ENDAC

Encoding converter

USER MANUAL

Crystal Vision

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Contents

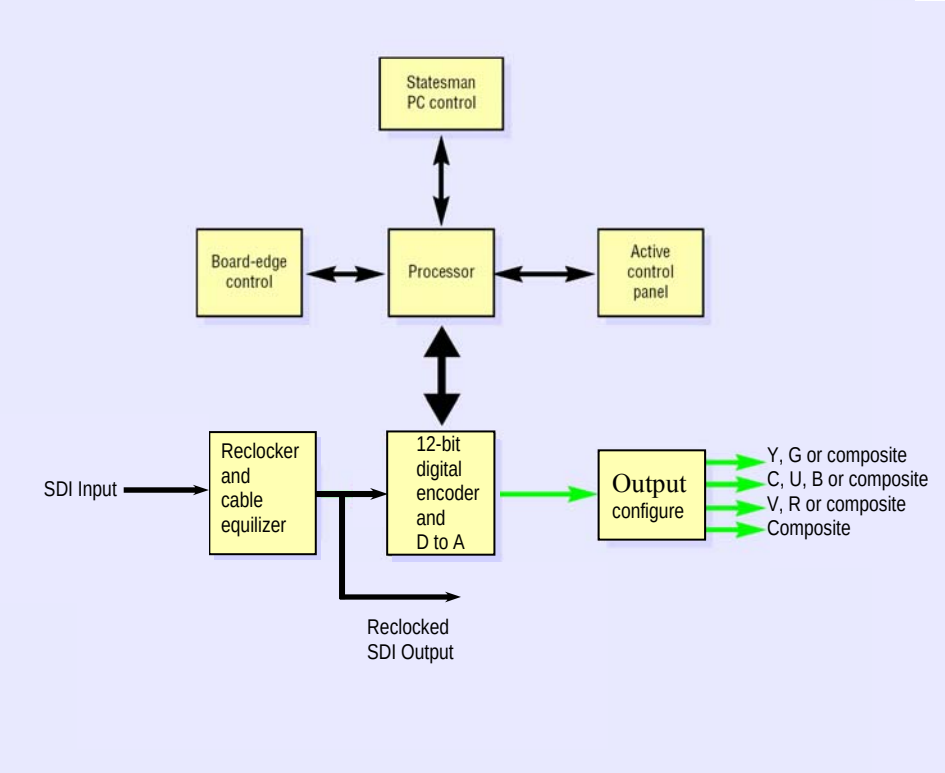
Revision 2	Block diagram title corrected	20-02-07
Revision 3	Text in table on page 5 corrected	26-02-07

1 Introduction

ENDAC is a 12-bit broadcast encoder with four outputs that can be configured to give a variety of component and composite signals.

ENDAC will fully integrate with any other interface or keying product from the Crystal Vision range. Further flexibility is afforded by the large choice of control options. Control options include board edge control, local or remote active control panel and the Statesman PC Control System.

- 12-bit digital encoder
- Flexible control, including PC software.
- Three link configurable outputs, 1 fixed composite output
- Compact design for high packing density



ENDAC 12-bit Encoder

ENDAC is a 100mm x 266mm module that fits in Crystal Vision four standard frame sizes. 24 modules fit in 4U, 12 modules fit in 2U, six in 1U or two in a desktop box. There are a range of rear connector modules available for the ENDAC which allow the system builder great flexibility in frame configuration.

1.1 Operating modes

Analogue video formats

There are four analogue video outputs of which one is a fixed composite output. The other three video outputs can be configured using on-board links to produce a selection of further composite outputs, YC, GBR or YUV component (Y'P'b P'r or Y'C'b C'r). 625 and 525-line output standard can be set. Data in the VBI (vertical blanking interval) is passed to the analogue composite output. The addition of a 7.5% IRE setup is also selectable when outputting an NTSC format signal. Betacam signal levels can also be selected for component YUV outputs.

Status and control

Status and control is available using the board edge menu selection switches and LEDs. Control and status reporting is also available from either an active frame front or remote active control panel. PC control is also available using Crystal Visions Statesman PC controller package.

Note. When the ENDAC is set to remote control mode the position of the board edge switches may not reflect the actual configuration of the card. Returning the card to local control will reinsert the board edge configuration

2 Hardware installation

The ENDAC single height module uses the RM01, which will fit into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

The ENDAC can also be used with several other rear modules such as the RM02 and RM18 but at reduced packing density.

2.1 Rear modules and signal I/O

The Indigo 4 4U frame will house up to 24 single height modules with up to three power supplies. The FR2AV and Indigo 2 2U frames will house up to 12 single height modules and dual power supplies. The FR1AV and Indigo 1 1U frames will house six single height modules and a single power supply. The DTBAV and Indigo desk top boxes both have a built-in power supply and will house up to two single height modules.

Note: For details of fitting rear connectors please refer to the appropriate frame manual

Rear module connections with RM01

The RM01being a single height module will allow maximum packing density with the maximum number of outputs available.

RM01 rear module connector	Description
	**RM01** • 24 ENDAC modules per Indigo 4 frame • 12 per FR2AV or Indigo 2 frame • Six per FR1AV or Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
R/V PAL/NTSC OUT	Component R / V or composite output (link selectable)
SDI IN	Serial digital input
SDI LOOP	Reclocked SDI input loop-through
Y/ G PAL/NTSC OUT	Component G / Y, YC-Y or composite output (link selectable)
C/B/U PAL/NTSC OUT	Component B / U, YC-C or Composite output (link selectable)
PAL/NTSC OUT	Composite Output

Module configuration

The ENDAC has five user selectable jumper links, which are used to configure output formats.

Note links PL10 & PL11 must be moved together as a pair.

Linked position	Output	Function
PL2 (YCY)	Y/ G PAL/NTSC OUT	Y
PL3 (CVBS)		Composite
PL4 (G/Y)		Green or Y component
PL5 (YCC)	C/B/U PAL/NTSC OUT	C
PL6 (CBVS)		Composite
PL7 (B/U)		Blue or U component
PL8 (CBVS)	R/V PAL/NTSC OUT	Composite
PL9 (R/V)		Red or V component
PL10 (U)	C/B/U PAL/NTSC OUT	Left Y'P'bP'r Right Y'C'bC'r
PL11 (V)	R/V PAL/NTSC OUT	Left Y'P'bP'r Right Y'C'bC'r

2.2 General Purpose Interface (GPI)

Each frame slot has up to six connections 'a-f 'for GPI control and monitoring. These connections are available at the rear of the frame on the 26-way D type Remote connectors.

GPI			Low (<1V)	High (+5V)
0	**'a'**	**Loss of input**	No user connection at present	
1	**'b'**		No user connection at present	
2	**'c'**		No user connection at present	
3	**'d'**		No user connection at present	
4	**'e'**		No user connection at present	
5	**'f'**		No user connection at present	

As supplied, each GPI output has a 220Ω resistor in series with its output. This allows for an external LED to be driven, connected to a DC voltage of +5V.

4U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to one of eight rear remote connectors as follows:

Slot no.	‘a’ pin	‘b’ pin	‘c’ pin	‘d’ pin	‘e’ pin	‘f’ pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)
Slot no.	**‘a’ pin**	**‘b’ pin**	**‘c’ pin**	**‘d’ pin**	**‘e’ pin**	**‘f’ pin**
1	8 (5)	9 (5)	18 (5)	26 (5)	19 (6)	20 (6)
2	7 (5)	16 (5)	17 (5)	25 (5)	10 (6)	11 (6)
3	8 (7)	9 (7)	18 (7)	26 (7)	19 (8)	20 (8)
4	7 (7)	16 (7)	17 (7)	25 (7)	10 (8)	11 (8)
5	5 (5)	6 (5)	15 (5)	24 (5)	1 (6)	2 (6)
6	4 (5)	14 (5)	13 (5)	23 (5)	3 (6)	4 (6)
7	5 (7)	6 (7)	15 (7)	24 (7)	1 (8)	2 (8)
8	4 (7)	14 (7)	13 (7)	23 (7)	3 (8)	4 (8)
9	3 (5)	12 (5)	22 (5)	21 (5)	12 (6)	13 (6)
10	10 (5)	11 (5)	19 (5)	20 (5)	21 (6)	22 (6)
11	3 (7)	12 (7)	22 (7)	21 (7)	12 (8)	13 (8)
12	10 (7)	11 (7)	19 (7)	20 (7)	21 (8)	22 (8)

Upper

Lower

Table shows pin number (Remote number)

Note: Remote 1, Remote 3, Remote 5 and Remote 7 are 26 way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2, Remote 4, Remote 6 and Remote 8 are 26 way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2 and Remote 6.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A. Remotes 5-8 are similarly protected.

2U frame GPI connections

GPI lines 'a' to 'f' of each card connect to one of four rear remote connectors as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Table shows pin number (remote number)

Note: Remote 1 and Remote 3 are 26 way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2 and Remote 4 are 26 way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2.

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A.

1U frame GPI connections

GPI lines 'a' to 'f' of each card connect to one of two rear remote connectors as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
4	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
5	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
6	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)

Table shows pin number (remote number)

Note: Remote 1: 26 way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26 way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

DTB-AV desk top box GPI connections

GPI lines 'a' to 'f' of each card connect to the rear remote connector as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	1	2	3	4	5	6
2	9	10	11	12	13	14

Note: Remote connector is 15 way normal density D-Type socket. Frame ground is pin 15.

Indigo DT desk top box GPI connections

GPI lines 'a' to 'f' of each card connect to the rear remote connector as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)

Table shows pin number (remote number)

Note: Remote 1: 26 way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

Remote 2: 26 way high-density D-Type male plugs and frame ground is pin 6 and +5V @500mA is pin 15

Note. The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-2 to approximately 1A.

3 Card edge operation

The hinged front panel of the case reveals the card user controls and LED indication of card status.

ENDAC front view showing controls and LEDs

3.1 Card edge switch settings

The 8 way piano switch allows the operating modes and status options to be selected.

Lever	Function	Up position	Down position
1	Component output format	YUV	RGB
2	Line standard	525	625
3	NTSC format	NTSC-M	NTSC-J
4	YUV Betacam format	UP normal	Betacam format
5			
6			
7	Control	Board-edge control	Statesman or active front panel control
8			

8 way DIL switch functions

3.2 Reading card edge LEDs

Card edge LEDs may be used in conjunction with status information from any connected remote status panel display or from Statesman if available.

Refer also to the trouble-shooting chapter for more help with solving problems and monitoring status information.

The following table summarises the card edge LED functions and colours:

Name	Led Colour	Function when ON
PSU	Green	Good power supply (PSU) rails. (Bottom LED)
Input	Green	Video input present

3.3 Card edge configuration

Component output format

Selecting the Component output format

The ENDAC can be configured to output four component analogue video formats, RGB, YUV Y'P'bP'r or Y'C'bC'r and YUV Betacam.

Note Y'P'bP'r / Y'C'bC'r selection is selected by the positions of links PL10 and PL11.

DIL 1		Function
UP	YUV	Normal
DOWN		Sets YUV gains to output Betacam video Chroma amplitudes

Line standard

The ENDAC is able to operate in both 625 and 525 line rates.

DIL 2		Function
UP	525	525-line standard selected
DOWN	625	625-line standard selected

Adding NTSC setup (pedestal)

When the NTSC standard is selected the analogue output can have a 7.5% IRE setup (pedestal) applied. The Chroma amplitude is also adjusted accordingly.

DIL 3		Function
UP	M	+7.5% IRE setup added
DOWN	J	No setup

Betacam format

The ENDAC is able to output in Betacam Y'P'bP'r format where the P'bP'r component is attenuated by 1.333.

DIL 4		Function
UP		Normal
DOWN	β	Sets YUV gains to output Betacam video Chroma amplitudes

Control

Control can be from card-edge or remotely from an active control panel or Statesman PC control package.

DIL 7		Control
UP	loc	Local, board-edge control available
DOWN	rem	Remote control selected. Board edge control are non-functional

Note. M/J and BETA modes will interact globally with composite and component outputs.

4 Using the active front panel

4.1 Module selected

This operational guide assumes that the panel has been setup according to the Panel setup procedure described in the Crystal Vision Control Panel manual.

Note: It is **ESSENTIAL** that the Panel setup procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up, the two line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. All eight control panel keys LEDs will illuminate.

The Crystal Vision control panel start up display

'Control Panel' then briefly replaces the version number display.

If the control panel firmware has been updated for Statesman control (version 1.5.0 or higher), Statesman Mode will be entered and the message, 'Press CAL to Exit' will be displayed and the CAL LED will light.

Statesman mode is entered by default

To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

The control panel will display the name of the card that first responds to the polling request together with its location number.

The location number consists of the frame number plus the card position in the frame.

Navigating the display

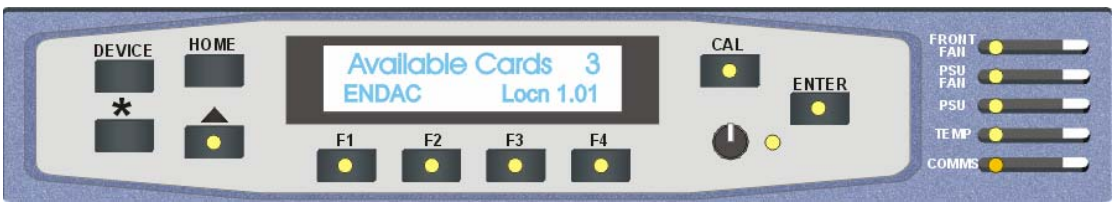
The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available / enters Panel setup when held down during power up / shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode / enters panel diagnostics mode when held down during power up / updates the display
- Asterisk – enters board rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the home menu
- ENTER – accept current selection
- Upward arrow – used to move up the menu structure / enter lock panel menu from the Device menu
- Rotary control – shaft encoder used to select options or variable data.

Note: Please refer to the Crystal Vision Control Panel manual for details of the Panel Setup, Lock Panel and Diagnostic menus.

Selecting ENDAC

To select a particular card in a frame, press the DEVICE key to go to the Device menu. The top line of the display will show 'Available Cards X', where X is the number of cards that have responded so far to the polling request.



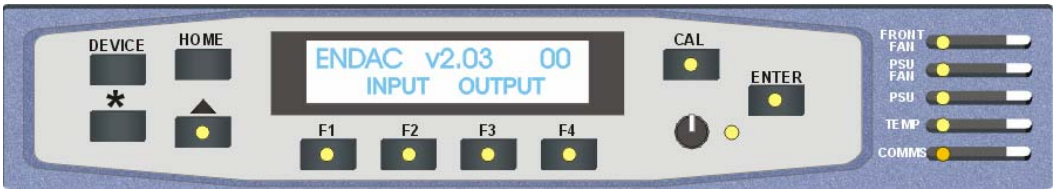
The available cards menu

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

In the example above, the card displayed is located in the first frame in slot number 1.

When the desired card is selected press the ENTER key to access that card's HOME menu.

The message shows that an ENDAC has been selected with the version of software on the module as Vv2.03.



The ENDAC home menu

Updating the display

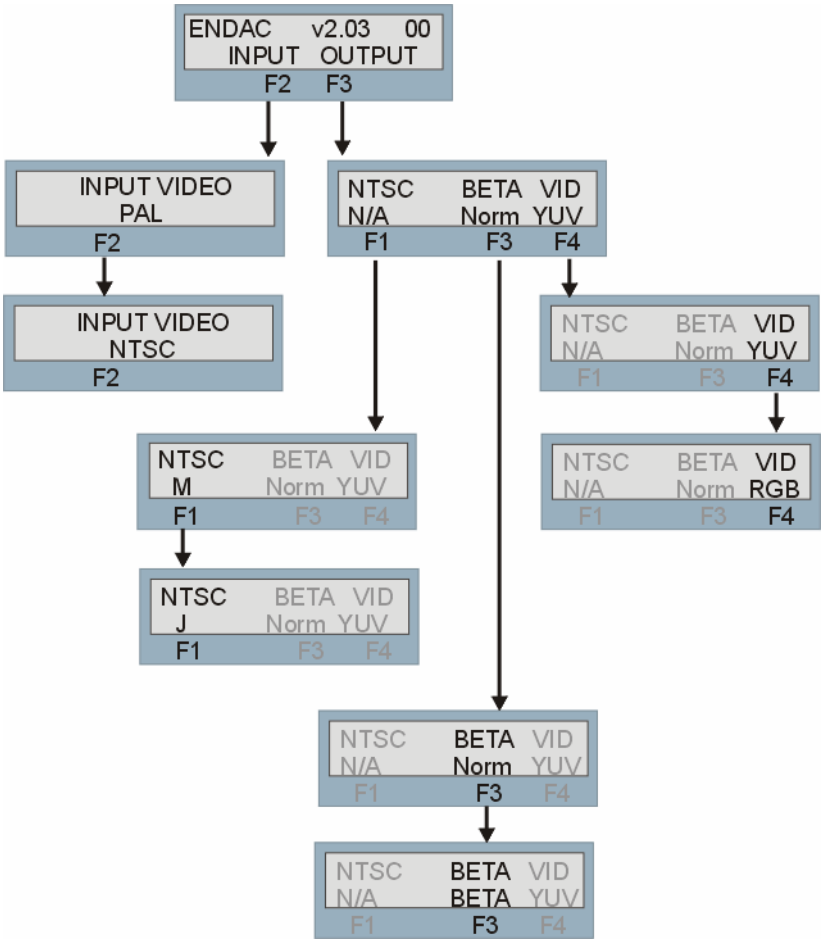
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If mode changes occur through the use of Statesman, card edge controls or through automatic response to the input video signal, the text displayed on the active front panel will not be updated immediately. If necessary, press CAL to update the display.

The ENDAC menu structure

The main top-level menu is obtained by pressing the F1 HOME menu. Menu keys are illuminated when active and when further menus are available.

Pressing the Function keys F2-3 accesses the ENDAC's sub menus. When a sub menu has been selected, further options can be accessed by further use of the function buttons. Where adjustments are available rotating the shaft will then make the required change. An adjacent LED illuminating indicates an active key. All key presses and numeric value changes are implemented immediately.

The following chart shows the available ENDAC menus. The actual menus available may vary slightly as software is updated.



The ENDAC menu tree

Note: Function keys LEDs are illuminated when active.

A more detailed description of the individual menus follows.

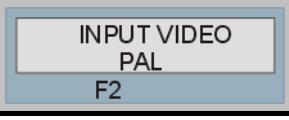
Home Menu

There are two sub menus available, Input and Output from the home menu. Pressing F2 Input leads to the line rate configurations. Output F3 contains the analogue output format configurations. The Home menu also contains information about the type of card and its position in the frame.

Configuration menu structure	Description
ENDAC v2.03 00 INPUT OUTPUT F2 F3	Card type and frame position. Access to sub menus.

Input Menu

The Input configuration menu allows the user to set the video operating standard for the ENDAC.

Video Configuration menu structure	Description
	Toggle **F2** to set the operating mode to be either PAL 625-line or NTSC 525-line.

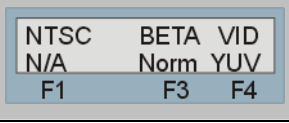
Output Menu

This menu gives access to the output configuration controls.

When NTSC input standard is selected the analogue output can have a 7.5% IRE setup (pedestal) applied. The Chroma amplitude is also adjusted accordingly.

The ENDAC can be configured to output four component analogue video formats, RGB, YUV Y'P'bP'r or Y'C'bC'r and YUV Betacam.

Note Y'P'bP'r / Y'C'bC'r selection is selected by the positions of links PL10 and PL11.

Output configuration menu	Description
	**F1** NTSC. Toggle for M or J. N/A in PAL mode. **F3** BETA. Toggle for BETA or Normal. Only active if YUV output is selected. **F4** VID. Toggle for YUV or RGB

Note. M/J and BETA modes will interact globally with composite and component outputs.

5 Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC.

The main Statesman application communicates with each module in a frame that is fitted with an active front panel. This panel can be with or without a LCD display. Statesman will not be able to detect modules used in a frame with only a passive front panel unless it is part of an active/passive combination.

5.1 Installing Statesman

Minimum pre-requisites:

- A PC running Windows 98, NT4 with SP 5 or higher Windows 2000 or Windows XP
- A parallel port dongle supplied with the Statesman software package
- An RS422 serial connection from the host PC to the Indigo frame control input or to Remote 2 connector on an FR1AV or FR2AV Crystal Vision frame with at least one FTX202 module and/or other Statesman compatible module
- An active control panel MUST be fitted to the frame with version 1.63 or above firmware – if it is an Indigo frame the firmware must be V1.04 or above
- An optional RS422 to RS232 converter if the PC has no RS422 ports

Installing Statesman

- Refer to the readme and/or help file on the CD before proceeding
- To view all application windows, set graphics resolution to at least 1024 x 768
- Remove any previous version of the Statesman software using the Add/Remove Programs application in the Windows Control Panel
- Ensure that the Statesman dongle is fitted to the parallel port of the host PC
- Insert the Statesman CD and the installation should start immediately – if it does not, run the setup.exe file on the CD
- Obey any installation program prompts and restart the PC when prompted

Running Statesman for the first time

The Statesman PC Control System may be run from the Crystal Vision programs folder via the Start menu or by double clicking on the Crystal Vision.exe file in the installed program directory.

When the program runs it will require licence information and an administrator name and password. It will also need to know which computer port is being used to connect to a Crystal Vision frame(s).

Note: For further details of Statesman configuration please refer to the Statesman manual.

5.2 Statesman operation

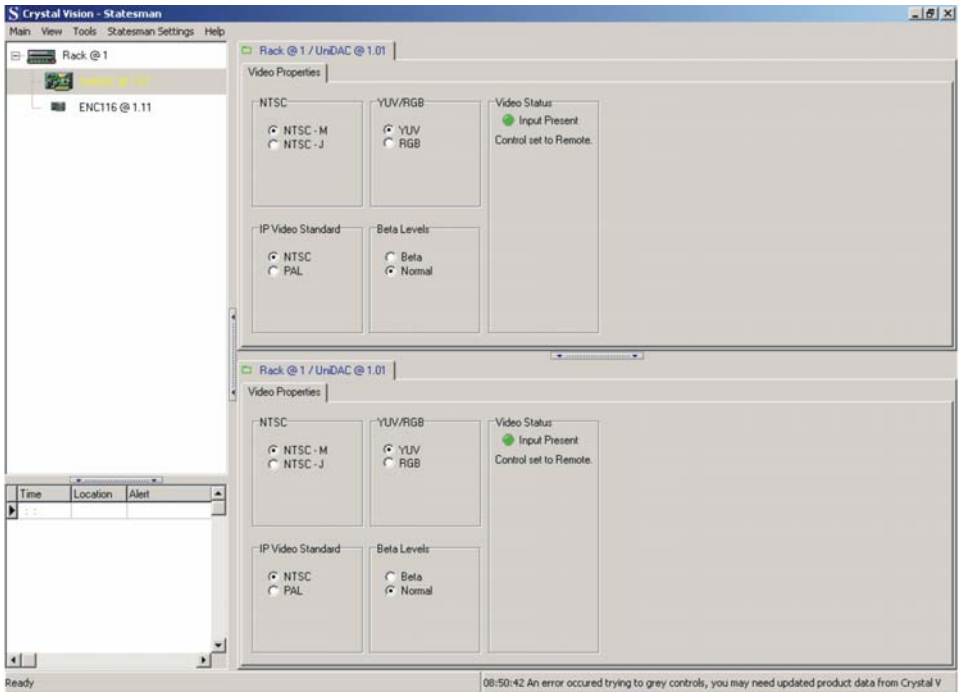
Once Statesman is configured it should automatically detect any Statesman compatible modules in the connected frame or frames and display them in the main application left hand explorer-style window.

Open any frame by clicking on the + sign or by double clicking on a frame. Installed modules should be shown with module icons. Frame and module icons can be named as desired by right clicking or using the edit menu and choosing rename.

To aid user recognition of module and frame status quickly, the following colour and size coding is used:

- A module is shown present by full colour and absent by greyed colour
- A module is shown open by large icon size and closed by small icon
- A module is the source of an active alarm if red and not alarmed if green

Double clicking on a module will enable the display of the main application menus.



Statesman main application window

The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower plane or drag the button to vary the size of the panes.

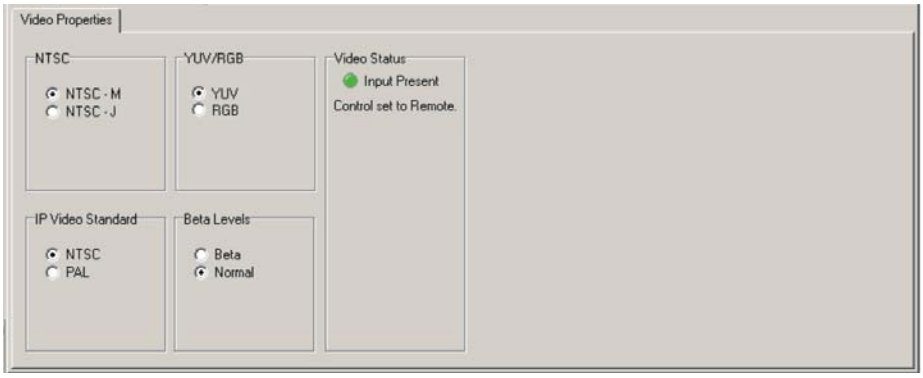
Note: For further details of Statesman configuration and operation please refer to the Statesman manual.

Video properties

Using Statesman status displays

Video status is provided by simulated LEDs in video status panel.

To select the desired mode click the item in the selected radio group.



ENDAC video properties

NTSC format

When NTSC input standard is selected the analogue output can have a 7.5% IRE setup (pedestal) applied. The Chroma amplitude is also adjusted accordingly.

Select NTSC-M for setup, NTSC-J no setup.

Input Video Standard

The ENDAC will operate in both PAL 625-line and NTSC 525-line standards.

Select PAL or NTSC.

Component Output format

The ENDAC can be configured to output four component analogue video formats, RGB, YUV Y'P'bP'r or Y'C'bC'r and YUV Betacam.

Note Y'P'bP'r / Y'C'bC'r selection is selected by the positions of links PL10 and PL11.

Betacam levels

In YUV output mode the ENDAC is able to output in Betacam Y'P'bP'r format where the P'bP'r component is attenuated by 1.333.

Video status

The Video Status panel allows the user a quick appraisal of parameters such as, Input present and control mode.

Note. M/J and BETA modes will interact globally with composite and component outputs.

6 Trouble shooting.

6.1 Card edge monitoring

Status LEDs

Board edge LEDs provide status reporting and may be useful when fault finding.

The following table summarises the card edge LED functions and colours:

LED Colour	Position	Description
Green	+5V	Illuminates when the board is powered
Green	Input	Illuminates when an analogue input is present (Y or Comp input only)

6.2 Fault finding guide

The Power OK LED is not illuminated

Check that the frame PSU is functioning and ensure the ENDAC is fully inserted into its slot– refer to the appropriate frame manual for detailed information.

There is no video output

Check that a valid serial digital video input is present and that all cabling is intact.

The video output exhibits jitter

Check that the input video stability is within normal limits and that the maximum cable length has not been exceeded.

The card no longer responds to Statesman or front panel control

Check that the card is seated correctly and that the power OK LEDs are lit.

Check any active control panel cabling.

Check if the control panel can control another card in the same rack.

If necessary re-set the card by simply removing the card from the rack and then re-inserting the card.

It is safe to re-insert the card whilst the rack is powered.

7 Specification

General

Dimensions	100 mm x 266 mm module with DIN 41612 connector
Weight	150g
Power consumption	6 W

Inputs

	270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M.
	Cable equalisation >200m Belden 8281 or equivalent.

Outputs

	4 x composite, 2 x composite plus YC, 1 x composite plus YUV/RGB
Sampling	12-bit precision
Frequency response	± 0.5dB to 5.5MHz
Gain error	<1.0%
Differential phase	<1.5%
Differential gain	<1.5%
Signal to noise	<-60dB

Control and status

Control	Board edge control using 8-way DIL switch and LEDs, active control panel or Statesman PC control software.
GPI Alarm	Input absent
	Electrically: Open drain FET 30V, 220Ω current limit resistors. Pulled up to +5V through 10kΩ.
LEDs	PSU okay, Input present.

Ordering information

ENDAC	12-bit encoder module.

Rear Connectors

RM01	Single height rear connector

Frames

Indigo 1	1U frame with passive front panel for up to 6 modules
Indigo DT	Desk top box with passive front panel for up to 2 modules
Indigo 2A	2U frame, Statesman enabled with active control panel for up 12 modules
Indigo 1A	1U frame, Statesman enabled with active control panel for up 6 modules
Indigo DTA	Desk top box, Statesman enabled with active control panel for up 2 modules
Indigo 4S	4U frame with passive front panel fitted with Statesman CPU for up to 24 modules

Indigo 2S	2U frame with passive front panel fitted with Statesman CPU for up to 12 modules
Indigo 1S	1U frame with passive front panel fitted with Statesman CPU for up to 6 modules
Indigo DTS	Desk top box with passive front panel fitted with Statesman CPU for up to 2 modules
Indigo 2-48V	48V 2U frame with passive front panel for up to 12 modules
Indigo 1-48V	48V 1U frame with passive front panel for up to 6 modules
Indigo 2A-48V	48V 2U frame, Statesman enabled, with active control panel for up 12 modules
Indigo 1A-48V	48V 1U frame, Statesman enabled, with active control panel for up 6 modules
Indigo 2S-48V	48V 2U frame with passive front panel fitted with Statesman CPU for up to 12 modules
Indigo 1S-48V	48V 1U frame with passive front panel fitted with Statesman CPU for up to 6 modules