Crystal Vision

LKEY 3

3G/HD/SD linear keyer

LKEY 3 provides high quality keying of an externally-generated real-time graphic over a 3Gb/s, HD or SD video stream – with the ability to fit 12 linear keyers in 2U making it ideal for multi-channel keying applications. It works with 31 different video standards, allowing it to be used in a variety of applications, from live broadcast to post production.

Amongst LKEY 3's many features you'll find system timing functionality (with built-in video delay and frame synchronisers on each input), a choice of keying methods to suit your graphics, sophisticated masks with adjustable edge softness, relay bypass protection and the option to fade just the graphic or the whole programme.

LKEY 3 is Crystal Vision's most affordable and space-saving solution for the keying of external graphics.

- **Feature-packed linear keyer:** use it to add one externally-generated graphic to a video signal
- **Use it with any source:** works with 3Gb/s, HD and SD (31 video standards in total)
- **Generate the key in two different ways:** using either luminance of key signal (External Key mode) or luminance of Foreground graphic (Self Key mode)
- **Overrule the key signal:** use the internal masks to select just part of a key or to extend the key size
- **Get the effect you're looking for:** easy to adjust the opacity of the key for a semi-transparent effect
- **Flexible fading:** fade the keyed graphic in and out or fade the programme to black – either manually or as a timed transition
- **Correct any timing errors automatically:** includes a frame synchroniser on each input timed to an analogue reference
- **Offset the graphic generator's delay or compensate for other big system delays:** with ten frames of video delay adjustment
- **Protect your output:** relay bypass protection of the background programme (with RM73 rear module)
- **Save rack space:** 100mm x 266mm module allows 12 LKEY 3 in 2U (six in 1U and two in desk top box)
- **Flexible control:** select from front and remote panels, GPIs, SNMP, PC software or web browser

CHOOSE HOW YOU GENERATE THE KEY

LKEY 3 is a linear keyer designed for the keying of a logo, caption, scoreboard or any other externally-generated graphic over a 3Gb/s, HD or SD video stream. It's equally suited for use upstream or downstream of your mixer.

LKEY 3 allows the key to be generated in two different ways. External Key mode uses the luminance of a separate key signal to cut a hole in the Background programme and generally provides the highest quality result while allowing complete flexibility in the content of the keyed graphic, including permitting parts of the key to have varied video levels for a semi-transparent effect. The simpler Self Key mode uses the luminance of the Foreground graphic itself to decide where the keying occurs, meaning only one channel is required and it is not necessary to generate a separate key signal which is aligned in position and time with the graphic. LKEY 3 offers both additive and multiplicative linear keying, allowing you to choose a method to suit the graphics.

After the key is generated, fill video is inserted – usually the Foreground graphic or alternatively black or a colour produced by the internal matte generator. It is easy to alter how the key signal affects the output image – such as compensating for a key signal which does not have enough amplitude to force full keying or creating a semi-transparent effect for your graphic – by changing the key gain and offset using the Min Clip and Max Clip controls.

OVERRULE THE KEYING

LKEY 3 includes two internally-generated rectangular masks – adjustable in position and size – which can be used to overrule the key signal and prevent keying in particular areas of the picture by masking the visibility of either the Foreground or Background signal. The masks can be used either together or independently.

The Foreground mask is used to select only part of a key by overriding the other keys to force the Background programme signal. The Background mask is used to extend the key size by overriding the other keys to force the Foreground signal. The masks can alternatively be inverted to force keying to only occur *outside* a given area. Adjustable edge softness is useful for blending between masked and unmasked areas for a more natural-looking mask edge. The masks can additionally be used to provide a simple manual wipe.

The External Key signal can also be enabled as an External mask, to force the Background through a Self Key.

FLEXIBLE FADING

The keyed graphic can be faded in and out, either manually or as a timed transition lasting up to 100 video frames, using the Fade Keys control. These fade controls additionally provide another way to display the graphic with a semi-transparent effect.

LKEY 3 can also be used to fade the complete programme to black if required.

CORRECT ANY TIMING ERRORS AUTOMATICALLY

Any timing errors will be automatically corrected by the frame synchroniser on each input – synchronising sources up to one frame apart for easy system timing. Reference timing can be selected to come from the Foreground, Background or Key input or from SD Black and Burst or HD tri-level syncs.

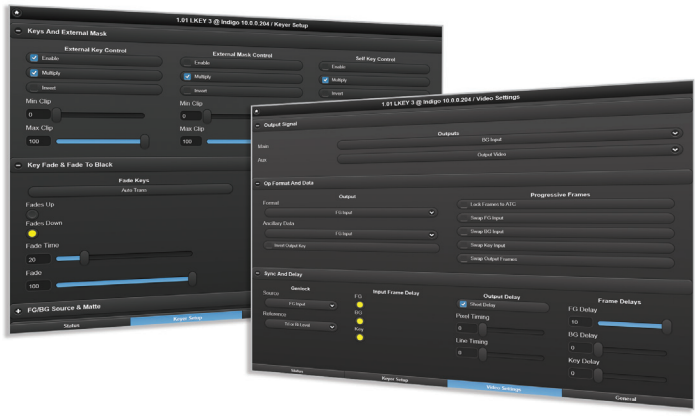
GET BUILT-IN VIDEO DELAY

LKEY 3 also includes an additional ten frames of video delay on each input, ideal for aligning system processing delays which are greater than a frame – for example, the fill and key coming from a graphics machine may arrive several frames later than the background programme video. The delay is adjustable in one frame steps.

SELECT YOUR OUTPUT AUDIO

LKEY 3 is easy to use in a system with embedded audio. The audio selected for embedding into the output video can be taken from any of the inputs, either from the Foreground, Background or External Key. Alternatively all ancillary data including embedded audio can be blanked.

POWERFUL CONTROL



VisionWeb

LKEY 3 can be controlled in many different ways to suit all preferences. Options include an integrated control panel on the front of the AE frame, the VisionPanel remote control panel or the SBB-4 smart button box. LKEY 3 can also be controlled using SNMP, our ASCII and JSON protocols, the Statesman Lite PC software or the VisionWeb Control web browser software.

LKEY 3 additionally features flexible GPI control, with dedicated GPI inputs assigned to fading the key on and off, to fading the programme to black and to recalling up to four of the 40 available presets, with these presets useful for storing settings such as lift, gain and fade time for a graphic.

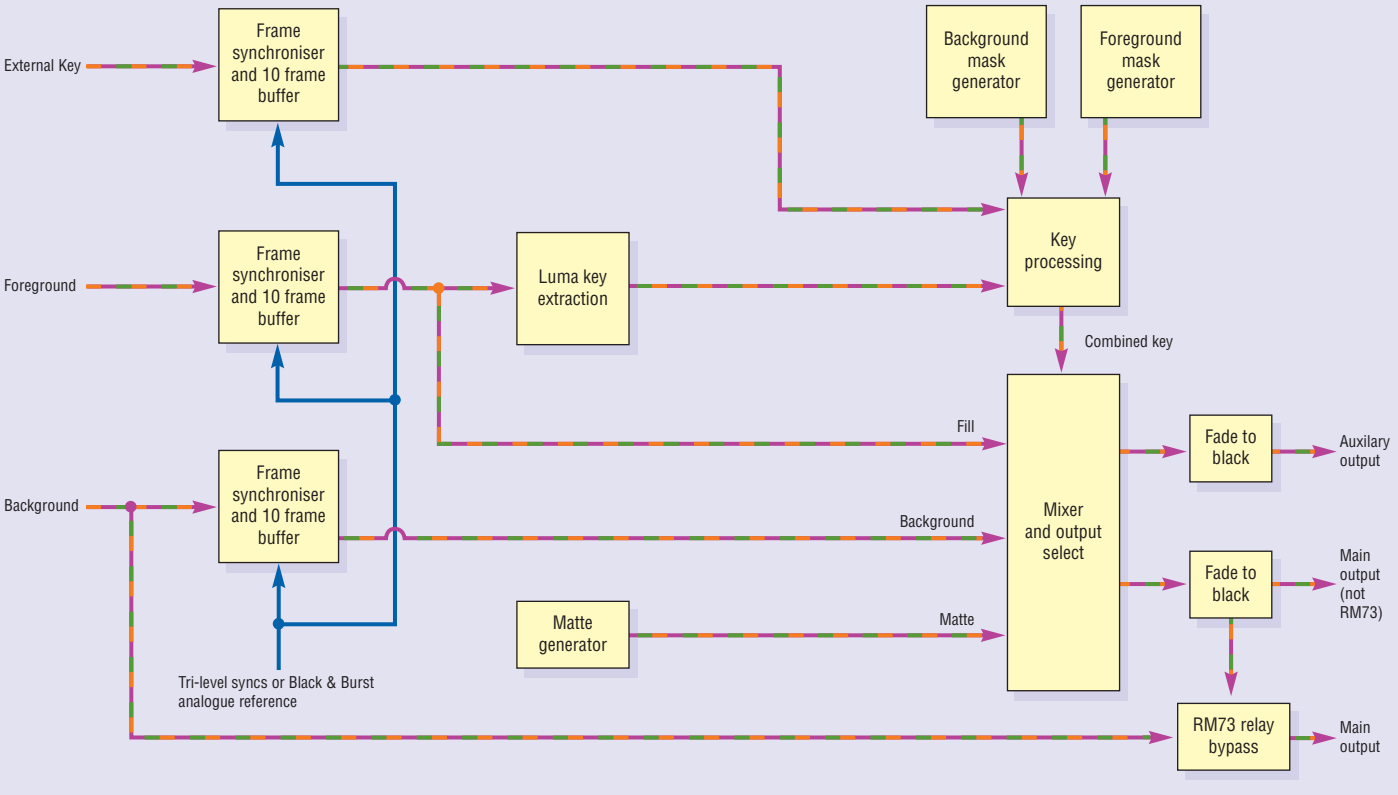
SAVE RACK SPACE – AND PROTECT YOUR OUTPUT

LKEY 3 is a 100mm x 266mm board which fits in the Indigo frames (available in 2U, 1U and desk top box sizes) and saves you rack space by allowing up to 12 linear keyers to be housed in 2U – making it ideal for multi-channel keying applications.

The Foreground, Background and Key inputs and one main output and one auxiliary output are accessed by using either the RM50 or RM73 frame rear modules. The main and auxiliary outputs can independently show the video sources, the key, the Foreground matte colour or the combined picture.

The RM73 rear module provides useful relay bypass protection of the Background programme feed on power failure or board malfunction or removal.

THE INPUTS AND OUTPUTS



SPECIFICATION

MECHANICAL
Standard Crystal Vision module 266mm x 100mm
Weight: 200g
Power consumption: 12 Watts

VIDEO INPUTS
Three 3Gb/s, HD or SD inputs (Foreground, Background and Key)
270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Works with the following video standards: 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30, 1080p50, 1080p59.94, 1080p60, 1080PsF23.98, 1080PsF24, 1080PsF25, 1080PsF29.97, 1080PsF30, 720p50, 720p59.94, 720p60, 1080i50, 1080i59.94, 1080i60, 2048x1080p23.98*, 2048x1080p24*, 2048x1080p25*, 2048x1080p29.97*, 2048x1080p30*, 2048x1080PsF23.98*, 2048x1080PsF24*, 2048x1080PsF25*, 2048x1080PsF29.97*, 2048x1080PsF30*, 625i and 525i (*= YUV 4:2:2 10 bit)
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 >200m Belden 8281 or equivalent
Input return loss: -15dB for 50MHz to 1.5GHz

VIDEO OUTPUTS
One main output and one auxiliary output accessed by using RM50 or RM73 frame rear modules. Relay bypass protection of Background with RM73
270Mb/s or 1.5Gb/s or 3Gb/s serial compliant to SMPTE 259, SMPTE 292-1 and SMPTE 424/425-A
Output frame rate same as input frame rate
Both main and auxiliary outputs can be used to show Output Video, Output Key, Foreground Input, Background Input, Key Input and Foreground Matte

DELAY THROUGH BOARD
SD: 85us min
HD: 18us min
3Gb/s: 10us min
Maximum delay of ten frames user adjustable delay, plus up to a frame of synchroniser delay

TIMING ADJUSTMENTS
Reference timing can be selected to come from Foreground, Background or Key input or from SD Black and Burst or HD tri-level syncs.
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
A frame synchroniser on each input will automatically synchronise sources up to one frame apart in timing for automatic correction of any timing errors
Amplitude of syncs 150mV to 600mV
Link on PCB selects 75 ohm termination or high impedance
Optional ten frames of video delay on each input, adjustable in one frame steps, allows compensation for any big system delays

KEYING MODES
External Key mode uses luminance of a key signal to key graphic over the Background, while Self Key mode uses luminance value in the Foreground graphic
Key processing can be additive or multiplicative. Additive keying is only required with some caption generators where the Foreground is already processed
External Key controls: Enable, Multiply/Additive, Invert, Min Clip, Max Clip
Self Key controls: Enable, Multiply/Additive, Invert, Min Clip, Max Clip
The key can be made to have a semi-transparent effect by using areas of grey in the external key signal, by using the Min and Max Clip controls or by using the fade controls

INTERNAL MATTE GENERATOR
The Foreground and Background source can be replaced with black or a colour produced by an internal matte generator

INTERNAL MASK GENERATOR
Two internal masks available (Foreground and Background) which can be turned on or off, inverted to force keying outside an area and adjusted in position and size. Masks have edge softness controls to prevent hard edge on mask, with each edge individually selectable
Foreground mask is used to select only part of a key by forcing the Background signal
Background mask is used to extend the key size by forcing the Foreground signal
Foreground and Background mask controls: Enable, Invert, Mask Window: Left/Right/Top/Bottom edges adjustable from 0 to 100% (to set mask size and position), Mask Softness: Left/Right/Top/Bottom edges adjustable from 0 to 100%
The External Key signal can also be enabled as an External Mask, to force the Background through a Self Key. Controls are: Enable, Multiply/Additive, Invert, Min Clip, Max Clip
Masks can be used to provide simple manual wipe

FADES
Fade Keys control can be used to fade all enabled keys (External, Self) to show the Background input only. The key can be faded in or out, either manually or as a timed transition with fade time set to 0-100 video frames
Fade programme to black on main and auxiliary outputs, with fade time set to 0-100 video frames

MIX
Mix between Foreground and Background by pressing the Fade Keys auto transition button when no keys are enabled

EMBEDDED AUDIO
Embedded audio is taken from any chosen input, allowing selection of audio from either the Foreground, Background or External Key input to output with the final video
All ancillary data including embedded audio can be blanked

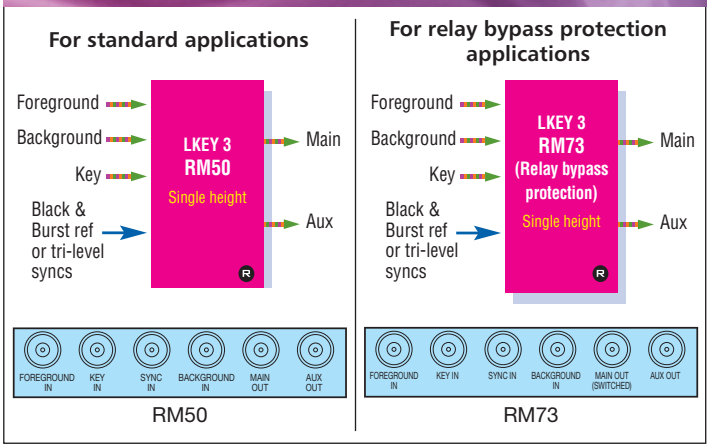
PRESETS
The current board settings can be saved in one of 40 locations to be recalled as required

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

GPI INPUTS
Six GPI inputs
Two are used for Key Fade with status tally
Two are used for Fade to Black with status tally
Two are used for the recall of up to four presets

REMOTE CONTROL
Software:
VisionWeb Control is available via the web server on the frame and allows operation using a standard web browser on a computer, tablet or phone
Statesman Lite allows control from any PC on a network
SNMP monitoring and control available as a frame option
Control using ASCII and JSON protocols
Hardware:
Control from integrated control panel on Indigo 1AE-DP frame
Control from VisionPanel 3U remote panel
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

REAR MODULE CONNECTIONS



ORDERING INFORMATION

LKEY 3	3G/HD/SD linear keyer
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
RM50	Single slot frame rear module. Allows maximum number of LKEY 3 in frame (12 in 2U, six in 1U, two in desk top box). Gives access to Foreground, Background and Key inputs with one main output and one auxiliary output
RM73	Single slot frame rear module. Allows maximum number of LKEY 3 in frame (12 in 2U, six in 1U, two in desk top box). Provides relay bypass protection of the Background. Gives access to Foreground, Background and Key inputs with one main output and one auxiliary output
VisionPanel	3U Ethernet remote control panel with touch screen
SBB-4	Smart button box with four programmable LCD switches. It is powered by PoE (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

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