Crystal Vision

EMDEC-200

Embedding Decoder

EMDEC-200 is Crystal Vision's broadcast embedding decoder, designed to offer the functions of three products on one board. It replaces a decoder with synchroniser, tracking audio delay and embedder and handles the whole input into an embedded system in a convenient, space-saving and inexpensive way.

EMDEC-200 converts 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. Adjustable timing, gains and levels all help to perfect the picture.

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 up to one frame apart.

EMDEC-200 allows you to embed analogue audio, just by fitting the 3G-AIP2 audio piggyback. If you're embedding analogue audio you must also fit a HD-DCDCV18 PSU. A 2 x 2 stereo router allows the shuffling of stereo pairs, while the audio can also be monitored from the front of the board using headphones. High quality audio is guaranteed with Crystal Vision's audio protection.

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

EMDEC-200 is a 100mm x 266mm module which fits in the Indigo frames (2U, 1U and desk top box), allowing full integration with any other interface or keying product from the Indigo range. It can be used with two different frame rear modules (RM04 and RM26) and gives a maximum of three SDI outputs. The flexible control options include board edge switches, an integrated front panel on the AE frames, the VisionPanel remote control panel, GPIs, SNMP, the Statesman Lite PC software and the VisionWeb web browser control.

With its ability to make systems 25% cheaper, EMDEC-200 is aimed at anyone who needs to bring analogue video into an embedded environment.

- **12 bit digital embedding decoder**
- **Save money and space: one board replaces decoder with synchroniser, tracking audio delay and embedder**
- **Suitable for all sources, from broadcast quality to VHS**
- **High quality digital filtering and five line comb**
- **Video synchroniser times input to local syncs**
- **Tracking audio delay synchronises video and audio**
- **Embed analogue audio**
- **2 x 2 stereo router**
- **100mm x 266mm module allows 12 EMDEC-200 in 2U (six in 1U and two in desk top box)**
- **Flexible control, including PC software**
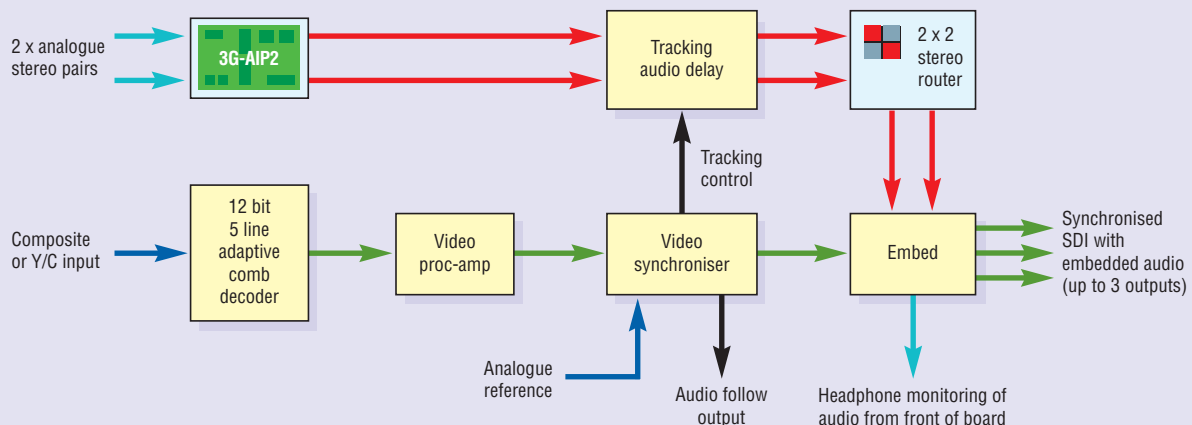
EMDEC-200 MOTHERBOARD

MECHANICAL
Standard Crystal Vision module 266mm x 100mm
Weight: 200g without piggyback; 240g with piggyback fitted
Power consumption: 6.2 Watts

ANALOGUE INPUT
Composite video input, 1 volt with syncs
625 line PAL or 525 line NTSC
PAL and NTSC Y/C

ANALOGUE REFERENCE
Analogue Black and Burst, mixed syncs or video
Amplitude of syncs 150mV to 4V
Optimum jitter performance is from analogue Black and Burst plus 300mV syncs to EBU N14-1988

SDI OUTPUTS
SDI 270Mbit to EBU 3267-E and SMPTE 259M with inserted EDH
Maximum of three SDI outputs (two outputs with frame rear module RM04 and three with RM26). One less output in each case if Y/C input
<500ps 1kHz jitter and <800ps broadband jitter from stable 300mV Black and Burst reference

ANALOGUE PERFORMANCE
Sampling: 12 bit precision 54Mbit (four times oversampling)
Exceptional performance is achieved by a 12 bit five line adaptive comb decoder
Frequency response (comb active): +/- 0.5dB to 5.5MHz

Gain error: <1%
Differential phase and gain <1.5°, <1.5%
Signal to Noise: <-60dB
Blanking: To analogue PAL/NTSC specifications, with selectable VBI blanking PAL lines 7 to 22 and 319 to 335. NTSC lines 10 to 20 and 273 to 282

VIDEO TIMING ADJUSTMENTS
With a video timing reference the timing of the output (with respect to the reference in) may be adjusted by any number of lines up to a whole video frame. Horizontal timing adjustment is also possible in 37nS steps
With no video timing reference the delay from input to output is set by the same timing adjustments

DELAY THROUGH BOARD
3 lines min - 2 fields + 3 lines max

FREEZE FUNCTIONS
Manual freeze allows EMDEC-200 to be used as a simple still store. Selecting single field output can counteract any flicker caused by the interlacing of two fields. Either field can be selected

AUDIO INPUTS
One 3G-AIP2 piggyback can be added to the main board to enable input of 2 x analogue stereo pairs to be embedded into a single audio group

AUDIO TIMING ADJUSTMENTS
The audio is normally delayed by the same amount as the video but an additional delay can be added to the audio of up to 20ms
Tracking delay auto or off

EMBEDDER TIMING PERFORMANCE
Interchannel: <1 clock cycle
Audio to video: Min 320μs for AES audio input. Min 1ms for analogue audio input

AUDIO MONITORING
One miniature front mounted audio jack and switch selects individual stereo audio analogue monitoring on both input and embedder

AUDIO FOLLOW OUTPUT
TTL output is provided on the same D-Type as GPIs to indicate the video delay through the synchroniser. The length of the pulse is equal to the length of the video delay

LED INDICATION OF:
Analogue input present
Analogue reference present
Power supplies okay
Delay less than 25 lines
Store frozen

GPI INPUT LEVELS
Electrically: Will tolerate 0V to 30V, pulled up to +5V through 10 kohm

GPI OUTPUT LEVELS
Electrically: Open collector transistors 30V, 330 ohm current limit resistors. Pulled up to +5V through 10 kohm

GPI INPUTS
Recall presets 0 to 15

GPI OUTPUTS
Video input present
Audio follow output

LOCAL CONTROL
Board edge with ten character alphanumeric display

REMOTE CONTROL
Control from integrated control panel on AE frames and remote panel
Statesman Lite allows control from any PC on a network
VisionWeb Control is available via the web server on the frame and allows operation using a standard web browser on a PC or tablet
SNMP monitoring and control available as a frame option

3G-AIP2 DUAL ANALOGUE AUDIO INPUT PIGGYBACK

AUDIO INPUTS
Two analogue stereo pairs or four mono channels. 24 bit quantising A to Ds. High input impedance (20 kohm) balanced

INPUT LEVEL RANGE
0dBFS = +28dBu max / 0dBFS = +12dBu min
Factory set default: 0dBFS = +18dBu or +24dBu by on board link

SIGNAL TO NOISE
99dB (+18dBu) rms., 22Hz to 22kHz typ.

TOTAL HARMONIC DISTORTION
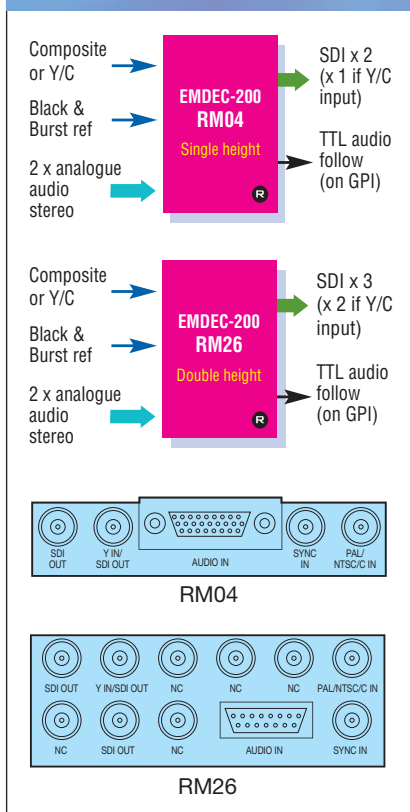0.004% THD+N rms., 22Hz to 22kHz typ.

INTERCHANNEL CROSSTALK
-110dB at 1kHz, -90dB at 20kHz, rms., typ.

SYNCHRONISATION
Digitised output of analogue A to D is automatically locked to video

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REAR MODULE CONNECTIONS

Composite or Y/C →
Black & Burst ref →
2 x analogue audio stereo →
EMDEC-200 RM04 Single height
→ SDI x 2 (x 1 if Y/C input)
→ TTL audio follow (on GPI)

Composite or Y/C →
Black & Burst ref →
2 x analogue audio stereo →
EMDEC-200 RM26 Double height
→ SDI x 3 (x 2 if Y/C input)
→ TTL audio follow (on GPI)

RM04: SDI OUT | Y IN/SDI OUT | AUDIO IN | SYNC IN | PAL/NTSC/C IN

RM26: SDI OUT | Y IN/SDI OUT | NC | NC | NC | PAL/NTSC/C IN | NC | SDI OUT | NC | AUDIO IN | SYNC IN

ORDERING INFORMATION

EMDEC-200	12 bit PAL/NTSC or Y/C to SDI embedding decoder with synchroniser (allows fitting of one audio input piggyback)
3G-AIP2	Analogue audio (two stereo pairs) input piggyback
HD-DCDCV18	18 Volt regulator for analogue audio configurations (one required if analogue audio piggyback fitted)
Indigo 2AE	2U frame with active front panel featuring smart CPU and integrated control panel for up to 12 Crystal Vision modules
Indigo 2SE	2U frame with active front panel featuring smart CPU for up to 12 Crystal Vision modules
Indigo 1AE	1U frame with active front panel featuring smart CPU and integrated control panel for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1AE-DP
Indigo 1SE	1U frame with active front panel featuring smart CPU for up to six Crystal Vision modules. Power supply redundancy available with Indigo 1SE-DP
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTSE	Desk top box with active front panel featuring smart CPU for up to two Crystal Vision modules
RM04	Single slot frame rear module. Allows maximum number of EMDEC-200 in frame (12 in 2U, six in 1U, two in desk top box). Suitable for embedding analogue audio. Gives access to two SDI outputs (or one if Y/C input). The default rear module and suitable for most applications
RM26	Two slot frame rear module. Allows six EMDEC-200 in 2U, three in 1U and one in desk top box. Suitable for embedding analogue audio. Gives access to three SDI outputs (or two if Y/C input)
VisionPanel	3U Ethernet remote control panel with touch screen
VisionWeb Control	VisionWeb web browser control included within frame software
SNMP	SNMP monitoring and control