

# Crystal Vision

## SYN102 Synchroniser



The SYN102 is Crystal Vision's general video frame synchroniser, designed to eliminate timing problems in all serial digital installations.

The default synchroniser for sources without embedded audio, it can also be used as a cost-effective synchroniser for embedded audio applications where the input and output frame rate are locked together. You should alternatively consider using the SYNNER144 or SYNAD-E synchronisers instead in your embedded environment.

The SYN102's 'fix anything' capability has consistently made it one of Crystal Vision's top-selling products. It has remote or local output timing adjustment both horizontally and vertically, with a full two fields of adjustment. It can be used in all applications to replace a line synchroniser as it has a very short minimum delay of  $2\mu\text{s}$ , and will recover input timing in the minimum time possible. It has the added advantage of infinite timing window, and the ability to freeze the picture.

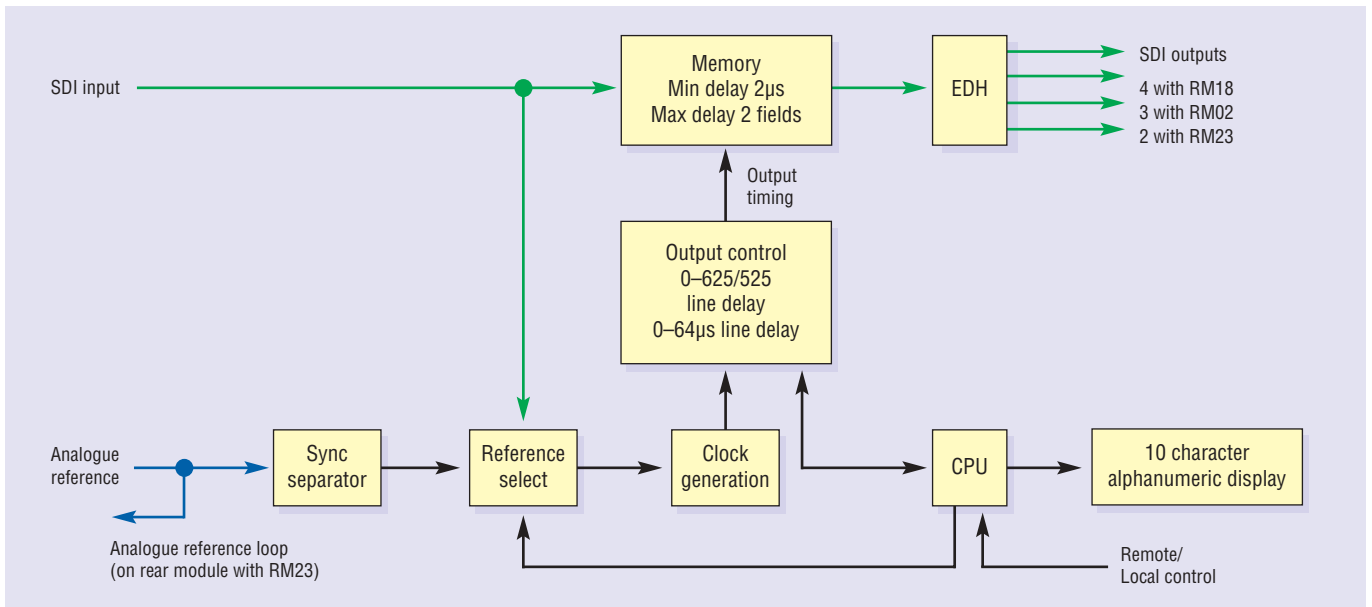
The SYN102 has two operational modes: synchroniser and delay line. A remote freeze function can be used in either. In synchroniser mode it will automatically fix any incorrect frame rates plus any delays by taking its timing from the analogue reference. Delay line mode is ideal for when the frame rate is correct but the source has been passed through equipment such as a chroma keyer and therefore been delayed for a few lines. The fixed delay can be set between  $2\mu\text{s}$  and two fields.

The serial digital output has virtually no output jitter (less than 500ps at 1kHz), both when used as a synchroniser (with a stable analogue reference) and when used as a delay line without a reference. Only in delay mode can jitter on the SDI input affect the output, but even then all high frequency jitter is removed by the internal phase-locked-loop.

Synchronisers are traditionally placed before a router to ensure all inputs have the same timing. This can become expensive if one is required for every video input. In 625 line applications where sources are synchronous but varying in timing by up to 23 lines, Crystal Vision provides an intelligent solution: one SYN102 can follow a router and have no disturbances on its video output. How does it do this? It waits until the last possible moment in the vertical blanking, line 23, to set the vertical position. Other synchronisers lock up from line 1 and therefore a vertical switch at line 6 to a vertically offset picture would not be corrected for a whole field.

Fitting in the standard frames, the SYN102 can be used with three frame rear modules (RM02, RM18 and RM23) and gives up to four SDI outputs. It can be controlled from either board edge, an active front panel on the frame, a remote control panel or the Statesman PC control system.

- ▶ 10 bit frame or line synchroniser
- ▶ Space saving: 100mm x 266mm module allows 12 SYN102s in 2U (24 in 4U, six in 1U and two in desk top box)
- ▶ Full vertical and horizontal adjustment (0-2 fields)
- ▶ Selectable black or freeze on input failure
- ▶ Digital green suppression
- ▶ Can be used as fixed delay line
- ▶ EDH generation and error detection
- ▶ GPI freeze input
- ▶ Audio follow control output
- ▶ Passes embedded audio (when output locked to input)
- ▶ Removes SDI jitter
- ▶ Flexible control, including board edge, front and remote panels and PC software



## SPECIFICATION

### MECHANICAL

Standard Crystal Vision module 266mm x 100mm  
 Weight: 200g  
 Power consumption: 6 Watts

### VIDEO INPUT

SDI 270Mbit to EBU 3267-E and SMPTE 259M  
 Cable equalisation >200m Belden 8281 or equivalent  
 Auto 525/625 line selection  
 May contain embedded audio when input and output frequencies are locked

### VIDEO OUTPUTS

Maximum of four SDI outputs (two outputs with frame rear module RM23, three with RM02 and four with RM18)  
 SDI 270Mbit to EBU 3267-E and SMPTE 259M with EDH

### ANALOGUE REFERENCE

Analogue Black and Burst, mixed syncs or video  
 Amplitude of syncs 150mV to 4V  
 Link on PCB selects 75Ohm termination or high impedance  
 Reference rear module loop-through available on RM23 - loop does not need SYN102 to be fitted as rear module has passive circuitry required  
 Reference active loop-through available on RM02 and RM18 - loop needs SYN102 to be fitted

### DELAY THROUGH BOARD

2µs min - 2 fields max

### FREEZE FUNCTIONS

Manual freeze allows the SYN102 to be used as a simple still store. Selecting single field output can counteract any flicker caused by the interlacing of the two fields on a picture with significant movement. Either field can be selected. The single field is output only when the picture is frozen. Automatic freeze is available when input fails through loss of signal. The user can specify to show the last good field repeated before picture failure, the whole frame in which failure happened (useful for diagnostic purposes) or a black screen

### AUDIO FOLLOW OUTPUT

TTL output on BNC  
 Pulse length shows delay through store  
 Can provide control signal for audio delay systems

### GPI INPUT LEVELS

Active: connect to ground  
 Inactive: high impedance, or 3 to 48 volts  
 Input current <50µA

### GPI OUTPUT LEVELS

CMOS levels  
 Max current 2mA

### GPI INPUTS

Freeze

### GPI OUTPUTS

Large delay in synchroniser (<25 lines)

### LED INDICATION OF:

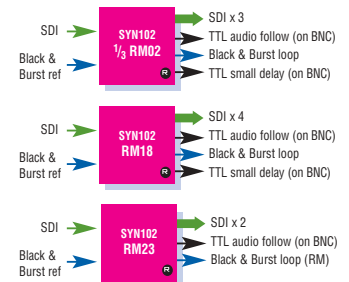
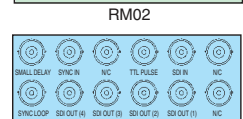
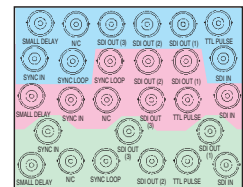
Power supplies on board  
 SDI input present  
 Analogue reference present (vertical syncs detected)  
 Input EDH errors  
 Large delay in synchroniser (<25 lines)  
 Manual freeze

### LOCAL CONTROL

Variables and options set by shaft encoder with values and prompts on 10 character alphanumeric display on board edge  
 Output timing adjustment of 0 to 2 fields, set as vertical and horizontal offset

### REMOTE CONTROL

RS422/485  
 19200 baud, 8 bits, 1 stop no parity  
 Control from frame active panel and remote panel  
 Statesman allows control from any PC on a network



## ORDERING INFORMATION

SYN102	10 bit SDI video frame synchroniser
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
RM02	Four slot frame rear module. One rear module used for three SYN102s, allowing 18 SYN102s in 4U and nine in 2U. Gives access to three SDI outputs and an active Black and Burst loop-through
RM18	Two slot frame rear module. Allows 12 SYN102s in 4U, six in 2U, three in 1U and one in desk top box. Gives access to four SDI outputs and an active Black and Burst loop-through
RM23	Single slot frame rear module. Allows maximum number of SYN102s in frame (24 in 4U, 12 in 2U, six in 1U, two in desk top box). Gives access to two SDI outputs and a rear module Black and Burst loop-through. The default rear module suitable for most applications
REMIND	19" remote control panel
Statesman	PC Control System

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