition under which the output is active (closed contact) is fully programmable. For added flexibility it is possible to set a different definition of 'OK' for the tally than that used for rule checking. It is therefore possible, for example to tally EDH errors without causing a switch over.

The default or factory rule setting is for the backup switch example; thus 'Rule\_1' is set to 'Select\_A' if 'A\_is\_OK' and 'Rule\_2' is set to 'Select\_B' if 'B\_is\_OK'. Rules 3 to 5 are switched 'Off'. The default setting for the GPI's is for GPI 1 to tally the switch state (closed contact = input B selected) with GPI 2 and GPI 3 set to tally the presence of signal on input A and input B respectively (closed contact = 'A/B\_is\_OK'). It is possible to return to the factory settings by using the 'Preset\_Unit' control.

## BLOCK DIAGRAM



## Features

- Passive SDI changeover switch
- Detection of carrier, SDI lock, line standard, EDH and embedded audio /data presence
- Automatic switch over on programmable condition(s)
- Continuity (A input) maintained with power loss or module removal
- Three programmable GPI/O's for control or tally
- Programmable switch over time delay
- RollCall remote and card edge control
- RollCall fault logging
- Can be linked to trigger other changeover modules via RollTrack

## TECHNICAL PROFILE

### Features

#### Signal Inputs

Primary switch ..... 2 x SDI via BNC connectors  
 Standards ..... SMPTE 259M-C-1997  
 Secondary switch ..... 2 per channel (2 channels) via  
 BNC

#### Signal Outputs (Passive)

Primary switch ..... 1 x SDI via BNC connector

### Specifications

#### Signal Inputs

##### Primary SDI (x2)

Input Return Loss ..... better than 15 dB to 270 MHz  
 (Output terminated)  
 Maximum Cable Length ..... >100 m PSF1/2 or equivalent  
 Cable length is defined as input  
 cable length + output cable length

##### Secondary (2 channels)

Input Return Loss ..... Better than -38 dB @ 5 MHz  
 Note that the secondary switches  
 are not guaranteed to work with  
 270 Mbit SDI signals, but may do  
 so in some installations.

#### Signal Outputs (Passive)

##### Primary

Output Return Loss ..... better than 15 dB to 270 MHz  
 (Inputs A and B terminated)

##### Secondary (2 Channels)

Output Return Loss ..... Better than -38 dB @ 5 MHz

GPI I/O (x3) Characteristics Closing Contact Type  
 Output Sink Current 100 mA  
 Input Source Current 1 mA typical  
 Input Threshold Voltage 1 V typical

#### Power Consumption

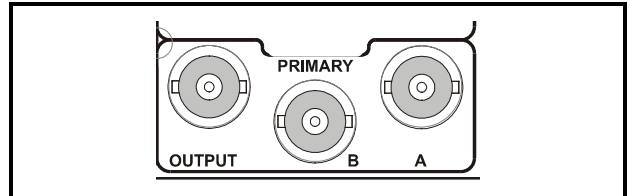
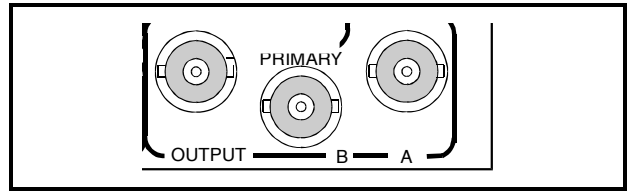
Module Power Consumption  
 3.9 W max

Standards ..... SMPTE 259M-C-1997  
 Secondary switch ..... 1 per channel (2 channels) via  
 BNC  
 GPI I/O ..... 3 x closing contact via BNC

INPUTS AND OUTPUTS

**Serial Input (A and B)**

These are the two serial digital inputs for each of the three channels via BNC connectors that terminate in 75 Ohms.

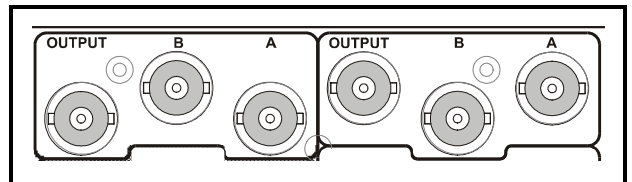
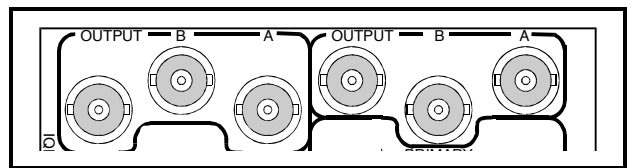


**Serial Output (OUT)**

This is the Serial Digital output of the changeover switch via a BNC connector for 75 Ohms.

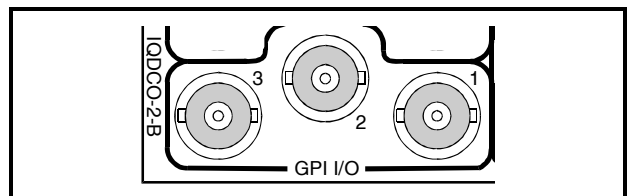
**Note:**

If the Primary output is not terminated correctly by 75 Ohms, the output may alternately select between input A and B until correctly terminated. To overcome this, in some systems it is possible to insert an in-line 75 Ohm termination at the receiving equipment input. This will have a detrimental effect on the stated receive distance i.e. will be reduced. An absolute figure is difficult to specify due to system configuration, cable type and connector type etc.



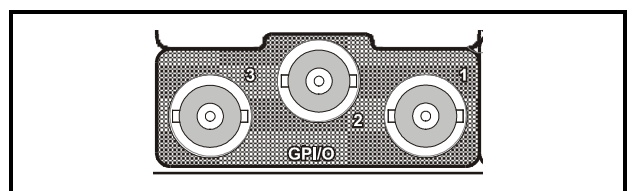
**Secondary Inputs/ Outputs**

Note: The secondary switches are not guaranteed to work with SDI sources, but may do so in some installations

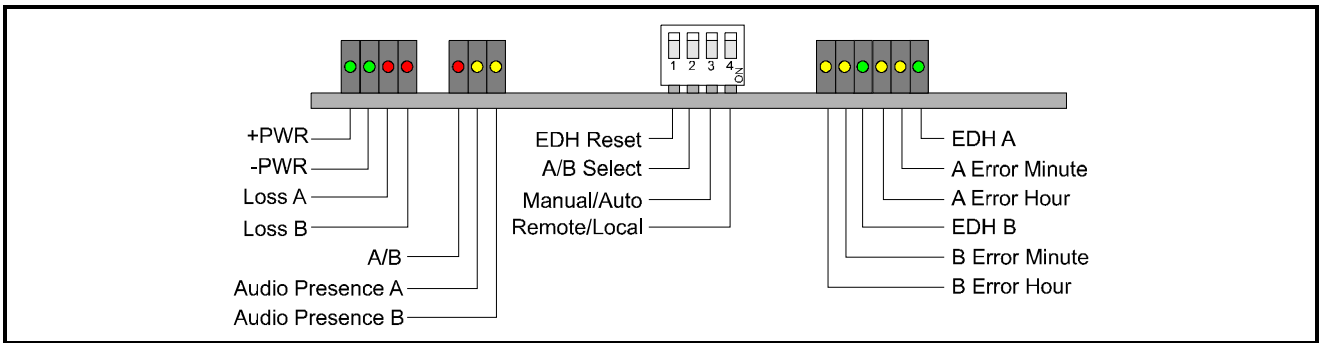


**GPI I/O**

These three GPI connectors may be configured independently as inputs or outputs.



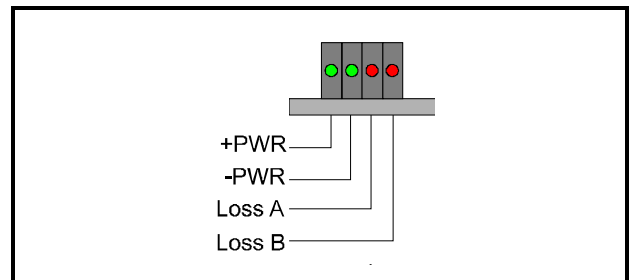
CARD EDGE CONTROLS



INDICATORS

**+PWR and -PWR**

When illuminated these LED's indicate that the unit is powered.



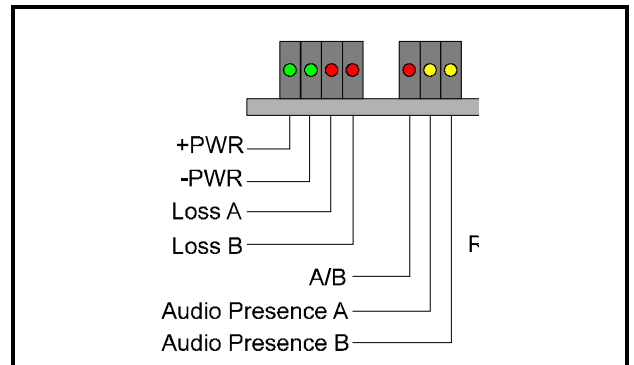
**Loss A and Loss B**

When illuminated these LED's will indicate that there is no signal at the A or B inputs.

**A/B**

This LED will indicate which of the two inputs has been selected to become the output.

When illuminated Input B has been selected, when OFF input A has been selected.



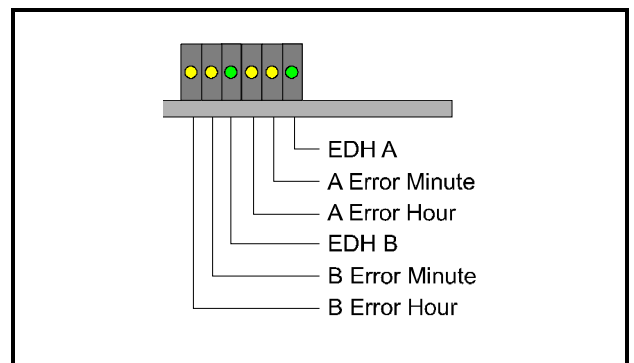
**Audio Presence A and Audio Presence B**

This LED will become illuminated when at least one channel of audio is detected in the input channel.

**EDH A and EDH B**

This LED will become illuminated if the input SDI video has embedded EDH data.

This LED will also blink off for approximately 1s whenever an EDH checksum error is detected.



**A and B EDH Minute / Hour**

These LED's provide the EDH error minute and hour history for channels A and B indicating occurrence of errors within their respective time periods.

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

## 4 WAY DIP SWITCH

**Position 1 EDH Reset**

When enabled (set to ON-Down) this will clear EDH error history for both channels.

**Position 2 A/B Select**

This position allows either the A input or the B input to be selected and routed to the output if manual control is activated – see position 3.

When set to UP (OFF) channel B will be selected, when set to DOWN (ON) channel A will be selected.

**Position 3 Manual/Auto**

This position allows either manual selection of the input channel using position 2 of this switch or automatic switching.

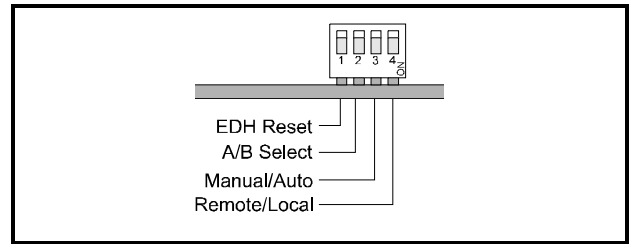
UP (OFF) selects Automatic and DOWN (ON) selects Manual.

Automatic mode activates the rule based changeover logic detailed in the operation overview section. To program the rules a RollCall control interface such as a RollCall front panel or the IQSPCR PC application is used.

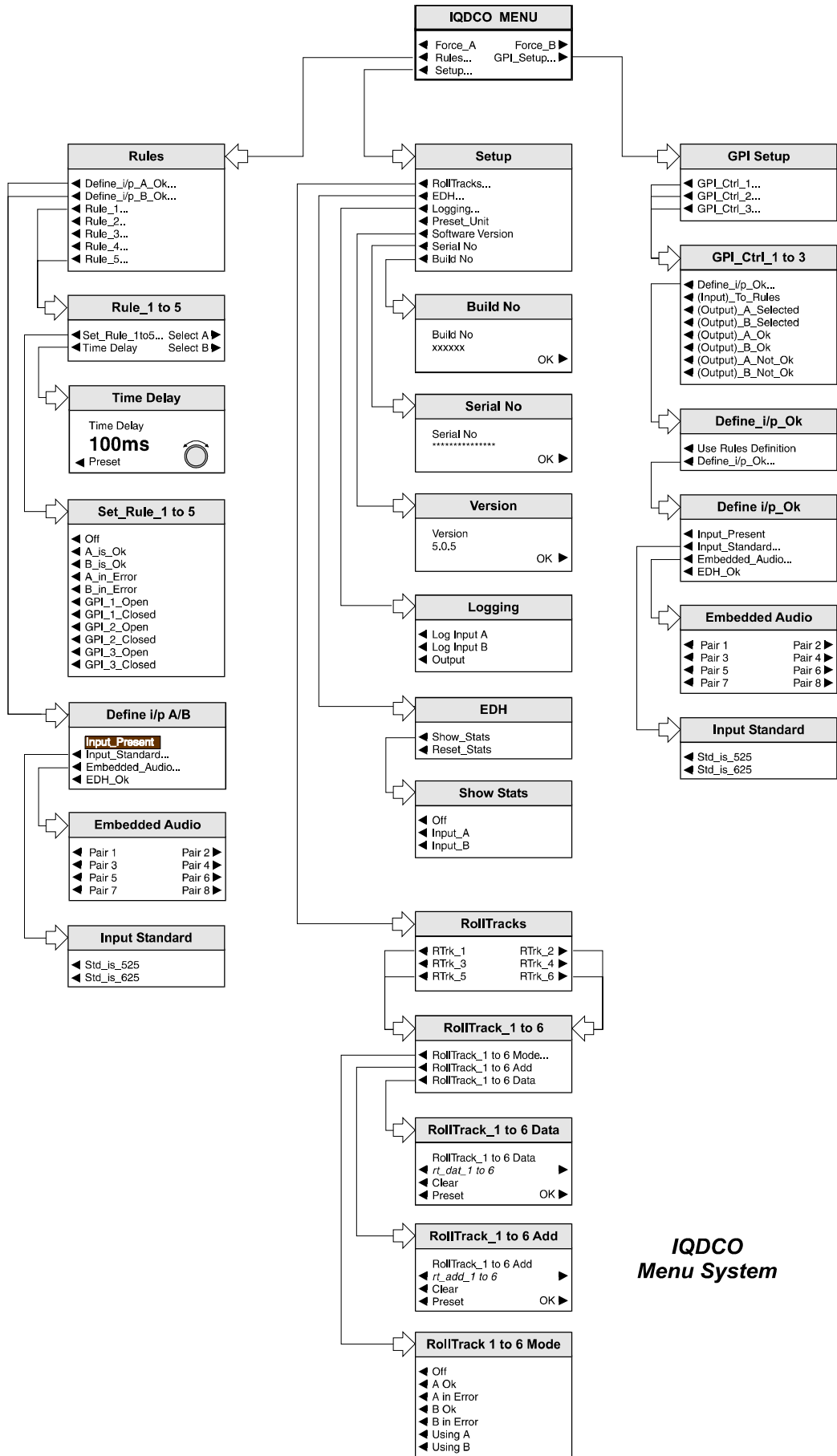
**Position 4 Remote/Local**

This position allows either remote (RollCall) or local operation (using this DIP switch) of the module.

*Note that in Main-frames where RollCall™ is not available it should be set to the DOWN (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 (OFF) position the card will power-up with the last settings stored in the non-volatile memory. In local mode the default automatic changeover logic selects input B if signal is lost on input A.*







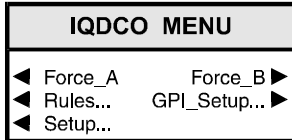
**IQDCO  
Menu System**

**MENU DETAILS**

(see IQDCO 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.

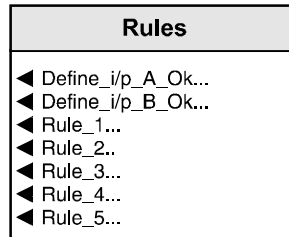
Whenever a menu item is selected the parameters of that selection will be displayed in the Information window of the front panel. Where the selection is purely a mode selection and does not enable a sub-menu, the text will become reversed (white-on-black) indicating that the mode is active. If the mode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



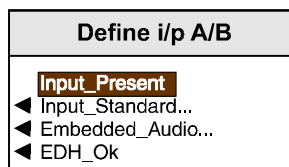
When highlighted these items allow the manual selection of input A or input B. Note that they override all automatic control of the switch.



The automatic operation of the switch is governed by a sequence of Rules (for more information please see Operation Overview section)



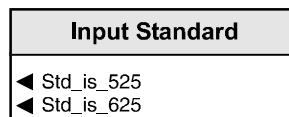
**Define i/p A/B**



**Input Present**

This is an essential element in determining that the input is OK! It is always active.

**Input Standard**



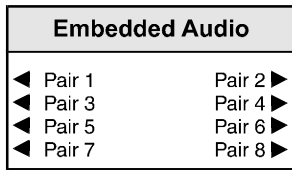
These are optional elements in the definition of 'OK'.

Selecting Std\_is\_625 ensures that only 625 line inputs will be accepted as meeting the definition of OK.

Selecting Std\_is\_525 ensures that only 525 line inputs will be accepted as meeting the definition of OK.

If neither are selected then both 625 and 525 inputs are accepted

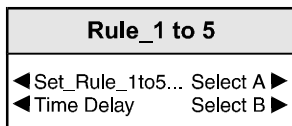
◀ Embedded Audio



◀ Pair 1 to 7 Pair 2 to 8 ▶

These are optional elements in the definition of 'OK'. Individual audio pairs may be checked for presence. If no selections are made all embedded audio checking is disabled. Embedded audio may be PCM or non-PCM encoded.

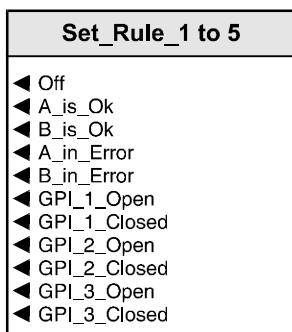
◀ Rule 1 to 5



Select A ▶  
Select B ▶

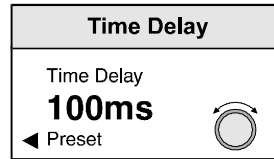
Each of the 5 rules available are programmed in an identical way. Each rule, if evaluated as true, may invoke one of two actions – Select input A or Select input B. If no action is selected then the Rule is effectively disabled.

◀ Set Rule 1 to 5



The Rule is set here to any one of 10 possibilities including input checking and GPI condition. 'Off' disables the Rule.

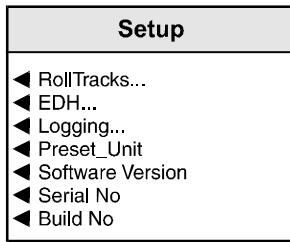
◀ Time Delay



Under each rule it is possible to set a time delay. This is the length of time that the rule must be evaluated as true for before activating the action. If the rule is evaluated as false before the set time expires the action will be prevented and the time reset.

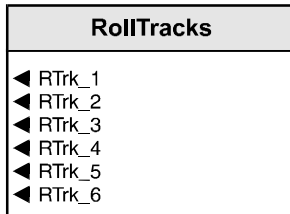
The time delay can be set between 0 and 10s.

◀ Setup...



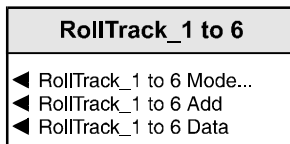
◀ RollTracks

This function allows information about the status changeover switch to be communicated to other RollTrack compatible modules connected to the network. This message can then be used to cause another unit to perform a specific action. Up to 6 RollTrack communication channels to compatible modules may be selected from the following menu:



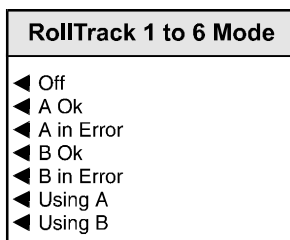
◀ RollTrack\_1 to 6

When a particular RollTrack communication channel has been selected the following menu should be used to set up the Mode, Address and Data.



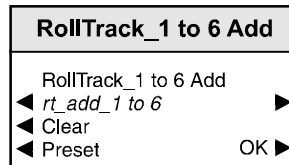
◀ RollTrack 1 to 6 Mode

This sub-menu allows the unit to provide the following information about the status of the changeover switch to the connected RollTrack Unit. The destination unit will then perform a specific action in response to this information.



◀ RollTrack 1 to 6 Add

This item allows the address of the destination unit to be set.



When the item is selected, the first character will be in reversed flashing text; this character can then be changed by rotating the spinwheel. When the desired character is found the button to the left or right of the text line should be pressed and the next text character will be highlighted and available for changing. The buttons to the left and right of the text line may be used to select other characters.

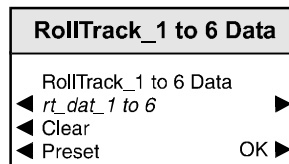
To save the new text, press the OK button. It should be noted that this is the only way to save the new text as any other button function will return to another menu without modifying the original text.

The **Preset** button sets the text line to the default value.

The **Clear** function sets the text line to all zeros.

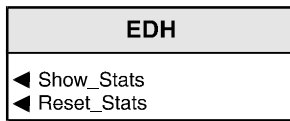
◀ RollTrack 1 to 6 Data

To make the destination unit perform a particular function a RollCall command number must be entered using this function.



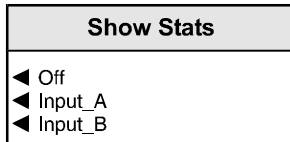
*For details of the RollCall command numbers for specific units please contact your local Snell & Wilcox agent.*

◀ EDH



This selection reveals a sub-menu that allows Input EDH parameters to be displayed.

◀ Show\_Stats (Statistics)



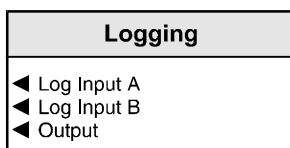
When either **Input\_A** or **Input\_B** is enabled (text reversed) the information window will display the number of errors from the time the function was enabled. The elapsed time in hours, minutes and seconds is also displayed. **Off** will turn off the function.

◀ 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 will be reported to the logging device assigned in the Remote Control Interface system. (See Section 1, The RCIF Menu System)



The logging sub-menu allows the following information to be made available for logging:

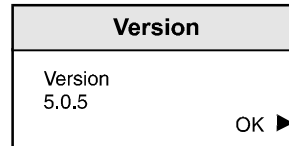
- ◀ Log Input A
- ◀ Log Input B
- ◀ Output

◀ Preset Unit

Selecting this item sets all adjustment functions that include a preset facility, to their preset values. Note that this is a momentary action and the text will not become reversed.

◀ Software Version

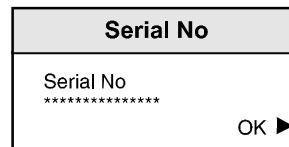
Selecting this item reveals a display showing the version of the software fitted in the module.



Select OK to return to the System Menu

◀ Serial No

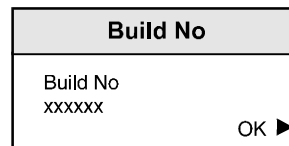
Selecting this item reveals a display showing the serial number of the module.



Select OK to return to the System Menu.

**Build No**

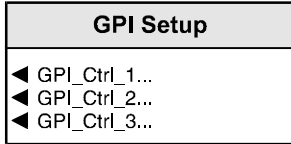
Selecting this item reveals a display showing the build number of the embedded software. This is part of the Snell & Wilcox revision control system.



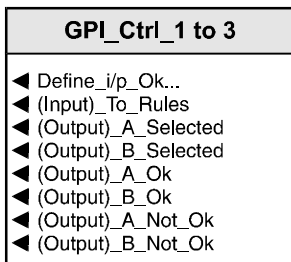
Select OK to return to the System Menu.

**GPI Setup... ▶**

Three independent GPI ports are provided. These may be individually configured as control inputs or tally outputs

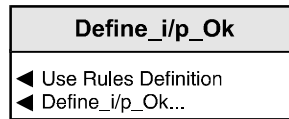


**◀ GPI Ctrl 1 to 3**

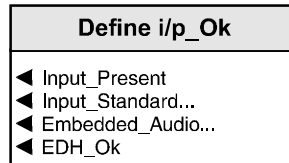


This menu should be used to select the operation of each GPI port. If a GPI input is used in any of the Rule definitions then it **must** be set to **(Input)\_To\_Rules**

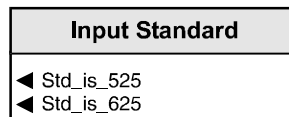
**◀ Define i/p Ok**



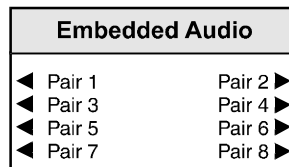
The definition of OK may either follow that used in the Rule logic or be defined individually for each GPI output. The definition selections are the same as those shown above under Rules.



**◀ Input Standard**



**◀ Embedded Audio**



### *Manual Revision Record*

Date	Version No.	Issue No.	Change	Comments
200201	1	1		First Issue
280302	1	2	Now includes information for the 3A enclosure modules	New manual issued
100403	1	3	Power consumption added to techspec	New manual issued
220205	1	4	Unterminated output note added	New manual issued