

IQDPR Digital Proc Amp

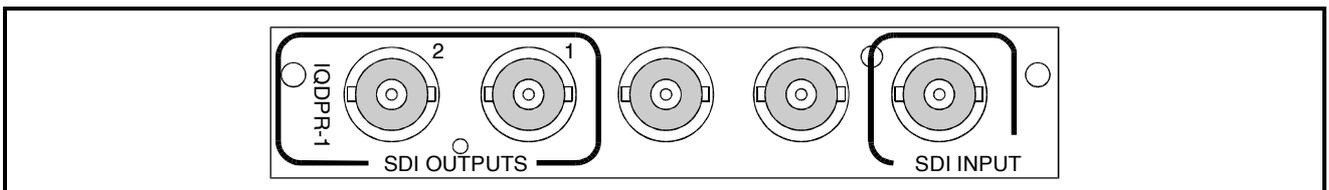
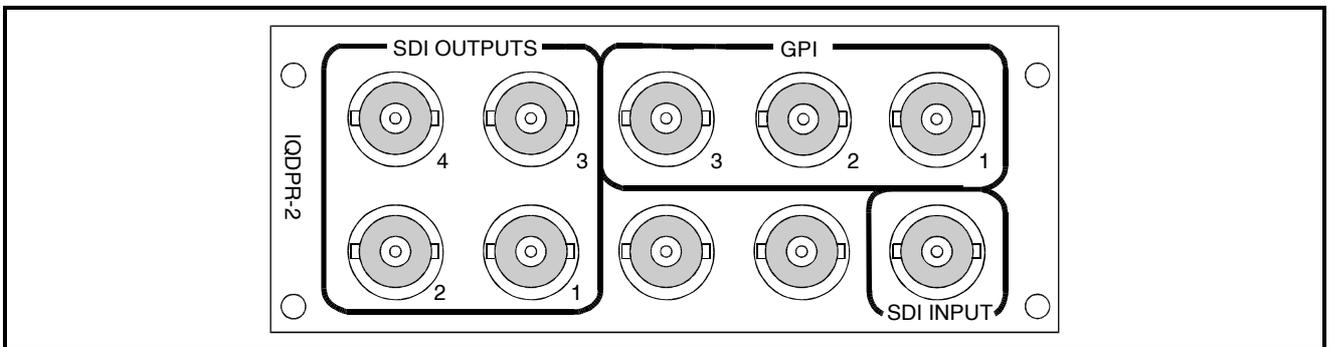


Module Description

The IQDPR unit is a SDI proc amp module aimed at correcting common errors in digitised images. It provides control of luminance gain, black level, and black stretch. For chrominance, gain, Cb & Cr offset and hue controls are provided. Controls include horizontal picture position adjustment, horizontal chrominance delay adjustment and user adjustable clippers for both luminance and chrominance. Pattern generation and caption insertion is included. A crystal locked output helps in reducing incoming jitter and together with sync insertion provides a continuous

output in event of input loss. The unit automatically detects 525 and 625 line inputs. The unit will pass all HANC ancillary data and give the user complete control over the VANC active picture lines. The unit will detect EDH errors and insert EDH on the output. For added flexibility four SDI outputs are provided. Full remote control via RollCall is included, however for simple control applications 3 GPI closing contacts can activate selected control functions.

REAR PANEL VIEWS



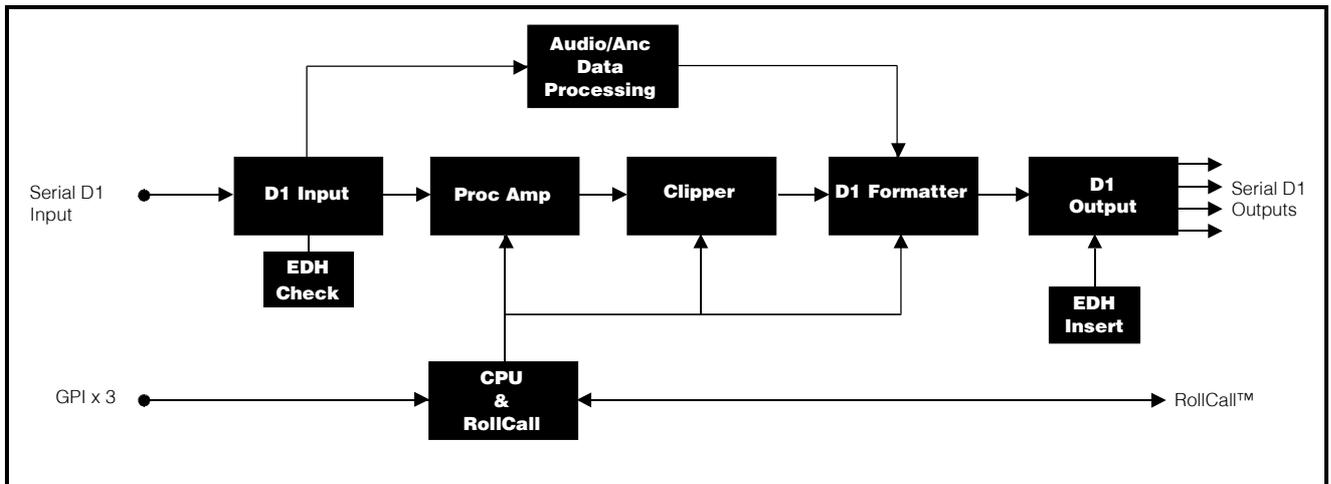
Versions of the module cards available are:

IQDPR-2
IQDPR-1

Four SDI outputs
Two SDI outputs

Double width module
Single width module

BLOCK DIAGRAM



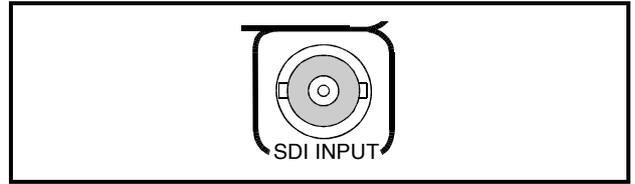
Features

- Y black level and gain adjustment
- Separate Cb and CbCr gain adjustment
- Separate Cb and Cr offset adjustment
- Hue adjustment
- Black stretch
- Horizontal picture position adjustment
- Horizontal Y/C timing correction
- Chroma line average
- Transparent ancillary data processing
- Control of vertical interval
- Pattern generation
- Uninterruptible valid output
- All data paths 10-bit
- Automatic 625 and 525 line selection
- EDH checking and insertion to SMPTE RP165
- 3 Configurable General Purpose Inputs
- RollCall remote control and monitoring

INPUTS

Serial Digital Video Input

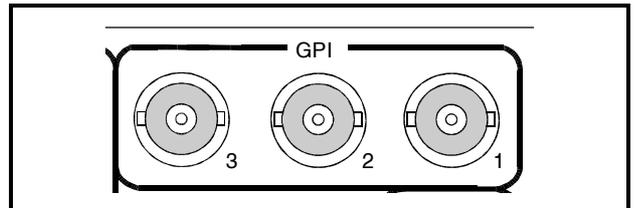
The serial digital input to the unit is made via this BNC connector which terminates in 75 Ohms.



GPI (-2 version only)

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

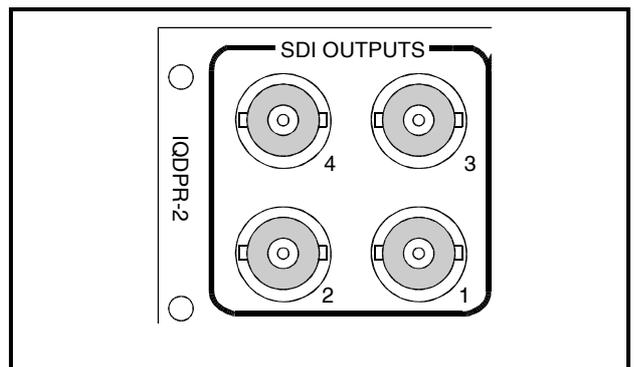
When enabled the interface will respond to a closed contact event from the BNC GPI input and enable the item selected from the **GPI/GPI_Function** menu item.



OUTPUTS

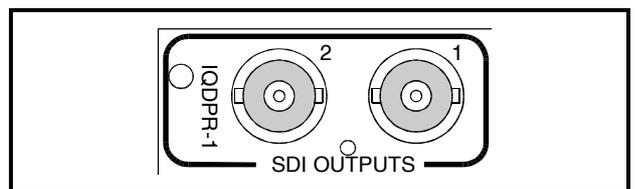
Serial Digital Video (-2 version)

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

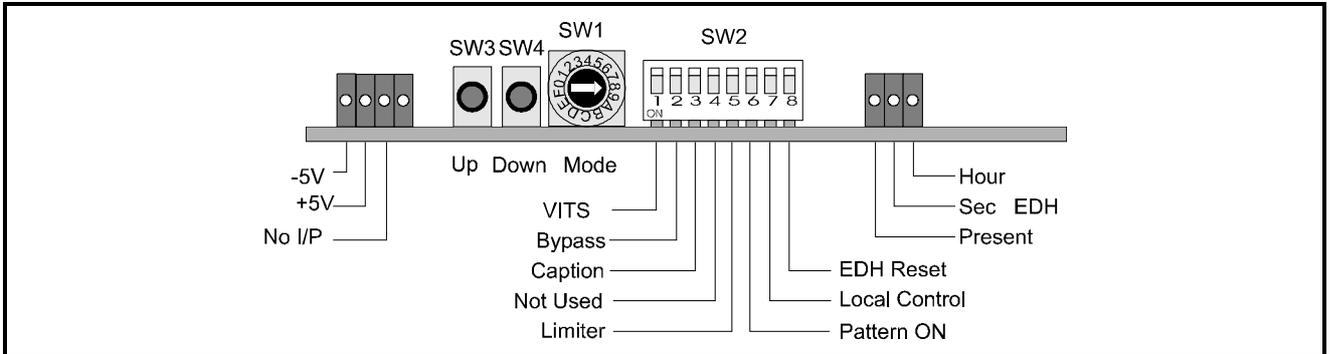


Serial Digital Video (-1 version)

These are the two 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.

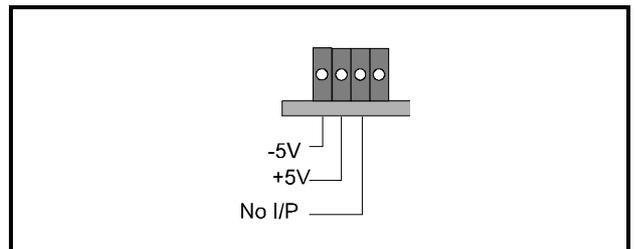
LED INDICATORS

+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.

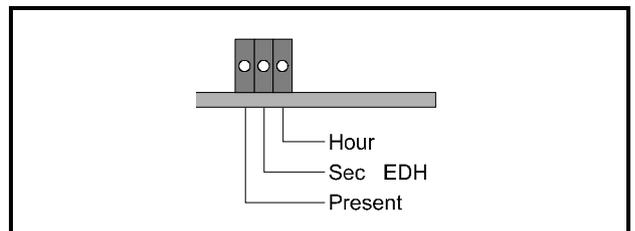


EDH Reporting

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 SW4/8 resets these indicators.



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

SWITCHES

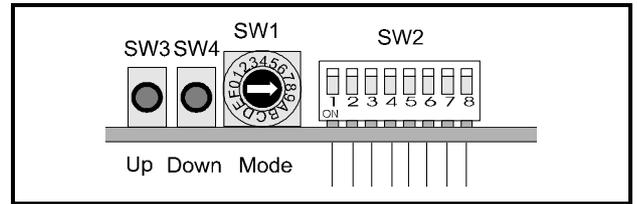
Two push buttons, a Hex switch and a 8 way DIL switch allow various functions and modes to be set.

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

The push buttons SW4, SW3 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 11.

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 input VITS will be passed through to the output

Position 2

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

Position 3

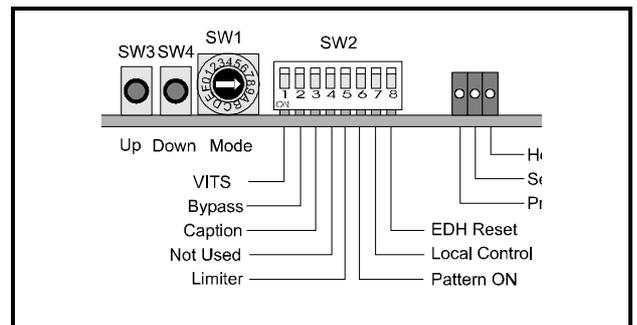
Setting to ON will insert the **caption** set up via the menu system.

Position 4

This position is not used.

Position 5

Setting this to ON enables the **limiter** (clipper) and the output is limited to standard levels. (0 V/700 mV for Y, 700 mV p-p for Pb and Pr)



Position 6

When set to ON (Down) this allows the unit to produce a **test pattern** (selected using SW1) signal as an output.

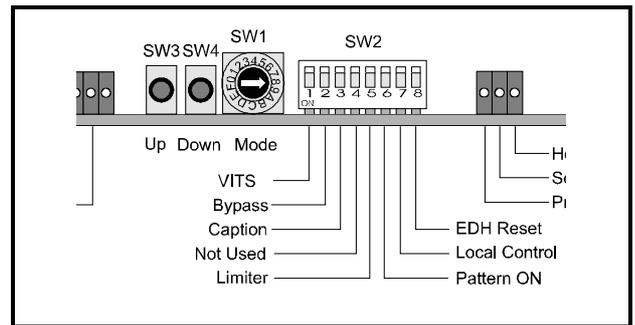
Position 7

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 SW4 and SW3.

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 **hue** of the output picture to be adjusted.

The overall range of adjustment is $\pm 180^\circ$ in 1° steps.

Default setting is to the calibrated value of 0° .

Position 1

This position has no function

Position 2

This allows the **horizontal picture position** of the picture to be adjusted.

The overall range of adjustment is ± 592 ns in 148 ns steps.

Default setting is to the calibrated value of 0.

Position 3

The **horizontal chrominance delay** relative to luminance (i.e. Y to Cb/Cr timing) may be adjusted by ± 444 ns in 148 ns steps using SW1 and SW2.

Default is to 0 ns

Position 4

This allows **black stretch** to be applied to the signal and the amount of adjusted.

The overall range of adjustment is from 1 to 0.64 in 10 steps.

Default setting is to the calibrated value of 1.

Position 5

This allows the **luminance gain** of the unit to be adjusted.

The overall range of adjustment is ± 6 dB in 0.1 dB steps.

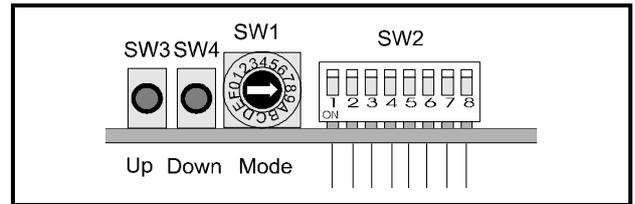
Default setting is to the calibrated value of 0 dB.

Position 6

This allows the **chrominance gain** of the unit to be adjusted.

The overall range of adjustment is ± 6 dB in 0.1 dB steps.

Default setting is to the calibrated value of 0 dB



Position 7

This allows the **black level** of the unit to be adjusted.

The overall range of adjustment is ± 100 mV in 0.8 mV steps.

Default setting is to the calibrated value of 0 mV.

Position 8

This allows a **test pattern** to be selected as the output (in this order) from the following list:

Off

Black

EBU Bars

100% Bars

Multiburst

Valid Ramp

Pulse and Bar

Green

Default is to 100% Bars.

Position 9

This position is not used

Default is to OFF.

Position A

This position is not used

Default is to OFF.

Position B

This allows an **offset** to be applied to the **Cb** signal (the digital equivalent of the analog B-Y colour difference signal)

The effect will be to alter the overall colour tint of the picture; for Cb the picture will be either more or less blue.

The overall range of adjustment is ± 50 mV (when viewing the analog colour difference signal at standard amplitude) in steps of 0.8 mV.

Default is to 0 mV.

Position C

This allows an **offset** to be applied to the Cr signal (the digital equivalent of the analog R-Y colour difference signal)

The effect will be to alter the overall colour tint of the picture; for Cr the picture will be either more or less red.

The overall range of adjustment is ± 50 mV (when viewing the analog colour difference signal at standard amplitude) in steps of 0.8 mV.

Default is to 0 mV.

Position D

This allows the gain of the Cb signal (the digital equivalent of the analog B-Y colour difference signal)

The effect will be to alter the overall amplitude of the colour difference signal and the picture will be either more or less red.

By rotating the spinwheel the amount of offset may be adjusted by ± 1 dB in steps of 0.1 dB.

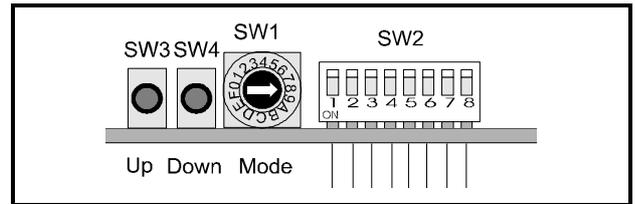
Position E

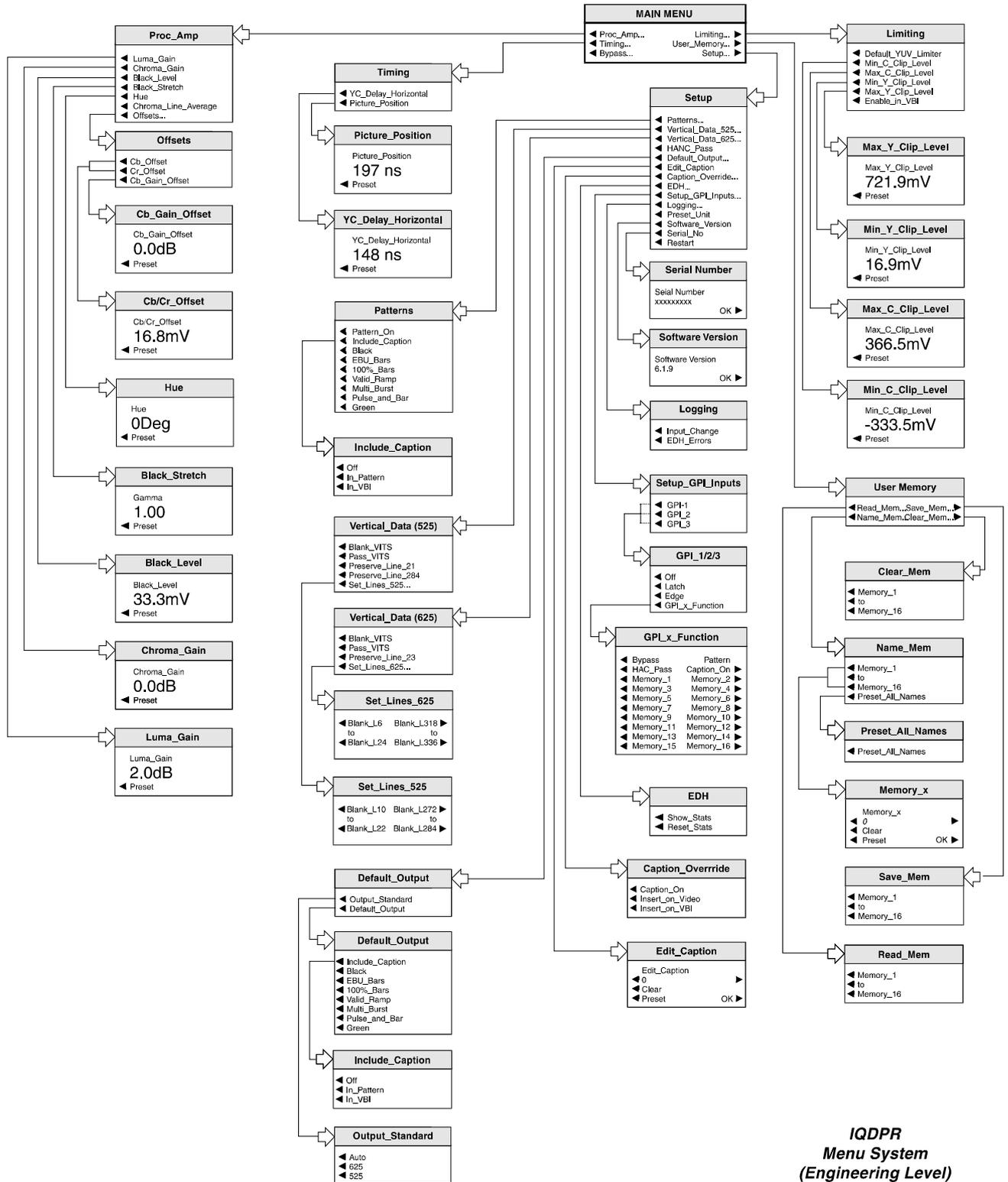
This position allows the unit to pass HANC data (SW2 pressed) or blanked (SW4 pressed)

Default is to Pass.

Position F

In this position pressing SW4 and SW3 together sets all parameters to the **default/preset** conditions.





**IQDPR
Menu System
(Engineering Level)**

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.

◀ Proc_Amp

This selection allows various adjustments to be made to the processed signal.

◀ Luma_Gain

This selection reveals a numerical readout display for the gain of the luminance signal. By rotating the spinwheel the gain may be adjusted by ± 6 dB in steps of 0.1 dB.

Selecting Preset returns the setting to the calibrated value of 0.

◀ Chroma_Gain

This selection reveals a numerical readout display for the gain of the chrominance signal. By rotating the spinwheel the gain may be adjusted by ± 6 dB in steps of 0.1 dB.

Selecting Preset returns the setting to the calibrated value of 0.

◀ Black_Level

This selection reveals a numerical readout display for the Y pedestal or black level.

By rotating the spinwheel the pedestal may be adjusted by ± 100 mV in steps of 0.8 mV.

Selecting Preset returns the setting to the calibrated value of 0.

◀ Black_Stretch

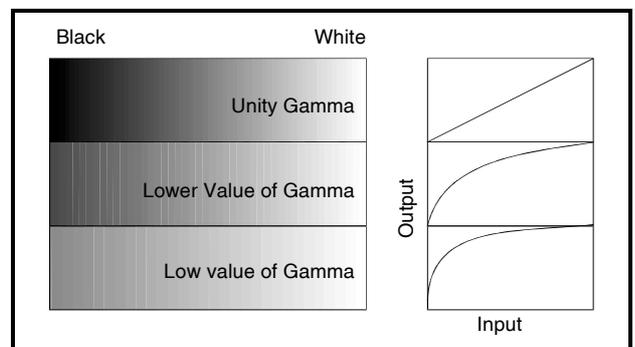
This selection reveals a numerical readout display for the amount of black stretch (Gamma) that can be applied to the signal.

Black stretch allows the gain, close to black level, to be increased revealing more detail in the dark areas of the picture. Generally the output level is related to the input signal by the equation:

$$V_o = V_{in}^{\gamma}$$

Where γ = value of Gamma or Black Stretch

Effect of applying Black Stretch/Gamma Correction to Black to White ramp signal



By rotating the spinwheel the amount of black stretch may be adjusted from 1.00 to 0.64 in steps of 0.04.

Selecting Preset returns the setting to the calibrated value of 1.

◀ Hue

This selection reveals a numerical readout display for the Hue of the signal. By rotating the spinwheel the Hue may be adjusted by $\pm 180^\circ$ in steps of 1° .

Selecting Preset returns the setting to the calibrated value of 0° .

◀ Chroma_Line_Average

This control provides a simple averaging process to the chrominance on a line-by-line basis. It has the effect of reducing 'Hanover Bars' generated by PAL switch errors.

Note that the chrominance is effectively moved ½ line downwards when this function is activated.

◀ Offsets

This item allows offsets to be applied to the chrominance channel of the signal.

◀ Cb_Offset

This applies an offset to the Cb signal (the digital equivalent of the analog B-Y colour difference signal)

The effect will be to alter the overall colour tint of the picture; for Cb the picture will be either more or less blue.

By rotating the spinwheel the amount of offset may be adjusted by ±50 mV (when viewing the analog colour difference signal at standard amplitude) in steps of 0.8 mV.

◀ Cr_Offset

This applies an offset to the Cr signal (the digital equivalent of the analog R-Y colour difference signal)

The effect will be to alter the overall colour tint of the picture; for Cr the picture will be either more or less red.

By rotating the spinwheel the amount of offset may be adjusted by ±50 mV (when viewing the analog colour difference signal at standard amplitude) in steps of 0.8 mV.

◀ Cb_Gain_Offset

This changes the gain of the Cb signal (the digital equivalent of the analog B-Y colour difference signal)

The effect will be to alter the overall amplitude of the colour difference signal and the picture will be either more or less red.

By rotating the spinwheel the amount of offset may be adjusted by ±1 dB in steps of 0.1 dB.

Limiting ▶

◀ Default_YUV_Limiter

When selected this enables the **limiter** (clipper) and the output is limited to standard levels. (0 V/700 mV for Y, 700 mV p-p for Pb and Pr)

Clip Levels

These functions allow Y and C signal excursions to be limited by setting minimum and maximum clipping levels. All adjustments are made in steps of 0.8 mV.

◀ Min_C_Clip_Level

The minimum clip level for the chrominance signal may be set between -397 mV and -200.4 mV

Preset value is -397 mV

◀ Max_C_Clip_Level

The maximum clip level for the chrominance signal may be set between +393.8 mV and +200.4 mV

Preset value is +393.8 mV

◀ Min_Y_Clip_Level

The minimum clip level for the luminance signal may be set between -48 mV and +48 mV

Preset value is -48 mV

◀ Max_Y_Clip_Level

The maximum clip level for the luminance signal may be set between +600 mV and +760.8 mV

Preset value is +760.8 mV

◀ Enable_in_VBI

Normally limiting is disabled during the vertical blanking interval. When this function is selected (text highlighted) limiting is also applied during the vertical blanking interval.

Preset is to limiting disabled during the vertical blanking interval.

◀ Timing

This selection allows various timing adjustments to be made to the processed signal.

◀ YC_Delay_Horizontal

Selecting this item reveals a display showing the timing of the chrominance signal relative to the luminance signal, (i.e. Y to Cb/Cr timing) in nanoseconds. Rotating the spin-wheel will adjust this value.

Range is from ± 444 ns in 148 ns steps.

Selecting **Preset** returns the setting to the preset value of 0.

◀ Picture_Position

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 ± 592 ns in 148 ns steps.

Selecting **Preset** returns the setting to the preset value of 0.

User_Memory ▶

All settings of the unit may be stored in any of 16 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_Mem

This will reveal a list of 16 memory locations. When a particular location is enabled, settings will be changed to the values contained in that memory location.

Save_Mem ▶

This will reveal a list of 16 memory locations. When a particular location is enabled, current settings will be saved in that memory location.

◀ Name_Mem

This function will allow each of the 16 memory locations to be named.

It will reveal a list of the 16 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_Mem ▶

This will reveal a list of the 16 memory locations that may be selected and individually cleared to their default settings.

◀ Bypass

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

Set_Up ▶

◀ Patterns

Enabling this function will allow various patterns to be used as the output signal.

◀ Pattern On

When this item is enabled a pattern, selected from the list below, will become the output signal.

Patterns available are:

- ◀ Pattern_On
- ◀ Include_Caption
- ◀ Black
- ◀ EBU_Bars
- ◀ 100%_Bars
- ◀ Valid_Ramp
- ◀ Multi_burst
- ◀ Pulse_and_Bar
- ◀ Green

◀ Include_Caption

This function allows the caption to be included in various ways.

- ◀ Off
- ◀ In_Pattern
- ◀ In_VBI (Vertical Blanking)

◀ Vertical_Data_525/625

Activating this item allows the Vertical Interval data (all or specific lines) contained in the input signal to be blanked or passed through the module.

Note that in the 525 standard VITS lines are from line 10 and 284 and in the 625 standard from line 6 and 336 inclusive.

◀ Blank_VITS

This function will blank (remove) all standard VITS data lines.

◀ Pass_VITS

This function will allow all standard VITS data lines to pass through the unit.

- ◀ Preserve_Line_21 (525 operating standard)
- ◀ Preserve_Line_284 (525 operating standard)
- ◀ Preserve_Line_23 (625 operating standard)

Enabling the Preserve function will ensure that the lines mentions above **will not** be changed by any of the processing controls.

◀ Set_Lines_625/525

These sub-menus will show the lines that may be selected to be blanked from the output signal. In the 525 standard VITS lines are from line 10 to 284 and in the 625 standard from line 6 to 336 inclusive.

◀ HANC Pass

When this function is enabled the unit will pass all ancillary data in the HANC region.

◀ Default Output

This item allows the output standard and pattern output to be selected in the event of a loss of input.

◀ Output_Standard

In the event of a loss of input the output standard may be set to become:

- ◀ Auto The output will be in the last known standard
- ◀ 625 The output will be in the 625 standard
- ◀ 525 The output will be in the 525 standard

◀ Default_Output

Under the above conditions the pattern that appears at the output may be selected from the following list:

- ◀ Include_Caption
- ◀ Black
- ◀ EBU_Bars
- ◀ 100%_Bars
- ◀ Valid_Ramp
- ◀ Multiburst
- ◀ Pulse_and_Bar
- ◀ Green

◀ Include_Caption

This function allows the caption to be included in various ways.

- ◀ Off
- ◀ In_Pattern
- ◀ In_VBI (Vertical Blanking)

◀ Edit_Caption

This selection allows text to be compiled which may be overlaid on the output signal.

To compile/edit the text the ◀ Edit_Caption function should be selected and the right ► and left ◀ buttons adjacent to the upper text line in the Caption menu 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 ◀ **Presets** function loads the default text (card identification)

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

◀ Caption_Override

These functions allow the caption to be enabled and the inset assignments set.

◀ Caption_On

This toggle function will turn the caption On or Off

Note that this function overrides any other caption settings. e.g. Patterns, Default Output etc.

◀ Insert_On_Video

When enabled this function will insert the caption in the active video region.

◀ Insert_On_VBI

When enabled this function will insert the caption in the vertical interval.

◀ 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.

◀ 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
Pattern ▶	Selects Pattern as output
◀ HANC_Pass	Enables pass HANC function
Caption_On ▶	Enables the caption
◀ Memory_x ▶	Selects a memory location

◀ 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.

