EMDEC-200

Embedding decoder

Crystal Vision

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Revision 1. Preset recal table amended, page 18. 16-04-13

1 Introduction

EMDEC-200 is a broadcast embedding decoder. It brings together onto one PCB the functions of a 12-bit decoder with synchroniser, tracking audio delay and 4-channel embedder.

The EMDEC-200 will convert PAL/NTSC composite or Y/C 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.

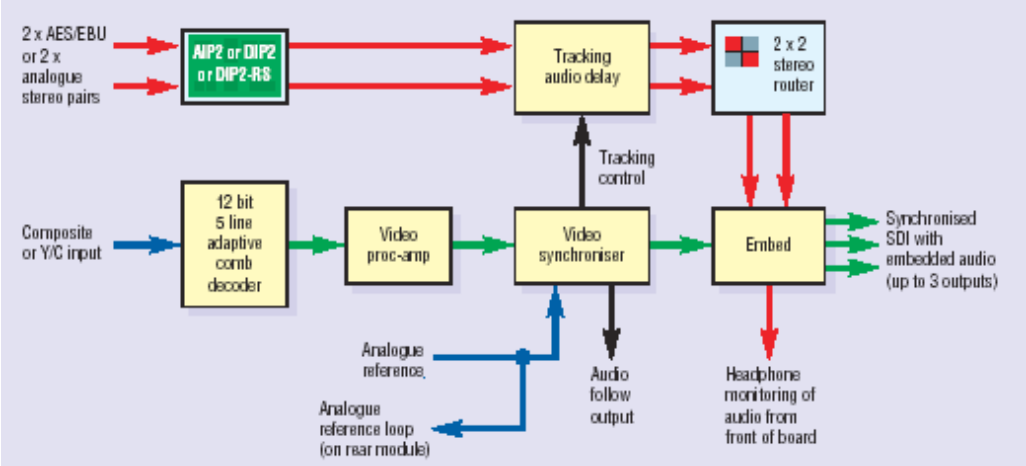
The on-board video frame synchroniser allows untimed inputs to be timed to the local syncs. It will sort out any incorrect frame rates plus any delays by taking its timing from the external analogue reference and will automatically synchronise sources between 0 and 2 fields.

Fitting the appropriate audio piggyback from our standard range allows the user to embed a variety of audio input formats. Fit the AIP2 and DCDCV18 to embed analogue audio, the DIP2 for synchronous AES or the DIP2-RS for asynchronous AES. A 2x2 stereo router allows the shuffling of stereo pairs, whilst headphone monitoring is available from the front of board stereo jack socket

The internal tracking audio delay tracks the video delay, running the audio fast or slow to ensure the video and audio stay correctly timed. A 20ms of fixed audio delay can be added on top of the tracking to compensate for early audio. Predictive tracking is also available and can be used to minimise the offset between audio and video delay when video frames are dropped or repeated. An audio follow pulse is also produced which allows EMDEC-200 to be used with an external audio delay.

The EMDEC-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 frame rear modules and control options. Control options include board edge control, local or remote active control panel and the Statesman PC Control System.

- 12-bit digital embedding 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
- Embedded analogue or AES audio
- Tracking audio delay synchronises video and audio
- Flexible control, including PC software.



EMDEC-200 12-bit Embedding Decoder

EMDEC-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. The frame rear modules available for the EMDEC-200 are the RM04, RM05, RM26 and RM30.

1.1 Operating modes

Synchroniser and Delay Modes

EMDEC-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 SDI 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.

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

Also in either mode the audio delay can be configured to track the video delay and provide an additional or offset delay to the video delay or to be configured for a fixed delay. There is also an external audio follow video pulse output, the duration of which reflects the current video delay. The AFV output can be used with external audio delay processors if required.

Video tracking

When enabled, the built-in video tracking (strictly speaking Audio Follow Video tracking) helps to ensure that the audio delay matches the video delay to maintain lip

sync. Although video tracking (AFV) can be used in both Synchronisation and Delay Modes, it operates dynamically in Synchronisation Mode as input/output timing changes.

When video tracking is on in Synchronisation Mode, the rate at which the audio delay tracks fast or abrupt changes in video delay is controlled by the tracking audio delay (TAD) rate.

The faster the TAD speed, the faster the audio delay will match the video delay, but at the expense of musical pitch.

Since the TAD speed can be audible as a pitch change the response time needs to be chosen with care. A sports event may well benefit from a fast TAD speed but classical music with piano and violins would require the slowest speed.

For example a TAD speed of 0.1% can cause a pitch change of the same value to be heard as the audio delay catches up with the video.

To put this in perspective, imagine a piano recital is in progress and a concert pitch A above middle C is heard. This has a fundamental frequency of 440Hz. A 0.1% change would produce 440.44Hz. A sharp or B flat is 466.16Hz so in this case the audio delay slew rate only causes a pitch change of the order of one sixtieth of a semitone.

The TAD speeds are 0.8%, 0.4%, 0.2%, 0.1% and 0.05%.

TAD versus slew rate

A 40 ms change in video timing only takes five seconds at the 0.8% TAD speed. Each decreasing response step takes double the time to catch up, so a 0.05% rate means that the audio would take 80 seconds to catch up with the video.

The following table relates audio tracking response time to video changes for a range of TAD values:

Video timing change	T.A.D. 0.05%	T.A.D. 0.1%	T.A.D. 0.2%	T.A.D. 0.4%	T.A.D. 0.8%
40 ms	80 seconds	40 SCEs	20 seconds	10 seconds	5 seconds
20 ms	40 seconds	20 seconds	10 seconds	5 seconds	2.5 seconds
10 ms	20 seconds	10 seconds	5 seconds	2.5 seconds	1.25 seconds
5 ms	10 seconds	5 seconds	2.5 seconds	1.25 seconds	0.6 seconds
1 ms	5 seconds	2.5 seconds	1.25 seconds	0.6 seconds	0.3 seconds

Predictive tracking

In Synchronisation Mode, there are two situations when the video delay changes abruptly between zero and two fields. These are when the video delay increases to the point where it is about to jump from one full frame delay to zero or when it decreases to the point where it is about to reach zero and then jump to one full frame delay.

To avoid the need for large changes in audio delay or noticeable lip sync problems it may be better to change the audio delay in anticipation of the imminent jump in video delay.

If there is no predictive tracking (i.e. set to off) then only after the jump in video delay does the audio delay start changing. As a result, there is a short period of time just after the jump in video delay where the audio is offset from video by 40 ms (625 line systems - 33 ms for 525L).

When predictive tracking is on, then as the video delay jump approaches, the audio delay starts to change so that significant audio delay change has already been effected prior to the jump in video delay.

With predictive tracking on, the relative audio timing will always be within the recommended window (less than 16 ms ahead or 24 ms behind).

When the video delay or rate of change is small, the audio delay will track and remain very close to the value of video delay, until the point where predictive tracking function (if ON) will compute that predictive offset is required.

To ensure that lip sync errors are minimised during the necessary jumps in video timing with asynchronous inputs in Synchronisation Mode, make sure that the predictive tracking is on and that an appropriate TAD value for the programme material has been selected.

Predictive tracking is not available in Delay Mode.

Adjusting the audio delay

The audio delay can be controlled independently of the video delay from 3 to 20 ms.

If video tracking is off the actual audio delay is set manually. If video tracking is on the audio delay is automatically controlled to match the video delay. However the offset timing between audio and video remains adjustable in any mode.

Audio delay	Description
Video tracking on	Audio delay controlled automatically to follow video delay Relative timing available
Video tracking off	Actual audio delay controlled manually

Note: Audio delay dynamically follows video delay in Synchronization Mode and when video delay is manually changed when video tracking is on in either Synchronization or Delay Mode.

EMDEC-200 embed pattern

The EMDEC-200 supports the SMPTE embedding format, which omits embedding from one line before the vertical interval switch point as defined in SMPTE RP168, through to three lines after - a total of a four line gap in each and every TV field.

Embedder configuration

The analogue or AES stereo input audio from the sub PCB may be rearranged prior to embedding by the on-board 2 x 2 router. The reconfigured audio may then be inserted into the SDI output stream in any one of the 4 available groups A-D.

Note: The 4 audio input channel must be treated as if they are stereo pairs although their individual content does not need to be related in any way.

Note: The EMDEC-200 can only embed all audio four channel into a single audio group

Using the headphone monitor output

The card edge jack socket [3.5 mm, stereo] can be used to monitor the two stereo channels present from on the sub PCB. It can also be used to monitor the two stereo channels at the output of the 2 x 2 router, which will reflect the order found in the SDI signal after embedding.

These analogue audio signals are only available through the headphone jack socket.

Note: There are no outputs to the rear connectors, as there are with TANDEMs, TAD202, & Demon.

Tip: The headphone output will not drive non-amplified speakers. Use with active loudspeakers, or a pair of headphones.

Input sub PCBs

The removable input sub PCB greatly increases the flexibility of the EMDEC-200. It will support all four of the current audio input sub PCBs of the type fitted to the Tandem range of cards. Although provision is made to fit only one audio sub PCB, this can be either an analogue type with balanced input or AES that is synchronous or asynchronous to the input video.

Note: It will be necessary to also fit a DCDC18 PSU sub PCB when any of the analogue sub PCBs are used.

Analogue video formats

The composite video input may be selected to be composite or YC PAL/NTSC. 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 it also selectable when receiving an NTSC format video input.

Freezing the picture

The type of picture freeze used when the freeze command is given may be selected from frame, field 1 and field 2. If there is movement between both fields a frame freeze may show movement judder. A field freeze works 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.

The audio output is always muted when the video is frozen. The embedded packet structure is maintained but the packets contain silence.

Video Input loss behaviour

The EMDEC-200 output will cut to blue immediately on lose of input video.

Status and control

Comprehensive status and control is available from the EMDEC-200 using the board edge menu selection switches and 10-digit display. 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 software.

2 Hardware installation

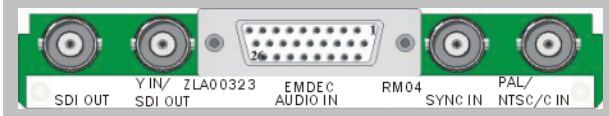
The EMDEC-200 single height module uses the RM04, RM05, RM07, RM26 and RM30 rear connectors and fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

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

RM04

RM04 modular rear connector	Description
	**RM04** • 24 EMDEC-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

Note: One EMDEC-200 card can be fitted to each RM04 rear module.

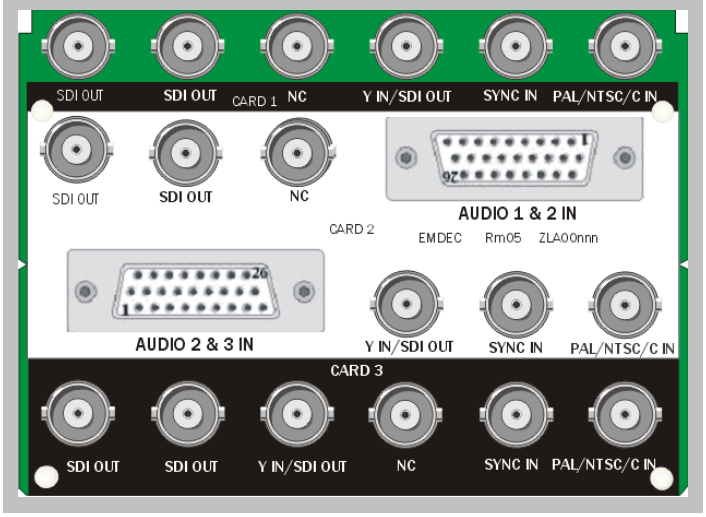
BNC	Function
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input.
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
SDI OUT	Serial digital output

The **RM04** high density 26 way D-Type female socket has the following pin assignments for each fitted audio option card:

AIP2/AOP2	DIP2/DIP2RS	pin-out
GND	**GND**	1, 9, 19, 20, 23, 24
No connect	**No connect**	2, 3, 4, 5, 6, 7, 8, 18, 21, 22
Analogue audio 1L+	**AES1+**	14
Analogue audio 1L-	**AES1-**	15
Analogue audio 1R+	**AES1scrn**	10
Analogue audio 1R-	**NC**	11
Analogue audio 2L+	**AES2+**	16
Analogue audio 2L-	**AES2-**	17
Analogue audio 2R+	**AES2scrn**	12
Analogue audio 2R-	**NC**	13

The RM04 rear module allows cards to be placed in all frame slots.

RM05

RM05 modular rear connector	Description
	**RM05** • 18 EMDEC-200 modules per Indigo 4 frame • 9 per FR2AV or 2U Indigo frame • All frame slots can be used • Card 1 fits in slots 1, 5 and 9 • Card 2 fits in slots 2, 6 and 10 • Card 3 fits in slots 3, 7 or 11 • No card fits in 4, 8 or 12

BNC Card 1	Function
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
NC	No Connection
SDI OUT	Serial digital output
SDI OUT	Serial digital output
BNC Card 2	**Function**
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
NC	No Connection
SDI OUT	Serial digital output
SDI OUT	Serial digital output
BNC Card 3	**Function**
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input
NC	No Connection
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
SDI OUT	Serial digital output
SDI OUT	Serial digital output

The RM05 high density 26 way D-Type female socket has the following pin assignments for each fitted audio option card:

RM05 – upper high-density 26-way D-Type female connector – card 1

AIP2	DIP2/DIP2RS	Pin-out
GND	**GND**	1, 9
No connect	**No connect**	2, 3, 4, 5, 6, 7, 8, 9, 18, 19, 20, 21, 22, 23, 25, 26
Analogue audio 1L+	**AES1+**	14
Analogue audio 1L-	**AES1-**	15
Analogue audio 1R+	**AES1scrn**	10
Analogue audio 1R-	**No connect**	11
Analogue audio 2L+	**AES2+**	16
Analogue audio 2L-	**AES2-**	17
Analogue audio 2R+	**AES2scrn**	12
Analogue audio 2R-	**NC**	13

RM05 – lower high-density 26-way D-Type female connector – card 2

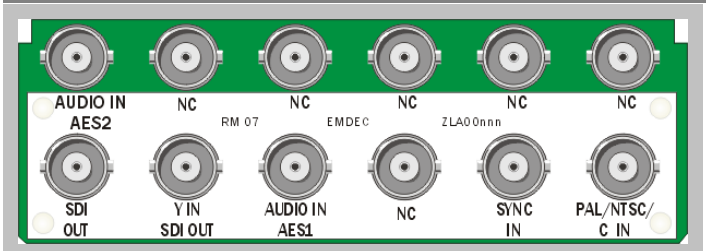
AIP2	DIP2/DIP2RS	Pin-Out
Analogue audio 1L+	**AES1+**	19
Analogue audio 1L-	**AES1-**	20
Analogue audio 1R+	**AES1scrn**	21
Analogue audio 1R-	**No connect**	22
Analogue audio 2L+	**AES2+**	23
Analogue audio 2L-	**AES2-**	24
Analogue audio 2R+	**AES2scrn**	25
Analogue audio 2R-	**No connect**	26

RM05 – lower high-density 26-way D-Type female connector – card 3

AIP2	DIP2/DIP2RS	Pin-out
GND	**GND**	1, 9
No connect	**No connect**	2, 3, 4, 5, 6, 7, 8, 18
Analogue audio 1L+	**AES1+**	14
Analogue audio 1L-	**AES1-**	15
Analogue audio 1R+	**AES1scrn**	10
Analogue audio 1R-	**No connect**	11
Analogue audio 2L+	**AES2+**	16
Analogue audio 2L-	**AES2-**	17
Analogue audio 2R+	**AES2scrn**	12
Analogue audio 2R-	**No connect**	13

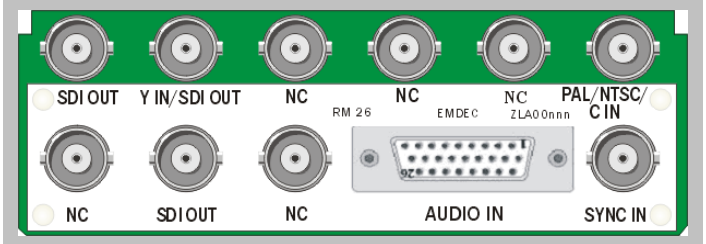
The RM05 rear module allows cards to be placed as follows: card 1 fits in slot 1, 5 and 9, card 2 fits in slots 2, 6 and 10 whilst card 3 fits in slots 3, 7 and 11. No cards are fitted in slot positions 4, 8 and 12.

RM07

RM07 modular rear connector	Description
	**RM07** • 12 EMDEC-200 modules per Indigo 4 frame • 6 per FR2AV or Indigo 2 frame • 3 per FR1AV or Indigo 1 frame • 1 per desk top box Odd number frame slots can not be used

BNC	Function
NC	No Connect
NC	No Connect
NC	No Connect
NC	No Connect
NC	No Connect
AUDIO IN AES2	2 channel (stereo) serial digital audio Input. Channel 2.
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input
NC	No Connect
AUDIO IN AES1	2 Channel (stereo) serial digital audio Input. Channel 1.
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
SDI OUT	Serial digital output

RM26

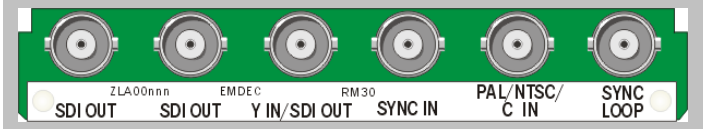
RM26 modular rear connector	Description
	• **RM26** • 12 EMDEC-200 modules per Indigo 4 frame • 6 per FR2AV or 2U Indigo frame • 3 per FR1AV or 1U Indigo frame • 1 per desk top box Odd number frame slots can not be used

BNC	Function
PAL/NTSC/C IN	Composite video or C input
NC	No Connect
NC	No Connect
NC	No Connect
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
SDI OUT	Serial digital output
SYNC IN	Composite sync (B & B) input
NC	No Connect
SDI OUT	Serial digital output
NC	Serial digital output

The **RM26** 15 way D-Type female socket has the following pin assignments for each fitted audio option card:

AIP2	DIP2/DIP2RS	pin-out
GND	**GND**	6, 13, 14
No connect	**No connect**	7, 8, 15
Analogue audio 1L+	**AES1+**	3
Analogue audio 1L-	**AES1-**	2
Analogue audio 1R+	**AES1scrn**	5
Analogue audio 1R-	**NC**	4
Analogue audio 2L+	**AES2+**	10
Analogue audio 2L-	**AES2-**	9
Analogue audio 2R+	**AES2scrn**	12
Analogue audio 2R-	**NC**	11

RM30

RM30 modular rear connector	Description
	• **RM30** • 24 EMDEC-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
PAL/NTSC/C IN	Composite video or C input
SYNC IN	Composite sync (B & B) input
Y IN/SDI OUT	Y In or Serial digital output (link selectable)
SDI OUT	Serial digital output
SDI OUT	Serial digital output

2.2 Module configuration

The EMDEC-200 has three user selectable jumper links, which configure both the Composite and Sync input termination impedance and select the function of the Y IN/SDI OUT port.

Loop or terminate the Composite Input

The PAL/NTSC Composite analogue input may be terminated with 75Ω or left un-terminated for when looping through. Set jumper link PL2 at the top right hand corner of the module to its lower position to terminate with 75 Ohms. Set jumper PL2 its upper position to un-terminate. The Hi-Z input impedance is approximately 100K Ohms.

Link	Position	Select loop through or termination of reference syncs
PL2	Top right hand corner	Link in its upper position – Comp Input Hi-Z Link in its lower position – Comp Input terminated with 75R

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	Select loop through or termination of reference syncs
PL3	Middle right hand edge	Link in its left position – ext syncs Hi-Z looped through Link in its right position – ext syncs terminated on board

Y IN / SDI OUT port configuration

The Y IN/SDI OUT port can be configured by setting the position of link PL9 (to be found at the middle right hand edge of the module). When a YC input is required set jumper link PL9 to its right –hand position (towards the board connector). Set jumper PL3 to its left-hand position when a further SDI output is required.

Link	Position	Select loop through or termination of reference syncs
PL9	Bottom right hand corner	Link in its upper position – Set for Y IN Link in its lower position – Set for SDI OUT

2.3 General Purpose Interface (GPI)

The EMDEC-200, like most Crystal Vision modules, is equipped with GPI control I/O.

GPI			Low (<1V)	High (+5V)
0	**'a'**	**Recall preset bit 1**	Active	Non-active
1	**'b'**	**Recall preset bit 2**	Active	Non-active
2	**'c'**	**Recall preset bit4**	Active	Non-active
3	**'d'**	**Recall preset bit 8**	Active	Non-active
4	**'e'**	**Audio follow pulse**	Pulse width equal to audio delay	
5	**'f'**	**Silence alarm/loss of input**	Alarmed	Not alarmed

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.

GPI Preset	Bit 8	Bit 4	Bit 2	Bit 1	GPI Preset	Bit 8	Bit 4	Bit 2	Bit 1
1	H	H	H	H	**9**	L	H	H	H
2	H	H	H	L	**10**	L	H	H	L
3	H	H	L	H	**11**	L	H	L	H
4	H	H	L	L	**12**	L	H	L	L
5	H	L	H	H	**13**	L	L	H	H
6	H	L	H	L	**14**	L	L	H	L
7	H	L	L	H	**15**	L	L	L	H
8	H	L	L	L	**16**	L	L	L	L

Note: GPI presets are actioned upon a change in level.

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)

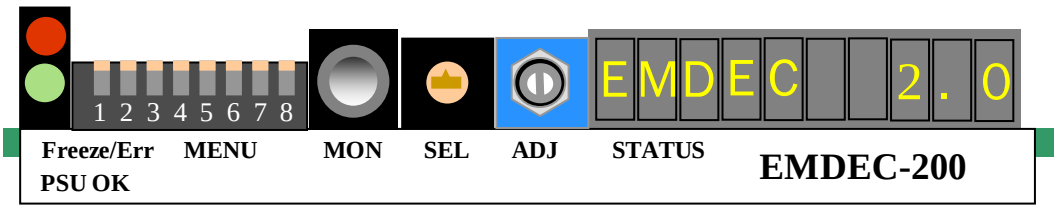
Note: Remote 1: 26 way high-density D-Type female socket. Frame ground is pin 2 and +5V @500mA is pin 1.

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 the monitor headphone socket.



EMDEC-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
0	Status	All levers up, SEL selects
1	Action	Normally UP, Set DOWN & back UP to action adjustments
2	Preset selection	Selects which preset 0-15 to be saved or recalled
3	Video configuration	Allows the selection of the various video controls
4	Audio selection and routing	Allows the selection of the various audio controls
5	Video Gains and levels	Allows the adjustment of the various video gains and levels
6	GPI and Alarms config	Allows the configuration of the GPIs and alarm reporting
7	Not used	Normally UP, No customer functions
8	Recall	Normally UP, Set DOWN & back UP to recall presets

8 way DIL switch functions

3.2 Card edge rotary controls

Control	Function
SELECT	Rotary menu control. Rotate to select the various menus available initially show the current status of that parameter or setting.
ADJUST	Used in conjunction with the SELECT control. When the SELECT control has selected the required menu, the ADJUST control is rotated to change the current setting to other options.

Rotary control functions

Notes: Rotary controls can access menus and parameter values by clockwise or anti-clockwise rotation.

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/Err	Red	Illuminates if an error is detected, such as no input, no reference input, picture frozen, silence detected when flag enabled.
PSU	Green	Good power supply (PSU) rails. (Bottom LED)

3.4 Navigating card edge menus

To access the card edge menu system proceed as follows:

- Start with all of the DIL switch levers in the UP position
- Scroll through and select desired menu by rotating the SELECT control
- The current value assigned will be displayed
- To change the assigned value, rotate the ADJUST control
- Assign new value with DIL switch lever 1 if required (operational changes only)

The action required to save the new assignment depends on the data type as shown in the following table:

Data Type	Down
Numeric value	Automatically updated as value is changed
Audio monitor source	New selection is active immediately
Operational mode change	DIL lever 1 ACT must be set DOWN and then UP

The displayed menu brightness will flash slowly if confirmation with the ACT lever is required.

3.5 Card edge configuration

Menu order assumes clockwise rotation from the initial 0 (12 O'clock) position of the SEL rotary hex switch.

Card edge status operation

To enter the card edge status mode set all eight DIL switch levers UP.

Turn the SELECT control to show either the audio or video status display.

Error Status

Shows the error status EMDEC-200.

[option]		**Rotate SELECT to show Error status (0)**
Option:	**Aud Op*xxxx***	Where *x* is group 1, 2, 3, 4 or s for silent
Option:	**Vid Ip Abs**	No Video input present
Option:	**Ref Ip Abs**	No external reference input present. Syncro mode only.
Option:	**Aud Op Off**	No embedder Audio group selected

Example: **[Aud Op1s34]**

Incoming composite Video status

Shows the presence of a Composite video input.

[Vid Ip Ok]		**Rotate SELECT for SDI input status (1)**
Option:	**Ok**	input present
Option:	**Ads**	input not present

Incoming reference status

Shows the presence of a reference input.

[Ref Ip Ok]		**Rotate SELECT for reference input status (2)**
Option:	**Ok**	Reference input present
Option:	**Ads**	Reference input not present

Not applicable in Delay mode

Composite video input standard

Shows the line rate off the incoming video.

[Ip 625 Ok]		**Rotate SELECT for Composite video input standard (3)**
Option:	**625**	SDI input line rate is 625 lines per frame
Option:	**525**	SDI input line rate is 525 lines per frame
Option:	**Vid Ip Abs**	No input present

Video delay status

Shows the current setting of the video delay.

[VidDly *xxx*]		**Rotate SELECT to show video delay setting (6)**
Option:	***xxx***	Where *xxx* is the delay in lines (0-624)

Example: [VidDly 37]

Embedded audio output groups

Shows which two of the 4 output groups are selected to receive the re-embedded audio.

[Op Gp *xxxx*]		**Rotate SELECT to show which output groups are selected (8)**
Option:	***xxxx***	Where *xxxx* are the groups 1234 and where '–' not selected

Example: [Ip Gp -2-4]

Option:	**SDI Ip Abs**	No SDI input present

Video delay status

Shows the current setting of the video delay.

[VidDly *xxx*]		**Rotate SELECT to show video delay setting (6)**
Option:	***xxx***	Where *xxx* is the delay in lines

Example: [VidDly 37]

Software version

Shows the version level of the currently fitted software.

[Sware *n.nn*]		**Rotate SELECT to show software version (D)**
Option:	***n.nn***	where n.nn is the issue and level

Example: [Sware 2.02]

Serial number

Shows the SYNNER PCB's serial number.

[SerNo*nnnnn*]		**Rotate SELECT to show software version (E)**
Option:	***nnnnn***	where nnnnn is a 5-digit number

Example: [SerNo78558]

Sub PCBs

Shows the type of sub PCBs currently fitted to the EMDEC-200.

[PCB *type*]		**Rotate SELECT to show sub PCBs fitted (F)**
	type	
Option:	**AIP2**	Analogue audio input PCB
Option:	**DIP2**	Digital AES input card
Option:	**DIP2RS**	Digital AES input card with re-sampling

Using presets

To enter the preset menu set DIL switch lever 2 DOWN.

All others in the **UP** position: -

[Preset 01]		Function and card edge display examples (0-15)
Option:	0 to 15	These menus allow the saving and recall of user presets To save the current SYNNER setup as a preset proceed as follows: • Select the required pre-set 0 to 15 with the SELECT switch. Press Menu lever 1 DOWN then UP to save the preset To recall a preset proceed as follows: • Select the required pre-set 0 to 15 with the SELECT switch (SW 3) • Press Menu lever 8 DOWN then UP to recall the preset

Example: [Preset 15]

Video configuration.

To enter the Video and Audio configuration menu set DIL switch lever 3 DOWN.

All others in the UP position: -

Selecting the video delay or offset

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.

Setting the video delay in lines

To select the video frame synchroniser video delay or vertical offset in lines turn the SELECT control to display **[Line F *'nnn'*]** or for a courser control **[Line C *'nnn'*]**, and then turn the ADJUST control to select the desired option.

[Line F '*nnn*']	**Rotate ADJUST for video delay or offset in lines (0)**
Option: *'nnn'*	Required vertical timing or offset (video delay) in lines: where 'n' is 0 to 624 for 625 line systems, or 0 to 524 for 525 line systems
Confirmation:	The new value is active the moment it is displayed

[Line C '*nnn*']	**Rotate ADJUST for video delay or offset in lines x 10 (1)**
Option: *'nnn'*	Required vertical timing or offset (video delay) in lines x 10: where 'n' is 0 to 624 for 625 line systems, or 0 to 524 for 525 line systems
Confirmation:	The new value is active the moment it is displayed

Setting the fine video delay

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

To select the video frame synchroniser video fine delay or horizontal offset, turn the SELECT control to display **[Smpl F *'nnnn'*]** or for a courser control **[Smpl C *'nnnn'*]**, and then turn the ADJUST control to select the desired option.

[Smpl '*nnnn*']	**Rotate ADJUST control for fine video delay value (2)**
Option: *'nnnn'*	Fine video delay in pixels or picture samples: where 'n' is 0~1727 for 625 line systems, or 0~1715 for 525 line systems
Confirmation:	The new value is active the moment it is displayed

[Smpl C '*nnnn*']	**Rotate ADJUST for video delay or offset in lines x 10 (3)**
Option: *'nnnn'*	Fine video delay in pixels or picture samples x10: where 'n' is 0~1727 for 625 line systems, or 0~1715 for 525 line systems
Confirmation:	The new value is active the moment it is displayed

Selecting the Freeze Mode

The type of freeze used when the freeze command is given may be selected from frame, field 1 and field 2. If there is movement between both fields a frame freeze may show movement judder. A field freeze works 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.

Forcing a picture freeze

To select the EMDEC-200 forced video picture Freeze Mode, turn the SELECT control to display **[freeze 'option']**, then turn the ADJUST control to select the desired option.

[Freeze 'option']		**Rotate ADJUST for picture freeze on/off (4)**
Option:	**Dis**	Sets EMDEC-200 into automatic Freeze Mode as determined by the Input loss menu.
	En	Sets EMDEC-200 into forced Freeze Mode as determined by the Freeze Mode setting menu.
Confirmation:		The new value is active the moment it is displayed

Note: When freeze is ON, audio output is MUTED. Freeze may be set to ON by manual control from edge of PCB (see above) or Statesman control

To select the EMDEC-200 video picture Freeze Mode turn the SELECT control to display **[Frz 'option']**, turn the ADJUST control to select the desired option.

[Frz 'option']		**Rotate ADJUST for Freeze Mode (5)**
Option:	**Frame**	Sets EMDEC-200 into frame Freeze Mode, whenever freeze is ON
	Field2	Sets EMDEC-200 into field 2 Freeze Mode, whenever freeze is ON
	Field1	sets EMDEC-200 into field 1 Freeze Mode, whenever freeze is ON
Confirmation:		The new value is active the moment it is displayed

Selecting the operating Mode

The EMDEC-200 has two modes of operation, synchronisation and delay line. In Synchronisation Mode the unit takes its timing from the analogue external reference and will automatically synchronise sources with or without embedded audio between 0 and 2 fields. In Delay Mode, timing is derived only from the SDI input.

To set the EMDEC-200 to video frame synchroniser operation or variable SDI delay mode turn the SELECT control to display **[‘option’ Mode]**, turn the ADJUST control to select the desired option and then confirm the new value.

[‘option’ Mode]		**Rotate ADJUST for operating mode (6)**
Option:	**Synch**	Sets EMDEC-200 to frame synchroniser mode
	Delay	Sets EMDEC-200 to variable SDI delay mode
Confirmation:		DIL lever 1 ACT must be set DOWN and then UP

Suppressing NTSC setup (pedestal)

The EMDEC-200 can cater for the two common 525 composite signals formats, NTSC-M and NTSC-J (Japan). Before conversion to a SDI signal the 7.5% IRE setup (pedestal) applied to NTSC-M waveform will require suppressing. Turn the SELECT control to display **[NTSC ‘option’]**, then turn the ADJUST control to select the desired option.

[NTSC -‘option’]		**Rotate ADJUST for NTSC pedestal on/off (7)**
Option:	**J**	Sets EMDEC-200 to no suppression
	M	Sets EMDEC-200 to suppress the +7.5% IRE setup
	N/A	EMDEC-200 with a 625 line input
Confirmation:		The new value is active the moment it is displayed

Enabling blanking of the vertical interval

The VBI of the EMDEC-200 analogue video picture input may be blanked or passed, turn the SELECT control to display **[VBI ‘option’]**, then turn the ADJUST control to select the desired option.

[VBI ‘option’]		**Rotate ADJUST for VBI on/off (8)**
Option:	**Blank**	Sets analogue video picture output VBI content to be blanked
	Passed	Sets analogue video picture output VBI content to be passed
Confirmation:		The new value is active the moment it is displayed

Tracking audio delay

Selecting the tracking audio delay speed

This sets the time the audio delay takes to track fast or abrupt changes in video delay, when video tracking is on.

The faster the rate of change, the quicker the audio delay will match changes in video delay so minimising lip sync errors, but at the expense of a matching change of musical pitch.

Note: Video tracking is turned on or off with the **[VTrack on/off]** menu.

Refer to the Introduction chapter for more help with TAD speed settings for different applications.

To select the tracking audio delay maximum rate of change (speed), turn the SELECT control to display **[Tad Sp '*n.nn*']**, then turn the ADJUST control to select the desired option.

[Tad sp '*n.nn*']		**Rotate ADJUST for TAD speed (9)**
Option:	**'*n.nn*'**	Maximum permitted rate of change in binary steps: where '*n.nn*' = 0.8%, 0.4%, 0.2%, 0.1%, 0.05%
Confirmation:		The new value is active the moment it is displayed

Enabling video tracking

As explained in the previous section, when video tracking is enabled the audio delay can be made to match the video delay and so maintain lip sync.

To enable or disable video tracking turn the SELECT control to display **[VTrack 'Off/On']**, then turn the ADJUST control to select the desired option.

[VidTrk 'On/Off']		**Rotate ADJUST for video tracking options (A)**
Option:	**Off**	Turns video tracking off
	On	Turns video tracking on
Confirmation:		The new value is active the moment it is displayed

Selecting predictive tracking

Predictive tracking is designed to be used in Synchronisation Mode with video tracking on, so that as the video delay changes, the rate of change of the audio delay is controlled.

To select the Predictive Tracking Audio Delay Mode turn the SELECT control to display **[Pred Tk 'on/of']**, turn the ADJUST control to select the desired option.

[Pred Tk 'On/Off']		**Rotate ADJUST for predictive tracking options (B)**
Option:	**Off**	Turns predictive tracking off
	On	Turns predictive tracking on
Confirmation:		The new value is active the moment it is displayed

Note: Predictive tracking cannot be turned on if video tracking is off.

Input Video format

Selecting the Input video format

The EMDEC-200 can be configured to accept two analogue video input formats, PAL/NTSC composite and YC, turn the SELECT control to display **[IP = 'option']**, then turn the ADJUST control to select the desired option.

[IP = 'option']		**Rotate ADJUST for VBI on/off (C)**
Option:	**COMP**	Sets the analogue video input to PAL/NTSC Composite
	YC	Sets the analogue video input to PAL/NTSC YC
Confirmation:		The new value is active the moment it is displayed

Audio selection and routing

To enter the audio selection and routing menu set DIL switch levers 4 DOWN.

Menu piano lever 4 DOWN, all others in the UP position:-

Selecting the additional audio delay

This sets the time the audio is to be delayed in the Delay Mode, or in Synchronisation Mode, added to the tracking audio delay when that mode is switched on. When tracking delay is OFF, then this selects the actual audio delay.

To select the additional audio delay turn the SELECT control to display **[A Del *'nn'*]**, and then turn the ADJUST control to select the desired option.

[A Del C *'nn'*]		**Rotate ADJUST for additional audio delay (0)**
Option:	***'nn'***	Additional delay in milliseconds: where '*n*' = 1 to 20 in 1 millisecond steps
Confirmation:		The new value is active the moment it is displayed

Audio Routing

Selecting an audio stereo pair for embedding

Turn the SELECT control to display **[*'option'* > Op12]**, turn the ADJUST control to select the desired option and then confirm the new value.

[*'option'* > Op12]		**Rotate ADJUST to select channel pair for channel 1-2 of the embedder (1)**
Option:	**Ip12**	Audio channel 1 / 2 selected for embedder channel 1 / 2
	Ip34	Audio channel 3 / 4 selected for embedder channel 1 / 2
Confirmation:		DIL lever 1 ACT must be set DOWN and then UP

Turn the SELECT control to display **[*'option'* > Op34]**, turn the ADJUST control to select the desired option and then confirm the new value.

[*'option'* > Op34]		**Rotate ADJUST to select channel pair for channel 3-4 of the embedder (2)**
Option:	**Ip12**	Audio channel 1 / 2 selected for embedder channel 3 / 4
	Ip34	Audio channel 3 / 4 selected for embedder channel 3 / 4
Confirmation:		DIL lever 1 ACT must be set DOWN and then UP

Selecting an audio group in the output SDI stream and assigning to the embedder

Turn the SELECT control to display **[Op Group '*n*']**, turn the ADJUST control to select the desired option and then confirm the new value.

[Op Group '*n*']		**Rotate ADJUST to select audio group for embedding (3)**
Option:	**'*n*'**	Audio group number: 1 / 2 / 3 / 4, or - for OFF
Confirmation:		DIL lever 1 ACT must be set DOWN and then UP

Monitoring audio

It is possible to monitor the audio input to be embedded at either the input or output of the audio router via the board-edge 3.5mm stereo jack socket.

To select audio source for the headphone monitor jack socket turn the SELECT control to display **[MonSr 'xxnn']** then turn the ADJUST control to select the desired option.

[Mon Sr '*xxnn*']		**Rotate ADJUST for monitor source (4)**
Option:	**Ip12**	Where 12 is channel 1 & 2 of the input sub PCB
	Ip34	Where 34 is channel 3 & 4 of the input sub PCB
	Op12	The stereo pair selected to be embedded in channel 1 & 2 of the selected SDI audio group
	Op34	The stereo pair selected to be embedded in channel 3 & 4 of the selected SDI audio group
Confirmation:		The new value is active the moment it is displayed

Video levels and gains

To enter the video levels and gains menu set DIL switch lever 5 DOWN.

All others in the UP position: -

Video levels and gains

Luma, Chroma, Black offset gain and Burst to Chroma Phase (NTSC Hue) can be adjusted to correct for input signal variations.

Luma gain

Turn the SELECT control to display **[lGain '*nnn*']**, turn the ADJUST control to set the Luma gain to the desired level.

[lGain '*nnn*']		**Rotate ADJUST to set Luma gain (0)**
Option:	***nnn***	80-120% in steps of 1%
Confirmation:		The new value is active the moment it is displayed

Chroma gain

Turn the SELECT control to display **[cGain '*nnn*']**, turn the ADJUST control to set the Chroma gain to the desired level.

[cGain '*nnn*']		**Rotate ADJUST to set Chroma gain (1)**
Option:	***nnn***	80-120% in steps of 1%
Confirmation:		The new value is active the moment it is displayed

U gain

Turn the SELECT control to display **[uGain '*nnn*']**, turn the ADJUST control to set the U gain to the desired level.

[uGain '*nnn*']		**Rotate ADJUST to set U gain (2)**
Option:	***nnn***	80-120% in steps of 1%
Confirmation:		The new value is active the moment it is displayed

V gain

Turn the SELECT control to display **[vGain '*nnn*']**, turn the ADJUST control to set the V gain to the desired level.

[vGain '*nnn*']		**Rotate ADJUST to set v gain (3)**
Option:	***nnn***	80-120% in steps of 1%
Confirmation:		The new value is active the moment it is displayed

Black level

The black offset level may be adjusted by ± 25mV in steps of approximately 1mV.

Turn the SELECT control to display **[loff '*nn*']**, turn the ADJUST control to set the Black offset to the desired level.

[loff '*nn*']		**Rotate ADJUST to select silence detect delay period (4)**
Option:	***nn***	±25mV in steps of 1mV
Confirmation:		The new value is active the moment it is displayed

Burst to Chroma phase and NTSC Hue

The Burst to Chroma phase or NTSC Hue may be adjusted by ± 90deg in steps of 1deg.

Turn the SELECT control to display **[Phase '*nn*']**, turn the ADJUST control to set the phase/hue to the desired angle.

[phase '*nn*']		**Rotate ADJUST to select silence detect delay period (5)**
Option:	***nn***	±90deg in steps of 1deg
Confirmation:		The new value is active the moment it is displayed

GPI and Alarm configuration

To enter the alarm configuration menu set DIL switch lever 6 DOWN.

All others in the UP position: -

Assigning GPI6 alarm reporting

A silence alarm may be triggered if the audio present in any one of the output channels remain below –50dBFS for longer than a period of time set by the silence detect delay, approximately 40sec. Any of or all four channels can set the common alarm, GPI-f.

Silence detect

Turn the SELECT control to display **[Sil *n* '*option*']**, turn the ADJUST control to select the desired option and then confirm the new value.

[Sil C*n* '*option*']		**Rotate ADJUST to select audio channel to report from embedder C (0-3)**
Option:	**Msk**	Mask silence detect for selected audio channel
	Flg	Flag silence detect for selected audio channel
	n	Audio channel 1 / 2 / 3 / 4 on embedder (router OP)
Confirmation:		The new value is active the moment it is displayed

GPI6 configuring

Turn the SELECT control to display **[GPI '*option*']**, turn the ADJUST control to select the desired option and then confirm the new value.

[GPI '*option*']		**Rotate ADJUST to select silence detect delay period (A)**
Option:	***Dis***	GPI is disabled
	Ena	GPI is enabled
Confirmation:		The new value is active the moment it is displayed

Engineering settings

There are three engineering settings, VCO, Factory Default and Factory Reset. Of these the VCO adjustment will have been set during manufacture so would normally not require further adjustment.

VCO

Turn the SELECT control to display **[VCO '*nnn*']**, turn the ADJUST control to select the desired offset. Sets the reference VCO free running frequency. This adjustment can only be carrier out with both the input and reference removed.

[VCO '*nnn*']		**Rotate ADJUST to select silence detect delay period (A)**
Option:	***nnn***	0-255 steps (factory set control)
Confirmation:		The new value is active the moment it is displayed

Factory defaults

This control when actioned will return all adjustable values to there default value. Note. Any configuration stored, as presets will remain unaffected.

Turn the SELECT control to display **[Default]**, Set switch 1 down then up to confirm this action.

[Default]	**Rotate ADJUST to select silence detect delay period (A)**
Confirmation:	DIL lever 1 ACT must be set DOWN and then UP

Factory Reset

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

Turn the SELECT control to display **[Reset]**, Set switch 1 down then up to confirm this action.

[Reset]	**Rotate ADJUST to select silence detect delay period (A)**
Confirmation:	DIL lever 1 ACT must be set DOWN and then UP

4 Using the active front panel

4.1 Module selected

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

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

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

The Crystal Vision control panel start up display

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

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

Statesman mode is entered by default

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

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

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

Navigating the display

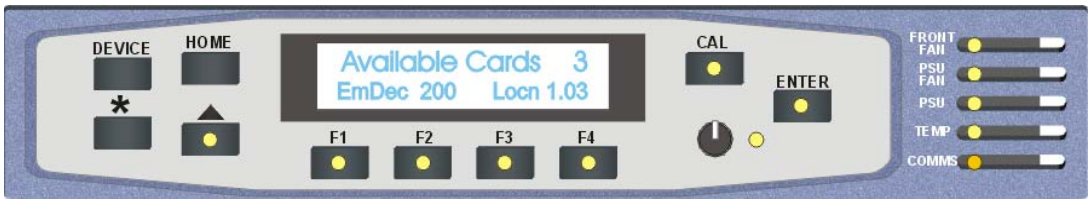
The functions assigned to control panel keys are:

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

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

Selecting EMDEC-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.

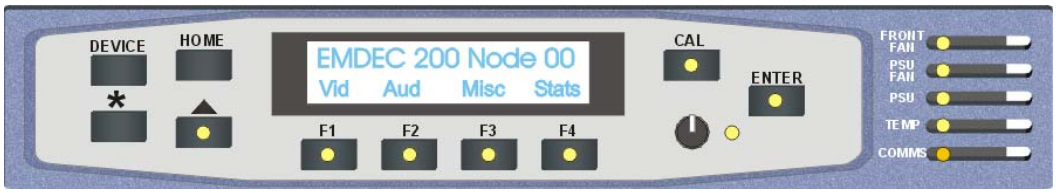


The available cards menu

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 EMDEC-200 has been selected.



The EMDEC-200 home menu

Updating the display

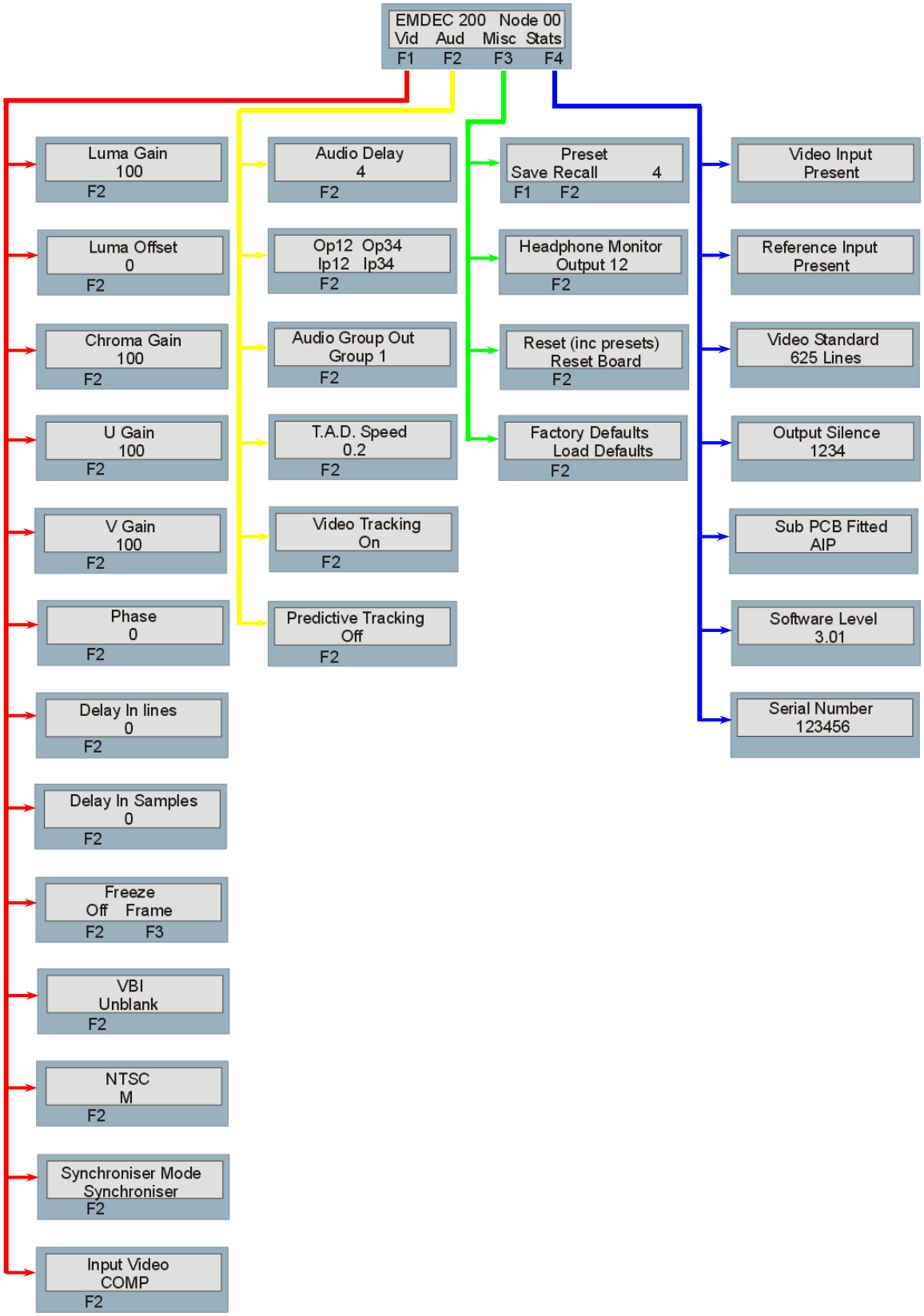
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If mode changes occur through the use of Statesman, card edge controls or through automatic response to the input video signal, the text displayed on the active front panel will not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

The EMDEC-200 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 be made. Their integrated LEDs illuminating will indicate active function keys.

When a sub menu has been selected, further options may be obtained buy using the Shaft control to scroll through the available options. Once the desired option has been located a selection or value change can be made by either toggling the appropriate function key or by selecting and using the shaft control to alter a numerical value. A configuration change or value will be activated as the shaft control is rotated or function button is toggled.

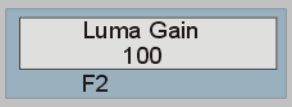
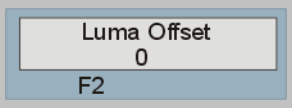
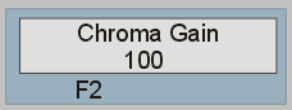
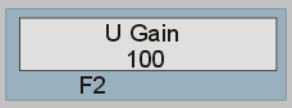
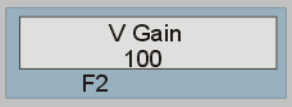
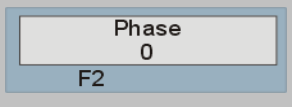
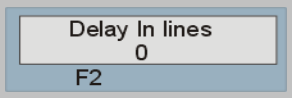
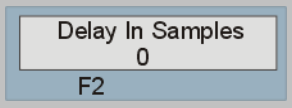
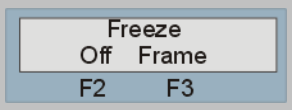
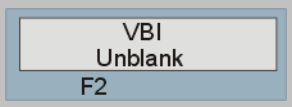
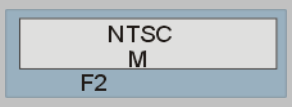
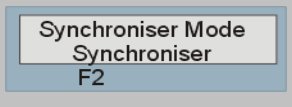
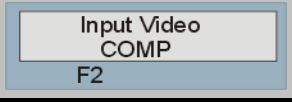
The following chart shows the available EMDEC-200 menus. The actual menus available may vary slightly as software is updated.



EMDEC 200 menu tree

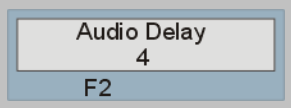
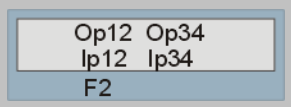
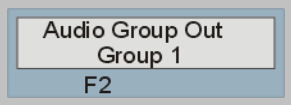
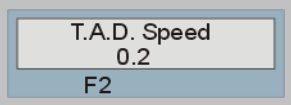
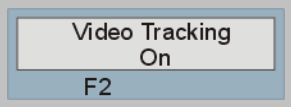
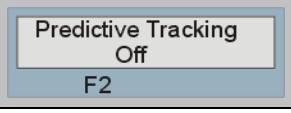
Video Configuration Menu

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

Video Configuration menu	Description
	Pressing the appropriate function key will access the four sub menus. These sub menus are then be traversed by rotating shaft control.
	Press **F2** key to select and adjust shaft control to increment the Luma Gain. Adjustment 80-120% in 1% steps.
	Press **F2** key to select and adjust shaft control to increment the Luma Offset, ± 25mV in 1mV steps
	Press **F2** key to select and adjust shaft control to increment the Chroma Gain. Adjustment 80-120% in 1% steps.
	Press **F2** key to select and adjust shaft control to increment the U axis Gain. Adjustment 80-120% in 1% steps.
	Press **F2** key to select and adjust shaft control to increment the V axis Gain. Adjustment 80-120% in 1% steps.
	Press **F2** key to select and adjust shaft control to increment the Chroma Phase (NTSC Hue) in the analogue input video. ± 90deg in 1deg steps
	Press **F2** key to select and adjust shaft control to increment the Delay in lines, 0-624 in 625 line standard and 0-524 in 525 line standard
	Press **F2** key to select and adjust shaft control to increment the Delay in pixels, 0-1727 in 625, 0-1715 in 525
	Toggle **F2** to enable the freeze function. Toggle **F3** to select Frame freeze, Field 1 freeze or Field 2 freeze.
	Toggle **F2** to blank and unblank data in the vertical interval.
	Toggle **F2** to remove the NTSC 7.5% IRE black level pedestal. M removed, J not removed. (NTSC only)
	Toggle **F2** to select synchronisation or Delay mode.
	Toggle **F2** to select the video input format. COMP PAL/NTSC Composite or Y/C

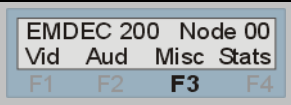
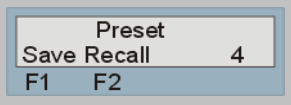
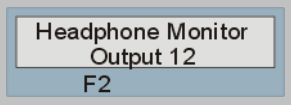
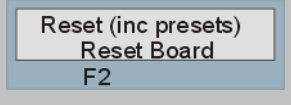
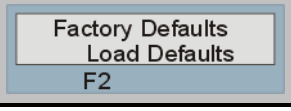
Audio Configuration Menu

The Audio configuration menu allows the user control over the various audio functions.

Audio Configuration menu	Description
	Pressing the appropriate function key will access the four sub menus. These sub menus are then be traversed by rotating shaft control.
	Press **F2** key to select and adjust shaft control to increment the Audio Delay in delay mode or offset in synchro mode. Adjustment 4 to 20 ms.
	Press **F2** key to select and adjust shaft control to set audio routing. **F1** Op12, **F2** Op34.
	Press **F2** key to select and adjust shaft control to set Output group to receive embedded audio. Group1, 2, 3, 4 & none The output is format is SMPTE
	Press **F2** key to select and adjust shaft control to increment the TAD speed. The current rates are 0.8%, 0.4%, 0.2%, 0.1% and 0.05%.
	Press **F2** key to toggle Tracking On and Off.
	Press **F2** key to toggle Predictive tracking On and Off.

Misc Configuration Menu

The Misc configuration menu contains Preset control, engineering and monitoring menus.

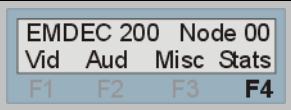
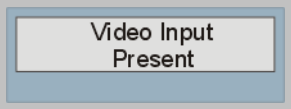
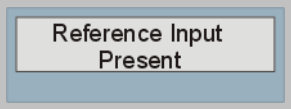
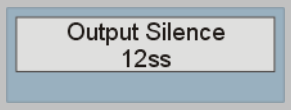
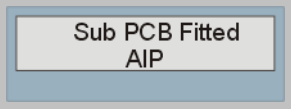
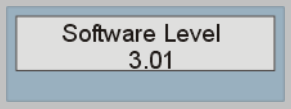
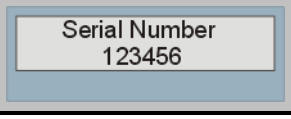
Video Configuration menu	Description
	Pressing the appropriate function key will access the four sub menus. These sub menus are then be traversed by rotating shaft control.
	Press **F2** key to enter the preset menu. Adjust shaft control to increment the Preset store location 0-16. Press **F1** to save. Press **F2** to recall. Note when an empty location is selected for a recall the selection will jump to location 1.
	Press **F2** key to select and adjust shaft control to set the card edge headphone socket to monitor the Input channel pairs 12, 34 or Output channel pairs 12, 34.
	Press **F2** to return the card settings to their default values. Note all stored preset configurations will be erased.
	Press **F2** to return the card settings to their default values. Note all stored preset configurations will be retained.

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

Parameter	Default value
Embedder	Group 1
Audio delay	4 ms - minimum measured delay through board
Gains and levels	0 or 100% as applicable.
Headphone select	Output Channels 1 and 2
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
TAD Speed	0.2
Video tracking	On
Predictive tracking	Off
Video standard	PAL
Delay in lines	0
Delay in samples	0 - minimum through board
Lock	Vertical blanking
VBI	Unblanked
Routing	Channel 1-1, 2-2, 3-3, 4-4.
Alarms	Deselected

Stats Menu

The stats menu allows the user to check the card status.

Video Configuration menu	Description
	Pressing the appropriate function key will access the four sub menus. These sub menus are then be traversed by rotating shaft control.
	Indicates the presence or absence of an input signal.
	Indicates the presence or absence of an external reference signal.
	Indicates the line standard of the incoming video. 625 or 525 lines
	Indicates the presence or absence (silence) of audio channels embedded onto the output video stream.
	Shows the type of piggyback sub PCB fitted. AIP, DIP etc.
	Shows the software level currently fitted.
	Shows the card serial number.

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 normally 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

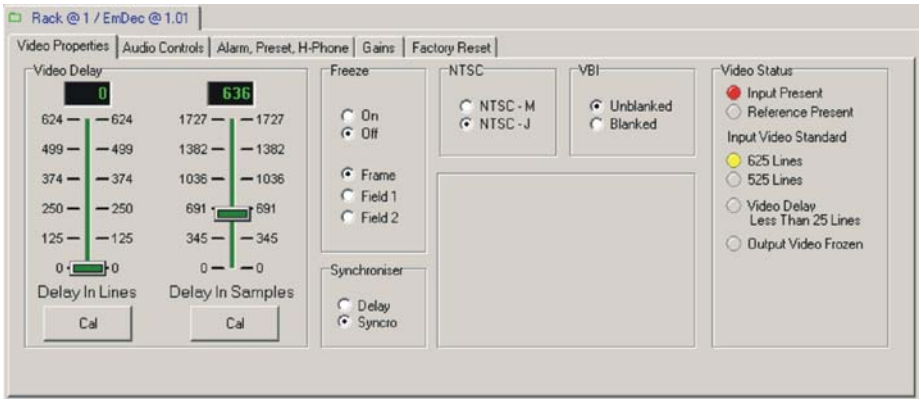
Using Statesman status displays

Video and audio status is provided by simulated LEDs in both the video and audio panels.

Selecting Synchronisation or Delay Mode

The EMDEC-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.



EMDEC-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 SDI input.

In each case the audio delay can be made to track the video delay and the audio always remains locked to video.

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.

The audio output is always muted when the video is frozen. The embedded packet structure is maintained but the packets contain silence.

Auxiliary data and NTSC format

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.

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

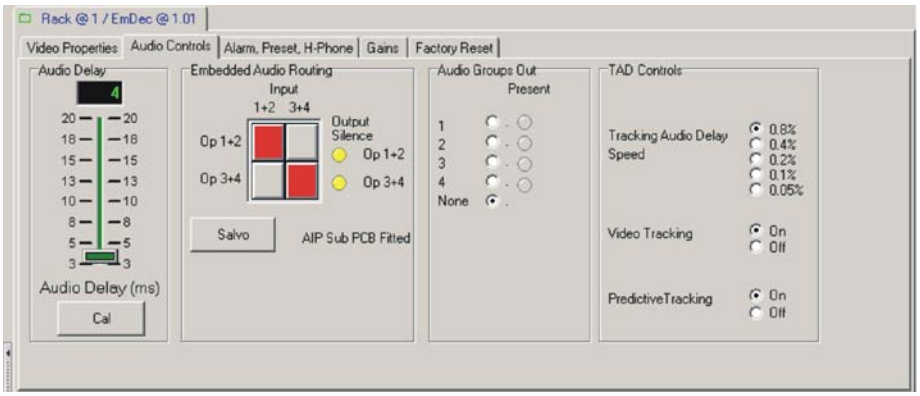
Video status

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 when the input video and output video is less than 25 lines apart.

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.

Audio selection and routing

The EMDEC-200 will take up to four channels (2 stereo pairs) and embed them into any one of the four available groups in the SDI output stream. A 2x2 audio router is also available which allows the user to reorder the audio channels prior to embedding.



Audio Controls

Adjusting the audio delay

The audio delay slider controls the actual delay if video tracking is off or the audio delay offset or additional delay if video tracking is on.

Use the audio delay sliders to control the delay from 4 to 20 ms

Note: When video tracking is on, audio delay dynamically follows video delay in Synchronisation Mode and when video delay is manually changed.

Audio Routing

The 2x2 router allows the order of the input audio to be reordered prior to embedding.

Note: the router treats input channel 1 & 2 as a stereo pair, and likewise channel 3 & 4 as a stereo pair.

An indication by simulated LED of a silent channel is also given to aid the user.

Routing selection is made by clicking on the appropriate routing tile, which then changes colour to indicate that it has been selected. At this point no routing has been actioned. Once the selection is complete it is implemented by clicking the Salvo button.

Selecting the embedder group

To select a group to embed into for the embedder, check group 1, 2, 3, 4 or none.

The output is format is SMPTE

Tracking audio delay speed

The tracking audio delay rate TAD speed determines the time taken for the audio delay to track fast or abrupt changes in video delay when video tracking is on. The faster the rate, the faster the audio delay will match the video delay, but at the expense of musical pitch.

To select the tracking audio delays maximum rate of change or speed click on the TAD box and select from the available rates. The current rates are 0.8%, 0.4%, 0.2%, 0.1% and 0.05%.

Video tracking

When enabled, the built-in video tracking helps to ensure that the audio delay matches the video delay to maintain lip sync.

To enable video tracking, check the Video tracking On box, to disable it check the Video Tracking Off box.

Using predictive tracking

In Synchronisation Mode, the video delay control processor has to add a frame of video when an asynchronous input video lags behind the reference timing by two fields or delete a frame of video when the input overtakes the reference. All video synchronisers have to work in a similar fashion, which means that when the video delay abruptly changes from zero delay to two fields delay.

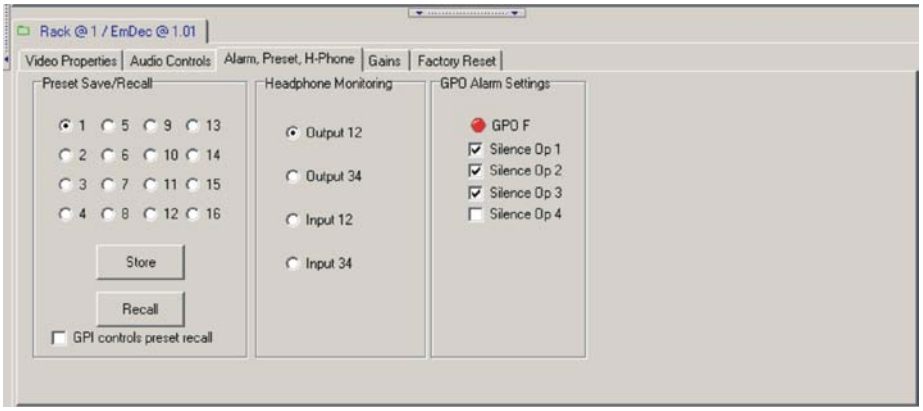
The EMDEC-200 does this with a predictive circuit that 'knows' when the timing jump is about to occur so that the audio delay can be slowly changed to maintain lip sync within close limits. The TAD setting controls any change in audio pitch.

To ensure that lip sync errors are minimised during the necessary jumps in video timing with asynchronous inputs in Synchronisation Mode, make sure that the Predictive Tracking On box is checked.

Remember to select a TAD value appropriate for the programme material.

Alarms, presets and headphone monitoring

The Alarm, Preset, H-Phone tab allows the user to configure the alarm reporting and monitoring facilities. The 16 presets are also accessible.



Alarms, presets and headphone monitoring

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.

Using the headphone monitor

The card edge jack socket [3.5 mm, stereo] is used to monitor the two stereo audio signals from the input sub PCB

It can also be used to monitor the two stereo audio signals that are to be inserted into the out going SDI stream the embedder.

Select the desired audio pair to listen to from the Headphone Monitoring box.

These analogue audio signals are only available through the headphone jack socket.

Note: There are no outputs to the rear connectors.

Tip: The headphone output will not drive non-amplified speakers. Use with active loudspeakers, or a pair of headphones.

Assigning GPI6 alarm reporting

A silence alarm may be triggered if the audio present in any one of the output channels remain below –50dBFS for longer than a period of 40sec. Any of or all four channels can set the common alarm, GPI6.

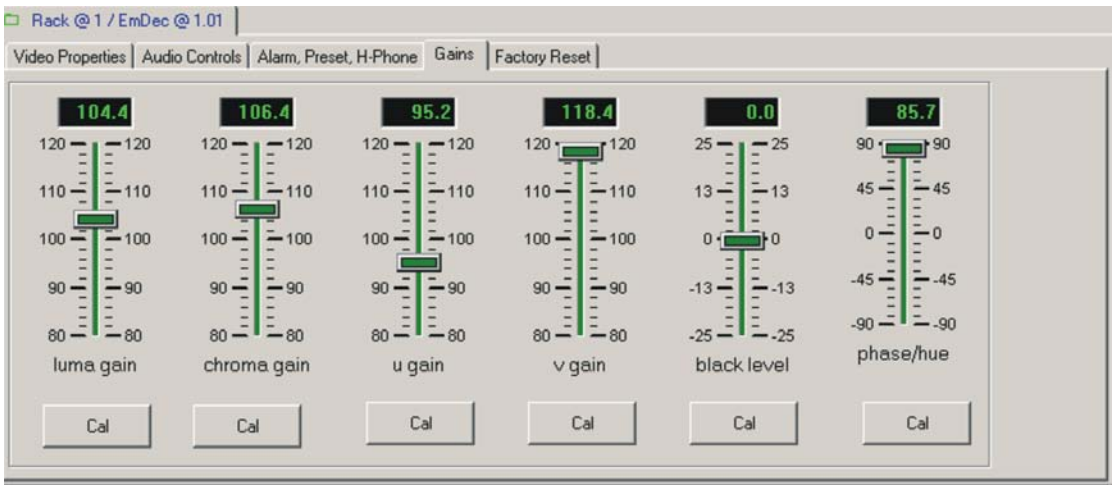
Tick the appropriate box or boxes to select which channels are required to flag an alarm when silence is detected.

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/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 0.1% steps. 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 EMDEC-200 to its Default State; Reset and Defaults.

Factory Reset controls

Factory defaults

This control when actioned will return all adjustable values to there 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 there 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
Embedder	Group 1
Audio delay	4 ms - minimum measured delay through board
Gains and levels	0 or 100% as applicable.
Headphone select	Output Channels 1 and 2
Synchronisation Mode	Synchronisation
Freeze	Off
Freeze Mode	Field 1
TAD Speed	0.2
Video tracking	On
Predictive tracking	Off
Video standard	PAL
Delay in lines	0
Delay in samples	0 - minimum through board
Lock	Vertical blanking
VBI	Unblanked
Routing	Channel 1-1, 2-2, 3-3, 4-4.
Alarms	Deselected

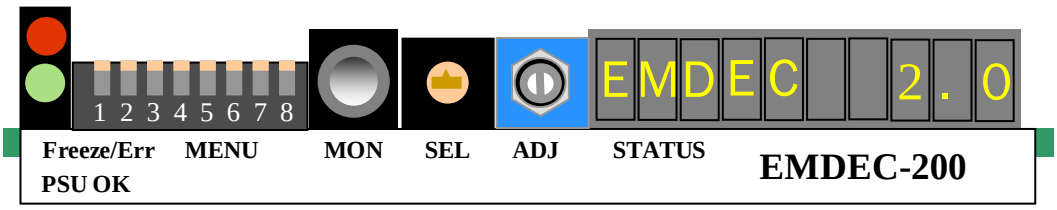
6 Trouble shooting

Card edge, active front panel and Statesman may all be used to aid in trouble shooting the EMDEC-200. 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.



EMDEC-200 front view showing controls and LEDs

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

LED Colour	Position	Description
Red	Freeze/Err	Illuminates when output is frozen or an error is detected
Green	+5V	Illuminates when the board is powered

Using the card edge display to interrogate an error condition

[option]		**Set DIP1-8 to UP, Rotate SELECT to show Error status (0)**
Option:	**Aud Op*xxxx***	Where *x* is group 1, 2, 3, 4 or s for silent
Option:	**Vid Ip Abs**	No Video input present
Option:	**Ref Ip Abs**	No external reference input present. Syncro mode only.
Option:	**Aud Op Off**	No embedder Audio group selected

Example: **[Aud Op1s34]**

6.2 Fault finding guide

The Power OK LED is not illuminated

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information.

The Freeze error LED is illuminated

This LED will illumination when an errors is present. These are; No video input, No reference input (synchro mode), frozen output or Audio channel silence. Use the board edge display to interrogate the error. All DIP switches UP, SEL0. Note. There may be more than one error present.

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

There are no audio outputs

Check that valid audio data is embedded in the outgoing SDI stream

Try connecting a pair of headphones to the 3.5mm jack socket on the card edge to verify that incoming audio is available and that it is being routed to the output embedder.

The video output is not synchronous with other station sources

If the input SDI stream is not synchronous with station sources, ensure that EMDEC-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 video output is not synchronised with the embedded audio output

Check that the incoming audio is not already out of sync with the incoming video

Check if video tracking is on or off.

Check if predictive tracking is on or off.

If the problem slowly corrects itself with predictive tracking on, try changing the TAD speed to a higher value.

Changes in pitch can be heard with certain sections of music

Ensure that video tracking and predictive tracking are on.

Try changing the TAD speed to a lower value.

I need to synchronise video with more than four channels of audio

Connect the AFV output to an external audio delay processor and use external embedders.

Why can't individual audio channels be selected or routed to the embedder?

More advanced audio shuffling features are provided by the TANDEM series of modules.

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 rack power and re-applying power after a few seconds or by 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

The card may be reset by simply removing the frame power and re-applying power after a few seconds or by removing the card from the frame then re-inserting it. It is usually safe to re-insert the card whilst the rack is powered.

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 (no sub PCB fitted) 7W (DIP sub PCB fitted) 9.5W (AIP and dc-dc PCBs fitted)

Inputs

Analogue video input	Composite or Y/C video input, 1 volt with syncs 625 line PAL or 525 line NTSC
Audio in	**Main audio in/out (option)** One sub PCB can be added onto the main board to enable either input of 4 analogue audio or 2 AES serial digital audio signals. These sub PCBs are selected from the TANDEM range and specifications are therefore defined on the TANDEM brochure.
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 delay through the EMDEC-200 is set by the same timing adjustments.

Audio timing	The audio is delayed by the same amount as the video but an additional delay can be added to the audio of up to 20 ms.
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 10 character alphanumeric display or Statesman PC control software.
GPI control	**GPI inputs:** 4 off 1,2 ,3 & 4. Recall presets 0 to 15. **GPI outputs** 5 Audio follow output pulse. 6 Indicates that an audio channel has been silent for longer than the silence delay period. Electrically: Open drain FET 30V, 220Ω current limit resistors. Pulled up to +5V through 10kΩ.
LEDs	PSU okay, output frozen or error.

Ordering information

EMDEC-200	Synchroniser module with optional sub PCBs for analogue or AES audio input to embedder.

Option sub PCBs

AIP2	Dual channel analogue I/P sub PCB card. 20 bit conversion
DIP2	Dual channel digital AES audio I/P sub PCB card, 75Ω and 110Ω I/P
DIP2RS	Dual channel digital AES audio I/P sub PCB card, includes resampling of I/P
DCDCV18	DC to DC converter sub PCB, required when fitting AIP2

Rear Connectors

RM04	Single height rear connector
RM05	Quad height rear connector
RM07	Double height rear connector
RM26	Double height rear connector
RM30	Single height rear connector

Frames

Indigo 4	4U frame with passive front panel for up to 24 modules
Indigo 2	2U frame with passive front panel for up to 12 modules
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