ADDEC-200

Analogue to SDI decoding converter

USER MANUAL

Crystal Vision

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Contents

1 Introduction

ADDEC-200 is a broadcast decoder. It brings together onto one PCB both the functions of a 12-bit decoder and synchroniser/delay module.

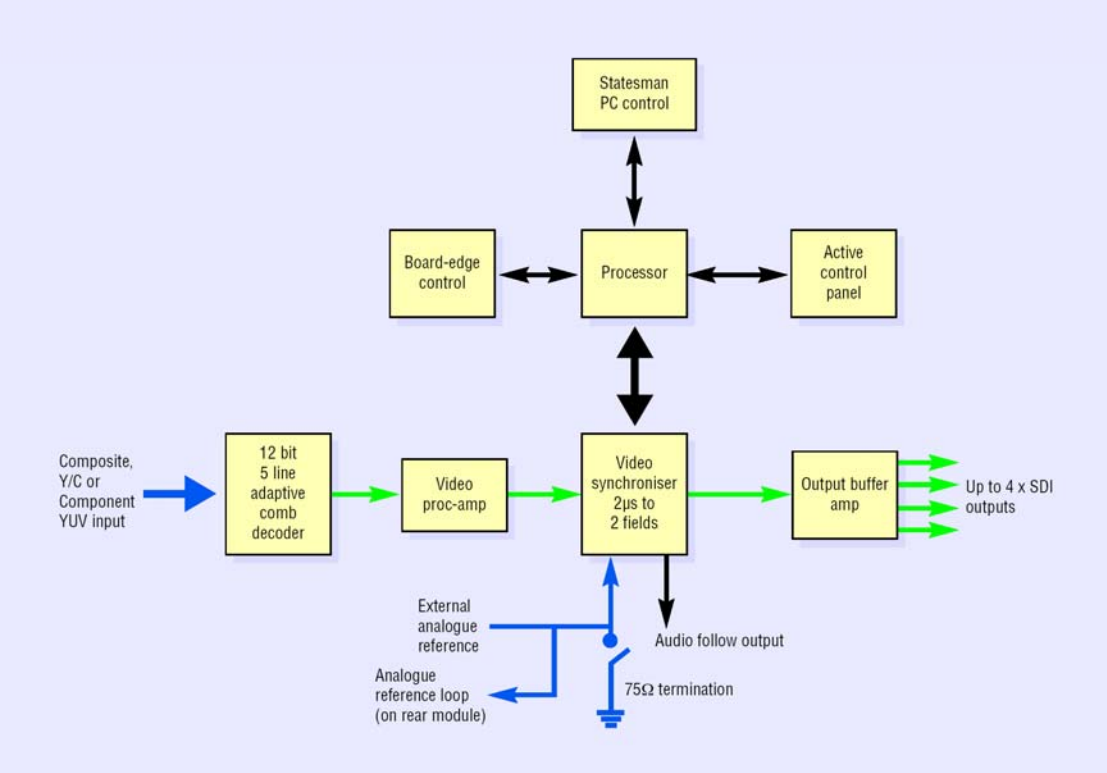
The ADDEC-200 will convert PAL/NTSC composite, Y/C or YUV component video to SDI using a high quality 12-bit decoder which can deal with any source from broadcast quality to VHS, and will accept damaged or jittery signals. The data is sampled at 54 Mbit per second (four times oversampled) allowing the highest quality digital filtering. It also offers the latest in comb technology, with a five-line comb resulting in exceptional decoding. Timing, gains and levels are also adjustable.

The on-board video frame synchroniser allows untimed inputs to be timed to the local syncs. It will sort out any incorrect frame rates plus any delays by taking its timing from the external analogue reference and will automatically synchronise sources between 0 and 2 fields.

An audio follow pulse is also produced which allows ADDEC-200 to be used with an external audio delay such as the TAD202.

The ADDEC-200 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 decoder
- Suitable for all sources, from broadcast quality to VHS
- High quality digital filtering and 5-line comb
- Frame or line synchroniser or used as a fixed delay times input to local reference syncs
- Flexible control, including PC software.
- Up to four Serial digital outputs
- Internal proc amp
- Audio follow pulse
- Compact design for high packing density
- Full range of inter-changeable rear connector modules



ADDEC-200 12-bit Synchronising Decoder

ADDEC-200 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 ADDEC which allow the system builder great flexibility in frame configuration.

1.1 Operating modes

Synchroniser and Delay Modes

ADDEC-200 has two modes of operation, Synchronisation and Delay.

In Synchronisation Mode the unit takes its timing from the analogue external reference and will automatically synchronise sources with or without embedded audio between zero and two fields. Synchronisation Mode is ideal for external sources that are not timed to station references such as satellite or remote contribution feeds.

In Delay Mode, timing is derived only from the analogue input. Typical applications are where a source passes through a processor such as a DVE, Chroma keyer or standards converter where the delay can be a few microseconds, multiple lines or up to two fields.

The video delay remains fully adjustable over two complete fields. This allows the output of the ADDEC-200 in synchronisation mode to be timed into any edit suite irrespective of the timing of the black and burst reference used.

Audio follow pulse

There is also a positive going external TTL level audio follow video (AFV) pulse output, the duration of which reflects the current video delay. The AFV output can be used with external audio delay processors such as the TAD202 if required.

Analogue video formats

The composite video input may be selected to be composite or YC PAL/NTSC or 525/625-line component YUV. Input standard selection is automatic and will follow the input video. Data in the VBI (vertical blanking interval) of the analogue composite input can be blanked or passed. NTSC- J and NTSC-M with or without 7.5% IRE setup is also selectable when receiving an NTSC format video input. Betacam input levels are also accepted.

Freezing the picture

The default picture freeze is Field 1. An active front panel or Statesman PC control system will allow Frame, Field 1 or Field 2 to be selected. This is useful if there is movement between both fields as a frame freeze may show movement judder. Field freeze will remove judder by repeating the same field to produce a synthetic frame of video, without movement judder. However a field freeze is more likely to show jagged edges on near horizontal lines.

Video Input loss behaviour

The ADDEC-200 output will cut to blue immediately on loss of input video.

Status and control

Status and control of the ADDEC-200 is available using the board edge menu selection switches and LEDs. Full function 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 ADDEC-200 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 ADDEC single height module uses the RM01, RM23, RM24, RM25 and RM27 rear connector. The RM25 quad height module will only fit into the 2U and 4U frames, although the rest will fit into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

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 ADDEC-200 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
SDI OUT	Serial digital output
SDI OUT	Serial digital output
V/SDI OUT	Component V / SDI OUT (link selectable)
Y/ PAL/NTSC	Component Y, YC-Y / PAL/NTSC IN
U/C IN SDI OUT	Component U / YC-C / Serial digital output (link selectable)
SYNC IN	Composite sync (B & B) input

Rear module connections with RM23

The RM23 single height rear module also allows maximum packing density but substitutes one of the outputs for a loop-through for the external reference input.

RM23 modular rear connector	Description
	• **RM23** • 24 ADDEC-200 modules per Indigo 4 frame • 12 per FR2AV or Indigo 2 frame • Six per FR1AV or Indigo 1 frame All frame slots can be used

BNC	Function
SYNC LOOP	Composite sync (B & B) input loop-through
SDI OUT	Serial digital output
V IN/SDI OUT	Component V Input / SDI OUT (link selectable)
Y/ PAL/NTSC IN	Component Y, YC-Y / PAL/NTSC Input
U/C/SDI OUT	Component U / YC-C Input / Serial digital output (link selectable)
SYNC IN	Composite sync (B & B) input

Rear module connections with RM24

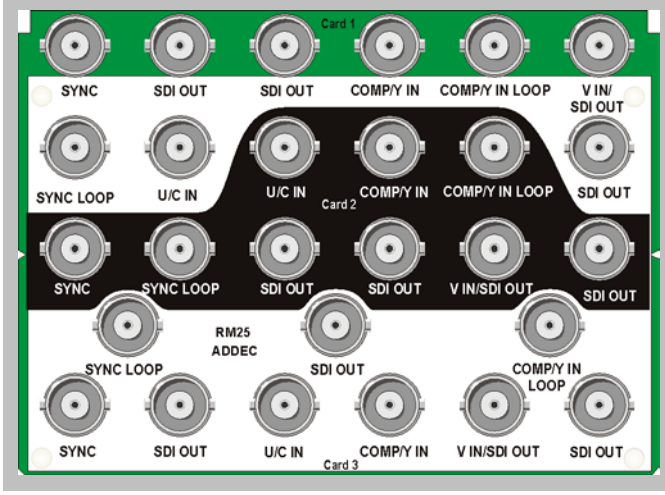
The RM24 is a single height rear module, which although has fewer outputs give the user the benefit of a sync and Composite input loop-through.

RM24 rear module connector	Description
	**RM24** • 24 ADDEC-200 modules per Indigo 4 frame • Six per FR2AV or Indigo 2 frame • Three per FR1AV or Indigo 1 frame • 1 per Indigo DT • Every other slot can be used

Channel A	I/O assignment
SYNC IN LOOP	Composite sync (B & B) input Loop-through
SDI OUT	Serial Digital Output
SDI OUT	Serial Digital Output
PAL/NTSC	Composite PAL/NTSC Input
PAL/NTSC LOOP	Composite PAL/NTSC Input Loop-through
SYNC IN	Composite sync (B & B) input

Rear module connections with RM25

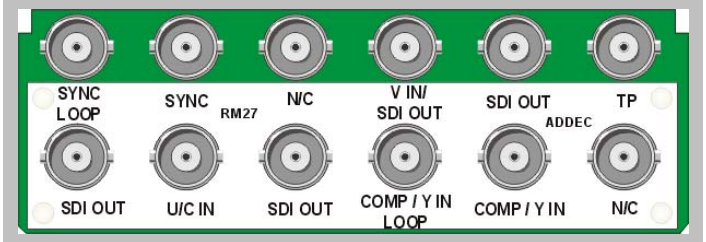
The RM25 quad height module will only fit the 2U and 4U. With this rear module cards can be inserted in the top two and bottom slot.

RM25 rear module connector	Description
	**RM25** • 18 ADDEC-200 modules per Indigo 4 frame • 9 per FR2AV or Indigo 2 frame • Slots 1,2 &4 of each bay can be used.

BNC	I/O assignment
SDI OUT	Serial digital output
V IN/SDI OUT	Component V / SDI OUT (link selectable)
COMP/Y IN LOOP	Component Y, YC-Y / PAL/NTSC IN loop-through
COMP/Y IN	Component Y, YC-Y / PAL/NTSC IN
SDI OUT	Serial digital output
SDI OUT	Serial digital output
U/C IN	Component U / YC-C Input
SYNC IN LOOP	Composite sync (B & B) input loop-through
SYNC IN	Composite sync (B & B) input

Rear module connections with RM27

The RM27 is a dual height rear module. This module also has the benefit of a BNC connection for the Audio follow pulse.

RM27 rear module connector	Description
	**RM27** • 12 ADDEC-200 modules per Indigo 4 frame • Six per FR2AV or Indigo 2 frame • Three per FR1AV or Indigo 1 frame • 1 per Indigo DT • Every other slot can be used

Channel A	I/O assignment
TP	TTL level positive going Audio follow pulse.
SDI OUT	Serial Digital Output
V IN/SDI OUT	Component V / SDI OUT (link selectable)
N/C	No user connection
SYNC IN	Composite sync (B & B) input
SYNC IN LOOP	Composite sync (B & B) input Loop-through
N/C	No user connection
COMP/Y IN	Component Y, YC-Y / PAL/NTSC IN
COMP/Y IN LOOP	Component Y, YC-Y / PAL/NTSC IN loop-through
SDI OUT	Serial Digital Output
U/C IN	Component U / YC-C Input
SDI OUT	Serial Digital Output

Module configuration

The ADDEC-200 has five user selectable jumper links, which configure the Component U / YC-C / Serial digital output, the Component V / SDI OUT and the Sync input termination impedance.

V / SDI OUT port configuration

The Component V / SDI OUT port can be configured by setting the position of links PL2 & PL5 (to be found just above the middle right hand edge of the module). When a Component V input is required set jumper link PL2 & PL5 to their upper position. Set jumper PL2 & PL5 to their lower position when a further SDI output is required.

Note links PL2 & PL5 must be moved together as a pair.

Link	Position	Function
PL2 & PL5	Above centre right hand edge	Links in their upper position – Set for V IN Link in their lower position – Set for SDI OUT

U / YC-C / SDI OUT port configuration

The Component U / YC-C / SDI OUT port can be configured by setting the position of links PL3 & PL6 (to be found approximately in the middle right hand edge of the module). When a Component U or C input is required set jumper link PL3 & PL6 to their upper position. Set jumper PL3 & PL6 to their lower position when a further SDI output is required.

Note links PL3 & PL6 must be moved together as a pair.

Link	Position	Function
PL3 & PL6	Centre right hand edge	Links in their upper position – Set for U / C IN Link in their lower position – Set for SDI OUT

Loop or terminate the external reference

The external analogue reference may be terminated with 75Ω or left un-terminated for when using the loop through output. Set jumper link PL3 (to be found at the middle right hand edge of the module) to its left –hand position (away from the board connector) to terminate the external reference. Set jumper PL3 to its right-hand position (towards the board connector) to un-terminate the reference input.

Link	Position	Function
PL4	Lower right hand edge	Link in its upper position – ext syncs Hi-Z Link in its lower position – ext syncs terminated on board

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’**	**Recall preset bit 1**	No user connection at present	
1	**‘b’**	**Recall preset bit 2**	No user connection at present	
2	**‘c’**	**Recall preset bit4**	No user connection at present	
3	**‘d’**	**Recall preset bit 8**	No user connection at present	
4	**‘e’**	**Audio follow pulse**	Pulse width equal to audio delay	
5	**‘f’**	**loss of input/ref/frozen**	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.

The 16 user preset configurations can be recalled using binary notation.

GPI Preset	Bit 4	Bit 3	Bit 2	Bit 1
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

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 (Upper)	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 (Lower)	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)

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, LED indication of card status and controls.

ADDEC-200 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	Normal state Up, Action Down
1	Input format	DOWN Y/C
2	Input format	DOWN YUV
3	Not assigned	Normally UP, No customer functions
4	YUV Betacam format	UP normal, DOWN Betacam format
5	Pedestal	UP pedestal setup is suppressed. DOWN pedestal setup un-suppressed
6	VBI	UP Information in the vertical interval is passed. DOWN blanked
7	Mode	UP Synchroniser mode. DOWN Delay Mode
8	Control	UP Controlled from the board-edge. DOWN Statesman or Active front panel control.

Both UP or DOWN Composite

8 way DIL switch functions

3.2 Card edge rotary controls

Control	Function
Delay	Clockwise rotation increases delay. Anti-clockwise decreases delay. Range 0-2 fields.

Rotary control functions

3.3 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
Freeze	Red	Illuminates if picture freeze is selected
PSU	Green	Good power supply (PSU) rails. (Bottom LED)
Ref	Green	External reference present
Input	Green	Video input present

3.4 Card edge configuration

Input Video format

Selecting the Input video format

The ADDEC-200 can be configured to accept three analogue video input formats, PAL/NTSC composite or YC and Component YUV.

DIP Switch	Composite	Y/C	YUV	Composite
1	UP	DOWN	UP	DOWN
2	UP	UP	DOWN	DOWN

Betacam format

The ADDEC-200 is able to accept Betacam YprPb format input where the PrPb component has been boosted in amplitude by 1.333.

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

Removing NTSC setup (pedestal)

Before conversion to a SDI signal the 7.5% IRE setup (pedestal) applied to NTSC-M waveform can be removed.

DIL 5		Function
UP	M	+7.5% IRE setup removed
DOWN	J	No setup removal

Vertical Blanking interval information

The information in the vertical blanking period of the analogue input video picture may be blanked or passed unaltered. DIL switch 6 sets whether the VBI signal is passed or blanked.

DIL 6		Function
UP	vbi	Sets analogue video picture VBI content to be blanked
DOWN	bln	Sets analogue video picture VBI content to be passed to the output

Selecting the operating Mode

There are two modes of operation, synchronisation and delay line. In Synchronisation Mode the unit takes its timing from the analogue external reference. In Delay Mode, timing is derived only from the analogue input video.

DIL 7		Function
UP	syc	Synchronisation mode
DOWN	del	Delay mode

Control

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

DIL 8		Function
UP	loc	Local, board-edge control available
DOWN	rem	Remote control selected. Board edge control are non-functional

Adjusting the video delay or offset

Adjustment is made by rotating the card edge 'Delay' shaft control. The range of this control is from 0 (minimum delay through the board) and 2 fields. The delay is incremented in single samples when the shaft is rotated very slowly; a quicker rotation will result in a coarse adjustment.

This sets the number of lines or pixels to be delayed in Delay Mode, or the vertical timing offset with respect to the reference input in Synchronisation Mode.

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

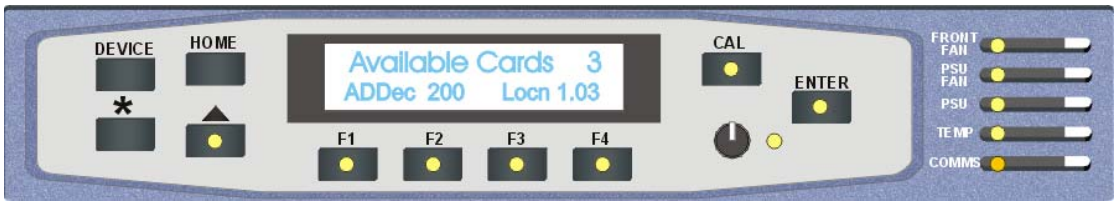
Menu numbering scheme

This manual uses a simple menu numbering convention based on the sequence of keys required to reach each menu from the top level home menu. For example, menu 1.1.2 is reached from the home menu by pressing F1, then F2. Menu 1.2.3 is reached by pressing F2 and then F3. Further option can be reached by using the shaft to scroll up or down.

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

Selecting ADDEC-200

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.



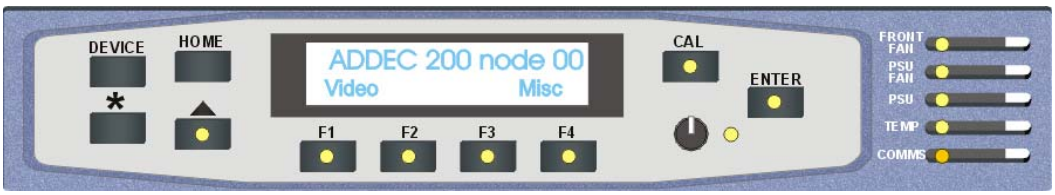
The available cards menu

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 ADDEC-200 has been selected with the version of software on the module as V1.00.



The ADDEC200 home menu

Updating the display

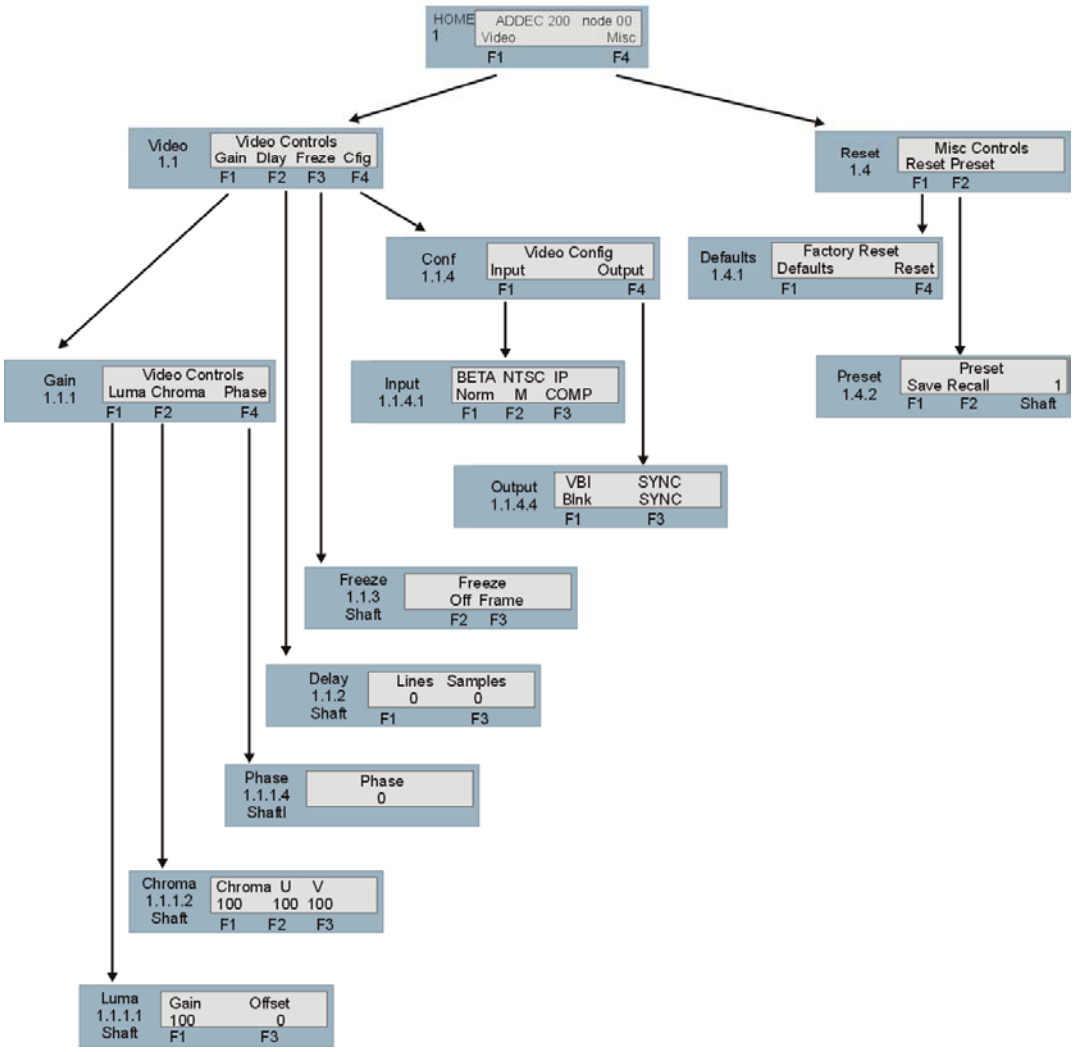
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If mode changes occur through the use of Statesman, card edge controls or through automatic response to the input video signal, the text displayed on the active front panel will not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

The ADDEC-200 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 F1-4 accesses the ADDEC-200s 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 ADDEC-200 menus. The actual menus available may vary slightly as software is updated.



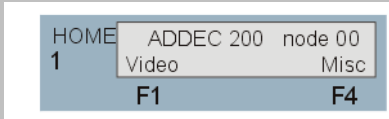
The ADDEC-200 menu tree

Note: Function keys LEDs are illuminated when active.

A more detailed description of the individual menus follows.

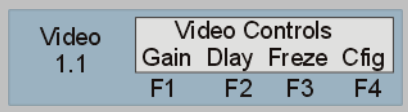
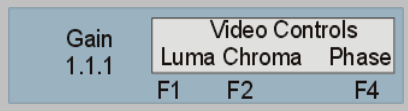
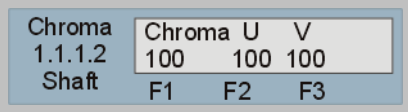
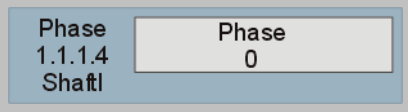
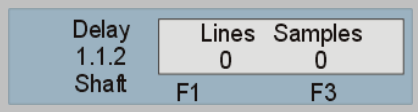
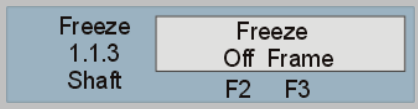
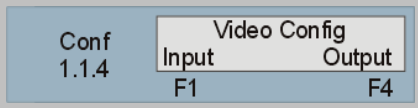
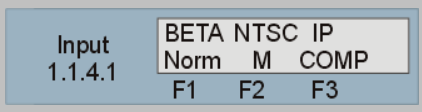
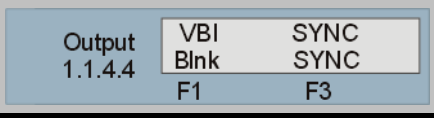
Home Menu

Video and Misc are the two sub menus accessible from the home menu. Pressing F1 Video leads to all the video gain levels and configurations. Misc contains the default and preset menus. The Home menu also contains information about the type of card and its position in the frame.

Video Configuration menu structure	Description
	Card type and frame position. Access to sub menus.

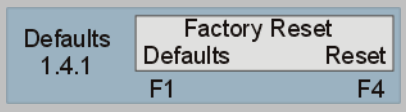
Video Menu

The video configuration menu allows the user to tailor the various functions of the ADDEC-200 to suit their specific application.

Video Configuration menu structure	Description
	Video top menu. Access to Input / Output configurations, gains, levels and functions.
	Gain Menu. Access to video amplitude and level settings
	Compensates for gain or attenuation to the Luma level in the analogue input video. 80-120% in 1% steps Allows black level correction in the analogue input video. ± 25mV in 1mV steps
	Overall Chroma amplitude adjustment or separate U and V adjustment by the shaft control. Adjusts 80-120% in 1% step
	Allows phase (NTSC Hue) correction in the analogue input video. ± 90 deg in 1deg steps Rotate shaft to adjust value.
	Delay in whole lines, 0-624 PAL, 0-524 NTSC Delay in samples, 0-1727 PAL, 0-1715 NTSC Rote shaft to adjust value
	F2 toggle for Freeze ON/OFF. F3 toggle for frame freeze, Field 1 freeze or Field 2 freeze.
	Select F1 for input format. Select F4 for Output modes
	Toggle F1 for normal or Betacam input signal levels. Toggle F2 to remove the NTSC 7.5% IRE black level pedestal. M removed. J not removed. Toggle F3 to select the video input format. Composite and YC 525/625 line. 525/625 lines YUV Component.
	Toggle F1 to blank or allow passing information contained in the vertical interval. Toggle F3 for synchronisation mode or delay mode.

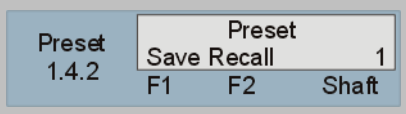
Miscellaneous Menu

This menu gives access to Preset save/recall controls as well as the engineering settings. ADDEC-200 can store for future use up to 16 user configurations.

Miscellaneous menu structure	Description
	Allows access to the Reset and Preset menus
	Press F1 to return all card setting to their default values. Press F2 to return all card settings to their default values including the erasing of all stored presets.

The following table shows the default values for each parameter affected:

Parameter	Default value
Gains and levels	0 or 100% as applicable.
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
Delay in lines	0
Delay in samples	0 - minimum through board
VBI	Unblanked
Pedestal (NTSC)	Suppressed

	Rotate the shaft to select the require location to be saved too or recalled from. Locations 0-15. Press F1 to Save to selected location. Press F2 to Recall previously stored setting from the selected location.

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

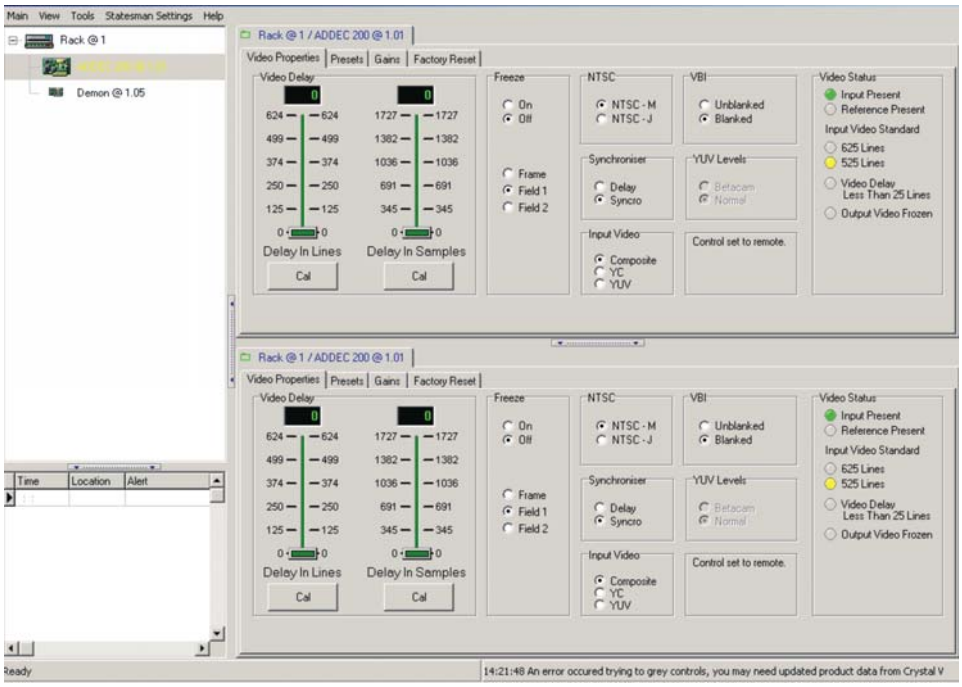
Once Statesman is configured it should automatically detect any Statesman compatible modules in the connected frame or frames and display them in the main application left hand explorer-style window.

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

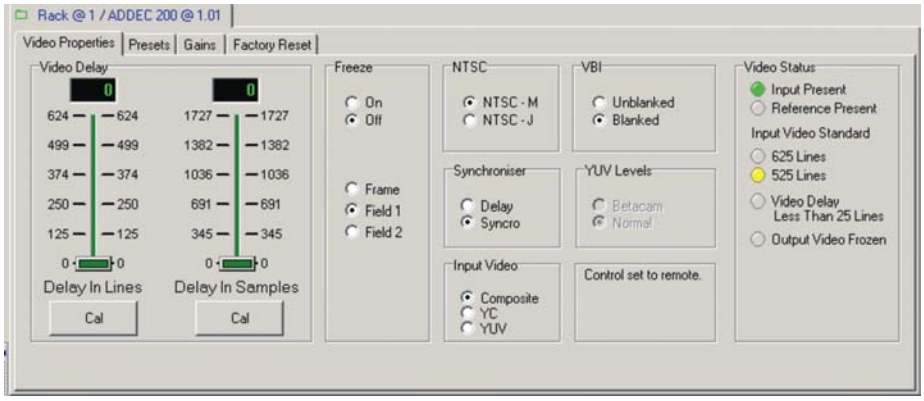
Using Statesman status displays

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

Selecting Synchronisation or Delay Mode

The ADDEC-200 may be used in either Synchronisation or Delay Mode.

To select the desired mode click either Syncro for synchronisation or Delay for delay Mode.



ADDEC-200 video properties

In Synchronisation Mode the unit takes its timing from the analogue external reference and will automatically synchronise sources with or without embedded audio between zero and two fields.

In Delay Mode, timing is derived only from the analogue input.

Adjusting the video delay

The video delay may be adjusted from zero to two fields for both 525 and 625 inputs in either Synchronisation or Delay Mode. Use the Delay in Lines and Delay in Samples sliders to control the delay.

Delay control	625 range	525 range	Description
Delay in Lines	0 to 624	0 to 525	Number of lines of delay in Delay Mode or vertical timing offset with respect to reference in Synchronisation Mode
Delay in Samples	0 to 1727	0 to 1715	Fine delay or horizontal offset in pixels in Delay Mode or fine vertical timing offset with respect to reference in Synchronisation Mode

Freezing the video

The video signal may be frozen as a full frame (two fields) or single field. The field used may be field 1 or field 2. Make the selection by checking the Frame; Field 1 or Field 2 box then check the Freeze ON box to freeze the input.

NTSC format

The 7.5% IRE setup present on the NTSC-M format can be removed by checking the NTSC-M box.

Auxiliary data

Data in the VBI (vertical blanking interval) of the analogue composite input can be blanked or passed. Click the VBI blanked or unblanked box as required.

Input format selection

Composite, YC or YUV input formats can be selected. The input can also be configured to accept Component Betacam level signals.

Video status

The Video Status panel allows the user a quick appraisal of parameters such as line rate, Input and Reference presence, Output frozen and an indication of when the difference between input video and output video is less than 25 lines.

Note: Video delay is less than 25-lines is mostly applicable in synchro mode where the relationship between the input video timing and reference/output video is likely to vary due to any upstream changes.

Presets

The Preset tab allows the user to store or recall any of the possible 16 presets that are available.

Storing and recalling Presets

Saving and recalling presets

The current board settings (i.e. routing and delay) can be saved in one of 16 locations to be recalled as desired. Therefore this allows the user to store and recall up to 16 different configurations for later use.

To save the current settings, tick the selected preset location and click on Store. This will write the current settings into this location.

Note: If the selected location contains previously saved setting information it will be over-written by the new setting data.

To recall previously store setting information, again tick the selected location and click Recall.

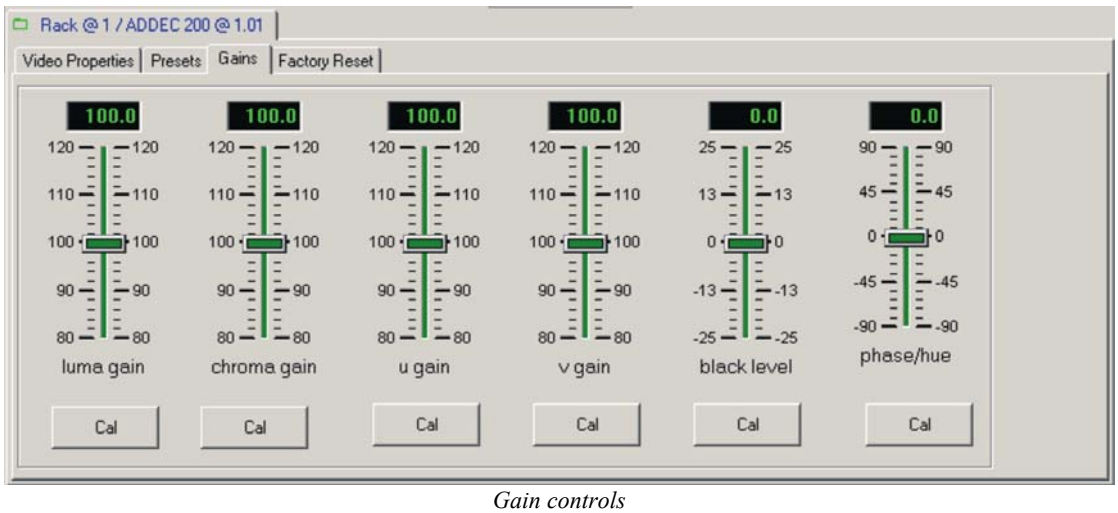
The recalling of previously stored presets can also be implemented externally via the GPI port. To sanction this facility, tick the GPI controls preset recall box.

Gains

The Gains tab gives control over the various gains and levels. This allows the user to compensate for any minor irregularities in the analogue video input.

The controls are: -

- Luma gain
- Chroma gain
- U and V gain
- Black level off-set
- Phase and hue angle



Gain controls

Luma gain

Slider varies Y gain from 80% to 120% in 0.1% steps. CAL button clears the current setting to 100%.

Chroma gain

Slider varies CbCr gain from 80% to 120% in 0.1% steps. Cal button clears the current setting to 100%

U/V Gain

U slider varies Cb gain from 80% to 120% in 0.1% steps. V slider varies Cr gain from 80% to 120% in steps of 1%. CAL button clears the current setting to 100%.

Black Level

The black level can be adjusted between ±25mV. Cal button clears the current setting to its zero off-set.

Phase/Hue

The Burst to subcarrier phase or Hue (NTSC) can be adjusted between ±90deg. Cal button clears the current setting to its zero off-set.

Note: Pressing a CAL button will take several seconds before its action is reflected on the Statesman control panel. The board value will be updated immediately.

Factory Reset

There are two controls for restoring the ADDEC-200 to its Default State. Reset and Default.

Factory Reset controls

Factory defaults

This control when actioned will return all adjustable values to their default value. Its action can be likened to a CAL All function.

Note. Any configuration stored, as presets will remain unaffected.

Factory Reset

This control when actioned will return all adjustable values to their default value. Note. Any configuration stored, as presets will also be erased.

This control can be used to restore a board from a previously unknown state before integration into a new system set-up

The following table shows the default values for each parameter affected:

Parameter	Default value
Gains and levels	0 or 100% as applicable.
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
Delay in lines	0
Delay in samples	0 - minimum through board
VBI	Unblanked
Pedestal (NTSC)	Suppressed

6 Trouble shooting

Card edge, active front panel and Statesman may all be used to aid in trouble shooting the ADDEC-300. Amongst the above, via the card edge would be the most effective way to interrogate any flagged errors.

6.1 Card edge monitoring

Status LEDs

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

ADDEC-200 front view showing controls and LEDs

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

LED Colour	Position	Description
Red	Err	Illuminates when an error is detected
Green	+5V	Illuminates when the board is powered
Green	Ref	Illuminates when an external reference is present
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 ADDEC is fully inserted into its slot– refer to the appropriate frame manual for detailed information.

The Freeze LED is illuminated

This LED will illuminate when the picture is set to frozen. This condition will have been set from a remote control panel or Statesman PC controller. Un-set this condition remotely or carry out a Defaults reset to remove this condition.

There is no video output

Check that a valid analogue 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.

Ensure the external reference input is stable.

The video output is not synchronous with other station sources

If the input analogue video is not synchronous with station sources, ensure that ADDEC-200 is in Synchronisation Mode and that an appropriate analogue composite video signal such as station Black and Burst is used as a reference.

Check the video offset timing (delay) is correct for your application.

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.

Re-setting the card

Use the Factory Default/Reset facility accessible from an active control panel or Statesman PC control system.

7 Specification

General

Dimensions	100 mm x 266 mm module with DIN 41612 connector
Weight	200 g
Power consumption	6 W

Inputs

Analogue video input	YUV Component, Composite or Y/C video input, 1 volt with syncs 625 line PAL or 525 line NTSC
Analogue reference	Analogue Black and Burst, mixed syncs or video. Amplitude of syncs 150mV to 4V. Link on PCB selects 75Ω termination or high impedance for loop through.

Outputs

Video output	**Digital video** Up to 3 times 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M with EDH checksum insertion as per SMPTE RP165. Less than 500ps 1kHz jitter and less than 800ps broadband jitter from a stable 300mV Black and Burst reference. Less than 500ps 1 kHz jitter in Delay Mode. (Low frequency jitter follows SDI input in Delay Mode only.)

Timing

Video timing	**Synchronisation Mode** The timing of the output (with respect to Ref in) may be adjusted by any number of lines up to a whole video frame. Horizontal timing adjustment is also possible in 37ns steps. **Delay Mode** When in Delay Mode the video delay through the card is set by the same timing adjustments.
Audio follow output	A TTL level output is available from a frame D-Type GPI output. This pulse is output every frame and the length of the pulse (the time between the rising and falling edge) is the same as the delay through the synchroniser. Note: The output signal has a greater drive capability than normal TTL in order to drive low impedance loads.

Control and status

Control	Board edge control using 8-way DIPswitch and LEDs, active control panel or Statesman PC control software.
GPI control	GPI inputs**:** 4 off 1,2, 3 & 4. Recall presets 0 to 15. (Not available at present) **GPI outputs** 5 Audio follow output pulse. 6 Indicates an error condition.

	Electrically: Open drain FET 30V, 220Ω current limit resistors. Pulled up to +5V through 10kΩ.
LEDs	PSU okay, Output frozen, Input present, External reference present.

Ordering information

ADDEC-200	12-bit decoder with Synchroniser module.

Rear Connectors

RM01 RM23 RM24	Single height rear connector
RM27	Dual height rear connector
RM25	Quad 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