

Crystal Vision

SYNAD-E

Embedded Audio Synchroniser with Dolby E processing

SYNAD-E is the ideal video synchroniser for any embedded audio environment, with the addition of special features designed for mixed Dolby E and standard AES installations.

SYNAD-E can synchronise video and up to two embedded audio groups (eight mono channels) to an analogue reference. Audio delay is handled separately from video delay, allowing the video path to drop or repeat frames without noticeably affecting the audio. SYNAD-E de-embeds the two groups of audio, passes them through a tracking audio delay resampling them, and then re-embeds the audio. The audio and video are delayed by the same amount to ensure they stay correctly timed and lip sync errors are avoided.

SYNAD-E is also the natural choice for systems containing Dolby E encoded audio, allowing a mixture of Dolby E and standard AES within a single audio group. Broadcasters are beginning to transmit programmes which use surround sound, encoding the 5.1 channels in a single AES stream of Dolby E, a form of audio compression. A second AES feed then contains a standard audio stereo pair, both for end users without a surround sound decoder and to make it easier for the broadcaster to monitor the audio. Most current broadcast infrastructures will only accept a single audio group and here a problem arises: embedding these two types of audio into the one group makes them difficult to synchronise because Dolby E data is processed differently to standard audio.

SYNAD-E solves the problem. It separates the Dolby E and standard audio, synchronising both types in the appropriate way and then recreates the audio with the delay matching the video. The only way to do this without SYNAD-E would cause disturbance to either the Dolby E data or the standard audio. SYNAD-E gives no discernible disturbance to either. The audio group can be entirely Dolby E, entirely standard audio, or have either of the stereo pairs as standard audio with the other pair as Dolby E. The second audio group is available for standard audio only.

SYNAD-E has a very short minimum delay of 3.8 μ s and avoids picture disturbance by fast locking after an upstream switch. It offers the choice of black, blue or freeze on input failure, while manual freeze allows the board to be used as a simple still store. The user can offset the reference by up to two fields, or can manually add up to two fields of delay when there is no reference. The inclusion of a monitoring encoder allows the synchroniser to be attached to a non-broadcast analogue device such as a picture monitor.

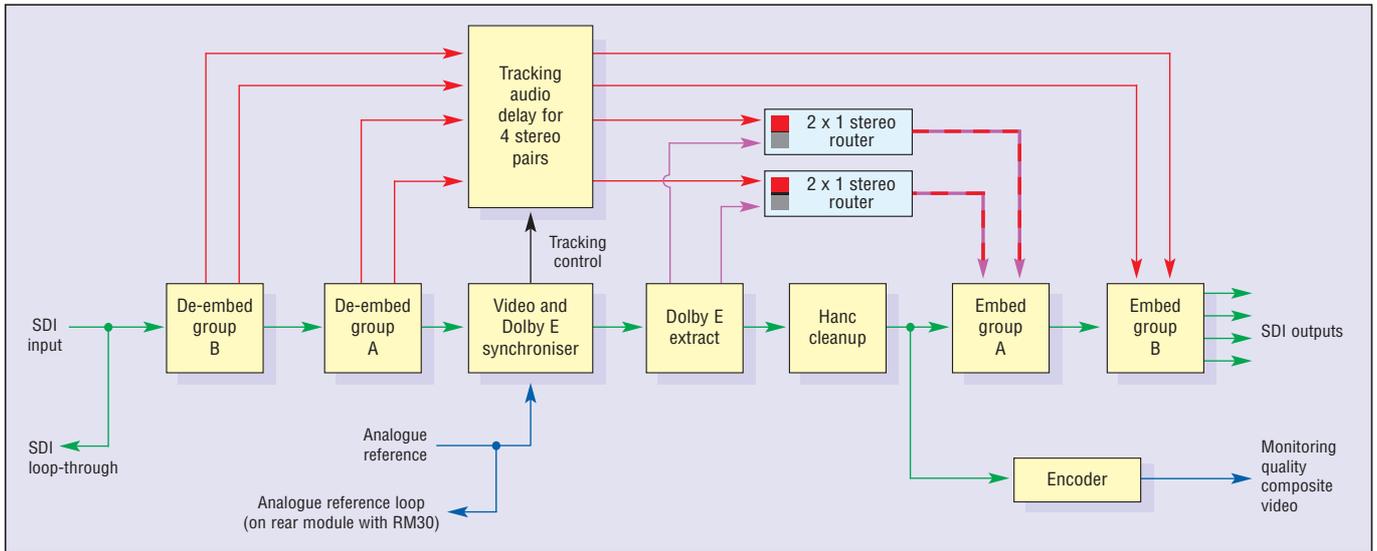
SYNAD-E incorporates sophisticated audio processing techniques to deal with any interruption to the embedded audio or unusual methods of packing, while a headphone socket on the front of the card allows the audio signals to be monitored.

SYNAD-E can be easily integrated with any of Crystal Vision's full range of modular interface and keying products. It can be used with two frame rear modules (RM26 and RM30) depending on the outputs required, with the RM26 giving the maximum four SDI and two composite outputs. Control can be from board edge, an active front panel on the frame, a remote control panel or the Statesman PC Control System.

Use SYNAD-E anywhere within a broadcast system. On lines in, after a routing switch where the sources are several lines apart, with the latest broadcast VTRs which can record up to two groups of embedded audio or - using its special features for Dolby E - for surround sound or multiple language applications.



- Digital embedded audio synchroniser
- Delays and resamples two groups of embedded audio
- First synchroniser to combine Dolby E and standard AES within a single audio group
- Includes PAL/NTSC monitoring encoder
- Full vertical and horizontal adjustment (0-2 fields)
- Can be used as fixed delay of up to two fields
- Minimum video delay of 3.8 μ s
- Selectable black, blue or freeze on input failure
- Corrects corruption to embedded audio
- Audio follow control output
- Space-saving: 100mm x 266mm module allows 12 SYNAD-Es in 2U (24 in 4U, six in 1U and two in desk top box)
- Flexible control, including PC software



SPECIFICATION

MECHANICAL

Standard Crystal Vision module 266mm x 100mm
Weight: 210g
Power consumption: 9 Watts

VIDEO INPUTS

SDI 270Mbit to EBU 3267-E and SMPTE 259M
Cable equalisation >200m Belden 8281 or equivalent
Auto 625/525 line selection

May contain up to two groups of embedded audio. One group may contain one or two channels of Dolby E

SDI OUTPUTS

SDI 270Mbit to EBU 3267-E and SMPTE 259M with inserted EDH

Maximum of four SDI outputs (two outputs with frame rear module RM30 and four with RM26)
Active relocked loop-through provided on RM26

ANALOGUE VIDEO OUTPUTS

Maximum of two PAL/NTSC composite outputs (one output with rear module RM30 and two with RM26)
Frequency response: +/-0.3dB 0 to 5MHz
Noise: <-54dB weighted luminance or chrominance

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
Reference loop-through available. Active loop-through with RM26. Rear module loop-through with RM30 - loop does not need SYNAD-E to be fitted as rear module has passive circuitry required

VIDEO TIMING ADJUSTMENTS

In synchroniser mode 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

In delay mode the reference is not used and the delay through for the SDI is set by the same timing adjustments

VIDEO DELAY THROUGH BOARD

3.8µs min - 2 fields max

FREEZE FUNCTIONS

Automatic freeze is available when input fails through loss of signal. Can show last good field before picture failure, whole frame in which failure happened or black or blue screen. Can also freeze picture for one second and then go to black or blue
Manual freeze allows SYNAD-E 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 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

AUDIO PROTECTION IN DE-EMBEDDERS

A variety of sophisticated techniques are employed to protect and minimise the effects of cuts to untimed and asynchronous SDI

AUDIO MONITORING

One miniature front mounted audio jack and switch selects individual stereo audio analogue monitoring on input de-embedder. Please note that you cannot hear valid audio on the Dolby E channel

EDH

EDH insertion on output

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:

SDI input present
Analogue reference present
Power supplies okay
Delay less than 24 lines
Store frozen
SDI absent, or selected audio group missing from input, or silent

GPI INPUT LEVELS

Electrically: Will tolerate 0V to 30V, pulled up to +5V through 10kOhm

GPI OUTPUT LEVELS

Electrically: Open collector transistors 30V, 330Ohm current limit resistors. Pulled up to +5V through 10kOhm

GPI INPUTS

Recall presets 0 to 15

GPI OUTPUTS

SDI input absent, or audio group selected but not present, or silent
Audio follow output

LOCAL CONTROL

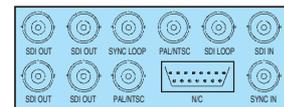
Board edge with 10 character alphanumeric display

REMOTE CONTROL

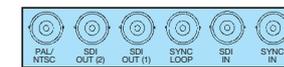
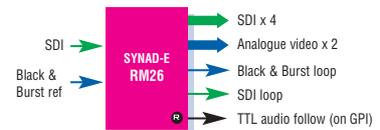
RS422/485

19200 baud, 8 bits, 1 stop no parity

Control from frame active front panel and remote panel
Statesman allows control from any PC on a network



RM26



RM30



ORDERING INFORMATION

SYNAD-E	Embedded audio synchroniser with Dolby E processing
Indigo 4	4U frame with passive front panel for up to 24 Crystal Vision modules
Indigo 4S	4U frame with passive front panel fitted with Statesman CPU for up to 24 Crystal Vision modules
Indigo 2	2U frame with passive front panel for up to 12 Crystal Vision modules
Indigo 2A	2U frame with active front panel for up to 12 Crystal Vision modules
Indigo 2S	2U frame with passive front panel fitted with Statesman CPU for up to 12 Crystal Vision modules
Indigo 1	1U frame with passive front panel for up to six Crystal Vision modules
Indigo 1A	1U frame with active front panel for up to six Crystal Vision modules
Indigo 1S	1U frame with passive front panel fitted with Statesman CPU for up to six Crystal Vision modules
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTA	Desk top box with active front panel for up to two Crystal Vision modules
Indigo DTS	Desk top box with passive front panel fitted with Statesman CPU for up to two Crystal Vision modules
RM26	Two slot frame rear module. Allows 12 SYNAD-Es in 4U, six in 2U, three in 1U and one in desk top box. Gives access to four SDI outputs, two PAL/NTSC outputs, an SDI loop-through and a Black and Burst loop-through
RM30	Single slot frame rear module. Allows maximum number of SYNAD-Es in frame (24 in 4U, 12 in 2U, six in 1U, two in desk top box). Gives access to two SDI outputs, one PAL/NTSC output and a Black and Burst rear module loop-through
REMIND	19" remote control panel
Statesman	PC Control System

Crystal Vision Ltd.

Lion Technology Park,
Station Road East, Whittlesford,
Cambridge CB2 4NL, England.

Tel: +44 (0)1223 497049

Fax: +44 (0)1223 497059

E-mail: sales@crystalvision.tv

www.crystalvision.tv