Crystal Vision

SYN 3G

3G/HD/SD video synchroniser

SYN 3G is the most cost-effective way to get a robust Crystal Vision video frame synchroniser which works with 3Gb/s, HD and SD sources. Designed principally for applications without embedded audio and ideal for synchronising in the studio or before the vision mixer, it can correct any timing problems – whether you need to synchronise sources timed to a different reference or correct system processing delays. It includes useful features such as delay compensation, video proc-amp and integrated fibre input/output connectivity, while the inclusion of four video outputs allows you to easily send the synchronised signal to multiple places.

- Correct any timing problems: either synchronise incoming video signals or compensate for timing delays within video system
- Use it with a variety of sources: works with 3Gb/s, HD and SD
- Use any available timing signals: reference any source to HD tri-level syncs or SD Black and Burst
- Easy to time all your signals: with full vertical and horizontal timing adjustments, plus up to three frames of additional user video delay
- Use the video proc-amp to optimise the video: with adjustment of the video gain, black level and independent RGB and YUV gains
- Give yourself peace of mind: relay bypass protection available with RM67 rear module
- Optional integrated fibre input/output connectivity means you won't be limited by cable lengths
- Save yourself a distribution amplifier: send the synchronised signal to multiple places, with four video outputs
- Saves rack space: 100mm x 266mm module allows 12 SYN 3G in 2U (six in 1U and two in desk top box)
- Flexible control: select from front and remote panels, GPIs, SNMP, PC software and your web browser

SYNCHRONISE THE VIDEO

SYN 3G can both synchronise incoming video signals which are not locked to the local reference and compensate for timing delays within the video system. It has two operational modes: synchroniser and delay line.

Synchroniser mode is ideal for external sources that are not timed to station references such as satellite or remote contribution feeds. In synchroniser mode SYN 3G takes its timing from the external analogue reference and will automatically synchronise sources that are up to one frame apart, fixing any incorrect frame rates plus any delays. The ability to cross-lock allows it to conveniently use any existing timing signals, with a 3Gb/s, HD or SD input referenced to either HD tri-level syncs or SD Black and Burst.

Delay mode takes its timing from the video input and is ideal for when the frame rate is correct but the source has been passed through other equipment and therefore been delayed for a few lines. The delay is adjustable in samples, lines and whole frame steps. Should the reference be removed or the board powered without a connected reference, SYN 3G will revert to delay mode.

You can easily compensate for mistimed sources elsewhere in your system by adjusting the output timing relative to the reference through an entire frame using horizontal and vertical settings.

Further fixed delays can then be added, with up to three frames of video delay – adjustable in one frame steps – allowing you to match any big video delays in the system, such as compensating for Dolby E encoding and decoding.

SYN 3G is principally designed for use with video-only sources, but can pass through embedded audio transparently if the input and output frame rates are locked together.

FREEZE FUNCTIONS

Both automatic and manual freeze are available, with manual freeze allowing SYN 3G to be used as a simple still store. You can choose to show the last good frame or alternatively a black or blue screen or 100% colour bars, with an optional initial delay of three seconds.

OPTIMISE THE VIDEO

SYN 3G includes a video proc-amp for picture optimisation and to help maintain colour fidelity, with adjustment of the video gain, black level and independent RGB and YUV gains.

FIBRE CONNECTIVITY – ON THE BOARD

SYN 3G allows you to have fibre input or output straight into the board – ideal when you need to send and receive signals beyond the local equipment bay. Just order either the FIP fibre input option or FOP fibre output option.

Designed for SMPTE 297-2006 short-haul applications, the FIP is used to receive an optical input and the FOP to transmit an optical output using a Class 1 laser. With a FIP fitted you can select your video input source to be taken either from the input BNC or the optical input. Having the fibre integral to the board reduces the need to use up additional rack space for separate fibre optic transmitters and receivers – as well as saving you money.

SYN 3G can also support a CWDM laser if required.

SAVE RACK SPACE – AND GET MULTIPLE OUTPUTS

SYN 3G is a space-saving 100mm x 266mm module which is housed in the Indigo frames, available in 2U, 1U and desk top sizes and with up to 12 boards fitting in 2U. It can be used with a choice of three frame rear modules – either the default RM41, the RM57 for fibre applications or the RM67 where relay bypass protection is required. The RM67 includes relay bypass protection on power failure or board removal, giving that extra layer of security and preventing signal loss. Ideal when you need to ensure that the main signal continues - whatever happens.

With SYN 3G you'll get up to four video outputs – saving you the expense of a distribution amplifier on the output if you need to send the synchronised signal to multiple places.

FLEXIBLE CONTROL

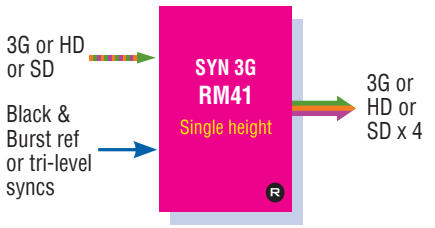
Operating SYN 3G is very straightforward, with control options including an integrated control panel on the AE frame, the VisionPanel remote control panel, the SBB-4 smart button box, SNMP, the Statesman Lite PC software and the VisionWeb web browser control.

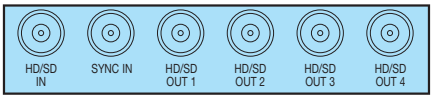
Signal monitoring is possible thanks to the two GPI outputs reserved for alarm indication, which may be assigned any number of four video alarms: video missing, reference missing, video black and video frozen. The video black and video frozen alarms can be delayed by up to 40 seconds before an alarm is asserted.

Up to 16 user-defined presets, containing the board setup data, may also be stored and recalled.

REAR MODULE CONNECTIONS

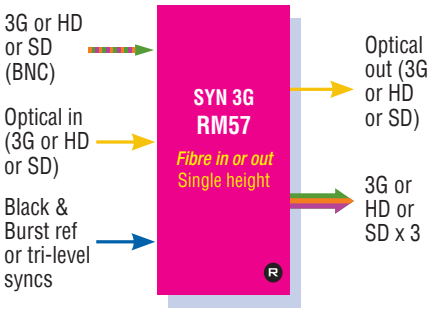
For standard applications



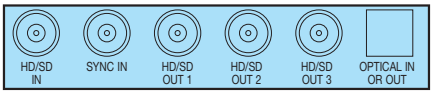


RM41

For fibre applications

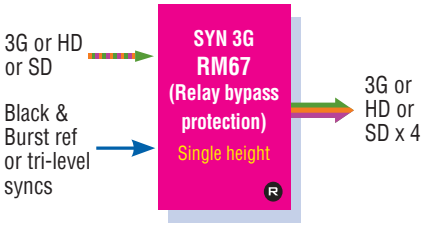


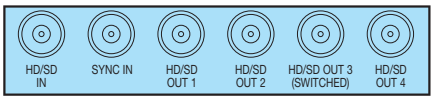
NB. Choose between fibre in or fibre out by selecting FIP or FOP fibre option



RM57

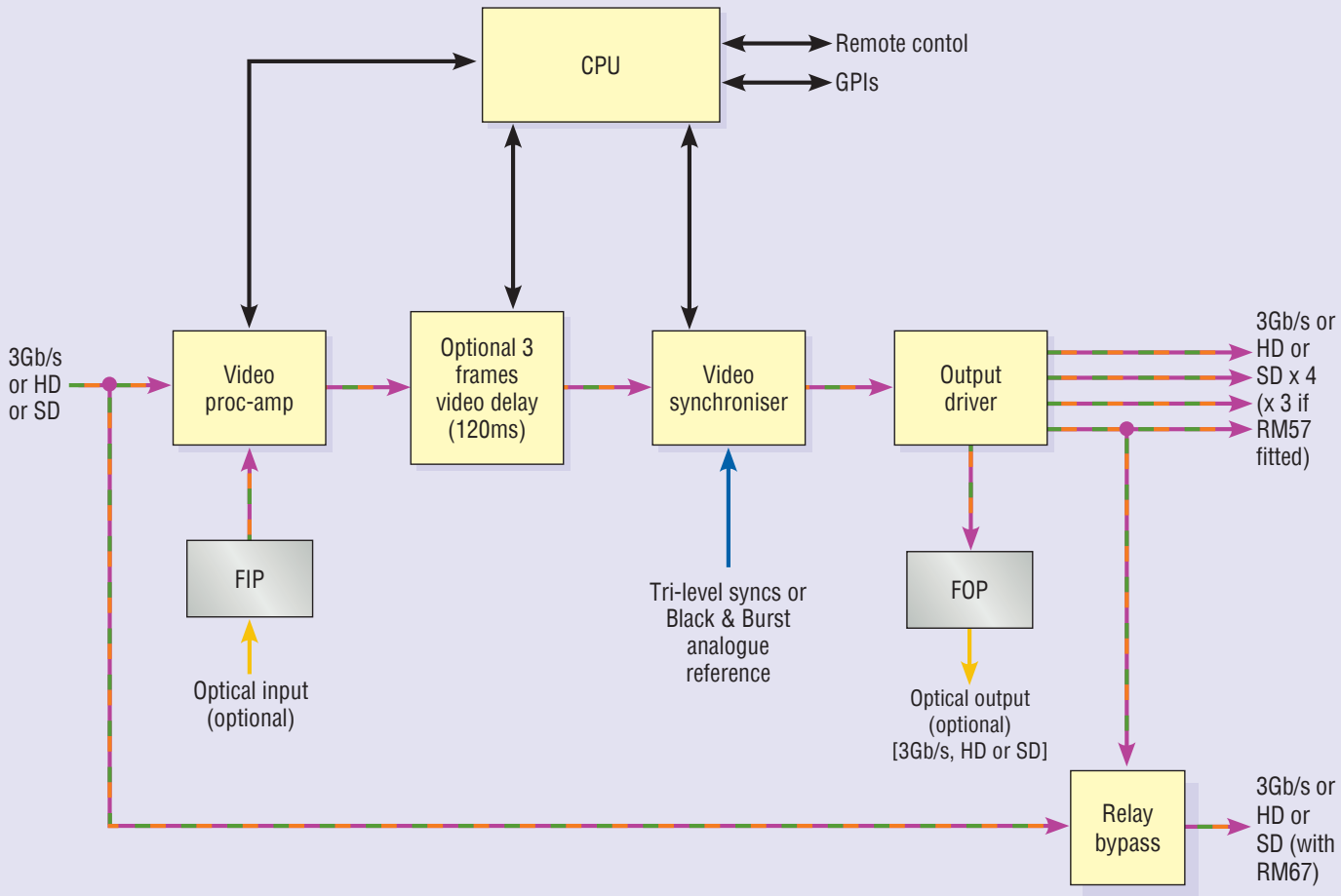
For relay bypass applications





RM67

THE INPUTS AND OUTPUTS



SPECIFICATION

MECHANICAL

Standard Crystal Vision module 266mm x 100mm

Weight: 200g

Power consumption: 9 Watts; 0.6 Watts (FIP and FOP)

VIDEO INPUT

One 3Gb/s or HD or SD input

When using FIP fibre input option allows selection between one optical and one electrical input

270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A

The video formats supported are 625, 525, 720p50, 720p59.94, 1080i50, 1080i59.94, 1080p50 and 1080p59.94

3Gb/s cable equalisation up to 80m using Belden 1694A. HD cable equalisation up to 140m with Belden 1694A or equivalent (approx. 100m with Belden 8281). SD cable equalisation >250m Belden 8281 or equivalent

Input return loss: -15dB for 50MHz to 1.5GHz

May contain embedded audio when input and output frequencies are locked

VIDEO OUTPUTS

Using RM41 rear module: Four 3Gb/s, HD or SD outputs

Using RM57 rear module with FIP fibre input option: Three 3Gb/s, HD or SD outputs

Using RM57 rear module with FOP fibre output option: Four 3Gb/s, HD or SD outputs (one on fibre and three on BNC)

Using RM67 rear module: Four 3Gb/s, HD or SD outputs

The RM67 frame rear module provides relay bypass protection. An electromechanical relay switch needs power to hold the switch in one state and will revert to the other state (board bypass) on loss of power. It prevents signal loss by mechanically connecting the input of the SYN 3G to one of its outputs on complete frame power failure or board removal

Serial output: 270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A. Output usually follows the input format

With or without an input present, the output format can be forced to any of the formats handled by SYN 3G and give either a 100% colour bars, black or blue output

INTEGRATED FIBRE OPTIONS

SYN 3G can be given integrated fibre connectivity by fitting the FIP fibre input option or FOP fibre output option

The chosen option should be fitted at the factory

To access the optical inputs or outputs an RM57 frame rear module must be used

When fitted with a FIP or FOP, SYN 3G can be housed in any frame slot position but due to its extra height it is not possible to place most Standard Definition or audio boards directly above it when the SYN 3G is in even numbered slot positions. 3Gb/s and HD boards do not share this restriction.

FIP and FOP meet the SMPTE 297-2006 short-haul specification, allowing operation with single-mode and multi-mode fibre

Connector type: SC/PC

FIP:

Optical wavelength: 1260-1620nm

Input level maximum: 0dBm

Input level minimum: Typical -20dBm (-18dBm 3Gb/s pathological)

FOP:

Optical power: Max 0dBm, min -5.0dBm

Fibre pigtail: Single-mode 9/125uM

Optical wavelength: 1290-1330nm (1310 typical)

Extinction ratio: 7.5dB

Laser safety classification: Class 1 FDA and IEC60825-1 Laser Safety compliant

CWDM laser can be fitted on request. The 18 output wavelengths defined by the ITU are 1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591 and 1611nm. For CWDM, order the FOP-CWDM and specify the wavelength required

ANALOGUE REFERENCE

Tri-level syncs or analogue Black and Burst or video

3Gb/s, HD or SD source can use either type of reference

When cross-locking it is necessary for both the video input and reference to share the same frame rate

Amplitude of syncs 150mV to 600mV

Link on PCB selects 75 ohm termination or high impedance

SYNCHRONISER TIMING ADJUSTMENTS

In synchroniser mode SYN 3G takes its timing from the external analogue reference and will automatically synchronise sources that are up to a frame apart. Further fixed delays can be added for matching purposes. Should the reference be removed, SYN 3G will revert to delay mode

In delay mode timing is derived from the 3Gb/s, HD or SD input, with the video delay adjusted in samples, lines and whole frame steps up to a maximum of four video frames

In both synchroniser and delay modes the timing can be fully adjusted using horizontal and vertical settings. Increasing the vertical setting will delay the output relative to the reference in increments of one line. Increasing the horizontal setting will increase this delay in increments of approx. 74ns for SD and 13.5ns for HD. With maximum adjustment of vertical and horizontal timing, the delay can be set between 220us and four frames

DELAY THROUGH BOARD

220us minimum

VIDEO DELAYS

0 to 1 frame video synchroniser delay

Optional one frame (33.3ms or 40ms), two frames (66.7ms or 80ms) or three frames (100ms or 120ms) video delay allows compensation for Dolby E encoding and decoding, or can match other big video delays in the system

FREEZE FUNCTIONS

Manual freeze allows SYN 3G to be used as a simple still store. Automatic freeze is available when input fails through loss of signal. The user can specify to show the last good frame or alternatively a black or blue screen or 100% colour bars (with or without an initial delay of three seconds).

VIDEO PROCESSING

Video proc-amp for picture optimisation, with independent lift and gain adjustment for RGB and YUV:

RGB lift: Offset the colour component by +/- 10%

RGB gain: Modify the gain of the colour component from +80% to +120%

Y lift: Offset the luminance component by +/- 10%

Y gain: Modify the luminance gain from +80% to +120%

U/V lift: Offset the U or V component by +/- 10%

U/V gain: Modify the U or V component gain from +80% to +120%

ANCILLARY DATA

Ancillary data passed

LED INDICATION OF:

Power supplies okay

Video input HD/SD

GPI output 5 active

GPI output 6 active

External reference connected

PRESETS

The current board settings can be saved in one of 16 locations to be recalled as required

GPI INPUT LEVELS

Active: pull to ground, pulled up to +5V through 10 kohm

GPI OUTPUT LEVELS

Electrically: Open collector transistors 30V, 270 ohm current limit resistors. Pulled up to +5V through 6800 ohm

GPI INPUTS

Four GPI inputs can be used to recall stored presets, either level or pulse triggered

GPI OUTPUTS

Two GPI outputs (GPI 5 and GPI 6) are reserved for alarm indication. They may be assigned any number of four video alarms:

Video missing

Reference missing

Video black

Video frozen

Video missing and reference missing will assert an alarm immediately. The video black and video frozen alarms can be delayed by up to 40 seconds before an alarm is asserted

REMOTE CONTROL

Control from integrated control panel on Indigo 1AE-DP frame

Control from VisionPanel 3U remote panel

VisionWeb Control is available via the web server on the frame and allows operation using a standard web browser on a PC or tablet

Statesman Lite allows control from any PC on a network

SBB-4 smart button box connects to the frame via Ethernet and provides four programmable LCD switches (which are configured for each order). The SBB-4 uses information from VisionWeb for settings. Uses Power over Ethernet so must be used with PoE enabled switch

SNMP monitoring and control available as a frame option

Control using ASCII and JSON protocols

ORDERING INFORMATION

SYN 3G	3G/HD/SD video synchroniser
FIP	Fibre input option for SYN 3G motherboard providing integrated fibre input connectivity
FOP	Fibre output option for SYN 3G motherboard providing integrated fibre output connectivity. For CWDM laser options, contact Crystal Vision
Indigo 2SE	2U frame with active front panel featuring smart CPU for up to 12 Crystal Vision modules
Indigo 1AE-DP	1U frame with active front panel featuring smart CPU and integrated control panel for up to six Crystal Vision modules, with included power supply redundancy
Indigo 1SE-DP	1U frame with active front panel featuring smart CPU for up to six Crystal Vision modules, with included power supply redundancy
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
RM41	Single slot frame rear module. Allows maximum number of SYN 3G in frame (12 in 2U, six in 1U, two in desk top box). Gives access to one 3Gb/s, HD or SD input and four 3Gb/s, HD or SD outputs
RM57	Single slot frame rear module. Allows maximum number of SYN 3G in frame (12 in 2U, six in 1U, two in desk top box). Designed for applications using fibre inputs or outputs. When using fibre input, allows you to select between one fibre and one electrical 3Gb/s, HD or SD input, and gives access to three 3Gb/s, HD or SD outputs. When using fibre output, gives access to one 3Gb/s, HD or SD input and three 3Gb/s, HD or SD outputs, along with one copy of the output on fibre
RM67	Single slot frame rear module. Allows maximum number of SYN 3G in frame (12 in 2U, six in 1U, two in desk top box). Provides relay bypass protection of the input. Gives access to one 3Gb/s, HD or SD input and four 3Gb/s, HD or SD outputs
VisionPanel	3U Ethernet remote control panel with touch screen
SBB-4	Smart button box with four programmable LCD switches. It is powered by Power over Ethernet and therefore needs to be connected to a PoE enabled switch
VisionWeb Control	VisionWeb web browser control included within frame software
Statesman Lite	PC Control System
SNMP	SNMP monitoring and control

Crystal Vision

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