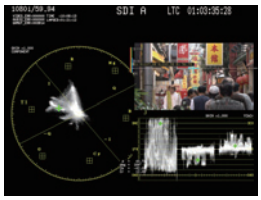
MULTI RASTERIZER

LV 7770 / LV 7770-01

LEADER

■ CINELITE Advanced Display



NEW

Synchronizes the markers on the vector display or waveform display to the measurement points of the CINELITE display's f Stop display or % display

External display

HD-SDI

SD-SDI

1U size

CINELITE II INSIDE

New

CE

Upon request

■ LV 7770 MULTI RASTERIZER

■ LV 7770-01 REMOTE CONTROLLER

Multi Rasterizer

The LV 7770 is a rasterizer that supports 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals.
It has a variety of features, including simultaneous monitoring of two SDI input signals, frame capturing, lip sync measurement, and ANC data analysis.

FEATURES

- **3G-SDI Compatible 2-Channel Simultaneous Display (LV 5770SER08 and LV 5770SER09)**
  The LV 7770 is equipped with a pair of SDI input connectors that support 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals. The two input signals can be displayed simultaneously. Even when one of the input signals is not being displayed, the LV 7770 still monitors the undisplayed signal for errors. In addition, the LV 7770 is equipped with SDI output connectors that can generate serial reclocked SDI signals from the input SDI signals. The A/B output connector generates the reclocked signal of the SDI signal applied to channel A or channel B. The output that is generated from this connector is switched between the two channels whenever an input key (A or B) is pressed.
- **Wide Variety of Display Formats (LV 5770SER08 and LV 5770SER09)**
  In the video signal waveform display, vector display, and picture display, the LV 7770 can display up to two input SDI signals on top of each other or side by side. This makes it suitable for adjusting the gain and black balance values of two video signals. In the video signal waveform and vector displays, the LV 7770 can make different input channels easier to see by displaying them using different colors.
- **Capture Feature**
  A screen capture feature that captures the screen as still images, a frame capture feature that captures single frames of SDI signals, and an error capture feature that automatically detects and captures error frames are available.
  Not only can captured data be displayed by the LV 7770, but it can also be compared with an input signal or saved to a USB memory device. It is easy to view the saved data on a PC.
- **XGA Resolution DVI-I Output**
  The measurement display has XGA resolution (an effective resolution of 1024 x768) and can be output from the DVI-I connector, which supports single-link TMDS. The aspect ratio can be switched between 4:3, 16:9, and 16:10. (The display must have a resolution conversion feature.)
- **Picture Monitor Output (LV 5770SER08 and LV 5770SER09)**
  The input SDI signal can be generated as an 8-bit signal. Regardless of the SDI input signal, the output format can be set to YC_BC_R 4:2:2, YC_BC_R 4:4:4, or RGB 4:4:4.
- **3D Assist Display (LV 5770SER08 and LV 5770SER09)**
  3D video signals can be evaluated by applying the video signal for the left eye to channel A and the video signal for the right eye to channel B. The available picture display formats are anaglyph, convergence, overlay, wipe, checker, and flicker.
- **Digital Audio I/O**
  An external digital audio signal can be displayed in addition to the embedded audio. The eight I/O channels of the four connectors can be switched between input and output. Therefore, the LV 7770 can also be used to extract and transmit the embedded audio's digital audio. Also, when the 16-channel digital audio I/O option (LV 7770 OP70) is installed in the LV 7770, the number of I/O connectors can be expanded to 8 connectors with 16 channels.(To measure embedded audio, the LV 7770 must have the LV 5770SER08 or LV 5770SER09 installed.)
- **With Loudness Measurement Function (for 2 Signals)**
- **Standard-Equipped CINELITE II / CINELITE Advanced**
  The CINELITE feature makes it easy to manage the levels of specific points on the picture display. This is useful for adjusting the gain of multiple cameras through the use of the same reference point. The CINEZONE feature makes it possible to check the luminance distribution of the whole picture display at a glance.
- **SDI Signal Data Analysis Feature (LV 5770SER08 and LV 5770SER09)**
  On the status display, SDI signal transmission errors and various errors related to the embedded audio signal and ancillary data can be detected. In addition, the LV 7770 has event log, data dump, and external sync signal and SDI signal phase difference display features for analyzing SDI signals. Ancillary data is displayed along with the embedded line numbers and numbers of the corresponding standards in a list. This makes it possible to display detailed analyses.
- **Timecode Display (LV 5770SER08 and LV 5770SER09)**
  The LTC and VITC that are embedded in an SDI signal and the D-VITC that is embedded in an SD-SDI signal can be displayed. The timecode can also be used for time stamps in the event log.
- **Superimposing of English Closed Captions (LV 5770SER08 and LV 5770SER09)**
  The English closed captions (EIA-608, EIA-708, or VBI) that are embedded in an SDI signal can be superimposed over the image on the picture screen.
- **External Control Connectors**
  The LV 7770 has two external control connectors: an Ethernet port and a remote control connector.
  By connecting the Ethernet interface to a PC, you can control the LV 7770 remotely over TELNET, transfer files over FTP, control the LV 7770 remotely and detect errors over SNMP, and control the LV 7770 over HTTP. You can also connect to the separately-sold LV 7770-01 (REMOTE CONTROLLER). (You cannot use TELNET and the LV 7770-01 at the same time.)
  The remote control connector can be used to load presets, switch the input signal, and transmit errors.

LV 5770SER08 SDI INPUT (Option)
SDI input(The LV 5770SER08 and LV 5770SER09 cannot be installed in the instrument at the same time.)

LV 5770SER09 SDI INPUT / EYE (Option)
In addition to the LV 5770SER08 features, eye patterns can also be displayed.(The eye pattern display can be used on one of the two input SDI signals that you select.)

LV 5770SER03A TRI SYNC / COMPOSITE NTSC/PAL (Option)
Tri-level sync and composite input.

LV 5770SER42 ANALOG AUDIO (Option)
Up to 8 channels of analog audio are supported.

LV 7770 OP70 16CH DIGITAL AUDIO ADAPTER (Option)
Up to 16 channels of digital audio are supported.

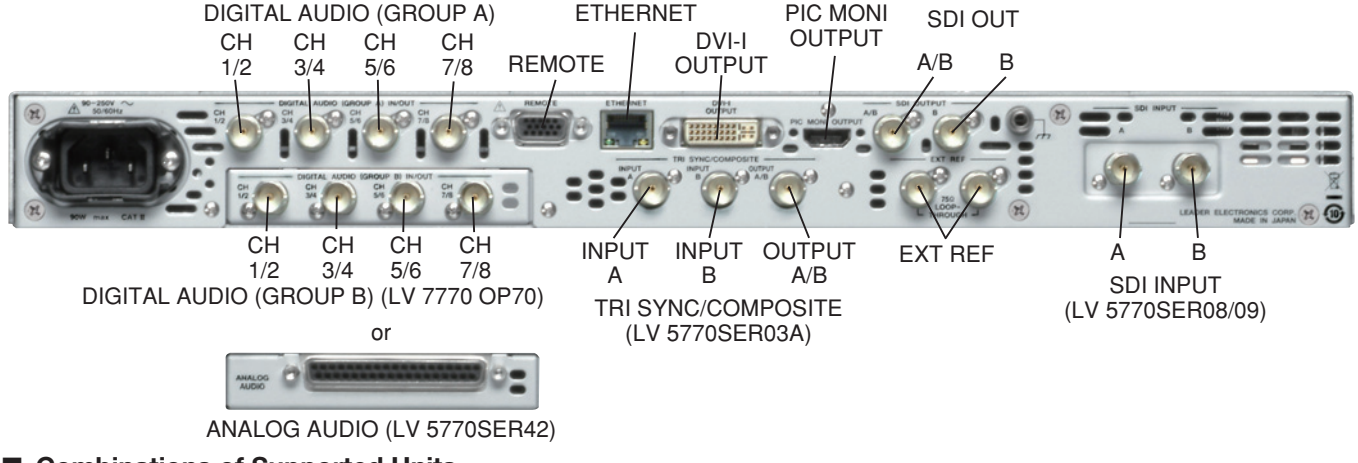
■ **Dolby Option**
The addition of the Dolby option enables the LV 7770 to decode and display the Dolby E or Dolby Digital signals that are compressed in embedded audio or digital audio signals.

(Dolby is a trademark of Dolby Laboratories)

Video Output Connectors	
DVI-I Output Connector	
Output Connector	One DVI-I connector
Output Signa	The measurement display is output as a digital signal
Resolution	XGA (1024 x 768)
Aspect Ratio *1	4:3, 16:9, 16:10
Signal Format	Single link TMDS, analog RGB
DDC	Not supported
HOT PLUG Detection	Not supported
Picture Monitor Output Connector (LV 5770SER08 and LV 5770SER09) *2	
Output Connector	1
Output Signa	Monitor output of the selected SDI input signal (channel A or B)
Signal Format	Single link TMDS
Color Space Conversion	YC_BC_R 4:2:2, YC_BC_R 4:4:4, RGB 4:4:4 (convertible between color spaces)
Quantization Conversion	8 bits, 10 bits, 12 bits
Audio *3	SDI embedded audio channels 1 to 8 embedded in the output signal (LPCM only) *1 The display must have a resolution conversion feature. *2 The following signals are not supported. 720p/24, 23.98,1080PsF/30, 29.97, 25, 24, 23.98, 1080p/24, 23.98 (2048x1080), 1080PsF /24, 23.98 (2048x1080) *3 The audio channel mapping is fixed.
Output	
DVI-I Output	
Output	Connector 1
Signal Format	Single link T.M.D.S Analog RGB
DDC	Not supported
HOT PLUG	Not supported
Pic Mon Output Connector (LV 5770SER08 and LV 5770SER09)	
Output Connector	1
Output Signal	Monitor output of the selected SDI input signal (channel A or B)
Signal Format	Single link TMDS
Color Space Conversion	YC_BC_R 4:2:2, YC_BC_R 4:4:4, RGB 4:4:4 (convertible between color spaces)
Quantization Conversion	8 bits, 10 bits, 12 bits
Audio	SDI embedded audio channels 1 to 8 embedded in the output signal (LPCM only)
Control Connectors	
USB Port	
Specification	USB 2.0
Supported Media	USB memory device
Function	Used to save captured data, event logs, preset data, data dumps, and loudness logs.
Ethernet Port	
Compliant Standard	IEEE802.3
Supported Protocol	TELNET, FTP, SNMP, HTTP, SNTP

I/O Connectors	RJ-45
Function	Remote control from an external PC or the LV 7770-01
Type	10Base-T, 100Base-TX
Remote Control Connector	
Function	Used to load preset settings, switch input channels, transmit the alarm signal, and start, stop, and clear the loudness measurement.
Control Signal	LV-TTL level (low active)
Input Voltage Range	0 to 5 VDC
Control Connector	15-pin D-sub (female)
Screen Capture	
Function	Captures the display
Display	Displays only the captured image or overlays the captured image over the input signal
Media	Internal memory (RAM) and USB memory
Data Output	Screen captures can be saved as bitmap files to USB memory, or they can be saved in a file format that the LV 7770 can load.
Format	TIF, DPX
Data Input	Data saved to USB memory can be loaded and displayed on the LV 7770.
Presets	
Presets *1	Saves the panel settings
Number of Presets	60
Preset Loading Method	Front panel, remote control connector *2, or ethernet
Copying	All preset data can be copied from the LV 7770 to a USB memory device or from a USB memory device to the LV 7770. *1 Settings related to whether the instrument is on or off, the ethernet connector, the remote control connector, the date, and the time are not saved. *2 The number of presets loaded from the remote control connector can be 8 (6 when loudness measurement is being controlled) or 60.
Environmental Conditions	
Operating Temperature	0 to 40 °C
Operating Humidity	85 %RH or less (no condensation)
Operating Environment	Indoor
Operating Altiude	Up to 2,000 m
Overvoltage Category	II
	90 to 250 VAC , 50/60 Hz, 90 W max.
Dimensions and Weight	426 (W) x 44 (H) x 460 (D) mm Approx. 5 kg 19 (W) x 1 3/4 (H) x 17 3/4 (D) inch, 11lbs.
Accessories	Power cord . . . . . 1 Cover/inlet stopper. . . . . 1 15-pin D-sub connector. . . . . 1 15-pin D-sub connector cover . . . . . 1 Instruction manual 1

■ REAR PANEL (LV 5770SER08, LV5770SER03A, LV 7770 OP70 for installation example)



■ Combinations of Supported Units

Option Name Number	Product Name	Combination Conditions										
		1	2	3	4	5	6	7	8	9	10	11
LV 5770SER03A	TRI SYNC/COMPOSITE						○	○	○	○	○	○
LV 5770SER08 / LV 5770SER09	SDI/EYE			○	○	○				○	○	○
LV 5770SER42	ANALOG AUDIO		○			○			○			○
LV 7770 OP70	16CH DIGITAL AUDIO ADAPTER	○			○			○			○	

LV 5770 / LV 7770 Platform Options

LEADER

LV 5770SER08 SDI INPUT/LV 5770SER09 SDI INPUT/EYE

FEATURES

- **Two-Channel Simultaneous Display**

  The LV 5770 is equipped with a pair of SDI input connectors that support 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals. The two input signals can be displayed simultaneously. Even when one of the input signals is not being displayed, the LV 5770 still monitors the undisplayed signal for errors. In addition, the LV 5770 is equipped with SDI output connectors that can generate serial reclocked SDI signals from the input SDI signals. The A/B output connector generates the reclocked signal of the SDI signal applied to channel A or channel B. The output that is generated from this connector is switched between the two channels whenever an input key (A or B) is pressed.

- **Rich Assortment of Display Features**

  Not only does the LV 5770 have essential displays for video signal quality monitoring, such as a video signal waveform display and a vectorscope display, it also has a rich assortment of other display features such as a picture display, 5-bar display, and status display.

- **Wide Variety of Display Formats**

  In the video signal waveform display, vectorscope display, and picture display, the LV 5770 can display up to two input SDI signals on top of each other or side by side. This makes it suitable for adjusting the gain and black balance values of two video signals. In the video signal waveform and vectorscope displays, the LV 5770 can make different input channels easier to see by displaying them using different colors.

- **Extremely Flexible Display Layouts (When optional units are installed)**

  The 1-screen display feature can be used to show each of the different displays on a single screen, or the 4-screen multi display feature can be used to divide the screen into four areas with a different display shown in each area. The video signal waveform display picture display audio level meter display, and histogram display can be shown on the 1-screen display.

- **Frame Capture and Screen Capture Features**

  The LV 5770 is equipped with a frame capture feature, which captures single frames of an SDI signal. Captured frame data can be displayed as still-image data on the video signal waveform, vectorscope, and picture displays. In addition, this data can be saved to a USB memory device.

  The LV 5770 is also equipped with a screen capture feature, which captures the entire display as still-image data.

- **Picture Monitor Output**

  The input SDI signal can be generated as an 8-bit signal. Regardless of the SDI input signal, the output format can be set to YC_BC_R4:2:2, YC_BC_R4:4:4, or RGB4:4:4. The signal can also be generated in 8 bits, 10 bits, or 12 bits.

- **SDI Signal Data Analysis Feature**

  On the status display, SDI signal transmission errors and various errors related to the embedded audio signal and ancillary data can be detected. The LV 5770 has event log, data dump, and external sync signal and SDI signal phase difference display features for analyzing SDI signals. Ancillary data can be displayed along with the embedded line numbers and numbers of the corresponding standards in a list. A variety of detailed ancillary data analyses can be displayed.

- **Timecode Display**

  The LV 5770 can display the LTC or VITC timecode that is embedded in an SDI signal and the D-VITC timecode of an SD-SDI signal. The timecode can also be used as the time stamp in the event log.

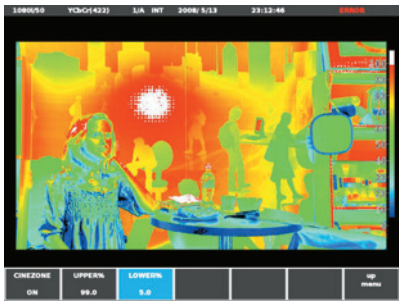
- **Superimposing Closed Caption Data**

  The closed caption data (EIA-608, EIA-708, VBI) that is embedded in an SDI signal can be superimposed on the picture display.

- **Standard-Equipped CINELITE II**

  The CINELITE feature makes it easy to manage the levels of specific points on the picture display. This is useful for adjusting thegain of multiple cameras through the use of the same reference-point. The CINEZONE feature makes it possible to check theluminance distribution of the whole picture display at a glance.

CINELITE Display



CINEZONE Display

- **3D Assist Option**

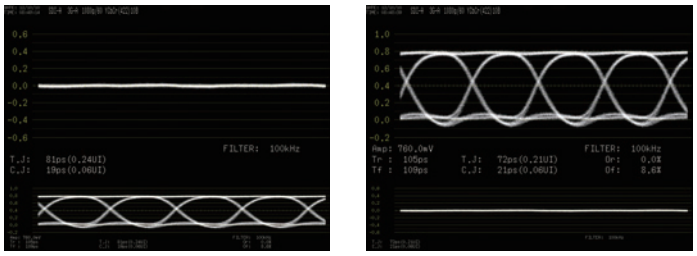
  3D video signals can be evaluated by applying the video signal forthe left eye to channel A and the video signal for the right eye tochannel B. The available picture display formats are anaglyph, con-vergence, overlay, and wipe.

LV 5770SER09

- **Eye Pattern and Jitter Measurement Display**

  The LV 5770 can display the eye pattern and jitter waveforms of 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals.

  An eye pattern's amplitude, rise time, fall time, timing jitter, current jitter, overshoot of the rising edge, and overshoot of the falling edge can be measured automatically.



Eye Pattern and Jitter Display (LV 5770SER09 installed)

SPECIFICATIONS

SDI Video Signal Formats and Standards

SD-SDI Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
Y,C_B,C_R 4:2:2	10 bit	525i	59.94	SMPTE ST 259
		625i	50	

HD-SDI Video Signal Formats and Standard

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10bit	1080i	60/59.94/50	SMPTE ST 274 SMPTE ST 292
		1080p	30/29.97/25/24/23.98	
		1080PsF	30/29.97/25/24/23.98	
		720p	60/59.94/50 30/29.97/25/24/23.98	SMPTE ST 296 SMPTE ST 292

HD Dual Link Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
Y,C_B,C_R 4:2:2	10 bit	1080p	60/59.94/50	SMPTE ST 372 (1920×1080)
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
Y,C_B,C_R 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080psF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 x 1080)
		1080psF		

* When these signals are displayed, phase differences of up to 100 clocks (approx. 1.4 µs) between links A and B are automatically corrected.
If links A and B are not synchronized, the various error detection features that are shown on the status display do not operate correctly.

3G-SDI Level A Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
Y,C_B,C_R 4:2:2	10 bit	1080p	60/59.94/50	SMPTE ST 424 SMPTE ST 425
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
Y,C_B,C_R 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		720p	60/59.94/50 30/29.97/25/24/23.98	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		720p	60/59.94/50 30/29.97/25/24/23.98	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080psF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 x 1080)
		1080psF		

3G-SDI Level B Dual-Link Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
Y,C_B,C_R 4:2:2	10 bit	1080p	60/59.94/50	SMPTE ST 424 SMPTE ST 425
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
Y,C_B,C_R 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bit	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bit	1080p	30/29.97/25/24/23.98	
		1080psF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 x 1080)
		1080psF		

3G-SDI Level B Dual Stream and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10bit	1080i	60/59.94/50	SMPTE ST 424 SMPTE ST 425
		1080p	30/29.97/25/24/23.98	
		1080PsF		
		720p	60/59.94/50 30/29.97/25/24/23.98	

Ancillary Data Standard SMPTE ST 291
Format Setting Automatic and manual
Automatic
3G-SDI and HD Dual Link The LV 5770 detects the format information within the payload ID (SMPTE ST 352) and automatically sets the format.
HD-SDI and SD-SDI The LV 5770 determines the format from the input signal's synchronization information and automatically sets the format.
Manual: The video signal format is set manually.

Embedded Audio Playback Method (When an LV 5770 SER41 is installed)
Standard Supported SMPTE ST 299 (HD-SDI, HD dual link, 3G-SDI) SMPTE ST 272 (SD-SDI)
Format LPCM, Dolby-E (factory option), Dolby-Digital (factory option)
Quantization 24 bits
Clock Generation Generated from the video clock
Synchronization All audio channels must be synchronized to the video clock.
In simul mode, channels A and B must be synchronized.
Channel Separation 2 groups—8 channels—can be selected (channels A and B can be mixed)

Input/Output Connectors
SDI Input
Input Connectors BNC connector 2 connectors
2 inputs (channels A and B) in HD-SDI, SD-SDI, and 3G-SDI modes
1 input (link A or B) in HD dual link mode
Input Impedance 75 Ω
Input Return Loss ≥ 15 dB (5 MHz to 1.485 GHz)
≥ 10 dB (1.485 to 2.97 GHz)
Maximum Input Voltage ±2 V (DC + peak AC)
SDI Output
Output Connectors BNC connector 2 connectors
Output Signal Serial reclocked input SDI signal
1 output (switchable between channels A and B) in HD-SDI, SD-SDI, and 3G-SDI modes
1 output fixed to channel B
1 output (link A or B) in HD dual link mode
Output Impedance 75 Ω
Output Voltage 800 mVp-p ± 10 % (into 75 Ω)
Output Return Loss ≥ 15 dB (5 MHz to 1.485 GHz)
≥ 10 dB (1.485 to 2.97 GHz)

External Sync Signal Input Connectors
Input Connectors 1 pair of BNC connectors
Input Signal Tri-level sync or NTSC/PAL black burst signal
Input Impedance 15 kΩ passive loop-through
Maximum Input Voltage ±5 V (DC + peak AC)
* If the video signal waveform is displayed using an external sync signal as the reference, inserting or removing an SDI signal or restarting the

LV 5770 / LV 7770 Platform Options

	device may cause the waveform phase to be off by one clock.
Main Display Features	
Input	SDI input
Input Mode	Single input mode and simul mode (Only single input mode is available for HD dual link signals or when the composite option is installed.)
Single Input Mode	Displays a single input signal
Simul Mode	Displays up to two input SDI signals simultaneously
3G-SDI 2 Mapping Mode	Splits a 3G-SDI signal into two HD-SDI signals and displays them simultaneously
Simul Mode Display Format	Mixed, tiled, aligned (differs depending on the displayed contents)
3G-SDI 2 Mapping Mode Display Format	
	The same as the simul mode display format
Mixed Display	Two input signals are displayed on top of each other.
Tiled Display	Two input signals are displayed in separate areas.
Aligned Display	Two input signals are displayed side by side.
Display Size	1-screen display, 2-screen display, 4-screen display
1-Screen Display	Displays a single, large screen (the thumbnail display can be turned on and off)
2-Screen Display	Splits the display into two screens (left and right)
4-Screen Display	Splits the display into four screens
Waveform Display	
Simul Mode Display Format	Mixed, aligned
Waveform Operations	
Display Mode	
Overlay	Displays component signals overlaid
Parade	Displays component signals side by side
Blanking Interval	H and V blanking periods can be masked.
RGB Conversion	Converts a Y,CB,CR signal into an RGB signal and displays the result
Pseudo-Composite Display	Digitally converts component signals into composite signals and displays the result
Channel Mapping	On the RGB conversion display, the order can be set to GBR order or RGB order.
Line Select	Displays the selected line
Display Colors	Seven colors to choose from; a different color for each input channel
Vertical Axis	
Gain	x1 or x5
Variable Gain	x0.2 to x2.0
Amplitude Accuracy	±0.5 %
HD-SDI	
Y Signal	±0.5 % for 1 to 30 MHz
C_BC_R Signal	±0.5 % for 0.5 to 15 MHz
Low-Pass Attenuation	≥ 20 dB (at 20 MHz)
SD-SDI	
Y Signal	±0.5 % for 1 to 5.75 MHz
C_BC_R Signal	±0.5 % for 0.5 to 2.75 MHz
Low-Pass Attenuation	≥ 20 dB (at 3.8 MHz)
Horizontal Axis	
Line Display	x1, x10, x20, ACTIVE, or BLANK
Field Display	x1, x20, or x40
Cursor Measurement	
Composition	Horizontal Cursors: 2 (REF and DELTA) Vertical Cursors: 2 (REF and DELTA)
Amplitude Measurement	mV , %, R%, DEC, HEX
Time Measurement	Second display
Frequency Display	Computes and displays the frequency with the length of one period set to the time between two cursors
Scale	
Types	% scale, V scale, decimal scale, hexadecimal scale
Display Colors	Seven colors to choose from
Thumbnail Display	Picture, audio level meter (when an LV 5770SER41/43 is installed)
Vectorscope Display	
Simul Mode Display Format	Mixed, tiled
Display Colors	Seven colors to choose from; a different color for each input channel
Blanking Interval	Masked(*)
Pseudo-Composite Display	Artificially converts component signals into composite signals and displays the result
Line Select	Displays the selected line
Gain	x1, x5, IQ-MAG
Variable Gain	x0.2 to x2.0
Amplitude Accuracy	±0.5 %
Scale	
Types	ITU-R BT.601, ITU-R BT.709, AUTO
Color Bar Saturation	75 %, 100 %
IQ Axis	Show or hide
Display Colors	Seven colors to choose from
Thumbnail Display	Picture, audio level meter (when an LV 5770SER41 is installed), histogram * On the multi-screen display, the blanking period depends on the video signal waveform display's blanking display settings.
5-Bar Display	
Simul Mode Display Format	Tiled only
Function	Converts an SDI signal into Y, R, G, B, and composite values and then displays the five peak levels
Scale	mV, %
Error Level	Based on the gamut error, composite gamut error, and luminance error thresholds
Line Select	Displays the selected line
Thumbnail Display	Picture, audio level meter (when an LV 5770SER41/43 is installed)
Picture Display	
Simul Mode Display Format	Mixed, tiled
Quantization	8 bits
Display Size	Fit, full frame, real, x2
Frame Rate	The frame rate is converted and displayed using the internal sync signal.
Aspect Marker Display	
HD-SDI	4:3, 13:9, 14:9, 2.39:1
SD-SDI	13:9, 14:9, 16:9
Aspect Marker Format	Line, shadow (99 levels), black
Safety Marker Size	ARIB TR-B4, SMPTE ST RP-218, user-defined
Line Select	Marks the selected line
AFD Display	Displays abbreviations for SMPTE ST 2016 standard AFD codes
Gamut Error Display	Displays gamut error locations over the picture
Superimpose	Displays closed captions over the picture *1
Standard Supported	EIA-708, EIA/CEA-608-B (EIA-708-B) SMPTE ST 334, EIA/CEA-608-B (EIA/CEA-608-B) SMPTE ST 334, VBI (EIA/CEA-608-B Line 21) CIA/EIA-608-B
CINELITE II Display	Displays the luminance information on the picture display
Thumbnail Display	Video signal waveform, audio level meter(when an LV 5770SER41/43 is installed) *1 The closed caption display is not supported when the input signal is 3G-SDI or HD dual link.
Status Display	
Signal Detection	Detects the presence of an SDI signal
Format Display	Displays the video signal format
Embedded Audio Channel	Displays the embedded audio channel numbers *2
SDI Signal Error Detection	
CRC Error	Detects transmission errors of 3G-SDI, HD-SDI, and HD dual link signals
EDH Error	Detects transmission errors of SD-SDI signals
TRS Position Error	Detects errors in the TRS position
TRS Code Error	Detects errors in the TRS protection bits
Line Number Error	Detects errors with the line numbers embedded in 3G-SDI, HD-SDI, and HD dual link signals
Illegal Code Error	Detects data in the range of 000h to 003h and 3FCh to 3FFh outside the TRS and ADF header
Dual Link Phase Difference Error	
	Detects errors when the phase difference between links A and B is 100 clocks or more
Ancillary Data Packet Error Detection	
Checksum Error	Detects transmission errors in the ancillary data
Parity Error	Detects parity errors in the ancillary data header
Embedded Audio Packet Error Detection *2	
BCH Error	Detects transmission errors of audio packets
DBN Error	Detects sequential errors in audio packets
Parity Error	Detects parity errors in audio packets
Image Quality Error Detection	
Gamut Error	Detects gamut errors
Detection Range	Upper Limit 90.8 to 109.4 % Lower Limit: -7.2 to 6.1 % in 0.1 % steps
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 % Lower Limit: -40 to 20 % in 0.1 % steps
Freeze Error(*2)	Detects freezing of video within the specified time range
Detection Method	Video interval checksum
Time Specification	2 to 300 frames
Black Error	Detects video blackouts *3

Black Level Specification	0 to 100 %
Area Specification	1 to 100 %
Time Specification	1 to 300 frames
Level Error	Detects YC_BC_R level errors *3 *2 If the input signal is 3G-SDI level B, only stream 1 is supported. If the input signal is HD dual link, only link A is supported. *3 This is not supported when the input signal is 3G-SDI or HD dual link.
Event Log	
Function	Records detected errors, events—such as the LV 5770 switching between input signals, and time stamps.
Recording Capacity	Up to 1000 events
Operation	Records all events from start to finish
Data Output	Can be saved in text format to a USB memory device
SDI Analysis Features	
Data Dump Display	
HD, SD-SDI Display Format	Displays data separated by serial data sequence or by channel
3G-SDI Display Format	Stream 1, stream 2, stream 1 and stream 2 simultaneously
HD Dual Link Display Format	Link A, link B, link A and B simultaneously
Line Select	Displays the selected line
Sample Select	Displays the selected sample
Jump Function	Moves to an EAV or SAV
Data Output	Save data in text format to a USB memory device
Phase Difference Display	
Function	Displays the phase difference between a reference signal and an SDI video signal numerically and graphically
Reference Signal	
3G, HD, SD-SDI	External sync signal, channel A of the SDI signal
HD Dual Link	External sync signal, link A
Display Range	
Vertical	1 frame
Horizontal	±1 line
Audio Control Packet *4	
Display Content	Displays audio control packet analysis
Group Selection	Select one group from four groups.
EDH Display (Only for SD)	
Standard Supported	SMPTE ST RP-165
Display Content	Analyzes and displays EDH packets and displays received CRC errors
Payload ID Display	Analyzes and displays payload information
Closed Caption Analysis Display*5	
Standard Supported	ARIB STD-B37, EIA-708-B, EIA/CEA-608-B
Display Content	Analyzes and displays the closed caption signal
Inter-Stationary Control Signal (NET-Q) Display *5	
Standard Supported	ARIB STD-B39
Display Content	Analyzes and displays inter-stationary control signals
Logging Feature	Q-signal logging
Data Broadcast Trigger Signal *5	
Standard Supported	ARIB STD-B35
V-ANC User Data Display *5	
Standard Supported	ARIB TR-B23
Arbitrary ANC Packet Display (Only for link A when the link format is set to dual)	
Method of specifying ANC	DID, SDID
AFD Packet Display *5	
Standard Supported	SMPTE ST 2016-1-2007 *4 If the input signal is 3G-SDI level B, only stream 1 is supported. If the input signal is HD dual link, only link A is supported. *5 This is not supported when the input signal is 3G-SDI or HD dual link.
Ancillary Data List Display	
List Display Content	Presence or absence of each ancillary data type, embedded line number, and number of packets per frame *6 *6 This is not supported when the input signal is 3G-SDI or HD dual link.
Lip Sync Measurement (When an LV 5770SER41/LV 5770SER43 is installed)	
Function	Measures the phase difference between an SDI video signal and digital audio
Reference Signal	Generated by a LEADER TSG that can create the signal necessary for lip sync measurements
Compliant Audio	SDI embedded audio, digital audio
Measurement Range	50 ms, 100 ms, 200 ms, 1 s, 2 s, 5 s
Measurement Resolution	1 ms
Frame Capture Feature	SDI
Function	Captures frame data

Closed Caption Packet Display	
Standard Supporte	

Feature	Standard Supported	DID	SDID
EIA-708 CC decode feature	SMPTE ST 334	161h	101h
EIA/CEA-608-B CC decode feature (EIA-708-B)	SMPTE ST 334	161h	101h
EIA/CEA-608-B CC decode feature (EIA/CEA-608-B)	SMPTE ST 334	161h	101h
VBI (EIA/CEA-608-B line 21) CC decode feature	CIA/EIA-608-B		

CDP Packet Display Content	CDP packet header information Frame rate, presence or absence of timecode packet, presence or absence of closed caption packet and validity of this packet, presence or absence of closed caption service packet and validity of this packet, presence or absence of the FUTURE data packet, timecode (when the time-code packet is present), closed caption data (when the closed caption packet is present and valid), presence or absence of the CC1 to CC4 packets, the TEXT1 to TEXT4 packets, and the XDS packet
XDS Packet Display Content	Contents adviser information Copy management information
Program Description Packet Display Content	
	Stuffing Descriptor, AC3 Audio Descriptor, Caption Service Descriptor, Content Advisory Descriptor, Extended Channel Name Descriptor, Service Location Descriptor, Time-Shifted Service Descriptor, Component Name Descriptor, DCC Departing Request Descriptor, DCC Arriving Request Descriptor, Redistribution Control Descriptor
Time Display Feature	
Time Display	Current time, timecode
Current Time Display	The time based on the internal clock
Timecode	LTC, VITC, D-VITC (SD-SDI only)
Standard Supported	
LTC, VITC	SMPTE ST 12-2
D-VITC	SMPTE ST 266

LV 5770SER09 only

Eye Pattern Display Display	Displays the input SDI waveform before equalizing
3G-SDI, HD-SDI, SD-SDI	Displays channel A or B, whichever is selected
HD Dual Link	Displays link A or B, whichever is selected
Method	Equivalent time sampling
Cursor Measurement	Amplitude measurement using Y cursors Time measurement using X cursors Rise time and fall time measurement using the TrTf cursor
Automatic Measurement Items	Eye pattern's amplitude Rise time (the time for the signal to rise from 20 to 80 % of its amplitude) Fall time (the time for the signal to fall from 80 to 20 % of its amplitude) Timing jitter
Jitter Display	
Display	Displays the jitter component of an SDI signal
3G-SDI, HD-SDI, SD-SDI	Displays channel A or B, whichever is selected
HD Dual Link	Displays link A or B, whichever is selected
Method	Phase detection method
Cursor Measurement	Jitter value measurement through the use of cursors
Automatic Measurement Display Feature	
	Displays the jitter value in seconds (sec) and unit intervals (UI)
Eye Pattern and Jitter Detection	
Error Detection	On or off per item
Error Threshold Settings	Can be set individually for 3G-SDI, HD-SDI, and SD-SDI signals
Event Log	Stores eye patterns and jitter errors
Threshold Values	100 % of the values in the SMPTE standard

LV 5770 / LV 7770 Platform Options

LEADER

LV 5770SER42 ANALOG AUDIO

FEATURES

• Digital Audio I/O

The addition of the analog audio option enables the LV 5770 to display analog audio. The LV 5770SER42 is equipped with an output connector, and this option can also be used to generate the analog audio that corresponds to the audio signal displayed on the screen. (This option requires the LV 5770SER41/43.)

SPECIFICATIONS

Audio Input/Output	
I/O Connectors	37-pin D-sub (female)
Input Signal Format	DC-coupled balanced input
Number of Input Channels	8 (4 stereo pairs)
Input Impedance	≥ 20 kΩ
Output Signal Format	DC-coupled balanced output
Number of Output Channels	8
Output Impedance	50 Ω (nominal)
Output Signal	8-channel audio signal that is displayed on the screen (Dolby*—available as a special order—signals are decoded and generated as analog signals.)
Maximum Output Level	100 kΩ load 24 dBu 600 Ω load 4 dBu

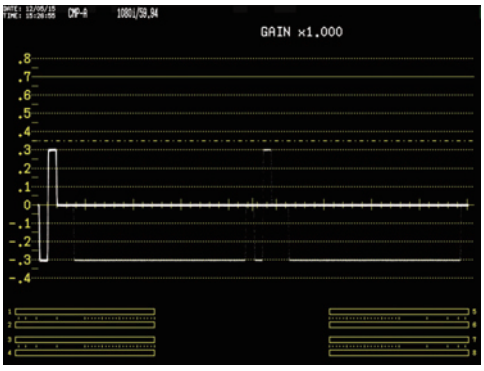
Headphone Output Jack (LV 5770SER41 option)	
Output Connector	One stereo jack
Analog Audio Display	
Input Signal	Analog audio input
Displayed Channels	Up to 8 channels (4 stereo pairs)
Display Type	Level meter, Lissajous, surround, Status, Loudness
Level Meter Display	
Displayed Channels	Two or eight
Dynamic Range	-60 dBFS / -90 dBFS
Meter Response Mode	TRUE PEAK, PPM type I, PPM type II, VU
Peak Hold Response Mode	TRUE PEAK, PPM type I, PPM type II
Peak Hold Time	0.5 to 5.0 s (in 0.5 s steps), HOLD
Level Setting	Reference level, warning level, over level (-40.0 to 0.0 dBFS for each level)
Lissajous Display	
Lissajous Display	The same as digital audio
Surround Display	The same as digital audio
Loudness Display	The same as digital audio *The LV 5770SER41 is required for the LV 5770SER42 to operate.
Accessories	
	37-pin D-sub connector .....1 37-pin D-sub connector cover.....1 Cable 2

LV 5770SER03A TRI SYNC / COMPOSITE

FEATURES

The addition of the analog composite input option enables the LV 5770 to display the video signal waveforms of NTSC, PAL, and HD tri-level sync signals, display vectors (NTSC and PAL only), measure SCH (NTSC and PAL only), and measure phase differences against external signals.
(For phase difference measurement, an external sync signal that is synchronized and of the same format as the input signal is necessary.)

■ Display Example



Tri sync display

SPECIFICATIONS

Formats and Standards	
Input Signal	NTSC or PAL composite video signal
Standard Supported:	SMPTE ST 170, ITU-R BT.470, SMPTE ST 274
I/O Connectors	
Input Connectors	2 BNC connectors (channels A and B are selectable)
Output Connector	1 BNC connector
Output Signal	Channel A or B—whichever is selected—of the composite option, the active signal
External Sync Signal Input Connectors	
Input Connector	1 pair of BNC connectors
Input Signal	Tri-level sync or NTSC/PAL black burst signal
Input Impedance	15 kΩ passive loop-through * If the video signal waveform is displayed using an external sync signal as the reference, inserting or removing an composite signal or restarting the device may cause the waveform phase to be off by two clock.

Waveform Display	
Waveform Operations	
Line Select	Displays the selected line
Sweep Modes	H and V
Vertical Axis	
IRE Scale (NTSC)	-40 to 100 IRE
V Scale (PAL)	-0.3 to 0.7 V
Horizontal Axis	
Operation Mode	1-waveform display
Display Format	
Line Display	1H, 2H
Cursor Measurement	
Horizontal Cursors	2 (REF and DELTA)
Time Measurement	Second display
Vertical Cursors	2 (REF and DELTA)
Amplitude Measurement	V or % display
Vectorscope Display	
Scale	
Color Bar Saturation	75 %, 100 % (color bar)
IQ Axis	Show, hide
Display Colors	Seven colors to choose from
Setup (NTSC)	0 %, 7.5 %
NTSC Display (PAL)	NTSC display, PAL display
SCH Display	The SCH value is displayed as a digital value.
Picture Display	
Quantization	8 bits
Display Size	Fit, full frame, real
Frame Rate	The frame rate is converted and displayed using the internal sync signal.
Aspect Marker Display	16:9, 14:9, 13:9
Aspect Marker Format	Line, shadow (99 levels), black
Safety Marker Size	SMPTE ST RP-218, user-defined
Analog Composite Signal Status Display Phase Difference Display	
Function	Displays the phase difference between a reference signal and an input signal both numerically and graphically
Reference Signal	NTSC/PAL black burst signal HD tri-level sync signal (The same format as the input signal)

* When an LV5770SER41/43 is installed