SYN101

SDI frame synchroniser

USER MANUAL

Crystal Vision

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SYN101 serial digital synchroniser
USERS MANUAL

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INTRODUCTION

The SYN101 is a serial digital synchroniser / delay module. The unit regenerates all the video sync information in its output data stream and will always produce legal video. The unit will plug into the front of the rack frame and the universal connection system will allow a mixture of Crystal Vision modules, without the use of extra rear panels, in both 1U and 2U frames.

The hinged front panel of the case reveals user controls of the card and an LED indication of status. There are a piano switch and several rotary switches on the board edge for user adjustments. Further configuration is possible using movable links.

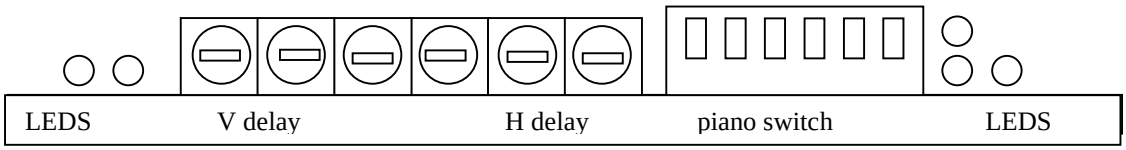
SPECIFICATION

Mechanical

Dimensions	100mm x 266mm module with DIN 41612 connector. User adjustments and indication at end of board to allow access from hinged front panel.
Weight	210g

Electrical

Video Input	270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M
Analogue reference	Composite Black & Burst plus 300mV syncs to EBU N14-1988.
Output	2 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M



FRONT PANEL CONTROLS AND INDICATIONS:-
LEDS

Outer left LED (green)	+5V – supply present
Inner left LED (green)	input present – serial input present.
Upper right LED (red)	EDH error flag 0. Meaning set by jumper link J8. See below.
Inner right LED (green)	Analogue sync input present.
Outer right LED (red)	EDH error flag 1. Meaning set by jumper link J8. See below.

ROTARY SWITCHES

V delay — Three 16 position rotary switches. These adjust the delay, or the output phase relative to the analogue sync reference. The right hand switch of the three is the least significant and adjusts the delay (or phase relative to sync input) in increments of one line when in 625 line mode, or one line plus 6 pixels in 525 line mode. The middle switch of the three adjusts in steps of 16 lines (or 16 lines and 96 pixels in 525 line) and the left hand switch adjusts in steps of 256 lines (or 257 lines and 678 pixels in 525 line). Only the first four positions (0-3) of the most significant (left hand) switch are meaningful. If the delay, or phase adjustment, set is greater than one frame then the actual value will be the setting minus one frame.

H delay — Three 16 position rotary switches. These adjust the delay, or the output phase, relative to the analogue sync reference. The right hand switch of the three is the least significant and adjusts the delay (or phase relative to sync input) in increments of one pixel (74ns).The middle switch of the three adjusts in steps of 16 pixels (roughly 1.2us) and the left hand switch of the three adjusts in steps of 256 pixels (roughly 19us). Only the first four positions (0-3) of the most significant (left hand) switch are meaningful.

PIANO SWITCH – switch 1 at left

1.	UP live video. DOWN freezes at end of frame
2.	Only has effect when frozen. UP outputs frame. DOWN outputs field 1 twice. Can be changed after image freeze.
3.	UP – freeze frame on input fail. DOWN output black on input fail. Can be changed after input failure. If freeze frame is selected then switch 2 can be used to select field or frame output on input failure.
4.	UP output timed to analogue sync input. Relative phase adjusted by rotary switches. DOWN output is timed to digital input and the rotary switches set the delay through the synchroniser. If there is no analogue sync input the unit defaults to delay mode.
5.	Not used. **MUST BE UP.**
6.	UP EDH receive mode. CRC is extracted, recalculated, compared, and re-inserted. Error flags are set as required. DOWN EDH transmit mode. CRC is calculated and inserted. Error flags have no significance.

REMOTE CONNECTIONS

INPUTS

Remote 0 – connection ‘a’

OPEN - live video on output.
CONNECT TO GROUND – freeze at end of frame.
This is electrically connected to piano switch 1.

Remote 1 – connection ‘b’

Only has effect when frame store is frozen.
OPEN - outputs frame.
CONNECT TO GROUND – output field 1 twice.
This is electrically connected to piano switch 2.

Remote 2 – connection ‘c’

OPEN – freeze frame on input fail.
CONNECT TO GROUND – output black on input fail.
This is electrically connected to piano switch 3

Remote 3 – connection ‘d’

OPEN – output timed to analogue sync input.
CONNECT TO GROUND – output timed to digital input.

OUTPUTS

Remote 4 – connection ‘e’

Active low TTL level EDH error flag. Low indicates error detected in active video (J8 open) or error detected in full frame (J8 fitted).

Remote 5 – connection ‘f’

Active low TTL level input failure signal. Low indicates digital input failure.

Each slot has an associated set of connections on a socket and on a plug. The letters in the table below refer to the connections described earlier in the manual.

1U frame Remote 1
26 way high density D-type **socket**
This connector is used for remote control.
Frame ground is pin 2

Slot number	‘a’ pin number	‘b’ pin number	‘c’ pin number	‘d’ pin number
1	8	9	18	26
2	7	16	17	25
3	5	6	15	24
4	4	14	13	23
5	3	12	22	21
6	10	11	19	20

1U frame Remote 2
26 way high density D-type **plug**
This connector is used for remote indication of status
Frame ground is pin 6

Slot number	‘e’ pin number	‘f’ pin number
1	19	20
2	10	11
3	1	2
4	3	4
5	12	13
6	21	22

2U Frame Remote 1 (1) and Remote 3 (3)
26 way high density D-type **sockets**
These connectors are used for remote control.
Frame ground is pin 2 in each case

Slot number	'a' pin number	'b' pin number	'c' pin number	'd' pin number
1	8 (1)	9 (1)	18 (1)	26 (1)
2	7 (1)	16 (1)	17 (1)	25 (1)
3	8 (3)	9 (3)	18 (3)	19 (3)
4	7 (3)	16 (3)	17 (3)	25 (3)
5	5 (1)	6 (1)	15 (1)	24 (1)
6	4 (1)	14 (1)	13 (1)	23 (1)
7	5 (3)	6 (3)	15 (3)	24 (3)
8	4 (3)	14 (3)	13 (3)	23 (3)
9	3 (1)	12 (1)	22 (1)	21 (1)
10	10 (1)	11 (1)	19 (1)	20 (1)
11	3 (3)	12 (3)	22 (3)	21 (3)
12	10 (3)	11 (3)	19 (3)	20 (3)

2U Frame Remote 2 (2) and Remote 4 (4)
26 way high density D-type **plugs**
These connectors are used for remote indication of input status
Frame ground is pin 6 in each case

Slot number	'e' pin number	'f' pin number
1	19 (2)	20 (2)
2	10 (2)	11 (2)
3	19 (4)	20 (4)
4	10 (4)	11 (4)
5	1 (2)	2 (2)
6	3 (2)	4 (2)
7	1 (4)	2 (4)
8	3 (4)	4 (4)
9	12 (2)	13 (2)
10	21 (2)	22 (2)
11	12 (4)	13 (4)
12	21 (4)	22 (4)

JUMPER LINKS

J2 Selects sync loop through mode.
Link to left (near TP4) selects internal termination of sync input.
Link to right (near U4) selects loop though.

J8 Selects meaning of EDH error indication signals when in receive mode.
When link is not fitted EDH flag 0 (upper right LED) indicates Unknown Error Status - no EDH information in incoming signal. EDH flag 1 (outer right LED) indicates Error Detected Here in active picture.
When link is fitted EDH flag 0 indicates Error Detected Already in full frame. EDH flag 1 indicates Error Detected Here in full frame.

J9 Selects ancillary data mode.
When the link is not fitted the unit removes all words from the incoming data that could form part of a sync word. All the sync words in the output are generated from the timing reference. This provides the most robust output but removes ancillary data such as embedded audio.
When the link is fitted the unit passes through ancillary data such as embedded audio. As a consequence it will also pass through single words of out of range data. It will NOT pass incorrectly timed video sync word sequences.

J17, J19 and J20 — Select video standard (525 or 625 line) and reference source.
These jumpers are used to select the video standard or, if automatic standard selection is used, the signal used to determine the standard.

J17	J19	J20	Standard Selection
OPEN	OPEN	OPEN	Fixed to 625 line.
OPEN	LINKED	OPEN	Fixed to 525 line.
LINKED	OPEN	OPEN	Automatic standard selection based on digital input.
OPEN	OPEN	LINKED	Automatic standard selection based on analogue reference input.

CONNECTIONS

SDI/1	Serial digital input
SD2	Audio follow TTL pulse. Width indicates delay through board.
Y/G/OPA	Serial digital output
U/B/OPB	Serial digital output
V/R/OPC	Analogue sync loop through output. Depends on link setting.
SYNC/OPD	Analogue sync input.