



IQDMENC Encoder

Module Description

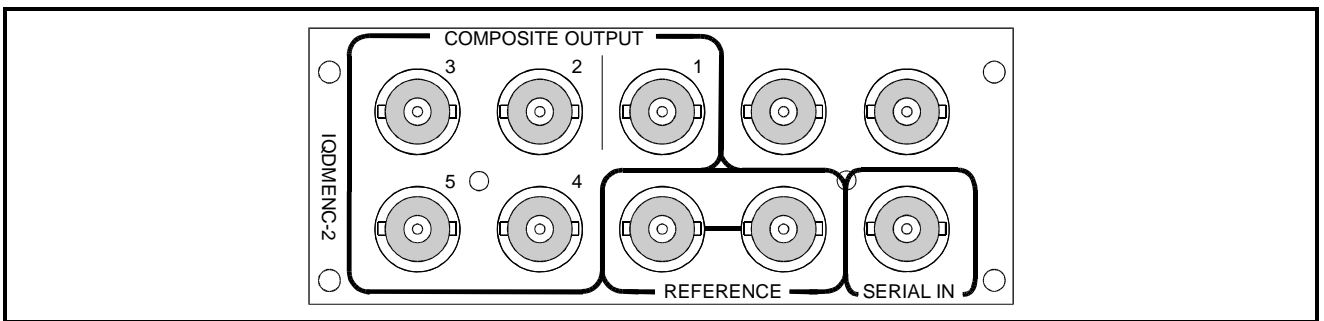
The IQDMENC is a PAL or NTSC encoder. A 10-bit SDI input is encoded into PAL for 625 line inputs or NTSC for 525 line inputs. A 2.8 line input buffer and color frame accurate genlock allows for simple installation.

A 10-bit oversampled DAC is used. Without a reference a minimum delay mode is automatically selected.

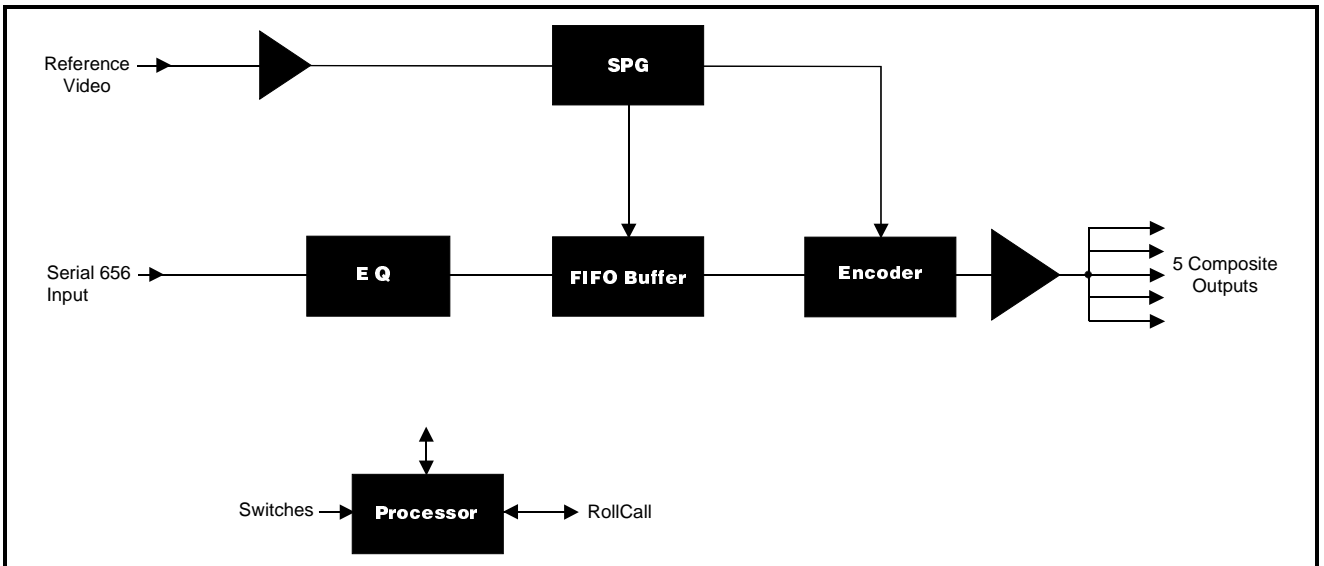
Encoding is in accordance to CCIR624

RollCall provides full remote control and monitoring

REAR PANEL VIEWS



BLOCK DIAGRAM



This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
 1, this device may not cause harmful interference, and
 2, this device must accept any interference received, including interference that may cause undesired operation.

Features

- PAL/ NTSC encoder
- Full genlock and minimum delay operation
- Line input buffer
- 10-bit oversampling DAC
- Composite outputs
- Internal color bar generator
- Tolerant of SMPTE RP168 serial switching

Versions of the module cards available are:

IQDMENC-2-0

5 output encoder

Double width module

TECHNICAL PROFILE

Features**Signal Inputs**

Serial Input	Equalized 270 Mbit/s 10-bit 4:2:2
Reference Input	Composite or black burst

Signal Outputs

Analog	5 Composite encoded outputs
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Preset Controls

Standard -	PAL or NTSC
Genlock Mode	Internal lock/Zero ScH Lock
Genlock H-Phase offset	± 1.9 lines
Genlock SC Phase offset	$\pm 180^\circ$

Indicators

Power Supplies OK	
No Input	
No Reference	
ScH Error/ Buffer Overflow	Reference ScH error Flashes for input buffer over or underflow

Specifications**Signal Inputs**

Serial Input Return Loss	Better than -15 dB to 270 MHz
Reference Input Standard	525/625 (same standard as D1 input)
Composite or Black Burst Reference Level	Standard level ± 3 dB

Signal Outputs

Composite Encoding	10-bit
Y Frequency Response	5.5 MHz ± 0.05 dB
U/I & V/Q Frequency Response	Less than -3 dB at 1.3 MHz less than 20 dB at 4.0 MHz
Differential Gain	Better than 0.2%
Differential Phase	Better than 0.2°
ScH Phase	$0^\circ \pm 2^\circ$
Composite Output Return Loss	Better than 35 dB to 5.8 MHz
Buffer Delay	Up to 2.8 lines
Delay (minimum delay mode)	Less than 4μ s

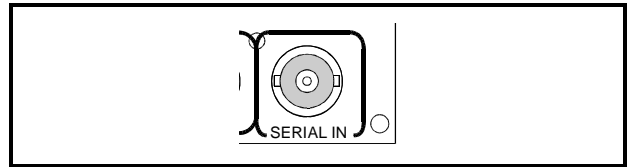
EMC Performance Information

Environment	Commercial and light industrial E2
Peak Mains Inrush Current following a 5 second mains interruption	No mains input
Performance Information	Immunity to conducted common-mode RF interference (EN 55103-2 immunity phenomenon I6): Interference is just visible on critical picture material when a video input or output is subjected to modulated RF at a level of 3 V.

INPUTS AND OUTPUTS

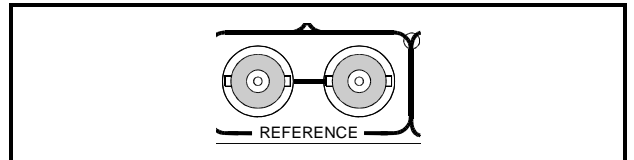
SERIAL INPUT

The connector is the serial digital video input to the encoder via a BNC connector terminated in 75 Ohms.

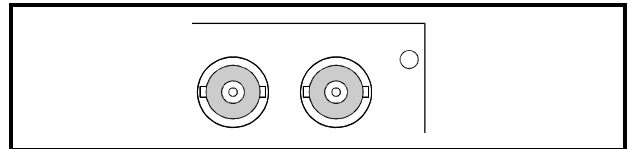


REFERENCE INPUT

These are the high impedance loop-through connections via BNC connectors for a black burst or composite video reference signal.

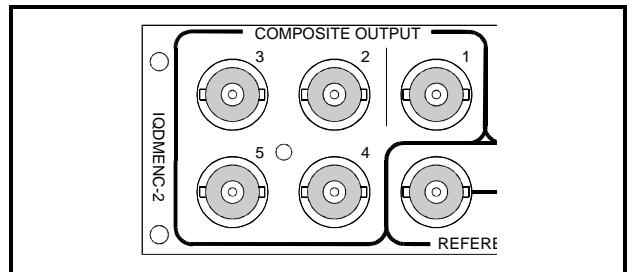


These two unmarked BNC connectors have no function on this unit.

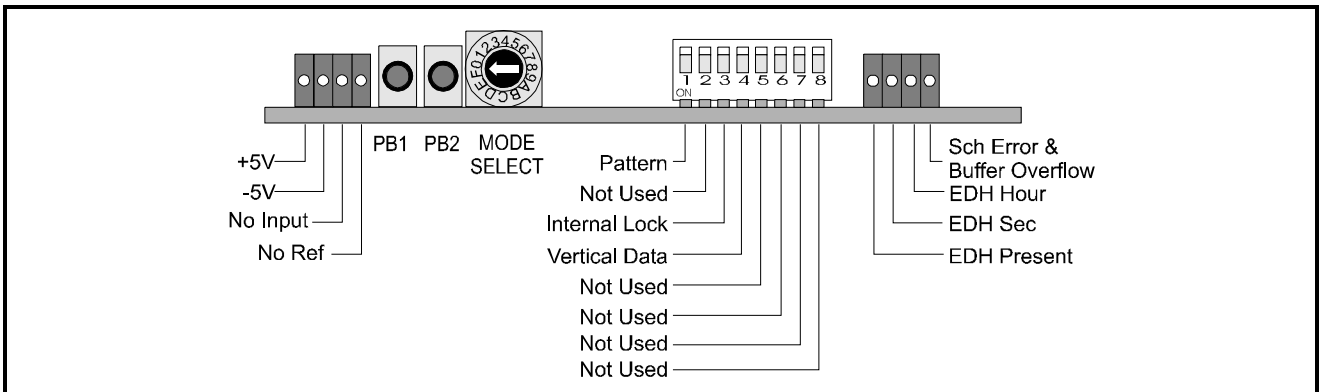


COMPOSITE OUTPUTS

These are the five composite video outputs of the unit via BNC connectors.



CARD EDGE CONTROLS



Adjustment of the settings of the IQDMENC 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

+5V and -5V

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

No Input

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

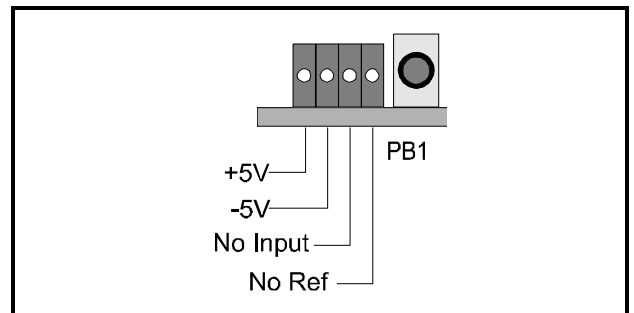
Note that in the **Genlock** mode this LED will flash when the input signal is of a different standard to that of the reference input. Under these conditions the output signal standard will be the same as the reference signal; the input signal will be ignored.

No Ref

When the **No Ref** LED is illuminated this indicates that the unit is not receiving a reference input signal.

Note that the **No Input** and **No Ref** LEDs will flash alternately when the unit is configuring or re-configuring in the event of a standard change.

The message **Please wait....** will appear in the lower line of the Information window during this operation.



EDH Present

This LED will be illuminated if EDH is present on the serial input. In the event of an EDH error being detected the EDH Present LED will become extinguished and the **EDH Min** and **EDH Hour** LEDs will become appropriately illuminated.

EDH Sec

The **EDH Sec** LED be extinguished if no errors have occurred during the previous second.

EDH Hour

The **EDH Hour** LED be extinguished if no errors have occurred during the previous hour.

ScH Error/Buffer Overflow

This dual function LED warns of Genlock error conditions.

It will be illuminated if ScH errors are detected in the reference signal.

It will flash to warn of input buffer under or overflow.

A long ON period will warn of an overflow or within 1.2 μ s of overflow.

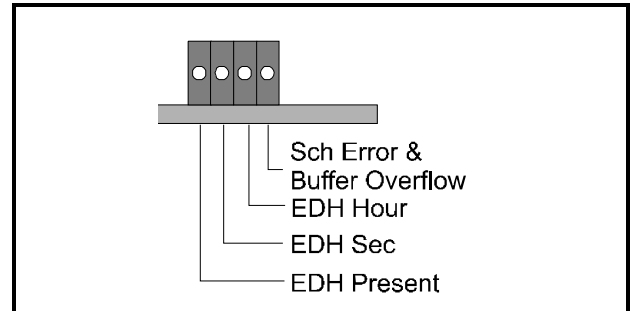
A long OFF period will warn of underflow or within 1.2 μ s of underflow.

Once the buffer has under or overflowed the output signal will be corrupted.

If **overflow** is indicated then the situation should be remedied by use of the Genlock H-Phase offset to delay the input signal compared to the reference signal or advance the reference signal compared to the input signal.

If **underflow** is indicated then the situation should be remedied by use of the Genlock H-Phase offset to advance the input signal compared to the reference signal or delay the reference signal compared to the input signal.

If the buffer has under or overflowed and ScH errors are detected in the reference/input signals this LED will flash with equal ON and OFF periods.



SWITCHES

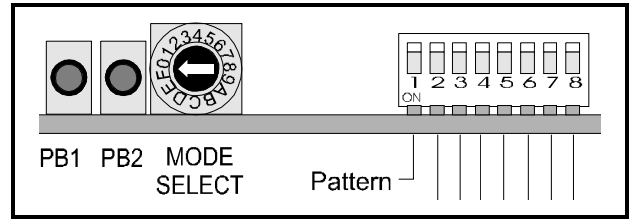
Two push buttons, a Hex switch and a 8 way DIL switch allow various functions and modes to be set.

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

The push buttons PB1, PB2 allow the value of the selected function/parameter to be adjusted.

The Mode select switch 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.

All functions available via an active front panel are duplicated by these switches.

More detailed information about these functions will be found under MENU DETAILS starting on page 11.

FUNCTION AND MODE SELECTIONS

DIL SWITCH FUNCTIONS

Position 1

When set to ON (Down) This position allows the encoder to produce a **test pattern** signal as an output.

Positions 2 and 3

These positions are used to set the **Genlock Mode** as shown in the table below:
(ON=Down, OFF=Up and X = don't care)

PAL/NTSC operation

Mode	Position 3
Genlock	OFF
Internal Lock	ON

Position 4 (Vertical_Data)

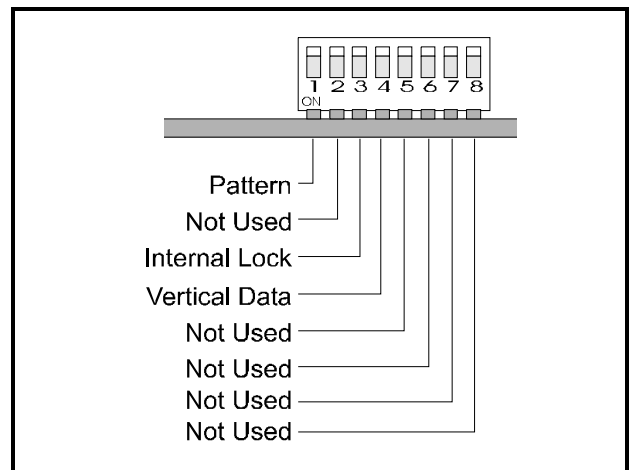
When set to OFF (UP) This position allows the encoder pass data (unblanked) present in the vertical interval, to the output.

In 525 line standards lines from 11 to 274 are unblanked. In 625 standards lines from 7 to 320 inclusive are unblanked.

When set to ON (Down) all data in the vertical interval will be blanked.

Positions 5, 6, 7 and 8

These positions have no function.



Operating Standard

The output standard is determined by the operating line standard - for 525 line the output will be NTSC; for 625 line the output will be PAL. The operating line standard will be determined by the following detection method (in order of priority)

1. The **reference input standard** (signal input standard ignored) when in Genlock mode.
2. If there is no reference signal, by the **input signal standard**.
3. If there is no reference signal and no signal input the standard may be selected by using either the **Mode Select** switch or the **Menu system** of an active front panel.

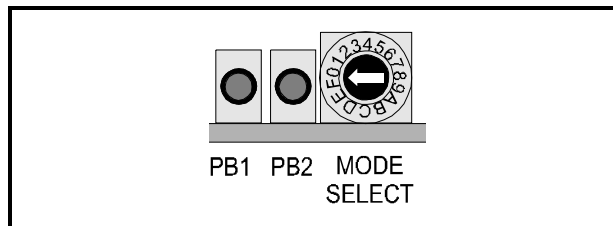
*Note that to use this method of selection the module **must** be operating in the **Internal Lock** mode set by the DIL switch position 3 or via the Genlock menu.*

MODE SELECT SWITCH

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

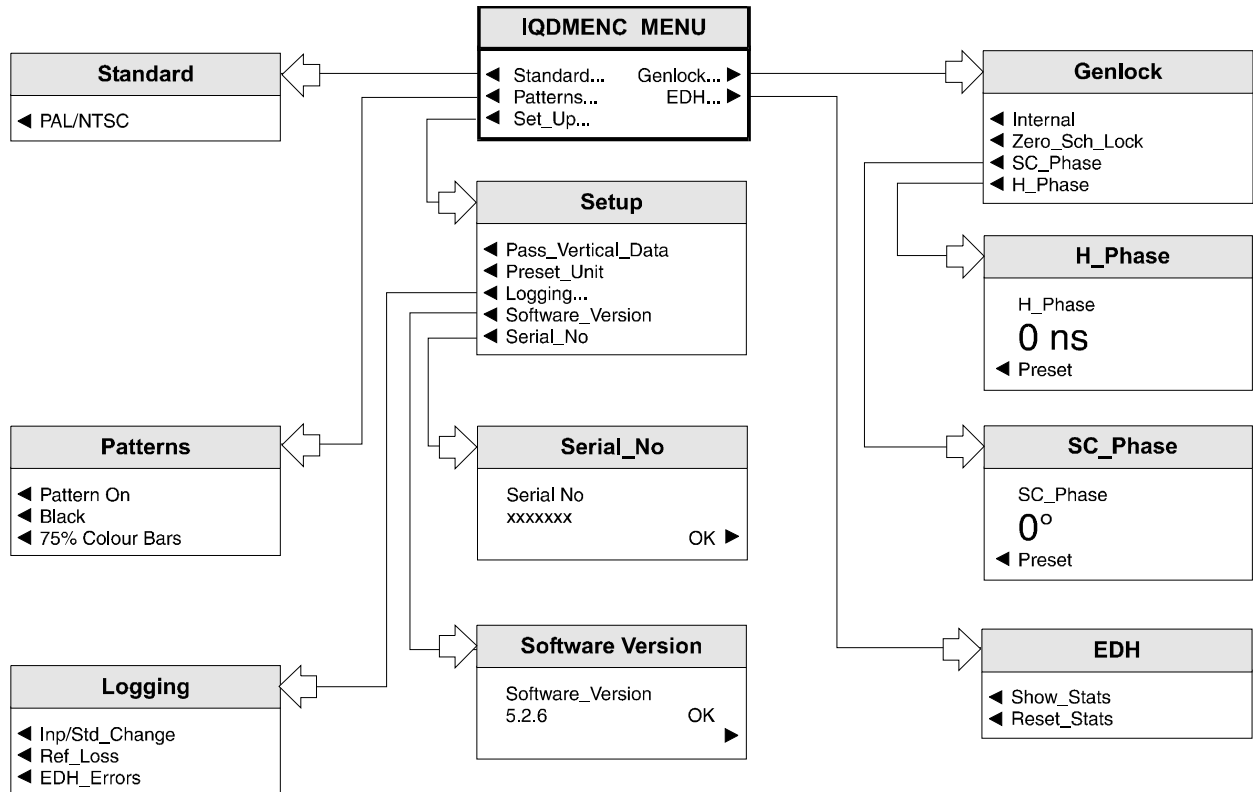
The push buttons allow the value of the selected function/parameter to be adjusted.

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



Function	Switch	Action of PB1	Action of PB2
S/C Phase	0	Rotates vectors anticlockwise	Rotates vectors clockwise
H Phase	1	Moves output ahead of reference	Moves reference ahead of output
No function	2		
No function	3		
No function	4		
No function	5		
EDH Reset	6	Resets EDH statistics	Resets EDH statistics
No function	7		
No function	8		
Standard	9	Selects 625 PAL standard	Selects 525 NTSC standard
Preset Unit	F	Press together to select all preset values	

Note that the availability of some of the above functions will depend on the operating mode of the module. e.g. test patterns will be different for different line standards; availability of phasing controls will depend on the genlock mode etc.



***IQDMENC
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 IQDMENC 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.

STANDARD

This menu selection allows the operating standard of the unit to be set.

The operating line standard will be determined by the following detection method (in order of priority)

1. The **reference input standard** (signal input standard ignored) when in Genlock mode
2. If there is no reference signal, by the **input signal standard**.
3. If there is no reference signal and no signal input the standard may be selected by using this menu. This allows the module to provide test signals in either standard. Selecting the PAL/NTSC menu will toggle the output standard between PAL and NTSC.

*Note that to use this method of selection the module **must** be operating in the **Internal Lock** mode set in the **Genlock** menu.*

If the signal input and reference input are of different line standards, the unit will output a black signal at the reference signal line rate.

GENLOCK

This sub-menu allows various modes of genlock to be enabled.

Internal

When this function is enabled the output signal will be locked to the serial input (if available) or free-running if no serial input is available.

In this mode the frequency accuracy will be ± 10 ppm

Notes:

1. *This mode will be automatically enabled if the signal input and reference input are of different line standards and the output will default to black burst in the reference standard.*
2. *This mode should be selected if test patterns of a particular line standard (and different to the reference input) are required at the output.*

Zero_ScH_Lock

This function allows the unit to lock to the reference signal input.

SC_Phase (Zero ScH Mode only)

This function allows the relative phasing between the reference subcarrier and the output signal subcarrier to be adjusted. Rotating the spin-wheel will adjust this value and the numerical display shows the phasing in degrees.

The range of adjustment is 359.9° (continuously adjustable) in steps of 0.1° and the preset value is 0° (Output coincident with reference)

H_Phase (Zero ScH Mode only)

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

The range is approximately ± 1.9 lines in steps of one cycle of subcarrier. (This ensures the correct SC/H timing is maintained)

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

EDH

The input stream is continuously monitored for EDH errors. Basic information on this can be monitored and/or reset here.

The following functions may be selected:

Show_Stats The information will be displayed in the LCD window

Reset_Stats Data will be reset

SETUP

This selection reveals a sub-menu that allows the following functions to be set up:

Pass_Vertical_Data

When selected (text reversed) the unit will pass data (unblanked) present in the vertical interval, to the output.

In 525 line standards lines from 11 to 274 are unblanked. In 625 standards lines from 7 to 320 inclusive are unblanked.

When de-selected (text normal) all data in the vertical interval will be blanked.

Preset_Unit

Selecting this function presets various functions such that some sort of signal is produced at the output even though some settings may be inappropriate for the input signal. This is useful if many settings have been set in error such that no output signal is being produced.

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 can be made available to such a device.

Inp/Std_Change

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

Ref_Loss

When activated a loss of reference signal condition will be notified to any logging device.

EDH_Errors

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

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 No

This displays the serial number of the unit.

Select OK to return to the setup menu.

Both the luminance and chrominance information may be modified to produce the visually nearest colour to the illegal colour.

THE INFORMATION WINDOW

The Information window has four lines of text indicating current selections and various information messages.

Note that in a RollCall system some units will overwrite the information window indication with their own messages. Under these conditions the control panel will only be able to write to the information window when the unit has been disconnected.

The first line will contain the name of the module which is currently being controlled.

The second, third and fourth lines provide specific information about the operating conditions of the module.

Example of text displayed

Line 1	01:IQDMENC		
Line 2	Inp:OK	Std:PAL	
Line 3	Ref:OK		
Line 4	ZSC	PVD	PAT

Text Line Details

- Line 1 This line contains the name of the module and Gateway code data.
- Line 2 This line gives information about the state of the video input and the output standard.
Input state may be OK, ERR (input error detected) or *** (no signal connected)
Output standard may be PAL or NTSC.
- Line 3 This line gives information about the state of the reference input.
Reference may be OK, *** (no signal connected) or SCE (a subcarrier error detected. e.g. a Sch error of >20°)
- Line 4 This line may show the state of the input buffer as OK, OF (overflow of >2.8 lines) UF (underflow <2.8 lines) or set up messages:
ZSC Genlock Zero SC/H Lock enabled
PVD Pass Vertical Data enabled
PAT Pattern ON enabled

Appendix 1

Genlock

The genlock will operate in one of two modes. The default mode (switches off), locks to the reference subcarrier and will always produce a zero ScH output. The output H timing will be maintained as close as possible to the reference H timing in the correct colour frame.

The ScH warning LED will light if the ScH of the reference is $> \pm 20^\circ$ (approx.), indicating that colour framing may be lost should the reference ScH error increase significantly.

With no reference applied or internal lock selected the output will lock to the input D1 with the buffer delay set to a minimum. Incoming jitter will be suppressed and the output ScH is guaranteed to be zero.

In the event of conflicting standards being applied to the reference and the D1 input the output will default to black burst in the reference standard. With no input or reference the output will also be black burst (or any available pattern) in a user selectable standard. In this mode the frequency accuracy will be $\pm 10\text{ppm}$.

In reference genlock modes the subcarrier may be offset by up to 360° . H phase offset is limited to approx. ± 1.9 lines. A genlock offset of ± 1.9 lines is allowed but the encoded output is only valid when delayed between approximately $4\ \mu\text{s}$ and 2.8 lines of the input D1 data. The ScH warning LED will flash when the buffer is under or overflowed indicating an invalid output or where the buffer is within $1.2\ \mu\text{s}$ of overflow or underflow.

Genlock and delay limits (without comb option):

