ADDEC-210

Analogue to SDI decoding converter

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1 Introduction

ADDEC-210 is a broadcast decoder. It brings together onto one PCB, both the functions of a 12-bit broadcast decoder and synchroniser/delay module.

The ADDEC-210 will convert PAL/NTSC composite, Y/C or YUV/RGB 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.

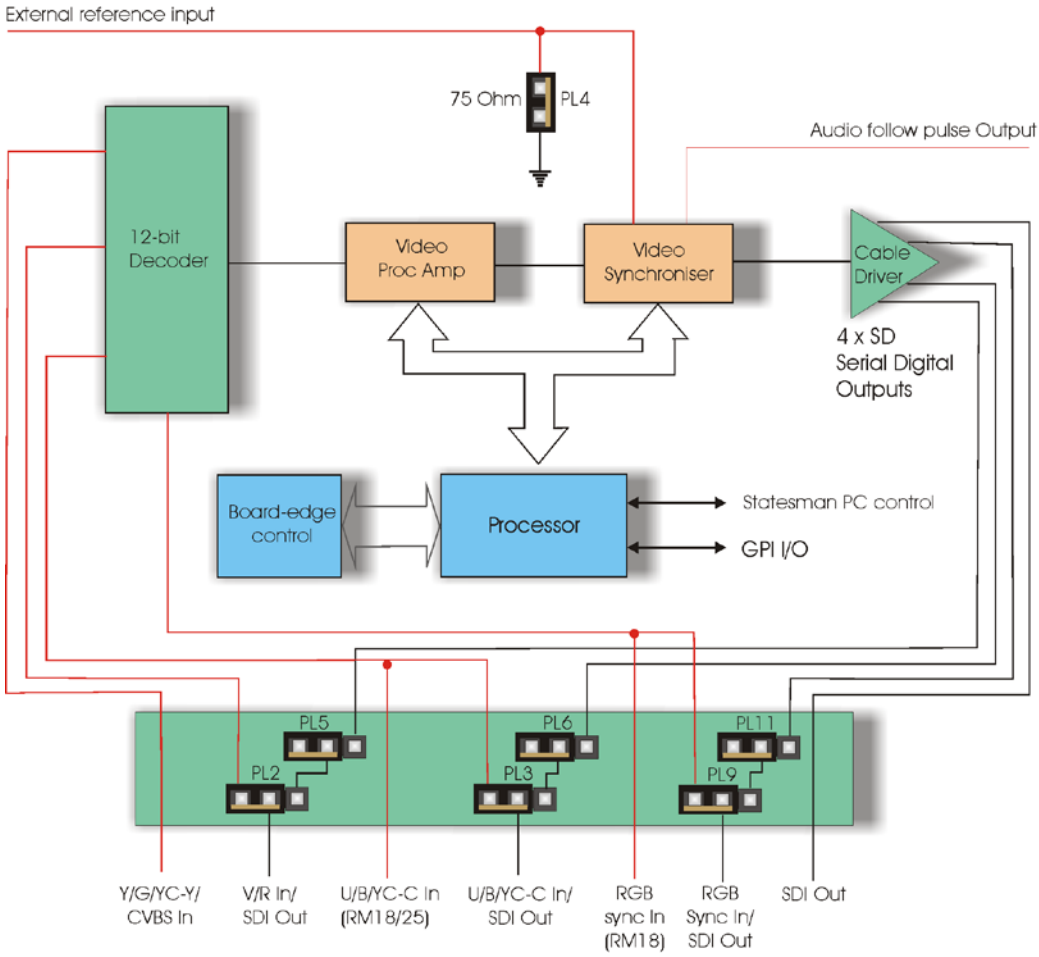
The on-board video frame synchroniser allows untimed inputs to be timed to the local syncs. It will sort out any incorrect frame rates plus any delays by taking its timing from the external analogue reference and will automatically synchronise sources between 0 and 2 fields.

An audio follow pulse is also produced which allows ADDEC-210 to be used with an external audio delay such as the TAD202

The ADDEC-210 will fully integrate with any other interface or keying product from the Crystal Vision range. Further flexibility is offered 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.

The main features are as follows:

- 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 output
- Compact design for high packing density
- Full range of inter-changeable rear connector modules



ADDEC-210 12-bit Synchronising Decoder

The ADDEC-210 is a 100mm x 266mm module that fits in Crystal Vision's 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-210 which allow the system builder great flexibility in frame configuration.

1.1 Operating modes

Synchronisation and Delay Modes

There are 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 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-210 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 analogue video input can be selected to be composite PAL/NTSC and YC or 525/625-line component YUV/RGB. ADDEC-210 can accept an RGB input with sync pulses on either all three components or Green alone. There is also an RGB external sync input should the RGB video not have syncs present. 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

When set to remote control the picture can be frozen and the freeze mode can be selected from freeze frame, field 1 and field 2. In situations where there is movement between fields a frame freeze may show movement judder. To prevent this, a field freeze which works by repeating the same field, will 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-210 output will cut to blue on loss of input video.

Status and control

Status and control of the ADDEC-210 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.

2 Hardware installation

The ADDEC-210 single height module uses the RM01, RM23, RM24, RM25 and RM27 rear connectors. 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 Indigo 2 2U frames will house up to 12 single height modules and dual power supplies. The Indigo 1 1U frames will house six single height modules and a single or dual power supply. The 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-210 modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT • All frame slots can be used

BNC	I/O assignment
SDI OUT / RGB SYNC	Serial digital output / External RGB reference input (link selectable)
SDI OUT	Serial digital output
V/R IN / SDI OUT	Component V and R input / Serial digital output (link selectable)
Y/G/YCY/CVBS IN	Component Y and G, Composite YC-Y and PAL/NTSC input
U/B/YCC IN / SDI OUT	Component U and B, Composite YC-C input / 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-210 modules per Indigo 4 frame • 12 per Indigo 2 frame • Six per Indigo 1 frame • 2 per Indigo DT All frame slots can be used

BNC	Function
SYNC IN LOOP	Composite sync (B & B) input loop-through (looped on rear module)
SDI OUT	Serial digital output
V/R IN / SDI OUT	Component V and R input / Serial digital output (link selectable)
Y/G/YCY/CVBS IN	Component Y and G, Composite YC-Y and PAL/NTSC input
U/B/YCC IN / SDI OUT	Component U and B, Composite YC-C input / Serial digital output (link selectable)
SYNC IN	Composite sync (B & B) input

Rear module connections with RM24

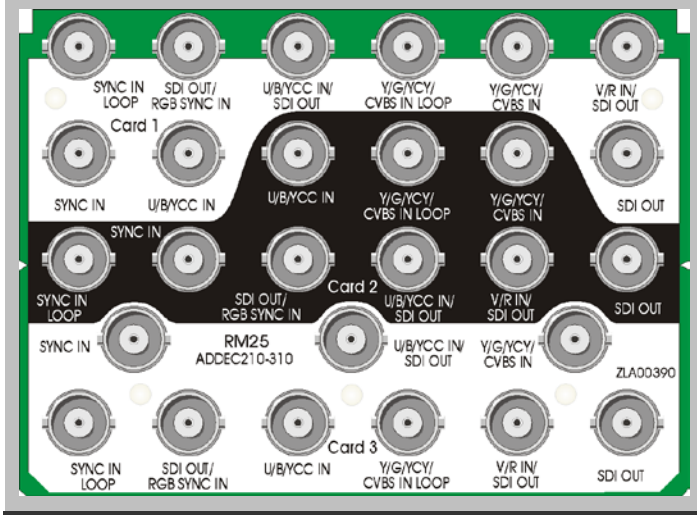
The RM24 is a single height rear module, which although has fewer outputs gives the user the benefit of a sync and composite input loop-through.

RM24 rear module connector	Description
	**RM24** • 24 ADDEC-210 modules per Indigo 4 frame • Six per Indigo 2 frame • Three per Indigo 1 frame • 1 per Indigo DT • Every other slot can be used

BNC	Function
SYNC IN LOOP	Composite sync (B & B) input loop-through (looped on rear module)
SDI OUT	Serial digital output
SDI OUT	Serial digital output (link to be set to SDI out)
CVBS IN	Composite PAL/NTSC input
CVBS IN LOOP	Composite PAL/NTSC input loop through. (looped on rear module)
SYNC IN	Composite sync (B & B) input

Rear module connections with RM25

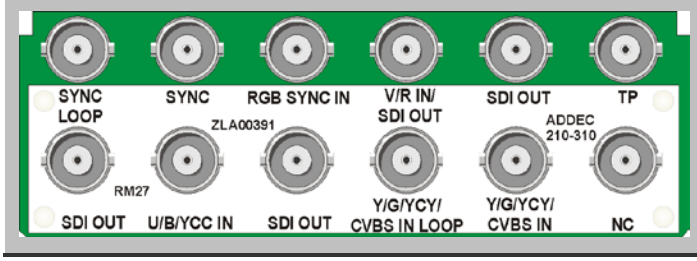
The RM25 quad height module will only fit the 2U and 4U frames. With this rear module, cards can be inserted in the top two and bottom slots.

RM25 rear module connector	Description
	**RM25** • 18 ADDEC-210 modules per Indigo 4 frame • 9 per Indigo 2 frame • Slots 1, 2 &4 of each bay can be used. • The Indigo 1 and Indigo DT will not accept the RM25 rear module

BNC	I/O assignment
SDI OUT	Serial digital output
V/R IN / SDI OUT	Component V and R input / Serial digital output (link selectable)
Y/G/YCY/CVBS IN	Component Y and G, Composite YC-Y and PAL/NTSC input
Y/G/YCY/CVBS IN LOOP	Component Y and G, Composite YC-Y and PAL/NTSC input (looped on rear module)
U/B/YCC IN / SDI OUT	Component U and B, Composite YC-C input / Serial digital output (link selectable)
SDI OUT / RGB SYNC	Serial digital output / External RGB reference input (link selectable)
U/B/YCC IN	Component U and B, Composite YC-C input
SYNC IN LOOP	Composite sync (B & B) input loop-through (looped on rear module)
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-210 modules per Indigo 4 frame • Six per Indigo 2 frame • Three per Indigo 1 frame • 1 per Indigo DT • Every other slot can be used

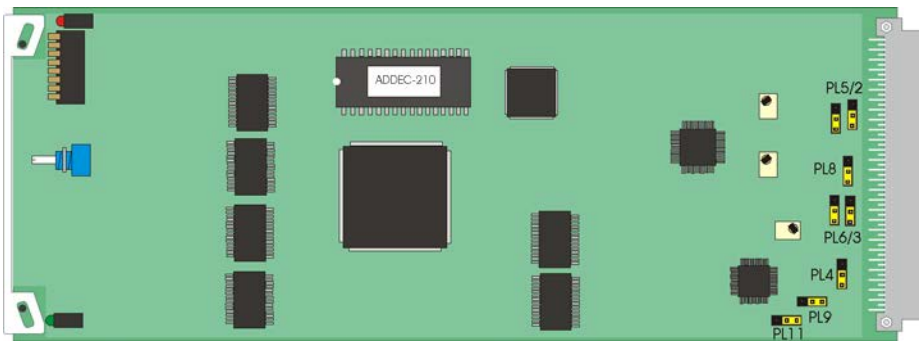
Channel A	I/O assignment
TP	TTL level positive going Audio follow pulse.
SDI OUT	Serial Digital Output
V/R IN / SDI OUT	Component V and R input / Serial digital output (link selectable)
RGB SYNC IN	External RGB reference input
SYNC	Composite sync (B & B) input
SYNC LOOP	Composite sync (B & B) input loop-through (looped on rear module)
N/C	No user connection
Y/G/YCY/CVBS IN	Component Y and G, Composite YC-Y and PAL/NTSC input
Y/G/YCY/CVBS IN LOOP	Component Y and G, Composite YC-Y and PAL/NTSC input (looped on rear module)
SDI OUT	Serial Digital Output (set PL3 and PL6 to SDI)
U/B/YCC IN	Component U and B, Composite YC-C input
SDI OUT	Serial Digital Output (set PL9 SDI)

Module configuration

The ADDEC-210 has eight user selectable jumper links, which configure the Component U/B/YC-C/Serial digital output, the Component V/SDI OUT, the RGB/SDI OUT and the RGB sync input and the external reference input termination impedance.

There are also three preset potentiometers. These are factory set and should not require any adjustment.

Note: Not all input/output combinations are available with all rear modules.



ADDEC-210 moveable links

V/R / SDI OUT port configuration

The Component V/R / SDI OUT port can be configured by setting the position of link PL2 & PL5 (to be found just above the middle right hand edge of the module). When a Component 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.

U/B/YC-C / SDI OUT port configuration

The Component U/B/YC-C/SDI OUT port can be configured by setting the position of link PL3 & PL6 (to be found just below the middle right hand edge of the module). When a Component U/B 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.

RGB sync / SDI OUT port configuration

When using the RM01 and RM25 rear module it is possible to substitute one of the SDI outputs for an RGB sync input should it be required. This is achieved by setting the position of link PL9 & PL11 (to be found at the bottom right hand edge of the module). If an external RGB sync is required set PL9 right towards the rear board connector and PL11 towards the board front (left, away from the board connector). With PL9 set to its left position and PL11 right an SDI output is present.

Note: Links PL9 & PL11 must be moved together as a pair. Setting PL9 & PL11 to external RGB syncs will disable the input format selection.

Loop or terminate the composite input

The composite (CVBS) input may be terminated with 75Ω or left unterminated when looping through. Set jumper link PL8 (to be found at the middle right hand edge of the module) to its lower position to terminate the composite input. Set jumper PL8 to its upper position to unterminate the composite input.

Loop or terminate the external reference

The external analogue reference may be terminated with 75Ω or left unterminated when using the loop through output. Set jumper link PL4 (to be found at the lower right hand edge of the module) to its lower position to terminate the external reference. Set jumper PL4 to its upper position to un-terminate the reference input.

2.2 General Purpose Interface (GPI)

Each frame slot has 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’	Bit 1		
1	‘b’	Bit 2	GPI recall of Presets	
2	‘c’	Bit 3	a,b,c,d high = Preset1, a,b,c,d low = Preset16	
3	‘d’	Bit4		
4	‘e’	Audio follow pulse	Pulse width equal to audio delay	
5	‘f’	I/P, Ref missing O/P frozen	Alarm set	No Alarm

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.

Note: GPI recall of presets is not available when the ADDEC-210 is set to local board edge control.

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.

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.

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

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

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)

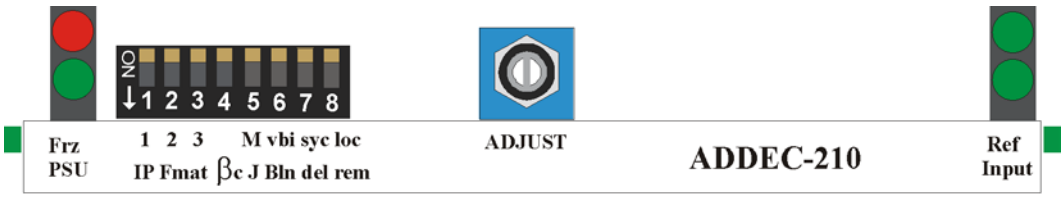
Note: Remote 1: 26 way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

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

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 with LED indication of status and controls.



ADDEC-210 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	Lever Up	Lever Down
1-3	Video input format	See card edge configuration.	
4	YUV Betacam format	Normal levels	Betacam format levels
5	Pedestal	Input pedestal suppressed	No pedestal on input
6	VBI	Information in the vertical interval is passed	Information in the vertical interval is blanked
7	Mode	Synchroniser mode	Delay Mode
8	Control	Controlled from the board-edge	Statesman or Active front panel control.

8 way DIL switch functions

3.2 Card edge rotary controls

Control	Function
Delay	Rotate to adjust delay in samples. 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 (not RGB sync)
Input	Green	Video input present

3.4 Card edge configuration

Input Video format

Selecting the Input video format

The ADDEC-210 can be configured to accept four analogue video input formats, PAL/NTSC composite or YC and Component YUV or RGB.

Lever	Function	CVBS	Y/C	YUV	RGsB	RsGsBs	RGBS
1	Input format	Up	Down	Up	Down	Down	Set links PL9/11
2		Up	Up	Down	Down	Down	
3		Up	Up	Up	Up	Down	

Betacam format

The ADDEC-210 is able to accept 525-line Betacam YPrPb format input where the PrPb component has been boosted in amplitude by 1.333.

Betacam levels are selected by DIL switch 4.

		Function
UP		Normal
DOWN	βc	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 requires removal. The NTSC-J video signal does not have a pedestal present so requires no further processing.

The position of DIL switch 5 will be determined by which NTSC format is presented.

		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.

		Function
UP	**vbi**	Sets analogue video picture VBI content to be passed to the output
DOWN	**Bln**	Sets analogue video picture VBI content to be blanked

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.

The operating mode is selected with DIL switch 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 software.

DIL switch 8 sets the ADDEC-210 to remote mode.

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

Reset

In the event that the video gains, offsets and phase have been previously adjusted remotely a reset can be preformed in local mode by re-powering the board with DIL switches 4 and 5 both down. On completion of the board power up DIL switches 4 and 5 will revert to their normal functions. Return them to their previous positions as necessary.

		Function
DOWN	**Reset**	Re-powering the board with 4 and 5 down will reset all gains and offsets to their default values.

Note: Delay settings are not effected by the board edge reset.

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 selection

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 lines 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. Warning: 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 an ADDEC-210

Note: The ADDEC-210 must be set to remote operation, DIL switch 8 down, to be viewed by an active front panel or any other remote device.

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-210 has been selected and is showing its top level home menu.

The ADDEC-210 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.

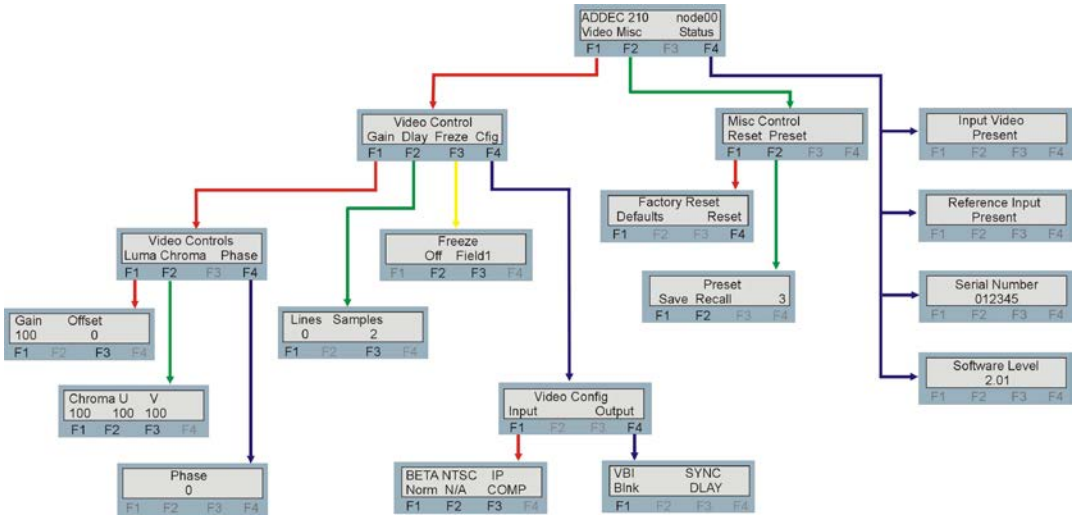
The ADDEC-210 menu structure

At any time the main top-level menu (Home) is obtained by pressing the HOME key. From the home menu further selections can then be made. Their adjacent LEDs illuminating will indicate active function keys.

When a sub menu has been selected, further options may be displayed which can then be accessed by further use of the function keys. Once the desired option has been located a selection or value change can be made by pressing the appropriate function key or by using the shaft control. A configuration change or value will be activated as the shaft control is rotated or function button is toggled.

The following chart shows the available ADDEC-210 menus. The actual menus available may vary slightly as software is updated.

Active control panel menu tree

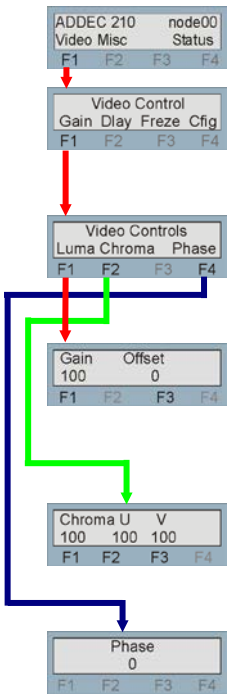


Note: Function keys LEDs are illuminated when active.

Video Configuration Menu

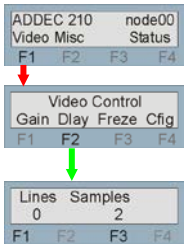
The video configuration menu allows the user to tailor the various video functions of the ADDEC-210 to suit their specific application.

Gains and offsets menu



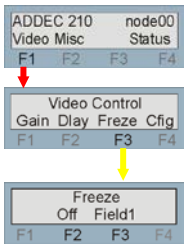
Menu	Comment
Gain and Offset menu	Pressing function key **F1** in the home menu selects the video control menus. Pressing function key **F1** again gives access to the video gain and offset menus
Video control	Press a function key to make adjustments to the selected attribute.
Luma gain and offset	Rotate the shaft control to adjust either Luma gain or Offset once selected. Luma gain 80-120% in 1% steps. Offset ± 100mV in 6mV steps depending on input format.
Chroma gain and UV component gains	Rotate the shaft control to adjust the Chroma gain or U & V levels once selected. Adjustment 80-120% in 1% steps
Phase / hue control	Allows phase (NTSC Hue) correction in the analogue input video. ± 90 deg in 1deg steps. Rotate the shaft control to adjust.

Delay menu



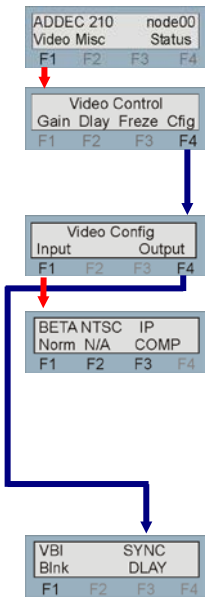
Menu	Comment
Delay menu	Pressing function key **F1** in the home menu selects the video control menus. Pressing function key **F2** gives access to the delay menu.
Delay in lines and samples	Press a function key to make adjustments to the selected attribute. Delay in lines, 0-624 in 625-line standard and 0-524 in 525-line standard. Delay in samples, 0-1727 in 625-line standard, 0-1715 in 525-line standard. Rotate shaft to adjust value once selected.

Freeze menu



Menu	Comment
Freeze menu	Pressing function key **F1** in the home menu selects the video control menus. Pressing function key **F3** gives access to the freeze menu.
Freeze and freeze mode	Selecting **F2** will force the output to frozen. Toggle **F3** to select a ***Frame*** freeze, ***Field 1*** freeze or ***Field 2*** freeze.

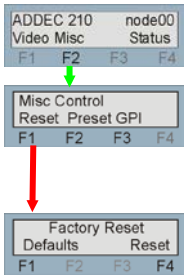
Configuration menu



Menu	Comment
Configuration menu	Pressing function key **F1** in the home menu selects the video control menus. Pressing function key **F4** gives access to the configuration menus.
Video input and output config	Press a function key to make adjustments to the selected attribute.
Input configurations	Toggle **F1** to accept Betacam levels in 525-line YUV input mode. Toggle **F2** to remove the NTSC 7.5% IRE black level pedestal. M removed, J not removed. (NTSC only). Toggle **F3** to select the video input format. PAL/NTSC composite or YC and Component YUV or RGB with sync options. **Note:** Links PL2/5, PL3/6 and PL9/11 are affected by selection.
Output configurations	Toggle **F1** to blank and unblank data in the vertical interval. Toggle **F3** to select synchronisation or Delay mode.

Miscellaneous menu

Factory reset

	Menu	Comment
	Misc control menu	Pressing function key **F2** in the home menu selects the miscellaneous menus. Pressing function key **F1** gives access to the factory defaults and reset menus.
	Factory reset menu	Press **F1** to select Factory Defaults. Note selecting factory defaults will return all values to their defaults and any stored presets will be retained. Press **F4** to select Factory Reset. Note selecting factory reset will return all values to their defaults. Any stored presets will also be erased. See table below.

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

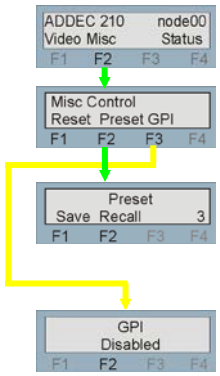
Parameter	Default value
Gains and levels	0 or 100% as applicable.
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
Delay in lines	0
Delay in samples	2 - minimum through board
VBI	Unblanked
Pedestal (NTSC)	NTSC-M
Input selection	Composite
Betacam	Normal

Presets menu

Up to 16 board set-ups may be stored and recalled either from the board control, active front panel, Statesman or through the use of external GPIs. The presets will store board setup data including operating mode and board configuration. The presets are numbered 1-16.

The GPI lines used to recall user saved presets can be disabled to prevent inadvertent triggering whilst under active control by Statesman or a front panel.

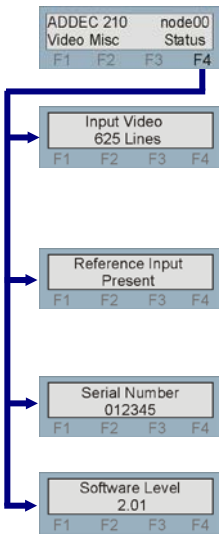
Note: Care should be taken when storing presets that the desired configuration is not changed by any external input prior to saving.



Menu	Comment
Misc control menu	Pressing function key **F2** in the home menu selects the miscellaneous menus. Pressing function key **F2** gives access to the presets menu.
Presets menu	Press **F1** to select the Save function. Rotate the shaft control to select memory location 1-16. Press Enter to action. Press **F2** to select the Recall function. Rotate the shaft control to action a recall of board setting from the selected memory location
GPI recall	Recall of presets via GPIs can be enabled and disabled by toggling function switch **F2**

Status menu

The status menu will give a quick overview of the board operation and engineering information



Menu	Comment
Input video present	Pressing function key **F4** in the home menu selects the status menus. Rotate the shaft control to show that a valid input is present. ***Present, Absent***
External reference present	Rotate the shaft control to show if an external reference is present. (not RGB reference). ***Present, Absent***
Board serial number	Rotate the shaft control to show the electronically stored six digit serial number.
Current software fitted	Rotate the shaft control to show the version number of the currently fitted software.

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. Statesman provides a user friendly means of configuring and operating the ADDEC-210 with the benefit of see-at-a-glance status monitoring.

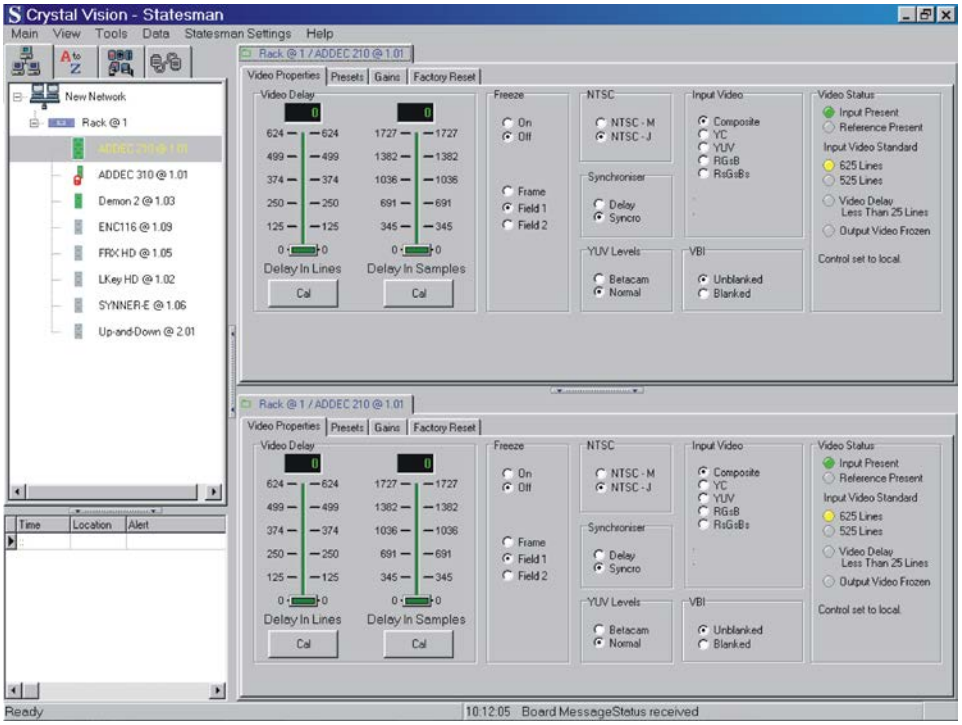
The main Statesman application communicates with each module in a frame through an active front panel. A frame or frame pair must have an active panel fitted to allow for Statesman control.

For details on installing Statesman on your PC refer to the Statesman installation manual.

5.1 Statesman operation

The initial view will show an Explorer style view of the connected frames and modules. Double-click on a module to display the main application control panes.

Initially two views of the first pane will be shown. Clicking any of the menu tabs will cause an alternate pane to appear.



Statesman main application window

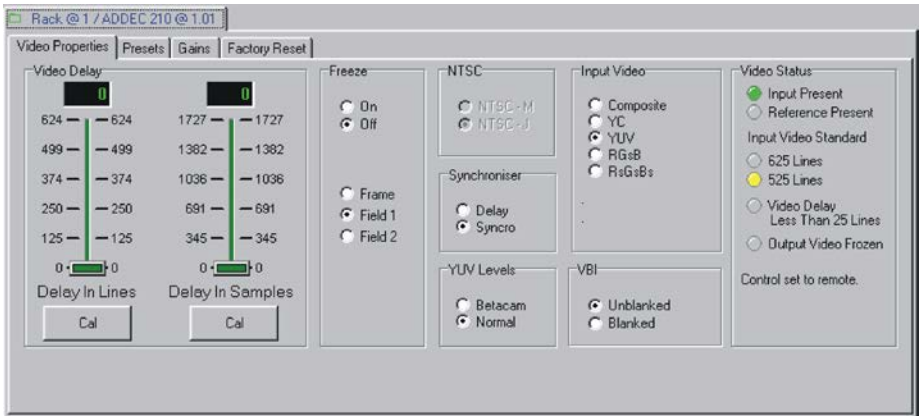
The two large control panes shown in the upper and lower halves of the window may display different menus for the same card, or controls for different cards. Click on the horizontal button-bar between the two panes to close the lower plane or drag the button to vary the size of the panes.

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

ADDEC-210 has four Statesman menu tabs that provide: Status information and video properties, Presets controls, gains and offsets and reset controls.

Video properties

The video properties menu pane is made up of eight group boxes. These group boxes allow the various formats and modes of operation to be set and give an overview of the ADDEC-210 status.



Video properties

Selecting Synchronisation or Delay Mode

The ADDEC-210 may be used in either Synchronisation or Delay Mode.

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

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 PAL/NTSC and YC or component YUV/RGB input formats can be selected.

When selecting RGB the final selection will depend on the format of the RGB signals available. The ADDEC-210 can accept RGB with syncs on all three components, on green only or no syncs. The latter requiring a sync supplied separately. Provision is made for connecting an external RGB sync at the sacrifice of an SDI output by moving links PL9/11 to their alternate position. This action will cause the input format selection to be disabled and controls to be greyed out.

The input can also be configured to accept 525-line component Betacam level signals.

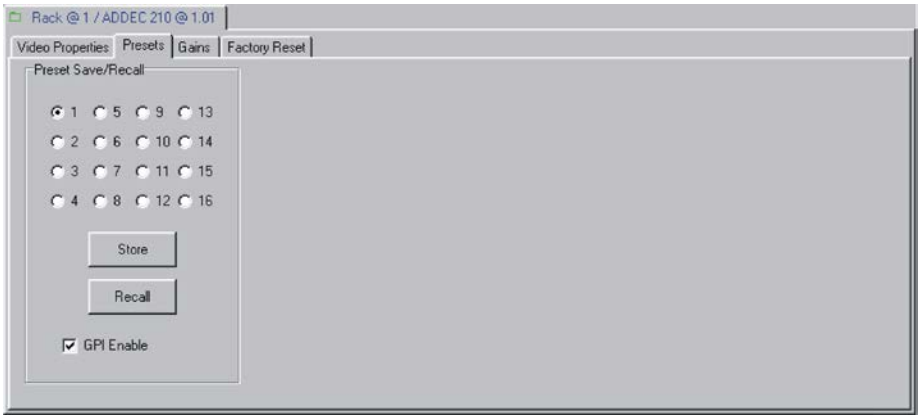
Video status

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 being 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.

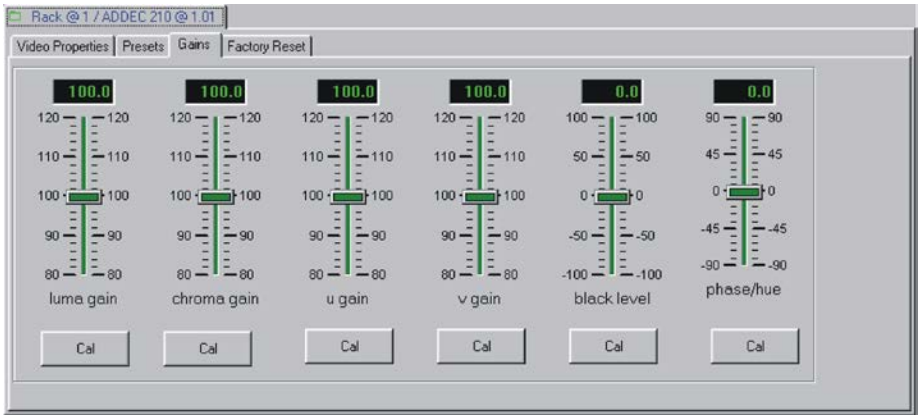
Note: If the selected location contains previously saved setting information it will be over-written by the new setting data.

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.



Gain control

Luma gain

Slider varies Y gain from 80% to 120% in 0.3% steps. CAL button clears the current setting to 100%.

Chroma gain

Slider varies CbCr gain from 80% to 120% in 0.3% steps. Cal button clears the current setting to 100%

U/V Gain

U slider varies Cb gain from 80% to 120% in 0.3% steps. V slider varies Cr gain from 80% to 120% in 0.3% steps. CAL button clears the current setting to 100%.

Black Level

The black level can be adjusted between ±100mV. Cal button clears the current setting to its zero off-set.

Note: Offset range will depending on input format

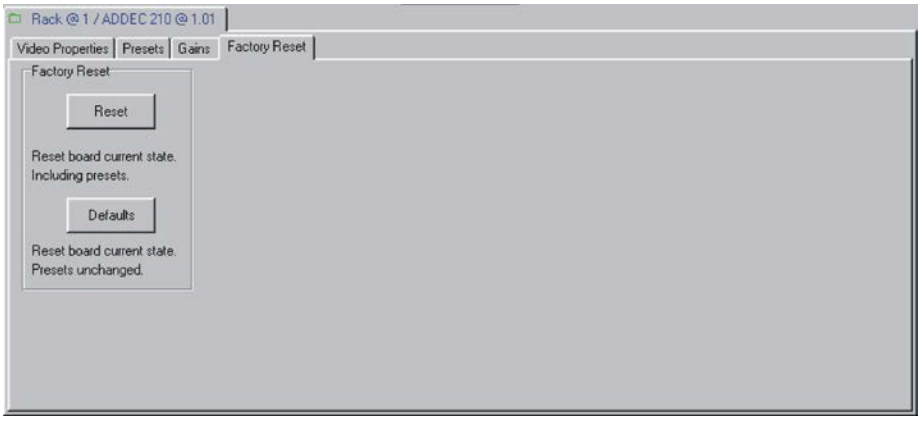
Phase/Hue

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

Note: Pressing a CAL button can 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-210 to its Default State. Reset and Defaults.



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:

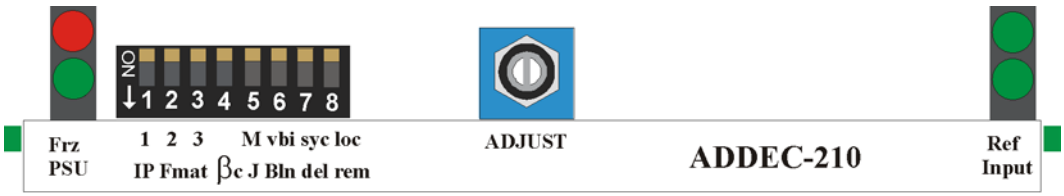
Parameter	Default value
Gains and levels	0 or 100% as applicable.
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
Delay in lines	0
Delay in samples	2 - minimum through board
VBI	Unblanked
Pedestal (NTSC)	NTSC-M
Input selection	Composite
Betacam	Normal

6 Trouble shooting

6.1 Card edge monitoring

Status LEDs

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



ADDEC-210 front view showing controls and LEDs

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

LED Colour	Position	Description
Red	Freeze	Illuminates when output is frozen
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)

Using the card edge display to interrogate an error condition

[option]		**Set DIP1-8 to UP, Rotate SELECT to show Error status (0)**
Option:	**Vid Ip Abs**	No Video input present
Option:	**Ref Ip Abs**	No external reference input present. Syncro mode only.

6.2 Fault finding guide

The Power OK LED is not illuminated

Check that the frame PSU is functioning and ensure the ADDEC-210 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 may have been set from a remote control panel or Statesman PC controller. Un-set this condition 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 any 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 that 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 the ADDEC-210 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 LED is 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.

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 the board edge, 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	6.5 W

Inputs

Analogue video input	YUV/RGB Component, Composite or Y/C video input, 1 volt with syncs 625 line PAL or 525 line NTSC Input return loss >35dB at 5.5Mhz
Analogue references	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.

Conversion performance

Frequency response 0.5dB to 5.5Mhz (PAL/NTSC input)

Frequency response with YUV input:

Y=0.14dB to 5.5Mhz

UV=1.0dB to 2.75Mhz

Differential gain <1%

Differential phase <1.0deg

Conversion resolution 12bits

Signal to noise ratio >60dB

Outputs

Video output

Digital video

Up to 4 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.)

Output return loss >15dB at 270Mhz

Timing

Video timing	**Synchronisation Mode** Adjustment timing of the output (with respect to Ref in) 0 to 1 frame Horizontal timing adjustment in 37ns steps **Delay Mode** Adjustment 0 to 1 frame
Audio follow output	A positive going 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 DIL switch or active front 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 Error. Input absent, Ref absent. (Not available at present) 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.