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VIDEO MULTI SDI RASTERIZER

Low-Cost Multi SDI Rasterizer

RoHS

CE
Upon request

■ Squeeze Feature

Supports aspect ratios of 4:3, 16:9, and 15:9.

External Display

HD-SDI

SD-SDI

CINELITE II

LV 7330 MULTI SDI RASTERIZER

GENERAL

The LV 7330 is a highly functional, compact, light-weight SDI rasterizer that boasts exceptional cost performance.
When the LV 7330 is connected to an external XGA monitor, it can display the picture of an HD-SDI or SD-SDI signal in addition to video signal waveforms, vectors, audio data, and data analyses of the signal. The LV 7330 also comes standard-equipped with CINELITE II, a convenient tool for analyzing luminance data.

FEATURES

■ **SDI I/O**
The LV 7330 has two SDI input connectors that can be used for both HD-SDI and SD-SDI input. It also has an SDI output connector that you can use to send a reclocked SDI signal.

■ **DVI Output**
The various LV 7330 displays are transferred through a DVI-I connector to an XGA (1024 × 768) display. The LV 7330 also uses a squeeze method to support aspect ratios of **16:9 (1366 × 768) and 15:9 (1280 × 768)**.

■ **CINELITE II**
The LV 7330 comes standard-equipped with CINELITE II (CINELITE and CINEZONE), which is a video signal luminance information analysis tool.
With CINELITE, you can use the cursor to select any 3 points and display their f-Stop numbers, percentage values, and level values. You can choose to analyze a single pixel or a small area by setting the size of the measured area to 1 pixel or to the average value for 9 or 81 pixels.
With CINEZONE, you can display the luminance levels in the picture using different colors. This allows you to quickly determine the overall luminance distribution in the picture, and it makes it easy to spot overexposure, underexposure, and different luminance levels in dark areas.

■ **Picture Display**
The LV 7330 has a wide assortment of SDI signal picture display features including zoom, various safety markers, and brightness, contrast, and chroma adjustment. The LV 7330 also supports CEA/EIA-608 closed captioning and superimposition.

■ **Video Signal Waveform Display**
The LV 7330 uses fully digital waveform display processing to achieve high precision and quality. From video signal waveform display gain expansion, sweep expansion, and cursor measurement to pseudo-composite and RGB displays, the LV 7330 has all of the features that people look for in a waveform monitor. The LV 7330 is equipped with an external sync signal input and it can display video signal waveforms based on a tri-level sync signal or an NTSC or PAL black burst signal.

■ **Vector Display**
The LV 7330 can display component chrominance signal vectors. The amplitude can be manually zoomed, or set to a fixed magnification value such as five. The IQ axes, which are useful for vector observation, can be turned on and off.

■ **5 Bar Display**
The LV 7330 can display the peak levels of the Y, R, G, B and pseudo-composite signals.
This feature is useful for monitoring gamut errors.

■ **Audio Display**
The LV 7330 can extract the audio signal embedded in an SDI signal and display level meters, Lissajous curves, and surround-sound images for up to eight channels. The LV 7330 also supports external digital audio input, for which it can display a two-channel level meter and Lissajous curves. The level meter supports loudness metering and is useful for managing the volume level experienced by the listener.
* The resolution of SD-SDI audio quantization is up to 20 bits.

■ **Stereo Headphone Output**
The LV 7330 can extract the audio signal embedded in an SDI signal. You can select two channels from the extracted audio and transmit them in stereo through the headphone output connector.

■ **Status Display**
The status display has a number of advanced features, including SDI signal error detection and analysis features.

■ **Time Code Display**
The LV 7330 can decode SMPTE RP-188 time codes (LTC or VITC) and display them. These codes can be used as timestamps in the event log.

■ **Screen Capture**
The display can be captured. Captured displays can be viewed or superimposed over an input signal. Captured displays can be saved in internal memory (RAM) or USB memory or sent to a PC through an Ethernet connection as bitmap data.

■ **Presets Settings**
The LV 7330 can remember up to 30 frequently used setting configurations. The configurations can be recalled easily from the front panel or using commands sent through the Ethernet or remote connector.

■ **Remote Connector**
You can recall presets by sending commands through the remote connector. Also, a tally light can be displayed on the screen.

■ **Ethernet Connector (Future)**
From a PC connected to the LV 7330 through the Ethernet connector, you can recall presets, execute panel operations, transfer files, and monitor errors.

■ **Last Memory**
The LV 7330 backs up the current settings so that you can use the same settings that you were using before immediately after powering it up.

■ **Power Supply**
The LV 7330 has an XLR DC input connector and runs on a 12-VDC power supply.

SPECIFICATIONS LV 7330

Video Signal Formats and Corresponding Standards

Single Link System Video

Color System	Quantization	Format		Corresponding Standards
		Scanning	Frame(Field) Rate	
Y, C_B, C_R 4:2:2	10 bits	1080i	60/59.94/50	SMPTE 274M SMPTE 292M
		1080p	30/29.97/25/24/23.98	
		1080PsF	30/29.97/25/24/23.98	SMPTE RP211 SMPTE 292M
		720p	60/59.94/50/ 30/29.97/25/24/23.98	SMPTE 296M SMPTE 292M
		525i	59.94	SMPTE 259M
		625i	50	

(only link A is supported for dual link)

Color System	Quantization	Format		Corresponding Standard
		Scanning	Frame(Field) Frequency	
GBR 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	SMPTE 372M (1920x1080)
		1080PsF	30/29.97/25/24/23.98	
		1080i	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF	30/29.97/25/24/23.98	
		1080i	60/59.94/50	
Y, C_B, C_R 4:2:2	10 bits	1080p	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF	30/29.97/25/24/23.98	
		1080i	60/59.94/50	

Format Setting: Can be set automatically based on the corresponding format or set manually (Set manually for dual link)

Supported Sampling Frequencies: HD:74.25 MHz or 74.25/1.001 MHz
SD:13.5 MHz

External Sync: Automatically set from the corresponding format

Audio Playback

Compliant Standard: HD:SMPTE-299M, SD:SMPTE-272M

Sampling Frequency: 48 kHz (must be synchronized to the video signal)

Quantization: HD:24 bits, SD:20 bits

Synchronization: All audio channels must be synchronized to the video clock.

Channel Separation: 2 groups of 8 channels are selectable.

Input/Output Connectors

SDI Input

Input Connector: 2 BNC connectors (A/B switching)

Input Impedance: 75 Ω

Input Return Loss: ≥15 dB for 5 MHz to the serial clock frequency

Maximum Input Voltage: ±2V (DC + peak AC)

External Reference Input*

Input Signal: Tri-level sync or NTSC/PAL black burst signal

Input Connector: 1 pair of BNC connectors loop-through

* If the video signal waveform or phase difference is displayed using an external sync signal as reference, the waveform phase one clock before or after an SDI signal is inserted or the power is turned on is indefinite.

AES/EBU Input

Input Connector: 1 BNC connector

Supported Formats: IEC 60958

Sampling Frequency: 48 kHz

SDI Output

Output Connector: 1 BNC connector
Reclocks and transmits the selected SDI input signal

Output Impedance: 75 Ω

Output Voltage: 800 mVp-p ± 10 %

Headphone Output

Output Signal: The LV 7330 extracts and transmits the audio signal embedded in an SDI signal.(Must be synchronized to the video signal.)

Output Connector: One 6.3-mm (1/4 in.) stereo jack

Volume Adjustment: Configured in the menu

Impedance: 32 Ω (16 to 600 Ω)

Control Connectors

USB Connector

Function: Used to save screen captures, event logs, preset data, and data dumps

Specifications: USB 2.0

Media: Only USB memory devices are supported.

Remote Connector

Function: Used to recall presets, display a tally light, and switch input channels (A/B)

Control Signal: TTL level (active-low logic)

Control Connector: 15-pin D-sub (female)

Ethernet (Future)

Function: Used to control the LV 7330 from a PC and monitor errors and other events

Compliant Standard: IEEE802.3

Input/Output Connectors: 1 RJ-45 connector

Type: 10Base-T/100Base-TX (automatic switching)

Display Form

1 Screen Display: Picture display, CINELITE display, CINEZONE display, video signal waveform display, vector display, status display, or audio display

2 Screen Display: Picture display and video signal waveform display
Video signal waveform display and vector display
Video signal waveform display and picture display
Video signal waveform display and audio level display
Audio waveform display and level meter display

4 Screen Display: Select audio level display or status display in addition to video signal waveform display, vectorscope display, and picture display

Format Display: Displays the video signal format at the top of the screen.

Color System Display: Displays the video signal color system at the top of the screen.

Date Display: Displays the date according to the internal clock at the top of the screen

Time or Time Code Display: Displays the time according to the internal clock or a time code at the top of the screen

Screen Capture

Function: Captures the screen

Display: Displays the captured image or superimposes the captured image over the input signal

Media: Internal memory (RAM) and USB memory
Only one screen capture can be stored in the internal memory.

Data Output: Screen captures can be saved as bitmap files or in a file format that the LV 7330 can load.
They can be saved to USB memory or transmitted through an Ethernet and saved on a PC.

Data Input: Data saved to USB memory can be loaded and displayed on the LV 7330.

Presets Settings

Number of Presets: 30

Recall Method: Front panel or remote connector or Ethernet command (The number of presets recalled from the remote connector can be 8 or 30.)

Copying: Preset configurations can be copied as a group to or from USB memory.

Video Signal Waveform Display

Waveform Operations

Display Modes

Overlay: Overlays component signals.

Parade: Displays component signals side by side.

Timing: Computes and displays Y-C_B and Y-C_R.
Uses a bowtie signal.

Blanking Period: Show or hide

RGB Conversion: Converts a Y,C_B,C_R signal into an RGB signal and displays the result.

Pseudo-Composite Display: Artificially converts component signals into composite signals and displays the result.

*ETHERNET will be supported in the future.

Channel Assignment: In RGB conversion display, the order can be set to GBR order or RGB order.
Line Select: Displays the selected line.
Sweep Modes: H and V

Vertical Axis
Gain: ×1 or ×5
Variable Gain: ×0.2 to ×2.0
Amplitude Accuracy: ±0.5 %
HD Frequency Characteristics
Y Signal: ±0.5 % for 1 to 30 MHz
C_B,C_R Signals: ±0.5 % for 0.5 to 15 MHz
Low-Pass Attenuation: ≥ 20 dB (at 20 MHz)
SD Frequency Characteristics
Y Signal: ±0.5 % for 1 to 5.75 MHz
C_B,C_R Signals: ±0.5 % for 0.5 to 2.75 MHz
Low-Pass Attenuation: ≥ 20 dB (at 3.8 MHz)

Horizontal Axis
Line Display: ×1, ×10, ×20, ACTIVE, or BLANK
Field Display: ×1, ×20, or ×40

Cursor Measurement
Composition
Horizontal Cursors: 2 (REF and DELTA)
Vertical Cursors: 2 (REF and DELTA)
Amplitude Measurement: %, or V
Time Measurement: usec/msec
Frequency Display: Computes and displays the frequency with the length of one period set to the time between two cursors.

Scale
Type: %, or V
75 % Marker: Displays where the location of the peak of a 75 % color bar chrominance signal would be.
Display Colors: 7 colors to choose from

Vector Display

Gain: ×1, ×5, or IQ-MAG
Variable Gain: ×0.2 to ×2.0
Amplitude Accuracy: ±0.5 %
Blanking Period: Masked

Scale
Type: 75 % or 100 % (color bar)
IQ Axis: Show or hide
Display Colors: 7 colors to choose from
Line Select: Displays the selected line
Pseudo-Composite: Artificially converts component signals into composite signals and displays the result.

5 Bar Display

Function: Displays five peak levels: those of the Y, R, G, B and composite signals.
Error Level: Based on gamut error level and composite gamut error level settings.
Filter: Removes transient errors
(The filter characteristics are the same as for gamut errors.)
Line Select: Displays the selected line

Phase Difference Display

Display: Displays the phase difference between an SDI signal and the external sync signal both numerically and graphically.

Display Range
Vertical: ±1 field (for interlace)
±1/2 frame (for progressive)
Horizontal*: ±1 line

* If the video signal waveform is displayed using an external sync signal as a reference, the waveform phase one clock before or after an SDI signal is inserted or the power is turned on is indefinite.

Picture Display

Image Quality Adjustment: Brightness, contrast, chroma level, and aperture
Display Sizes: FIT, ×1, or ×2 (HD)
FIT ×2 (SD)
Color Selection: Color or monochrome
Frame Rate: The frame rate is converted and displayed using the internal sync signal.

Marker Displays
Center Marker
Aspect Markers
HD: 4:3, 14:9, 13:9, 2.35:1, 1.85:1, and 1.66:1
SD: 16:9, 14:9, 13:9, 2.35:1, 1.85:1, and 1.66:1
Safe Action Markers: 95 %, 93 %, and 90 %
Safe Title Markers: 88 % and 80 %
Line Select: Marks the selected line

CINELITE Display

Function: f-Stop display, percentage display, and level display
f-Stop Display: Displays the f value relative to the reference point
The reference point is set to the value of an object with a reflection level of 18 %.

f-Stop Gamma Correction
Reference Gamma: 0.45 (ITU-R BT709)
User-Defined Correction Tables: 3
External Correction Tables: 5 (read from USB memory)
Percentage Display: Displays luminance or RGB components as percentages.
Level Display: Displays luminance or RGB components with 256 levels (8 bits).
Measured points: 3
Measurement sizes: 1 pixel, 3 × 3 pixels, or 9 × 9 pixels

CINEZONE Display

Function: Displays the luminance levels in the picture using different colors
Display Colors: Linear (1024 colors) or step (12 colors)
Upper Limit Setting: -6.3 to 109.4 % (values above the upper limit are displayed using white)
Lower Limit Setting: -7.3 to 108.4 % (values below the lower limit are displayed using black)
Level Search Display: Displays a specified luminance level ±0.5 % using green on an otherwise monochrome picture display.
Luminance Level Setting: -7.3 to 109.4 %

Embedded Audio Display

Lissajous Display
Displayed Channels: 2 channels or 8 channels (only for embedded audio)
Display Mode: X-Y or MATRIX

Sound Image Display
Channel Mapping: L, R, C, LFE, Ls(s), Rs, LL, RR
Surround Formats: 3-1, 3-2, 3-2-2

Level Meter Display
Displayed Channels: 8ch / 2ch
Meter: 60 dB peak level, 90 dB peak level, average, or loudness
Peak Hold Time: 0.5 to 5.0 seconds/HOLD (when displaying the peak level)

Channels
Group Selection: You can select any 2 groups from groups 1, 2, 3, and 4.
Audio Information: Detects the presence of each audio channel
Sampling Frequency: 48 kHz (must be synchronized to the video signal)

* The LV 7330 cannot display Lissajous curves, 8-channel level meters, or sound images for AES/EBU signals that it receives.

Status Display

SDI Signal Error Detection
Signal Detection: Detects the presence of an SDI signal
TRS Error: Detects TRS location and protection bit errors
Line Number Error: Detects HD-SDI signal line number errors
CRC Error: Detects HD-SDI signal transmission errors
EDH Error: Detects SD-SDI signal transmission errors
Gamut Error: Detects gamut errors
Detection Range Upper Limit: 90.8 to 109.4 % (0.1 % step)
Detection Range Lower Limit: -7.2 to 6.1 % (0.1 % step)
Filter: Removes transient errors
Low-pass (HD: 5 MHz LPF. SD: 1.8 MHz LPF)

Composite Gamut Error: Detects level errors that occur when component signals are converted to composite signals
- **Detection Range Upper Limit:** 90.0 to 135.0 % (0.1 % step)
- **Detection Range Lower Limit:** -40.0 to -20.0 % (0.1 % step)
- **Filter:** Removes transient errors
  Low-Pass (HD: 5 MHz. SD: 1.8 MHz)

Parity Error: Detects ancillary data header parity errors
Checksum Error: Detects ancillary data transmission errors
BCH Error: Detects errors in the transmission of the audio signal embedded in an HD-SDI signal
Audio CRC Error: Detects CRC errors in channel status bits
Audio Information Detection: Detects the presence of each audio channel
Error Count: Up to 100,000 errors
(Only the specified errors are counted.)
- **Count Period:** Only one error is counted for each second or frame.

Event Log Display
- **Recording Capacity:** Up to 1,000 events
- **Description:** Records all events from start to finish
- **Recorded Events:** Errors, changes in input type, time stamps, etc.
- **Data Output:** Event logs can be saved to USB memory or sent to a PC through an Ethernet connection as text data.

Data Dump Display
- **Display Modes:** Display data separated by serial data sequence or by channel
- **Line Select:** Displays the selected line
- **Sample Select:** Displays from the selected sample
- **Jump Feature:** Jumps to an EAV or SAV
- **Data Output:** Event logs can be saved to USB memory or sent to a PC through an Ethernet connection as text data.

Audio Status Display
- **Control Packets:** Analyzes and displays SDI signal audio control packets
- **Channel Status:** Analyzes and displays or displays the dump of the channel status of the embedded audio signal

EDH Display
- **EDH packets:** Analyzes and displays received EDH packets

Closed Caption Display
- **Compliant Standard:** ARIB STD-B37/CEA-608, ELA-708
- **Display Details:** Analyzes and displays the closed caption signal.

Inter-Stationary Control Data Display (NET-Q)
- **Compliant Standard:** ARIB STD-B39
- **Display Details:** Analyzes and displays inter-stationary control data

Data Broadcast Trigger Signal Display
- **Compliant Standard:** ARIB STD-B35

V-ANC User Data Display
- **Standard Supported:** ARIB TR-B23

Time Code Display
- **Corresponding Time Code:** Selects LTC or VITC SMPTE RP-188
- **Display Method:** Switches the display of internal clock, and the time code.

Front Panel
- **Key LEDs:** You can dimly light all of the keys by pressing the shortcut key.
- **Power Switch:** Turns the power on and off. If power is removed when the switch is on, the instrument will turn on when power is restored.
- **Last Memory:** Backs up the panel settings.

Environmental Conditions
- **Operating Temperature:** 0 to 40°C
- **Operating Humidity:** 85 %RH or less (no condensation)

Power Supply
- **Voltage:** 10 to 18 VDC
- **Power Consumption:** 18 W max.

Dimensions
215(W) × 44(H) × 250(D) mm
(excluding protruding parts)

Weight
1.3 kg

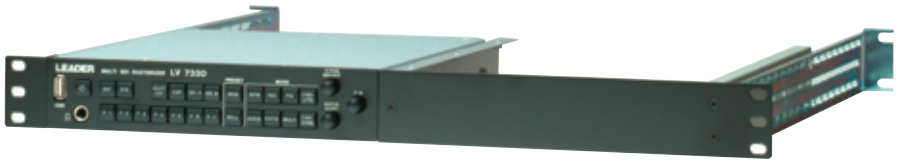
Accessories
- Instruction manual 1
- AC adapter (LP 1960) 1
- 15-pin D-sub connector 1
- 15-pin D-sub connector cover 1
- Ferrite core 1

*ETHERNET will be supported in the future.

LV 7330 Front Panel

LV 7330 Rear Panel

Rack Mounting



LR 2481 Rack Mount Adapter (sold separately)