

# Leader



Video Test Instruments

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# Leader ZEN



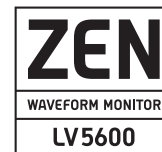
LV5300 Waveform Monitor  
LV5600 Waveform Monitor  
LV7300 Rasterizer  
LV7600 Rasterizer



## LV5600 WAVEFORM MONITOR

## LV7600 RASTERIZER

4K 12GSDI 3GSDI HDSDI  
SDSDI IP



## General

The LV5600/LV7600 is a hybrid-type waveform monitor and rasterizer compatible with 4K/HD/SD-SDI signal and HD/SD IP signal. The LV5600 is a waveform monitor with a 7-inch touch screen display in a compact 3 U enclosure with built-in AC power supply. The LV7600 is a rasterizer with the same function as the LV5600 in a 1U full rack enclosure. Selection of necessary input signals and functions from various options, and customization to the specification that fits your purpose are possible.

## Features

### Supports various signal inputs

SDI signals up to 12 G-SDI And IP (video over IP) signals can be observed/monitored. Audio signals can correspond to SDI embedded voice, voice multiplexed to IP, external input AES/EBU, analog voice.

### IP input format

The IP signal corresponds to the video signal of the 2K video format at SMPTE ST 2022-6 (non-compression) and SMPTE 2110-20 (non-compression). In 2K video format, up to 2 channels can be received with one 10 Gbit Ethernet cable.

### Excellent operability

With the front panel equipped with key buttons and knobs that follow the operability of conventional models, operation with a USB mouse is also possible. In addition, the LV5600 adopts a 7-inch full HD panel with a touch panel function, and the LV7600 can be operated and set intuitively by touch operation by connecting an external LCD adopted touch panel with a USB cable.

\* It does not guarantee the operation with the external LCD monitor adopted by all touch panels.

### SDI input format

It supports SD- SDI, HD- SDI, 3G- SDI, 12G- SDI single link, 3G- SDI dual link and quad link, HD- SDI quad link.

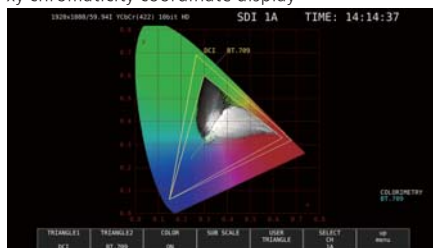
### Transmission quality analysis function

As an SDI signal analysis function, in addition to monitoring of transmission errors, external synchronization phase difference display, lip sync measurement, SDI signal frequency deviation measurement function, an ancillary data analysis function with increased importance as a 4K video signal is also realized. With respect to IP signal measurement, monitoring transmission errors such as packet loss and the transmission quality (QoS) monitoring function such as packet jitter, which was difficult to observe by using IP, are strengthened.

### Video analysis function

Various video signals include video signal waveform display, vector display, picture display 5 BAR display, CIE chromaticity diagram display, etc. In addition to the various displays, freeze error, Black error, gamut error detection Functions etc. Quality control (QoE) of video signals Features are equipped.

xy chromaticity coordinate display



### Voice analysis function

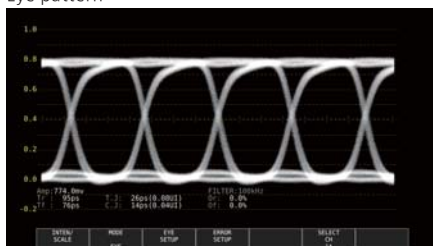
For audio signals, SDI signals and audio signals superimposed on IP signals can be displayed on a level meter. Furthermore, Lissajous display, mute, clip error detection, loudness easurement, etc. are available. Audio format is compatible with L-PCM. Also, Dolby E, Dolby Digital, Dolby Digital Plus decode display is possible.

### Eye pattern display

From SD-SDI to 12G-SDI

In the physical layer measurement of the SDI signal some eye pattern display, jitter display is possible.

Eye pattern



### Subtitles/closed caption decode display function

Japanese subtitles and CEA-608, CEA-708 closed caption, Teletext, OP47 subtitle superimposed on SDI signal can be decode displayed.

### External synchronization signal input

The phase difference and synchronization status of the SDI signal graphically based on the external synchronization signal (black burst, tri-level sync) can be confirmed.

Also, since the input external sync signal can be displayed as a waveform, it is useful for early detection of problems owing to the synchronization signal.

### Customizable layout

Various items such as video signal waveforms, vector waveforms, and pictures of input signals can be laid out in any position with your favorite size.

### SDI signal generation function

SDI signal generation function can handle from HD-SDI to 12G-SDI. HD multiformat color bar and pattern corresponds to the multiple overlays of moving boxes and embedded audio, flat field pattern can be specified at any level, multiformat color bar 4K can be selected.

### External monitor output

Since the measurement screen can be output as SDI and TMDS from the monitor output terminal, it can be displayed on an external SDI monitor or HDMI monitor with full HD resolution.

\* It does not guarantee operation with all HDMI monitors.

### Capture function

It equips with a screen capture function to capture the display screen as still image data and a frame capture function to capture 16 frames of data.

### Time code display

The time code superimposed on SDI signals and IP signals can be displayed. The time code can also be used as the timestamp of the event log.

### External remote terminal

The presets can be recalled by contact terminals, and switching input signals and tally displays and outputting alarms can be conducted.

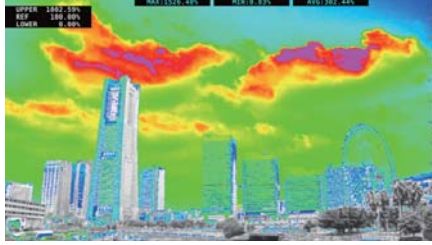
### Ethernet terminal

By connecting to the PC, remote operation by TELNET, file transfer by FTP, remote operation by SNMP and alarm notification, remote operation and monitoring from the browser via HTTP can be done.

## HDR

The HDR signal level monitoring and the level management at the assumed luminance (cd /m2 ) in a display considering OOTF are possible. The video signal waveform display corresponds to the HDR scale added to the IRE scale. In the cine zone display, the luminance distribution of the HDR area can be easily confirmed at the state where the SDR area is monochrome, the HDR is colored according to the brightness.

HDR zone display



## Focus Assist

We developed a new focus detection algorithm based on nonlinear super-resolution technology; accordingly the focus with high sensitivity can be detected even with low-contrast images, which were conventionally difficult to detect.

## Tally display

Serial communication enables to display camera ID, iris and tally.

\* Dolby and Dolby Digital, Dolby Digital Plus, Dolby E are registered trademarks of Dolby.Z

## / Options

### List of hardware options

Model Name	Type Number LV5600	LV7600	Function
SDI INPUT	LV5600-SER01	LV7600-SER01	SD, HD, 3G SDI input *1
SDI INPUT/EYE	LV5600-SER02	LV7600-SER02	SD, HD, 3G SDI input and eye pattern display *1
DIGI/ANA AUDIO	LV5600-SER03	LV7600-SER03	Digital/analog voice input/output and display
DOLBY	LV5600-SER04	LV7600-SER04	Dolby Digital, Dolby E decode function *2
IP INPUT	LV5600-SER05	LV7600-SER05	IP INPUT *1

\*1 For LV5600, either LV5600-SER01 or LV5600-SER02 is selected, but either one of LV5600-SER01, LV5600-SER02, LV5600-SER05 is necessary.

Either LV5600-SER01 or LV5600-SER02 is selected for LV7600, but either one of LV5600-SER01, LV5600-SER02, LV7600-SER05 is necessary.

\*2 LV5600-SER03 is required for LV5600. LV7600 requires LV7600-SER03.

### Software option list

Model Name	Type Number LV5600	LV7600	Function
AUDIO	Equipped with LV5600-SER03	Equipped with LV7600-SER03	AUDIO display function
CLOSED CAPTION	Standard equipment	Standard equipment	Japanese subtitles, EIA-608, 708, TELETEXT
CIE	Standard equipment	Standard equipment	CIE chart display function
HDR	LV5600-SER23	LV7600-SER23	HDR measurement function
TSG	LV5600-SER24	LV7600-SER24	SDI signal generation function
FOCUS ASSIST	LV5600-SER25	LV7600-SER25	Focus assist display Function
LAYOUT	LV5600-SER26	LV7600-SER26	Custom layout function
TALLY	LV5600-SER27	LV7600-SER27	ID/iris/tally display function
4K	LV5600-SER28	LV7600-SER28	4K video signal correspondence function
12G-SDI	LV5600-SER29	LV7600-SER29	12G-SDI compatible *

\* LV5600 requires LV5600-SER28. LV7600 requires LV7600-SER28.

**LV5600-SER01 / LV7600-SER01, SDI Input**

**LV5600-SER02 / LV7600-SER02, SDI input with eye pattern**

LV5600-SER01 is a unit that can display various SDI signals. (LV5600, LV7600 common unit)

• Video analysis function

Various types of video signals, in addition to a variety of displays such as video signal waveform displays, vector display, picture display, 5 BAR display, the CIE chromaticity diagram and CINELITEII., video signal quality (QoE) freezes error, error black, gamut error detection, etc. are equipped as standard equipment.

• Voice analysis function

The audio signal embedded in SDI signals can be displayed on a level meter.

\* Lissajous, surround and status can be displayed by adding LV5600-SER03/LV7600-SER03

• SDI signal data analysis function

The status display has an error detection function of CRC and embedded sound. It also has an event log, data dump, phase difference measurement functions, and can analyze SDI signals.

• Screen capture function

A screen capture function to capture the display screen as still image data and a frame capture function to capture 16 frames of data are equipped. The captured data can be saved in BMP format in comparison with the input signal, as well as the display on the main body, and thus confirmation with the personal computer is possible.

• Frame Capture function

A frame capture function to capture 16 frames of the SDI signals is equipped. There are two methods; one is to import them manually and another is to take them automatically when an error occurs.

• Frame capture viewer (free Windows software)

Search for data captured by the frame capture function, error search, and export to CSV are possible.

• Time code display

The time code superimposed on SDI signals and can be displayed. The time code can also be used as the timestamp of the event log.

• Input/output terminal

SDI input terminal BNC connector 4 terminal SDI output terminal BNC connector 4 terminal (main unit standard equipment) Output relock signal The SDI signal of the input terminal is relock output to the output terminals, respectively.

Output terminal 1 can switch the signal of the input terminal and can relock output.

• Audio level meter (8ch)

Embedded voice SMPTE ST 299, SMPTE ST 272

48 kHz/24 bit/L-PCM

Synchronization condition All are synchronized with the video clock. All input SDI signals are synchronized.

\* When LV5600-SER03/LV7600-SER03 is added, it corresponds to 16 channels.

• Closed caption display function

CEA-608, CEA-708 closed caption, Teletext, OP47 subtitle superimposed on SDI signal can be decode displayed.

• Japanese subtitle simplified display function

Japanese subtitles are simply displayed on the picture screen (HD, SD, analog), portable subtitles are selected/displayed. Language 1 and 2 are selected/displayed.)

Approved standard

ARIB STD-B37 short form data

Japanese subtitle simplified display



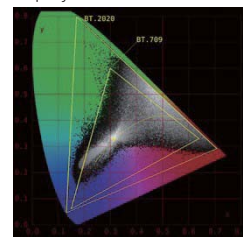
• CIE chart display function

This is a chromaticity diagram display function corresponding to colorimetry ITU- R BT. 601, ITU- R BT. 709, ITU- RBT. 2020.

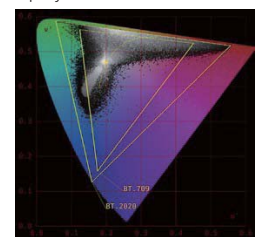
The display mode corresponds to CIE 1931 (xy display) and CIE 1976 (u'v' display). Since the CIE chart display function can display two color gamuts, the function can be used to suppress the color gamut of BT.709 using the equipment compatible with BT.2020, and to confirm the content that exceeds the color gamut of BT.709.

In color display, the chromaticity point is displayed using the color (on the picture) in the video signal. The chromaticity point can be measured at the point with the cursor.

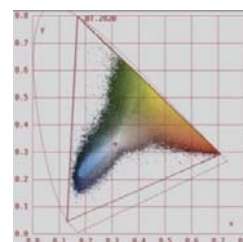
xy chromaticity coordinate display



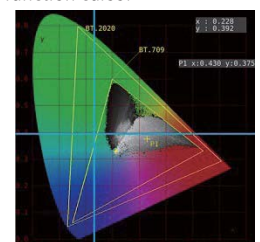
u' v' chromaticity coordinate display



xy coordinate color indication



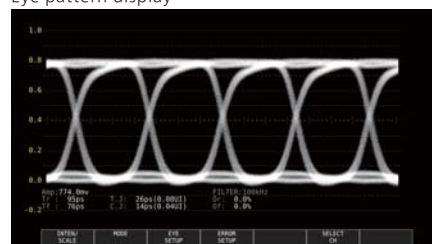
A light blue is a measurement function cursor



• Eye pattern display ( LV5600-SER02/LV7600-SER02)

The eye pattern waveform, jitter waveform of SDI signal, and the measurement result of each parameter can be displayed. Only input terminal 1 corresponds to eye pattern display.

Eye pattern display



**LV5600-SER03 / LV7600-SER03,  
Digital/analog voice input/output**

- Voice analysis  
Lissajous display, surround display, mute, clip error detection, loudness measurement, etc. are now available. Various analysis display is also possible, and simultaneously display of 16 channels from one SDI signal and 4 channels from 4 SDI signals is possible.

- Embedded voice  
Approved standard SMPTE ST 299, SMPTE ST 272  
48 kHz/24 bit/L-PCM

Synchronization condition All are synchronized with the video clock. All input SDI signals are synchronized.

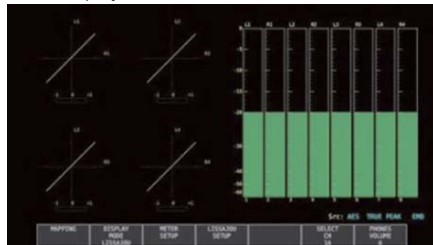
- External input audio  
Approved standard AES-3id  
Synchronization condition All external input voices are synchronized with each other.
- Digital voice input/output Terminal  
External digital input/output enables AES/EBU audio signal correspondence.

Input/output terminal DIN 1.0/2.3 connector  
Number of Input/output terminals  
Group A 4 terminals 8ch  
Group B 4 terminals 8ch  
Switching input/output Switching by each group (4 terminals 8 ch)

**LV5600-SER04 / LV7600-SER04, Dolby decoding function**

Decoding display of Dolby E, Dolby Digital, Dolby Digital Plus becomes possible by adding LV5600-SER 04 and LV7600-SER 04 to LV5600-SER 03 and LV7600-SER 03.

Audio display



**LV5600-SER05 / LV7600-SER05,  
IP input (SMPTE ST 2022- 6, SMPTE 2110- 20)**

It corresponds the IP signal and the video signal of the 2K video format at SMPTE ST 2022-6 (non-compression) and SMPTE 2110-20 (non-compression).

- Video analysis function  
Various types of video signals, in addition to a variety of displays such as video signal waveform displays, vector display, picture display, 5 BAR display, the CIE chromaticity diagram and CINELITEII, video signal quality (QoE) freezes error, error black, gamut error detection, etc. are equipped.

- Voice analysis function  
The audio signals superimposed on IP signals can be displayed on a level meter.

- Transmission quality analysis function  
Together with monitoring transmission errors such as packet loss, check sum error, packet discontinuity, the transmission quality (QoS) monitoring function such as packet jitter, which was difficult to observe by using IP, are strengthened.

- Capture function  
A screen capture function to capture the display screen as still image data is equipped. It also has a frame capture function and can capture one frame of an active video period.
- Time code display  
The time code superimposed on IP signals and can be displayed. The time code can also be used as the timestamp of the event log.
- Input video format  
Corresponding IP standard SMPTE ST 2022- 6, SMPTE ST 2110- 20  
Supported format 1080 (60, 59.94, 50 I/P),  
720 (60,59.94,50 I/P) ,576 (50I) ,  
487 (59.94I) , (YCBCRY4:2:2/10 bit)
- Input audio format  
Approved standard SMPTE ST 2022- 6, SMPTE ST 2110- 30  
Sampling frequency 48 kHz  
Quantization accuracy 24 bits  
Supported formats L-PCM/Dolby-E/Dolby Digital/Dolby Digital Plus.  
Clock generation method Generated from video clock  
Synchronization condition Synchronized with video signals.  
The maximum 16 channels of IP audio separation channels are separated/displayed.  
\* L-PCM requires optional mounting of LV5600-SER 03 and LV7600-SER 03.  
\* Dolby correspondence requires optional mounting of LV5600-SER03/04, LV7600-SER03/04.
- Input terminal  
Input terminal SFP +  
Number of terminals 2  
Approved standard 10GBASE-SR/10G BASE-LR  
\* SFP + transceiver is an optional item.
- Auxiliary data  
Approved standard SMPTE ST 2110-40



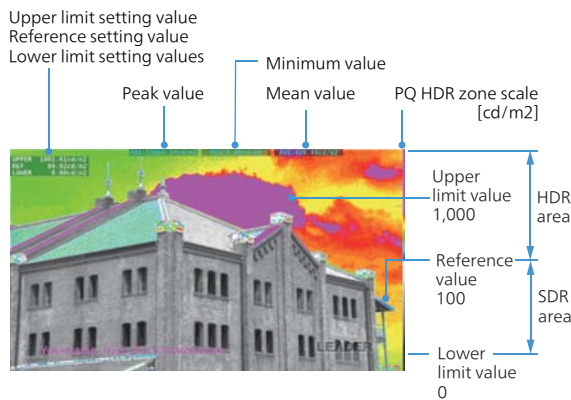
**LV5600-SER23 / LV7600-SER23,**

**HDR measurement function**

In addition to HLG and PQ provided by ITU-R BT.2100, the level monitoring of the HDR signal corresponding to S-log3 and the level management at the assumed luminance (cd/m<sup>2</sup>) in a display considering OOTF are possible. The video signal waveform display corresponds to the HDR scale added to the IRE scale. In the cine zone display, the luminance distribution of the HDR area can be easily confirmed by displaying the SDR area with monochrome, and the HDR with a color according to the brightness.

• HDR zone display

The luminance distribution of the HDR area can be easily confirmed by coloring the SDR area with monochrome, and the HDR with a color according to the brightness.

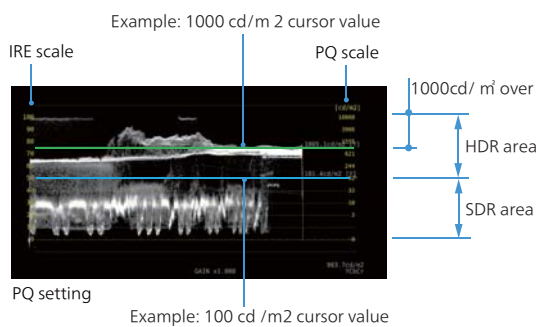


- The SDR part is monochrome, the HDR region is colored according to luminance.
- Above the upper limit value is colored with magenta.
- The upper limit value, the reference value, the lower limit value can be varied

• HDR Scale

By associating WFM and histogram with HDR scale, management of the video with brightness at the time of scene linearity is possible.

• HDR waveform display



• HDR point measurement

- The crosshairs can be freely moved.
- Up to 3 points can be measured simultaneously.



PQ setting  
P1(S: 884, L: 261) 3243.6cd/m<sup>2</sup>

HLG setting SYSTEM GAMMA OFF  
P1(S: 884, L: 261) 623.9%

HLG setting System Gamma On  
P1(S: 884, L: 261) 456.1cd/m<sup>2</sup>

S-Log3 setting System Gamma Off  
P1(S: 884, L: 261) 809.1%

**LV5600-SER24 / LV7600-SER24,**

**SDI signal generation function**

SDI signal generation function can handle from HD-SDI to 12G-SDI. HD multiformat color bar and pattern corresponds to the multiple overlays of moving boxes and embedded audio, flat field pattern can be specified at any level, multiformat color bar 4K can be selected.

With the 4K pattern of 3G-SDI quad link, the phase of each link can be shifted and output, so confirmation of the pull-in margin of the receiving device is possible.

The SDI signal generation function of 12G-SDI requires 4K and 12G-SDI options.

(LV5600-SER28 LV7600-SER28 LV5600-SER29 LV7600-SER29)

• Output pattern

100% color bar, 75% color bar, HD multi format color bar, ARIB 4K multi format color bar (simple format), color raster, cross hatch, 10 steps, limit lamp, passive logical, lip sync pattern.

• Scroll

Direction 8 directions (up and down, left and right, and combinations thereof)

Speed range and unit 4 to 124 dots per frame (field), 4 dot unit.

Moving Box ON/OFF

Color HITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE, BLACK

Speed 1 to 3

• Embedded voice

Number of superimposed channels maximum 16 ch

ON/OFF of superimposition ON/OFF in audio group unit

Voice level- 20 dBFS, -18 dBFS, 0 dBFS, Mute

\* For horizontal 4096/2048 pixel format at frame rates 60, 59.94, 30, and 29.97 Hz, only 8 channels are multiplexed.

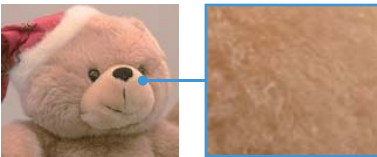
**LV5600-SER25 / LV7600-SER25, Focus assist function**

This is a focus detection function realizing a new algorithm based on nonlinear super resolution technology. The focus can be detected with high sensitivity even with low-contrast images, which were conventionally difficult to detect. In addition, sensitivity can be selected from 5 levels according to the video scene.

Focus assist display



After focus adjustment  
(The green part is the focus adjustment point )

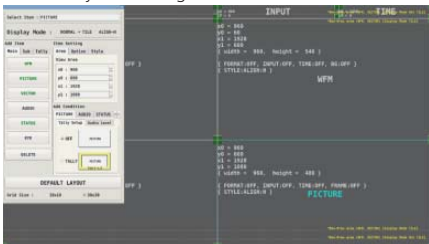


Enlarged view  
(After focus adjustment)

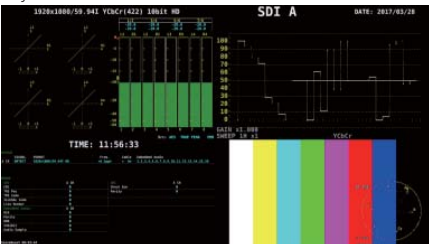
**LV5600-SER26 / LV7600-SER26, Custom layout function**

• Custom layout function  
Various items such as video signal waveforms, vector waveforms, and images of input signals can be laid out in any position with your preferred size. Multiple input signals up to 4 inputs can be displayed simultaneously, or one input signal can be displayed on multiple screens.

Custom layout setting screen



Layout Set measurement screen

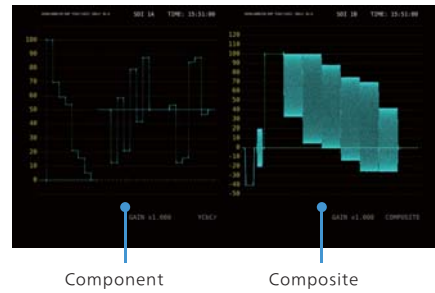


• Display channel Function

1SDI input signals of 1 to 4 input terminals can be allocated to A to D display channels.  
At this time, by allocating one SDI input signal to multiple display channels, monitoring video signals in multiple display formats is possible.

For example, displaying the signal input to SDI input 1 as component video waveform can be displayed on display channel A and the composite video waveform can be displayed on display channel B.

Display channel display image



**LV5600-SER27 / LV7600-SER27, ID/iris/tally display function**

Serial communication RS-422/485 terminals enable to display camera ID, and tally. Fast switching of tally display by remote terminal is also possible.

ID/iris/tally display screen



**LV5600-SER28 / LV7600-SER28, 4K video signal compatible function**

1It supports 4K video format signals of 3G-SDI dual link and quad link, HD- SDI quad link.

**LV5600-SER29 / LV7600-SER29, 12G-SDI compatible**

It is compatible with 12G-SDI single link. Also, in the 4K video format, switching up to 4 displays can be done with 12G-SDI single link input, and switching up to 2 displays can be done with 3G-SDI dual link.

\*Requires optional mounting of LV5600-SER28 and LV7600-SER28.

**LV7290, Remote Controller**

The LV7290 remote controller connects to the Ethernet port on the rear panel of the LV5600/LV7600 and can be used to remotely control the LV5300/LV7300. A single unit can connect and control up to eight LV5300/LV7300s.  
Dimensions and weight: ≤ 482 (W) X 44 (H) X 110 (D) mm (excluding protrusions), 1.2 kg



SDI video signal format and standard

SD video signal format and standard

Color System	Quantization	Image	Field Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	720 × 487	59.94 /I	SMPTE ST 259
		720 × 576	50 /I	

HD video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	1280 × 720	60/59.94/50/	SMPTE ST 292-1
			30/29.97/25/24/23.98 /P	SMPTE ST 296
		1920 × 1080	60/59.94/50 /I	SMPTE ST 274
			30/29.97/25/24/23.98 /P	SMPTE ST 292-1
		30/29.97/25/24/23.98 /PsF		

3G-A video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard		
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274		
			48/47.95 /P	SMPTE ST 425-1		
		2048 × 1080	60/59.94/50/48/47.95 /P	SMPTE ST 425-1		
				SMPTE ST 2048-2		
		12bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
	2048 × 1080		30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
	YCbCr 4:4:4	10bit	1280 × 720	60/59.94/50/	SMPTE ST 296	
				30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			1920 × 1080	60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
2048 × 1080			30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
12bit		1920 × 1080	60/59.94/50 /I	SMPTE ST 274		
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1		
		2048 × 1080	30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
		RGB 4:4:4	10bit	1280 × 720	60/59.94/50/	SMPTE ST 296
					30/29.97/25/24/23.98 /P	SMPTE ST 425-1
1920 × 1080	60/59.94/50 /I			SMPTE ST 274		
	30/29.97/25/24/23.98 /P			SMPTE ST 425-1		
2048 × 1080	30/29.97/25/24/23.98 /PsF			SMPTE ST 425-1		
				SMPTE ST 2048-2		
12bit	1920 × 1080		60/59.94/50 /I	SMPTE ST 274		
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1		
	2048 × 1080		30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
	XYZ 4:4:4		12bit	2048 × 1080	30/25/24 /P	SMPTE ST 425-1
					30/25/24 /PsF	SMPTE ST 428
		60/59.94/50 /I		SMPTE ST 274		
		30/29.97/25/24/23.98 /P		SMPTE ST 425-1		

3G-B-DL, HD(DL) video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard		
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274		
			48/47.95 /P	SMPTE ST 372		
		2048 × 1080	60/59.94/50/48/47.95 /P	SMPTE ST 425-1		
				SMPTE ST 2048-2		
		12bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 372	
	2048 × 1080		30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
	YCbCr 4:4:4		10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
					30/29.97/25/24/23.98 /P	SMPTE ST 372
		2048 × 1080		30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1	
					SMPTE ST 2048-2	
12bit		1920 × 1080		60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 372	
		2048 × 1080	30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
		RGB 4:4:4	10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
					30/29.97/25/24/23.98 /P	SMPTE ST 372
2048 × 1080				30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1	
					SMPTE ST 2048-2	
12bit	1920 × 1080			60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 372	
	2048 × 1080		30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1		
				SMPTE ST 2048-2		
	XYZ 4:4:4		12bit	2048 × 1080	30/25/24 /P	SMPTE ST 372
					30/25/24 /PsF	SMPTE ST 428
				60/59.94/50 /I	SMPTE ST 274	
				30/29.97/25/24/23.98 /P	SMPTE ST 425-1	

\* The phase difference between links of HD(DL) is automatically corrected and displayed to 100 clocks (about 1.34 μs).

3G-B-DS video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1
		1280 × 720	60/59.94/50/	SMPTE ST 296
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1

12G video signal format and standard (2 sample interleave)

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	60/59.94/50 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			48/47.95/P	-
		4096 × 2160	60/59.94/50/48/47.95 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			4096 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
Y <sub>CbCr</sub> 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			4096 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			4096 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
RGB 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			4096 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
			4096 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10

\* It corresponds to TYPE 1 of 12G-SDI.

3G(DL)-2K video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard	
Y <sub>CbCr</sub> 4:2:2	12bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274 SMPTE ST 425-3	
			48/47.95 /P	-	
		2048 × 1080	60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 SMPTE ST 425-3	
Y <sub>CbCr</sub> 4:4:4	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274 SMPTE ST 425-3	
			2048 × 1080	60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 SMPTE ST 425-3
		12bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274 SMPTE ST 425-3
	2048 × 1080	60/59.94/50/48/47.95 /P		SMPTE ST 2048-2 SMPTE ST 425-3	
	RGB 4:4:4	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274 SMPTE ST 425-3
				2048 × 1080	60/59.94/50/48/47.95 /P
12bit		1920 × 1080	60/59.94/50 /P	SMPTE ST 274 SMPTE ST 425-3	
2048 × 1080	60/59.94/50/48/47.95 /P		SMPTE ST 2048-2 SMPTE ST 425-3		

\* The phase difference between links of) is automatically corrected and displayed to 100 clocks (about 0.67 μs).

\* Links correspond to 3G-A, 3G-B-DL.

3G(DL)-4K video signal format and standard

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-3 SMPTE ST 2036-1
			30/29.97/25/24/23.98 /PsF	-
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-3 SMPTE ST 2048-1
			30/29.97/25/24/23.98 /PsF	-
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-3 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-3 SMPTE ST 2048-1

\* The phase difference between links of) is automatically corrected and displayed to 100 clocks (about 0.67 μs).

\* Links correspond to 3G-B-DS.

HD(QL) video signal format and standard

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	-
			30/29.97/25/24/23.98 /PsF	-
		4096 × 2160	30/29.97/25/24/23.98 /P	-
			30/29.97/25/24/23.98 /PsF	-

\* 2K model requires SER 28 separately.

\* The phase difference between links of) is automatically corrected and displayed to 100 clocks (about 0.67 μs).

3G(QL) video signal format and standard (square)

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard	
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	60/59.94/50 /P	SMPTE ST 425-5 SMPTE ST 2036-1	
			48/47.95 /P	-	
			4096 × 2160	60/59.94/50/48/47.95 /P	SMPTE ST 425-5 SMPTE ST 2048-1
		12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
				30/29.97/25/24/23.98 /PsF	-
			4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
	Y <sub>CbCr</sub> 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
				30/29.97/25/24/23.98 /PsF	-
			4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
		12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
				30/29.97/25/24/23.98 /PsF	-
			4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
RGB 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1	
			30/29.97/25/24/23.98 /PsF	-	
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1	
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1	
			30/29.97/25/24/23.98 /PsF	-	
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1	
XYZ 4:4:4	12bit	4096 × 2160	30/25/24 /P	SMPTE ST 425-5 SMPTE ST 428	
			30/25/24 /PsF	-	

3G(QL) video signal format and standard (2 sample interleave)

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard
Y <sub>CbCr</sub> 4:2:2	10bit	3840 × 2160	60/59.94/50 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	48/47.95 /P	-
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
Y <sub>CbCr</sub> 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
RGB 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
	12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2036-1
		4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 425-5 SMPTE ST 2048-1
XYZ 4:4:4	12bit	4096 × 2160	30/25/24 /P	SMPTE ST 425-5 SMPTE ST 428

\* The phase difference between links of) is automatically corrected and displayed to 100 clocks (about 0.67 μs).

\* Links correspond to 3G-A, 3G-B-DL.

IP input signal format (LV5600-SER05, LV7600-SER05 only)

Color System	Quantization	Image	Field Frequency / Scanning
Y <sub>CbCr</sub> 4:2:2	10bit	720 × 487	59.94 /I
		720 × 576	50 /I
		1280 × 720	60/59.94/50 /P
		1920 × 1080	60/59.94/50 /P*
			60/59.94/50 /I

\* Corresponding IP standard SMPTE ST 2022- 6, SMPTE ST 2110- 20.

\* The transmission structure corresponds to 3G-SDI level A and level B.

External synchronize input terminal

Input terminal	BNC terminal
Number of input terminals	1 line 2 terminals
Input impedance	15 kΩ Passive loop through
Input return loss	30 dB or more (50 kHz to 30 MHz, 75 Ω termination)
Maximum input voltage	± 5 V (DC + peak AC)
Input signal	Ternary synchronization signal or NTSC/PAL black burst signal 10 Field ID correspondence
Function	SDI reference signal input for video signal waveform display and phase difference display, Waveform display of external synchronization signal

Headphone output terminal

Output terminal	LV5600 3.5 mm Mini jack 1 terminal (stereo) LV7600 standard jack 1 terminal (stereo)
Output signal	On the screen of the displayed audio signal, arbitrary 2 ch (Downmixed Lt, Rt is also acceptable)

Monitor output terminal

SDI output terminal	
Function	Output screen for SDI monitor
Output terminal	BNC terminal
Number of output terminals	1
Output signal	Output liquid crystal display screen is output with HD, 3G-A, 3G-B-DL. 1920x1080 60, 59.94, 50 I/P, Y <sub>CbCr</sub> 4:2:2 (10 bits)
TMDs output terminal	
Function	The displayed screen is output for HDMI monitor.
Output terminal	HDMI terminal
Number of output terminals	1
Signal format	Single Link T.M.D.S
DDC function	Not supported
HOT PLUG detection function	Not supported
Output signal	Output liquid crystal display screen is output. 1920x1080 60 P, 59.94 P, 50 P

Control terminal

USB terminal	
Terminal shape	Standard A
Number of terminals	2
Standard	USB 2.0
Compatible device	USB memory, USB mouse, touch panel type monitor
For Ethernet terminal control	
Approved standard	IEEE802.3
Supported protocols	TELNET, FTP, SNMP, HTTP, SNTp
Input/output terminals	RJ-45
Function	Remote operation with an external PC or remote controller, File transfer, get status information
Types	10Base-T, 100Base-TX, 1000Base-T
Remote terminal	
Terminal shape	D Sub 15 pins (female)
Number of terminals	1
Control signal	LV- TTL level (LOW active)
Function	Preset recall, input signal switching, alarm output, tally
Alarm output	When a format alarm, various errors, fan abnormality, or internal temperature occurs
RS-422/485 terminal (LV5600-SER 27/LV7600-SER 27)	
Function	Reception of tally, camera ID, camera iris signal
Terminal shape	RJ-45
Number of terminals	2

### Display (LV5600)

Liquid crystal display	7 type TFT color liquid crystal
Resolution	1920x1080
Refresh rate	60 Hz, 59.94 Hz, 50 Hz (Free run or frequency synchronization to external synchronization signal)
Touch panel	Electrostatic capacity type touch panel

### General specifications

Environmental conditions	
Operating temperature range	0 to 40 ° C
Operating humidity range	85% RH or less (with no condensation)
Performance guarantee temperature range	10 to 30 °C
Usage environment	
Usable altitude	Indoors up to 2,000 m
Overtoltage category	II
Pollution degree	2
Power supply	
Voltage	AC 90 to 250 V, 50/60 Hz
Power consumption	TBD W max.

### Dimensions

LV5600	215 (W)x132 (H)x300 (D) mm (No protruding part included)
LV7600	426 (W)x44 (H)x300 (D) mm (No protruding part included)

### Weight

LV5600	TBD kg max. (Including options, accessories not included)
LV7600	TBD kg max. (Including options, accessories not included)

### Accessories

Power cord	x1
Cover inlet stopper	x1
D sub 15 pin connector	x1
D sub 15 pin connector cover	x1
Manual (CR-ROM)	x1
D sub 37 pin connector	x1 (LV5600-SER03/LV7600-SER03)
D sub 37 pin connector cover	x1 (LV5600-SER03/LV7600-SER03)

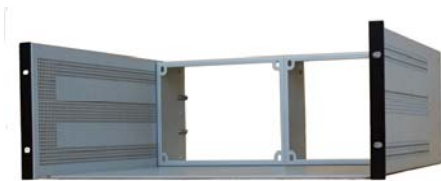
### Options

Remote controller	LV7290 (Ethernet connection)
Rack mount adapter (for LV5600)	TBD
10 GbE multimode SFP + transceiver	AFBR-709 SMZ
10 GbE single mode SFP + transceiver	TBD
AC adapter	SPU61A-105

## Accessories

### LR2560, RACKMOUNT ADAPTER

The LR2560 is a dual rack mount adapter used to install LV5600 waveform monitors in a 19-inch EIA standard rack. It allows two LV5600s to be installed side by side.



### SFP + Transceiver

(For LV5600-SER05/LV7600-SER05)  
AFBR-709SMZ (10 GbE multi mode)  
\*\*\*\*\_\*\*\*\*\* (10 GbE single mode)

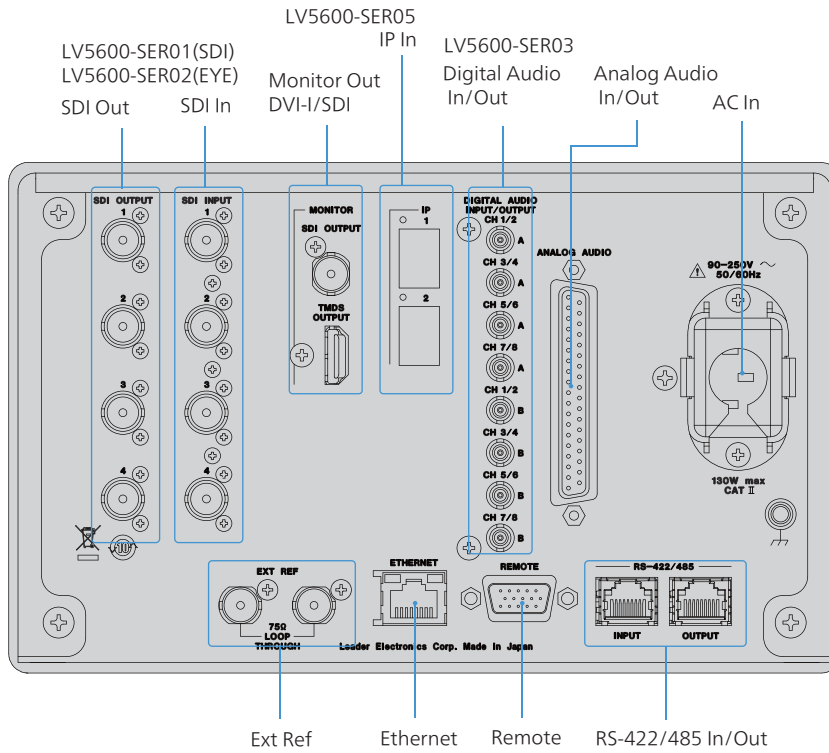


### LC2565, BLANK PANEL

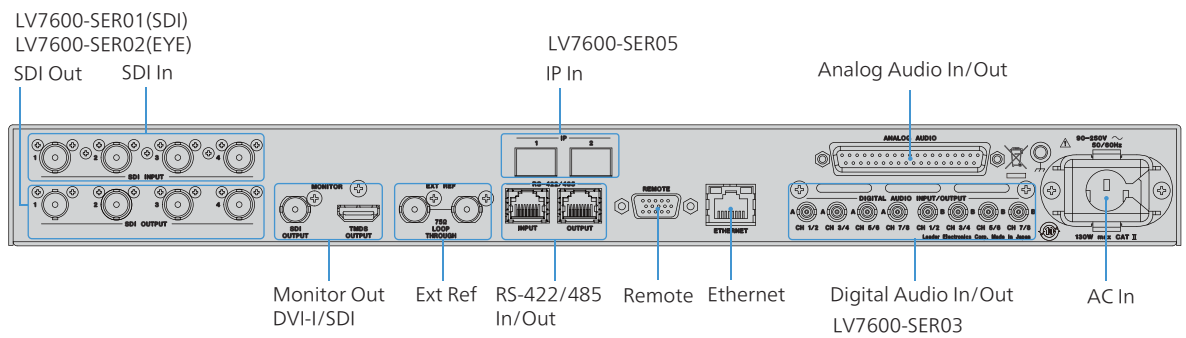
The LC2565 is a blank panel for the LR2560 rack mount adapter. Use it when installing a single LV5600 waveform monitor in the LR2560.



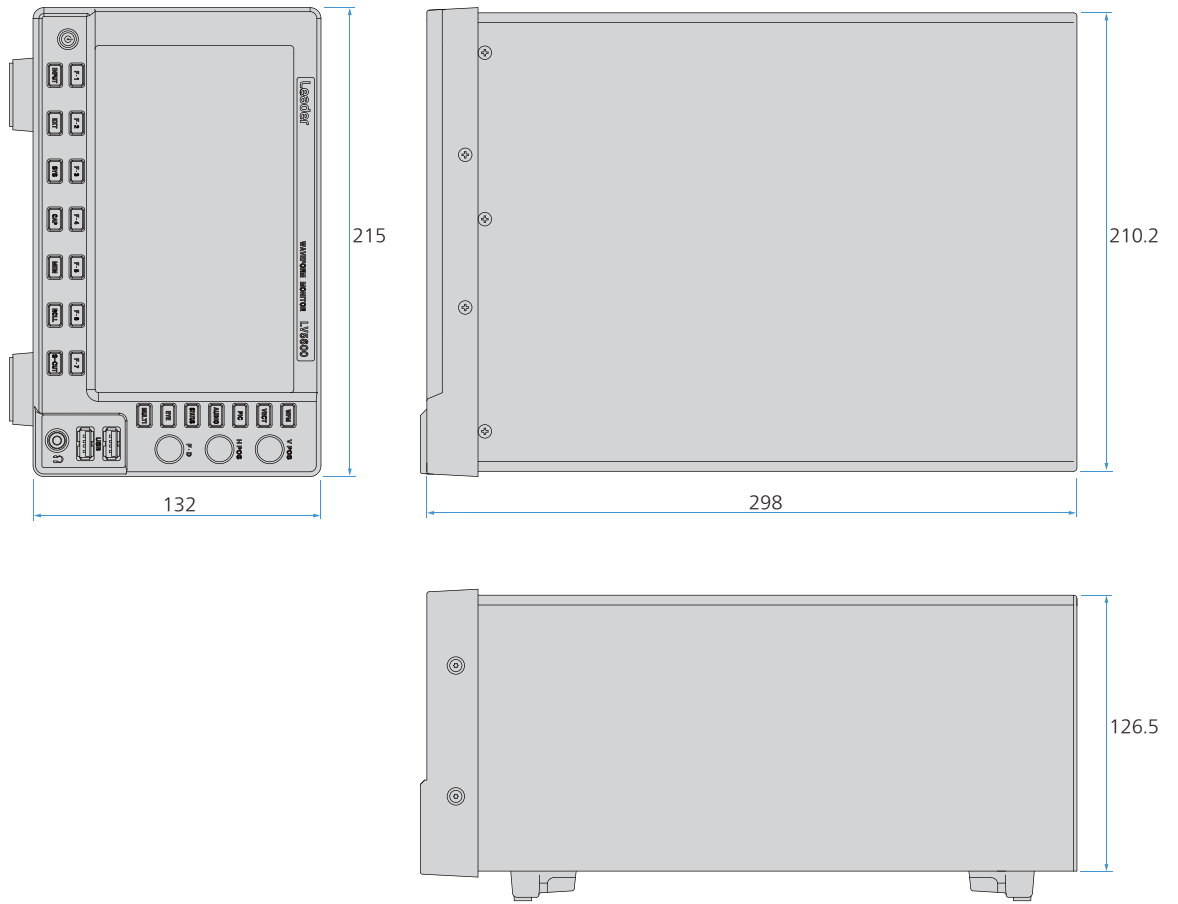
LV5600



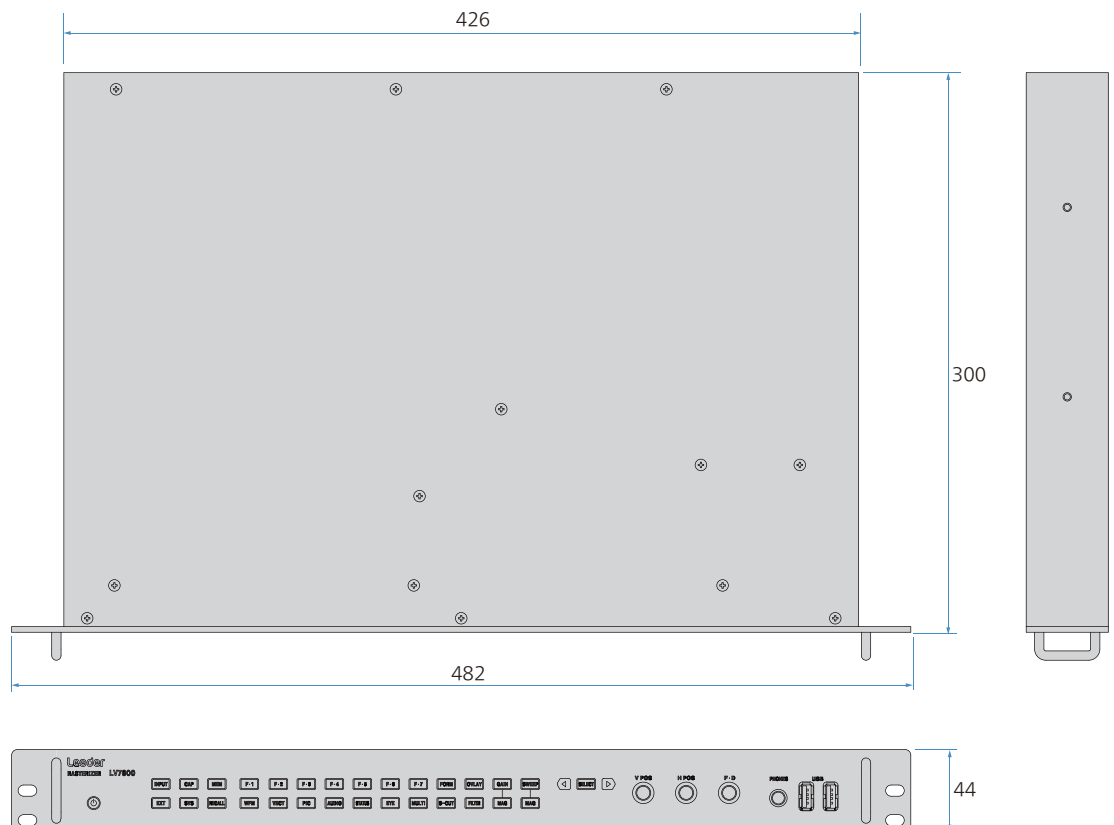
LV7600



LV5600



LV7600



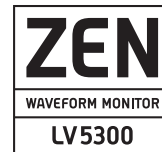




## LV5300 WAVEFORM MONITOR

## LV7300 RASTERIZER

4K 12GSDI 3GSDI HDSDI  
SDSDI



## / General

The LV5300/LV7300 is a space-saving, compact WAVEFORM MONITOR specialized for 4K/HD/SD-SDI video signals. The LV5300 is a waveform monitor with a 7-inch touch screen display in a compact 3 U enclosure operative with battery power supply. LV7300 is a 1U half rack size rasterizer. It is compact but supports eye pattern measurement up to 12 G-SDI.

## / Features

### Supports various signal inputs

Various SDI signals up to 12 G-SDI can be observed/monitored. Audio signals can correspond to SDI embedded voice.

### Excellent operability

With the front panel equipped with key buttons and knobs that follow the operability of conventional models, operation with a USB mouse is also possible. In addition, the LV5300 adopts a 7-inch full HD panel with a touch panel function, and the LV7300 can be operated and set intuitively by touch operation by connecting an external LCD adopted touch panel with a USB cable.

\* It does not guarantee operation with external LCD monitors adopted by all touch panels.

### SDI input format

SD-SDI, HD-SDI, 3G-SDI, 12G-SDI Single Link is supported.

### Transmission quality analysis function

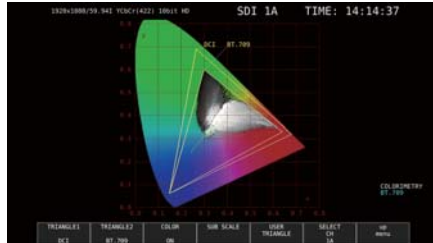
In addition to monitoring of various transmission errors, external synchronization phase difference display, lip sync measurement, SDI signal frequency deviation measurement function, an ancillary data analysis function with increased importance as a 4K video signal is also realized.

### Video analysis function

Various video signals include video signal waveform display, vector display, picture display 5 BAR display, CIE chromaticity diagram display, CINELITE, etc.

In addition to the various displays, freeze error, Black error, gamut error detection Function etc. Quality control (QoE) of video signals Functions Features are equipped.

xy chromaticity coordinate display



### Voice analysis function

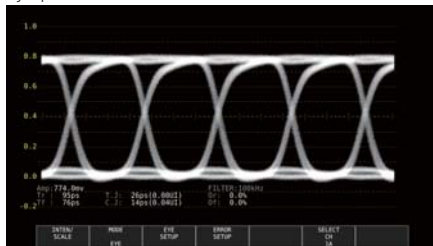
For audio signals, SDI signals and audio signals superimposed on SDI signals can be displayed on a level meter. Furthermore, Lissajous display, mute, clip error detection, loudness measurement, etc. are available. Audio format is compatible with L-PCM.

### Eye pattern display

From SD-SDI to 12G-SDI

In the physical layer measurement of the SDI signal Some eye pattern display, and jitter display is possible.

Eye pattern



### Subtitles/closed caption decode display function

Japanese subtitles and CEA-608, CEA-708 closed caption, Teletext, OP47 subtitle superimposed on SDI signal can be decode displayed.

### External synchronization signal input

The phase difference and synchronization status of each SDI video signal graphically based on the external synchronization signal (black burst, tri-level sync) can be confirmed.

### Customizable layout

Various items such as video signal waveforms, vector waveforms, and pictures of input signals can be laid out in any position with your preferred size.

### SDI signal generation function

SDI signal generation function can handle from HD-SDI to 12G-SDI. HD multiformat color bar and pattern corresponds to the multiple overlays of moving boxes and embedded audio, flat field pattern can be specified at any level, multiformat color bar 4K can be selected.

### External monitor output

Since the measurement screen can be output as SDI and TMDS from the monitor output terminal, it can be displayed on an external SDI monitor or HDMI monitor with full HD resolution.

- \* Does not guarantee the operation with all HDMI monitors.
- \* LV5300 does not support TMDS output.

### Capture function

It is equipped with a screen capture function to capture the display screen as still image data and a frame capture function.

### Time code display

The time code superimposed on SDI signals can be displayed. The time code can also be used as the timestamp of the event log.

### External remote terminal

The presets can be recalled by contact terminals, and switching input signals and tally displays and outputting alarms can be conducted.

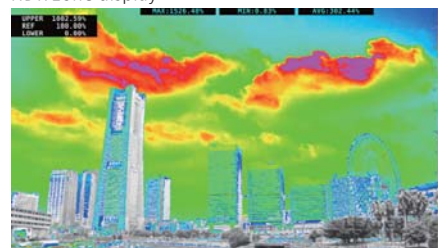
### Ethernet terminal

By connecting to the PC, remote operation by TELNET, file transfer by FTP, remote operation by SNMP and alarm notification, remote operation and monitoring from the browser via HTTP can be done.

### HDR

The level management is possible at the assumed luminance (cd/m<sup>2</sup>) in a display considering HDR signal level monitoring and OOTF. The video signal waveform display corresponds to the HDR scale added to the IRE scale. In the cine zone display, the luminance distribution of the HDR area can be easily confirmed at the state where the SDR area is monochrome, the HDR is colored according to the brightness.

HDR zone display



### Focus Assist

We developed a new focus detection algorithm based on nonlinear super-resolution technology, and accordingly the focus with high sensitivity can be detected even with low-contrast images, which were conventionally difficult to detect.

### Tally display

Fast switching of tally display by remote terminal is also possible.

**List of hardware options**

Model Name	Type Number		Function
	LV5300	LV7300	
SDI INPUT	LV5300-SER01	LV7300-SER01	SD, HD, 3G SDI input *
SDI INPUT/EYE	LV5300-SER02	LV7300-SER02	SD, HD, 3G SDI input and eye pattern display *
BATTERY ADAPTER V MOUNT	LV5300-SER11	–	V mount type battery adapter
BATTERY ADAPTER QR GOLD	LV5300-SER12	–	QR gold mount type battery adapter

\* For LV5300, one of LV5300-SER01 and LV5300-SER02 is selected, but one of them is necessary.  
 For LV7300, either LV7300-SER01 and LV7300-SER02 are selected, but one of them is necessary.

**Software option list**

Model Name	Type Number		Function
	LV5300	LV7300	
AUDIO	LV5300-SER20	LV7300-SER20	AUDIO display function
CLOSED CAPTION	LV5300-SER21	LV7300-SER21	Japanese subtitles, EIA-608, 708, TELETEXT
CIE	LV5300-SER22	LV7300-SER22	CIE chart display function
HDR	LV5300-SER23	LV7300-SER23	HDR measurement function
TSG	LV5300-SER24	LV7300-SER24	SDI signal generation function
FOCUS ASSIST	LV5300-SER25	LV7300-SER25	Focus assist display Function
LAYOUT	LV5300-SER26	LV7300-SER26	Custom layout function
TALLY	LV5300-SER27	LV7300-SER27	ID/iris/tally display function
4K	LV5300-SER28	LV7300-SER28	4K video signal correspondence function
12G-SDI	LV5300-SER28	LV7300-SER28	12G-SDI compatible

### LV5300-SER01 / LV7300-SER01, SDI Input

#### LV5300-SER02 / LV7300-SER02, SDI input with eye pattern

It is a unit that can display various SDI signals.

- Video analysis function

Various types of video signals, in addition to a variety of displays such as video signal waveform displays, vector display, picture display, 5 BAR display, the CIE chromaticity diagram and CINELITEII., video signal quality (QoE) freezes error, error black, gamut error detection, etc. are equipped as standard equipment.

- Voice analysis function

The audio signals superimposed on SDI signals can be displayed on a level meter.

\* Lissajous, surround and status can be displayed by adding LV5300-SER20/LV5300-SER20.

- SDI signal data analysis function

The status display has an error detection function of CRC and embedded sound. It also has an event log, data dump, phase difference measurement functions, and can analyze SDI signals.

- Screen capture function

A screen capture function to capture the display screen as still image data and a frame capture function to capture 16 frames of data are equipped. The captured data can be saved in BMP format in comparison with the input signal, as well as the display on the main body, and thus confirmation with the personal computer is possible.

- Time code display

The time code superimposed on SDI signals and IP signals can be displayed. The time code can also be used as the timestamp of the event log.

- Input/output terminal

SDI input terminal BNC connector 2 terminal

SDI output terminal BNC connector 2 terminal  
(main body standard equipment)

Output reclock signal

The SDI signals of the input terminals are reclock output to the output terminals, respectively.

Select reclock signal

The signals of the input terminals can be switched/reclock output

- Audio level meter (8ch)

Embedded voice SMPTE ST 299, SMPTE ST 272  
48 kHz/24 bit/L-PCM

Synchronization condition All are synchronized with the video clock. All input SDI signals are synchronized.

- Eye pattern display (LV5300-SER02/LV7300-SER02)

The eye pattern waveform, jitter waveform of SDI signal, and the measurement result of each parameter can be displayed. Only input terminal 1 corresponds to eye pattern display.

### LV5300-SER11, Battery V mount

#### LV5300-SER12, Battery QR golden mount

LV5300-SER11

V mount adapter for battery compatible with IDX battery.

LV5300-SER12

QR Golden Mount Adapter for Battery Compatible with Anton Bauer Battery.

LV5300-SER11 V Mount

LV5300-SER12 Antonbauer



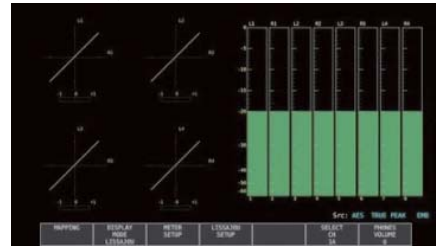
### LV5300-SER20 / LV7300-SER20,

#### Digital/analog voice input/output

- Voice analysis

Lissajous display, surround display, mute, clip error detection, etc. are now available. Various analysis display is also possible, and simultaneously display of 8 channels from one SDI signal and 4 channels from 2 SDI signals is possible. Embedded audio playback system complies with SMPTE ST 299, 272.

Audio display



### LV5300-SER21 / LV7300-SER21,

#### Closed caption display function

- Closed caption display function

CEA-608, CEA-708 closed caption, Teletext, OP47 subtitle superimposed on SDI signal can be decode displayed.

- Japanese subtitle simplified display function

Japanese subtitles are simply displayed on the picture screen (HD, SD, analog, portable subtitles) are selected/displayed.

Language 1 and 2 are selected/displayed.

Approved standard.

ARIB STD-B37 short form data.

Japanese subtitle simplified display



**LV5300-SER22 / LV7300-SER22, CIE chart display function**

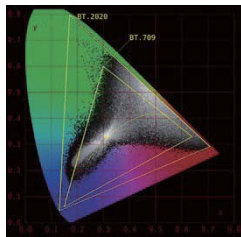
• CIE chart display function

This is a chromaticity diagram display function corresponding to colorimetry ITU- R BT. 601, ITU- R BT. 709, ITU- RBT. 2020.

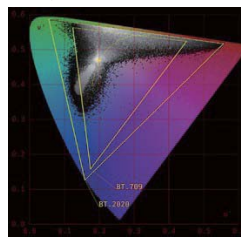
The display mode corresponds to CIE 1931 (xy display) and CIE 1976 (u'v 'display). Since the CIE chart display function can display two color gamuts, the function can be used to suppress the color gamut of BT.709 using the equipment compatible with BT.2020, and to confirm the content that exceeds the color gamut of BT.709.

In color display, the chromaticity point is displayed using the color (on the picture) in the video signal. The chromaticity point can be measured at the point with the cursor.

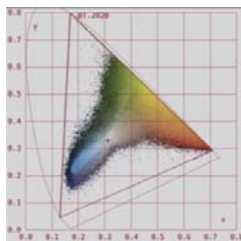
xy chromaticity coordinate display



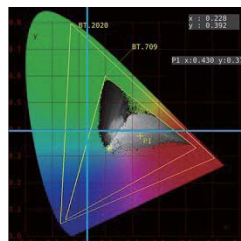
u' v' chromaticity coordinate display



xy coordinate color indication



A light blue is a measurement function cursor

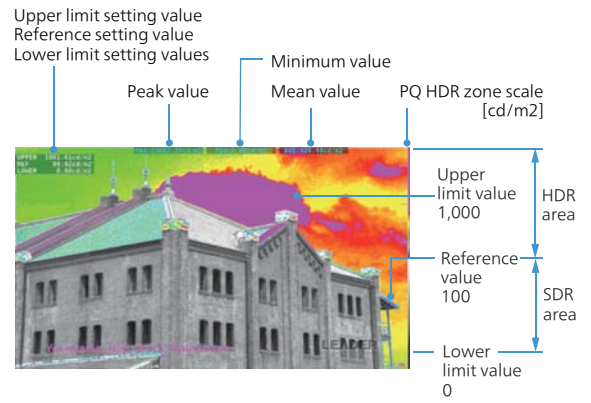


**LV5300-SER23 / LV7300-SER23, HDR measurement function**

In addition to HLG and PQ provided by ITU-R BT.2100, the level monitoring of the HDR signal corresponding to S-log3 and the level management at the assumed luminance (cd /m2) in a display considering OOTF are possible. The video signal waveform display corresponds to the HDR scale added to the IRE scale. In the cine zone display, the luminance distribution of the HDR area can be easily confirmed by displaying the SDR area with monochrome, and the HDR with a color according to the brightness.

• HDR zone display

The luminance distribution of the HDR area can be easily confirmed by coloring the SDR area with monochrome and the HDR with a color according to the brightness.



- The SDR part is monochrome, the HDR region is colored according to luminance.

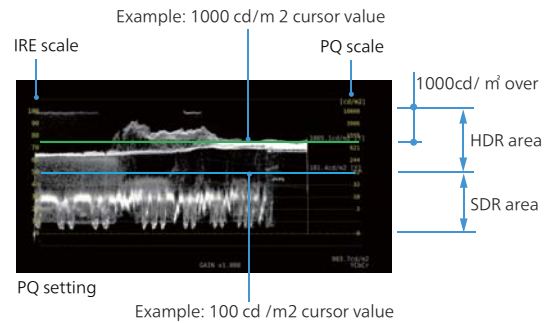
- Above the upper limit value is colored with magenta.

- The upper limit value, the reference value, the lower limit value can be varied

• HDR Scale

By associating WFM and histogram with HDR scale, management of the video with brightness at the time of scene linearity is possible.

• HDR waveform display.



• HDR point measurement

- The crosshairs can be freely moved.

- Up to 3 points can be measured simultaneously.



P1(S: 884,L: 261)3243.6cd/m2

HLG setting SYSTEM GAMMA OFF

P1(S: 884,L: 261) 623.9%

HLG setting System Gamma On

P1(S: 884,L: 261) 456.1cd/m2

S-Log3 setting System Gamma Off

P1(S: 884,L: 261) 809.1%

• Approved standard

ITU-R BT. 2100 (HLG, PQ), S-Log 3

• Supported format

It corresponds to all except SD and XYZ input of SDI.

**LV5300-SER24 / LV7300-SER24,  
SDI signal generation function**

SDI signal generation function can handle from HD-SDI to 12G-SDI. HD multiformat color bar and pattern correspond to the multiple overlays of moving boxes and embedded audio, flat field pattern can be specified at any level, and multiformat color bar 4K can be selected.

With the 4K pattern of 3G-SDI quad link, the phase of each link can be shifted and output, and thus confirmation of the pull-in margin of the receiving device is possible.

The SDI signal generation function of 12G-SDI requires LV5300-SER28/LV7300-SER28 options.

\* The LV5300/LV7300 are output from the SDI output terminal 2 according to the output setting.

Standard

- Output pattern

100% color bar, 75% color bar, HD multi format color bar, color raster, cross hatch, 10 steps, limit lamp, passive logical, lip sync pattern.

- Scroll

Direction 8 directions (up and down, left and right, and combinations thereof)

Speed range and unit 4 to 124 dots per frame (field), 4 dot units.

Moving Box ON/OFF

Color WHITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE, BLACK

Speed 1 to 3

- Embedded voice

1 Number of superimposed channels maximum 16 ch

ON/OFF of superimposition ON/OFF in audio group unit

Voice level- 20 dBFS, -18 dBFS, 0 dBFS, Mute

\*Flame rate For horizontal 4096/2048 pixel format at frame.

**LV5300-SER25 / LV7300-SER25, Focus assist function**

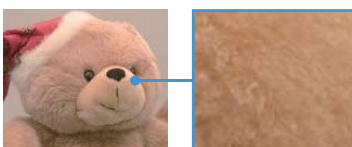
This is a focus detection function realizing a new algorithm based on nonlinear super resolution technology. The focus can be detected with high sensitivity even with low-contrast images, which were conventionally difficult to detect. In addition, sensitivity can be selected from 5 levels according to the video scene.

Focus assist display



After focus adjustment

(The green part is the focus adjustment point )



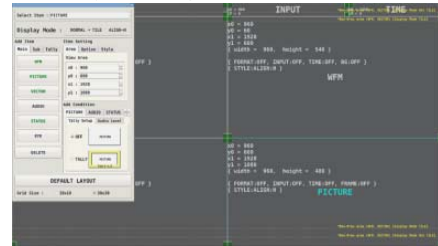
Enlarged view

(After focus adjustment)

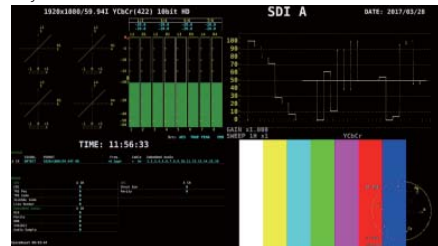
**LV5300-SER26 / LV7300-SER26, Custom layout function**

Various items such as video signal waveforms, vector waveforms, and pictures of input signals can be laid out in any position with your preferred size. Two input signals can be displayed simultaneously, or one input signal can be displayed on multiple screens.

Custom layout setting screen



Layout Set measurement screen



**LV5300-SER27 / LV7300-SER27, ID/tally display function**

Fast switching of tally display by remote terminal is also possible.

As for the camera ID, a fixed name can be assigned to each channel in the setting of this unit.

**LV5300-SER28 / LV7300-SER28,**

**4K video signal compatible function**

- 4K/12G-SDI compatible

It supports 4K video format signal of 12G-SDI single link.

\* 12G-SDI signal is input terminal 1 only.

**LV7290, Remote Controller**

The LV7290 remote controller connects to the Ethernet port on the rear panel of the LV5600/LV7600 and can be used to remotely control the LV5300/LV7300. A single unit can connect and control up to eight LV5300/LV7300s.

Dimensions and weight: ≤ 482 (W) X 44 (H) X 110 (D) mm (excluding protrusions), 1.2 kg



SDI video signal format and standard

SD video signal format and standard

Color System	Quantization	Image	Field Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	720 × 487	59.94 /I	SMPTE ST 259
		720 × 576	50 /I	

HD video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	1280 × 720	60/59.94/50/	SMPTE ST 292-1
			30/29.97/25/24/23.98 /P	
			60/59.94/50 /I	SMPTE ST 274
		1920 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 292-1
			30/29.97/25/24/23.98 /PsF	
			30/29.97/25/24/23.98 /PsF	

3G-A video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard	
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274	
			48/47.95 /P		SMPTE ST 425-1
			2048 × 1080	60/59.94/50/48/47.95 /P	
		12bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	SMPTE ST 425-1
				30/29.97/25/24/23.98 /PsF	
	2048 × 1080		30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
	YCbCr 4:4:4	10bit	1280 × 720	60/59.94/50/	SMPTE ST 296
				30/29.97/25/24/23.98 /P	
				1920 × 1080	60/59.94/50 /I
2048 × 1080			30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
12bit		1920 × 1080	60/59.94/50 /I	SMPTE ST 274	
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
		2048 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
RGB 4:4:4	10bit	1280 × 720	60/59.94/50/	SMPTE ST 296	
			30/29.97/25/24/23.98 /P		SMPTE ST 425-1
			1920 × 1080	60/59.94/50 /I	
		2048 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
	12bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274	
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
		2048 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
XYZ 4:4:4	12bit	2048 × 1080	30/25/24 /P	SMPTE ST 372	
			30/25/24 /PsF	SMPTE ST 428	
		2048 × 1080	30/25/24 /P	SMPTE ST 425-1	
			30/25/24 /PsF		

3G-B-DL video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard	
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /P	SMPTE ST 274	
			48/47.95 /P		SMPTE ST 372
			2048 × 1080	60/59.94/50/48/47.95 /P	
		12bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	SMPTE ST 372
				30/29.97/25/24/23.98 /PsF	
	2048 × 1080		30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
	YCbCr 4:4:4	10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	
				2048 × 1080	30/29.97/25/24/23.98 /PsF
12bit			1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	SMPTE ST 372
				30/29.97/25/24/23.98 /PsF	
		2048 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
RGB 4:4:4		10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	
				2048 × 1080	30/29.97/25/24/23.98 /PsF
	12bit		1920 × 1080	60/59.94/50 /I	SMPTE ST 274
				30/29.97/25/24/23.98 /P	SMPTE ST 372
				30/29.97/25/24/23.98 /PsF	
		2048 × 1080	30/29.97/25/24/23.98 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF		
			30/29.97/25/24/23.98 /PsF		
	XYZ 4:4:4	12bit	2048 × 1080	30/25/24 /P	SMPTE ST 372
				30/25/24 /PsF	SMPTE ST 428

3G-B-DS video signal format and standard

Color System	Quantization	Image	Frame (Field) Frequency / Scanning	Compliant Standard
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50 /I	SMPTE ST 274
			30/29.97/25/24/23.98 /P	
			30/29.97/25/24/23.98 /PsF	
		1280 × 720	60/59.94/50/	SMPTE ST 296
			30/29.97/25/24/23.98 /P	

12G video signal format and standard (2 sample interleave)

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard		
YCbCr 4:2:2	10bit	3840 × 2160	60/59.94/50 /P	SMPTE ST 2036-1		
			48/47.95/P		SMPTE ST 2082-10	
			4096 × 2160	60/59.94/50/48/47.95 /P		SMPTE ST 2036-1
		12bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1	
				30/29.97/25/24/23.98 /P	SMPTE ST 2082-10	
				4096 × 2160		30/29.97/25/24/23.98 /P
	YCbCr 4:4:4		10bit	3840 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1
					4096 × 2160	30/29.97/25/24/23.98 /P
				12bit	3840 × 2160	30/29.97/25/24/23.98 /P
		4096 × 2160	30/29.97/25/24/23.98 /P			SMPTE ST 2082-10
		RGB 4:4:4	10bit		3840 × 2160	30/29.97/25/24/23.98 /P
				4096 × 2160		30/29.97/25/24/23.98 /P
12bit	3840 × 2160			30/29.97/25/24/23.98 /P	SMPTE ST 2036-1	
			4096 × 2160	30/29.97/25/24/23.98 /P	SMPTE ST 2082-10	

\* It corresponds to TYPE 1 of 12G-SDI.

### External synchronize input terminal

Input terminal	BNC terminal
Number of input terminals	1 line 2 terminals
Input impedance	15 k $\Omega$ Passive loop through
Input return loss	30 dB or more (50 kHz to 30 MHz, 75 $\Omega$ termination)
Maximum input voltage	$\pm$ 5 V (DC + peak AC)
Input signal	Ternary synchronization signal or NTSC/PAL black burst signal 10 Field ID correspondence
Function	SDI reference signal input for video signal waveform display and phase difference display, Waveform display of external synchronization signal
* External signal waveform display is available only for LV5600/LV7600.	

### Headphone output terminal

Output terminal	LV5300 3.5 mm Mini jack 1 terminal (stereo) LV7300 Standard jack 1 terminal (stereo)
Output signal	On the screen of the displayed audio signal, arbitrary 2 ch (Downmixed Lt, Rt is also acceptable)

### Monitor output terminal (Excluding LV5300)

SDI output terminal	
Function	Output screen for SDI monitor
Output terminal	BNC terminal
Number of output terminals	1
Output signal	Output liquid crystal display screen is output with HD, 3G-A, 3G-B-DL. 1920x1080 60, 59.94, 50 I/P, YC <sub>B</sub> C <sub>R</sub> 4:2:2 (10 bits)
TMDS output terminal	
Function	The displayed screen is output for HDMI monitor.
Output terminal	HDMI terminal
Number of output terminals	1
Signal format	Single Link T.M.D.S
DDC function	Not supported
HOT PLUG detection function	Not supported
Output signal	Output liquid crystal display screen is output. 1920x1080 60 P, 59.94 P, 50 P

### Control terminal

USB terminal	
Terminal shape	Standard A
Number of terminals	2
Standard	USB 2.0
Compatible device	USB memory, USB mouse, touch panel type monitor

For Ethernet terminal control

Approved standard	IEEE802.3
Supported protocols	TELNET, FTP, SNMP, HTTP, SNTP
Input/output terminals	RJ-45
Function	Remote operation with an external PC or remote controller, File transfer, get status information
Types	10Base-T, 100Base-TX, 1000Base-T
Remote terminal	
Terminal shape	D Sub 15 pins (female)
Number of terminals	1
Control signal	LV- TTL level (LOW active)
Function	Preset recall, input signal switching, alarm output, tally
Alarm output	When a format alarm, various errors, fan abnormality, or internal temperature occurs

### Display (LV5300)

Liquid crystal display	7 type TFT color liquid crystal
Resolution	1920x1080
Refresh rate	60 Hz, 59.94 Hz, 50 Hz (Free run or frequency synchronization to external synchronization signal)
Touch panel	Electrostatic capacity type touch panel

### General specifications

Environmental conditions	
Operating temperature range	0 to 40 ° C
Operating humidity range	85% RH or less (with no condensation)
Performance guarantee temperature range	10 to 30 ° C
Usage environment	Indoors
Usable altitude	up to 2,000 m
Overvoltage category	I
Pollution degree	2
Power supply	
Voltage	DC 10 to 18 V
Power consumption	TBD W max.
Dimensions	
LV5300	215 (W)x132 (H)x85 (D) mm (No protruding part included)
LV7300	213 (W)x44 (H)x300 (D) mm (No protruding part included)
Weight	
LV5300	TBD kg max. (Including options, accessories not included)
LV7300	TBD kg max. (Including options, accessories not included)



## Accessories

D sub 15 pin connector	x1
D sub 15 pin connector cover	x1
Manual (CR-ROM)	x1

## Options

Remote controller	LV7290 (Ethernet connection)
Rack mount adapter (for LV5300)	TBD
Rack mount adapter (for LV7300)	TBD
10 GbE multimode SFP + transceiver	AFBR-709 SMZ
10 GbE single mode SFP + transceiver	TBD
AC adapter (LV7300 is included)	SPU61A-105

## Accessories

### LR2530, RACKMOUNT ADAPTER

The LR2530 is a dual rack mount adapter used to install LV5300 waveform monitors in a 19-inch EIA standard rack. It allows two LV5300s to be installed side by side.



### LC2535, BLANK PANEL

The LC2535 is a blank panel for the LR2530 rack mount adapter. Use it when installing a single LV5300 waveform monitor in the LR2530.



### LR2731, RACKMOUNT ADAPTER

The LR2731 is a rack mount adapter used to install a LV7300 rasterizer in a 19-inch EIA standard rack. Because one side is a blank panel, use it to install a single LV7300.

### LR2732, RACKMOUNT ADAPTER

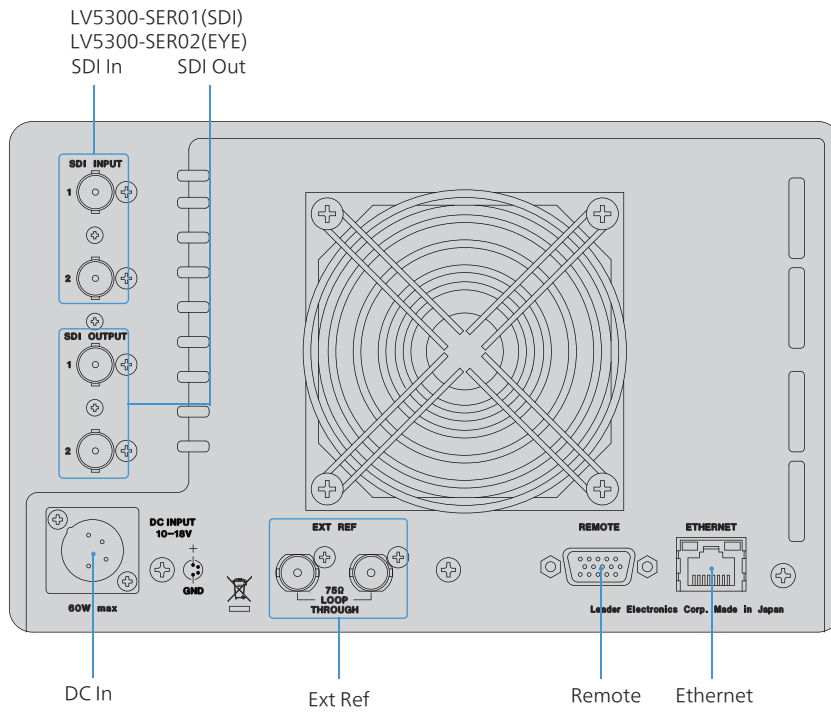
The LR2732 is a dual rack mount adapter used to install LV7300 rasterizers in a 19-inch EIA standard rack. It allows two LV7300s to be installed side by side.

### SPU61A-105, AC Adapter

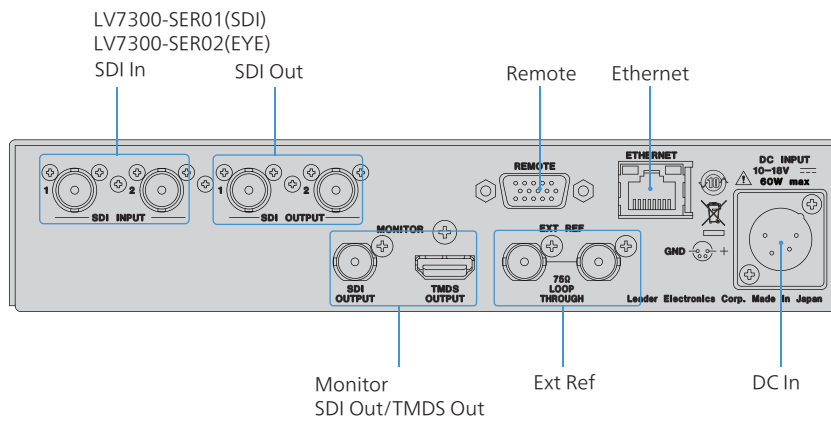
An AC adapter exclusive to Leader products. An AC cord is included.



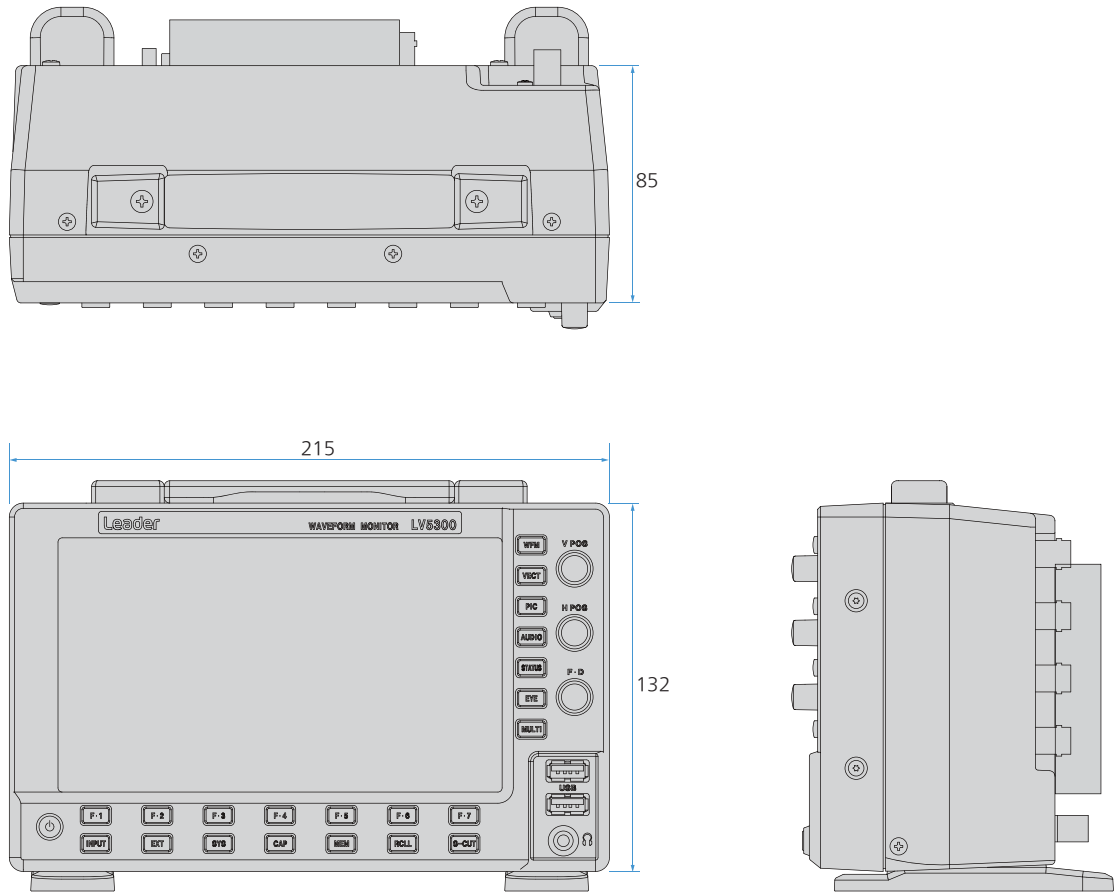
LV5300



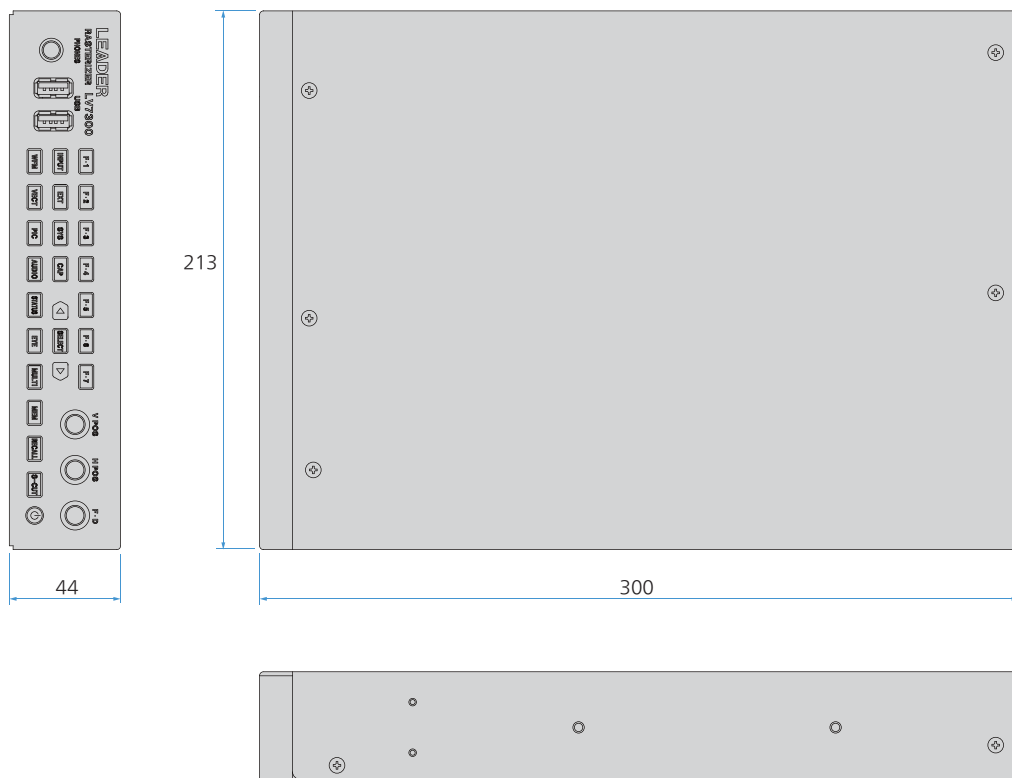
LV7300



LV5300



LV7300



# LV5490

## MULTI WAVEFORM MONITOR

4K 12GSDI 3GSDI HDSDI SDSDI  
HDR IP



### / General

The LV5490 is a multi waveform monitor that supports 4K video format (4096 × 2160, 3840 × 2160) based on 3G-SDI dual link or quad link, HD-SDI quad link, and 12G-SDI.

The following two 4K video division transmission systems are supported.

- 2-SAMPLE INTERLEAVE DIVISION
- SQUARE DIVISION

The display is a 9-inch full high definition LCD enabling the LV5490 to also be used as a high-quality picture monitor. In addition, the LV5490 supports simultaneous display of four 3G-SDI signal inputs and 1080 × 1920 (2048)/60p RGB 4:4:4 format based on 3G-SDI dual link.

It also supports CIE chart display and HDR display.

The LV5490 is equipped with SDI and DVI output connectors. The content shown on the LV5490 display can be shown on an external full high definition monitor.

**Full High Definition LCD**

The LV5490 is equipped with a 9-inch full high definition LCD with excellent viewing angle and color reproducibility.

**Flexible Free Layout Function**

Display areas such as waveform, vector, picture, and audio can easily be changed using a USB mouse.

**USB Mouse Operation**

A USB mouse can be used to operate the panel.

**External Monitor Output and SDI Routing**

The measurement screen can be output in SDI or DVI-D from the monitor output connector. The output signal can be displayed on an external LCD in full high definition resolution. In addition, an SDI signal received through one of the SDI input or SDI I/O connectors can be relocked and output, serving as a routing function.

**External Remote Control Connector**

The remote connector can be used to load presets, switch the input signal, and transmit alarms.

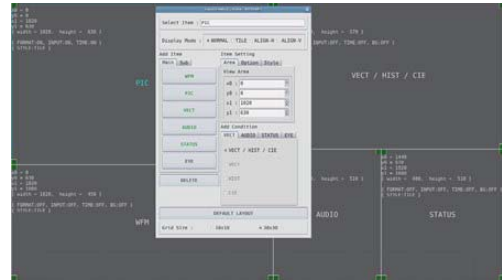
**Fan Control**

Five fan rotation settings are available. A quiet setting can be used depending on the surrounding environment.

**Flexible Free Layout Function**

Display areas such as waveform, vector, picture, and audio can easily be changed using a USB mouse.

Example of a display layout creation screen



Display example



**Combinations of Options**

Option model	Name	Combination pattern									
		01	02	03	04	05	06	07	08	09	10
LV5490-SER01	SDI INPUT	●		●							
LV5490-SER02	SDI INPUT / EYE		●		●						
LV5490-SER03	DIGITAL AUDIO			●	●	●		●		●	
LV5490-SER04	FOCUS ASSIST	○	○	○	○	○	○	○	○	○	○
LV5490-SER05	CIE DIAGRAM	○	○	○	○	○	○	○	○	○	○
LV5490-SER06	12G-SDI INPUT					●	●	●	●		
LV5490-SER07	HDR	○	○	○	○	○	○	○	○	○	○
LV5490-SER08	IP (NMI)									●	●
LV5490-SER09	12G-SDI EYE					○	○				
LV5490-SER10	NOISE METER	○	○	○	○	○	○	○	○	○	○
LV5480-SER20	4K (LV5480 Only)	○	○	○	○	○	○	○	○	○	○
LV5480-SER21	TSG (LV5480 Only)	○	○	○	○	○	○	○	○	○	○

- : Installed
- : Installed or not installed

### LV5490-SER01/02/06/08, Multi 4K Video Inputs

Up to two 3G-SDI quad link 4K video inputs and up to four 3G 4K video inputs can be displayed by switching. The LV5490-SER06/08 supports 12G-SDI input. When 12G-SDI signals are input to the LV5490-SER06, one of the four inputs can be selected and displayed.

### LV5490-SER01/02/06/08, Up to Eight SDI Signal Inputs and Four Simultaneous Input Display

Up to eight inputs can be supported by using the four input-only connectors and four input/output bidirectional connectors. All inputs support 3G-SDI, HD-SDI, and SD-SDI, and four simultaneous display is possible. The four input-only connectors (LV5490-SER01/02) feature an equivalent cable length meter function that allow the SDI signal attenuation to be displayed in terms of cable length. The LV5490-SER06/08 has a 12G-SDI serial clock output connector. You can select one of the four inputs to be transmitted from this output.

### LV5490-SER01/02/06/08, Pattern Generator Function and Reclock Output

Using the input/output bidirectional connectors as output connectors enables the LV5490 to be used as an HD, 3G, 4K still-image pattern generator. The connectors can also be used as SDI reclock signal outputs for the input-only connectors. The LV5490-SER06/08 has a 12G-SDI test pattern output connector.

### LV5490-SER01/02/06/08, SDI Signal Data Analysis Feature

The status display features an equivalent cable length meter function for SDI signals (SDI input-only connectors only) and a function for detecting CRC and embedded audio errors. It also features SDI signal analysis functions that display event logs, data dumps, phase difference between an external sync signal and SDI signal, and phase difference between multiple SDI signals.

### LV5490-SER01/02/06/08, Frequency Deviation Measurement

The deviation in the SDI signal sampling frequency can be measured. This can be used to verify the deviations in the field frequency and frame frequency.

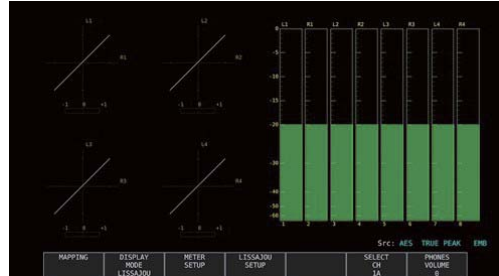
### LV5490-SER01/02/06/08, Frame Capture Feature

The LV5490 is equipped with a frame capture feature, which captures single frames in an SDI signal. The frame capture feature can be used to capture frames manually or automatically when errors occur. Data can be analyzed using a dedicated application. (VEC, WFM, PIC can be captured.)

### LV5490-SER03, Digital Audio I/O

The LV5490-SER03 can decode embedded audio in SDI signals and show Lissajous, surround, and meter displays. 16 channels from a single SDI signal input can be decoded and displayed. When decoding the audio of four SDI signal inputs simultaneously, four channels per input can be decoded and displayed.

Audio display



### LV5490-SER04, Focus Assist

This is a focusing function achieved from a new algorithm based on nonlinear super-resolution technology. It allows highly sensitive focusing even on low-contrast images that were difficult to be focused in on in the past. You can select the sensitivity from the five available levels according to the image scene.

Enlarged view (after focus adjustment)



After focus adjustment  
(The green area is the focus adjustment point.)

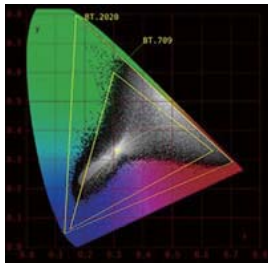


### LV5490-SER05, CIE Chromaticity Coordinate Display

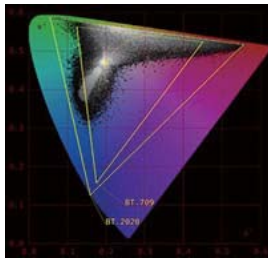
This is a chromaticity diagram display function that supports ITU-R BT.601, ITU-R BT.709, and ITU-R BT.2020 colorimetricies. Display mode supports CIE 1931 (xy display) and CIE 1976 (u'v' display). The chromaticity diagram display function can display two color-space triangles. As such, it can be used to suppress contents within the BT.709 color space using a BT.2020 compatible device or to confirm the contents that exceed the BT.709 color space.

On the color display, chromaticity points are shown using colors in the video signal (on the picture). Chromaticity points can be measured using the cursor. When Cinelite Advance is used, a point marker corresponding to the picture cursor and its values are shown on the chromaticity diagram.

Example of xy chromaticity coordinate display



Example of xy chromaticity coordinate display



### LV5490-SER06, 12G-SDI Input

This unit is for monitoring SDI signals up to 12G-SDI. When 12G-SDI signals are input, you can select one of four inputs. When signals up to 3G-SDI are input, four inputs can be displayed simultaneously. For 4K video formats, 12G-SDI single link, 3G-SDI dual link, and quad link are supported.

### LV5490-SER07, HDR

This is a software option to support 4K HDR video signals. On the picture display, the SDR area, which is the brightness range for conventional images, is displayed in monochrome. Coloring is applied to the HDR area, which exceeds the SDR area, according to the brightness. This makes it easy to check the brightness distribution in the HDR area. In addition, the waveform display supports various HDR standard scales, which can be used to manage levels based on scene linear brightness.

Original image



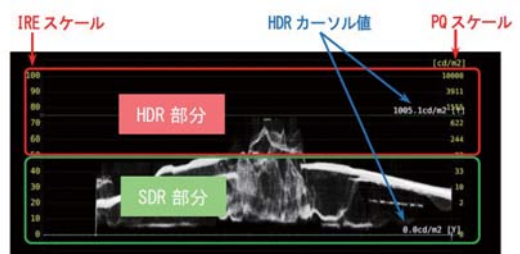
HDR zone display



HDR value display using a cross-hair cursor



Waveform display of the HDR area and SDR area



### LV5490-SER08, IP Input

This unit supports video signals in IP 4K video format (3840 × 2160).

It has four 12G, 3G, HD, SD-SDI signal inputs. A single unit can measure IP and SDI input signals simultaneously.

\* The LV5490-SER08 cannot be installed simultaneously with the LV5490-SER01, LV5490-SER02, or LV5490-SER06.

### LV5490-SER09 | 12G-SDI EYE

This option can display and measure the eye patterns and jitters of serial digital signals including 12G-SDI. It enables the measurement and observation of the physical characteristics of not only 12G-SDI signals but also 3G-SDI, HD-SDI, and SD-SDI signals.

The LV5490-SER09 is a license key option for the LV5490-SER06.

\* The LV5490-SER06 cannot be installed simultaneously with the LV5490-SER01, LV5490-SER02, or LV5490-SER08.

### LV5490-SER10, Camera Noise Meter

This is a license option that adds a function for measuring the video noise included in the intensity signals or RGB signals of SDI signals applied to the LV5490. A window for measuring noise can be set. Even when the video levels are not flat due to the effects of the lens or the like, you can select a flat area for making measurements.

Noise meter display

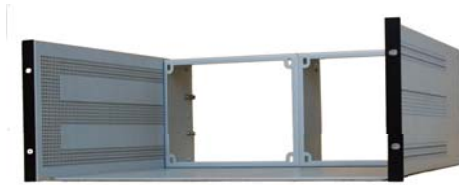


## / Accessories

### LR2490, Rack Mount Adapter

The LR2490 is a dual rack mount adapter used to install Leader's 4U half-rack size products in a 19-inch EIA standard rack.

It allows two Leader products to be installed side by side.



### LC2190, Blank Panel

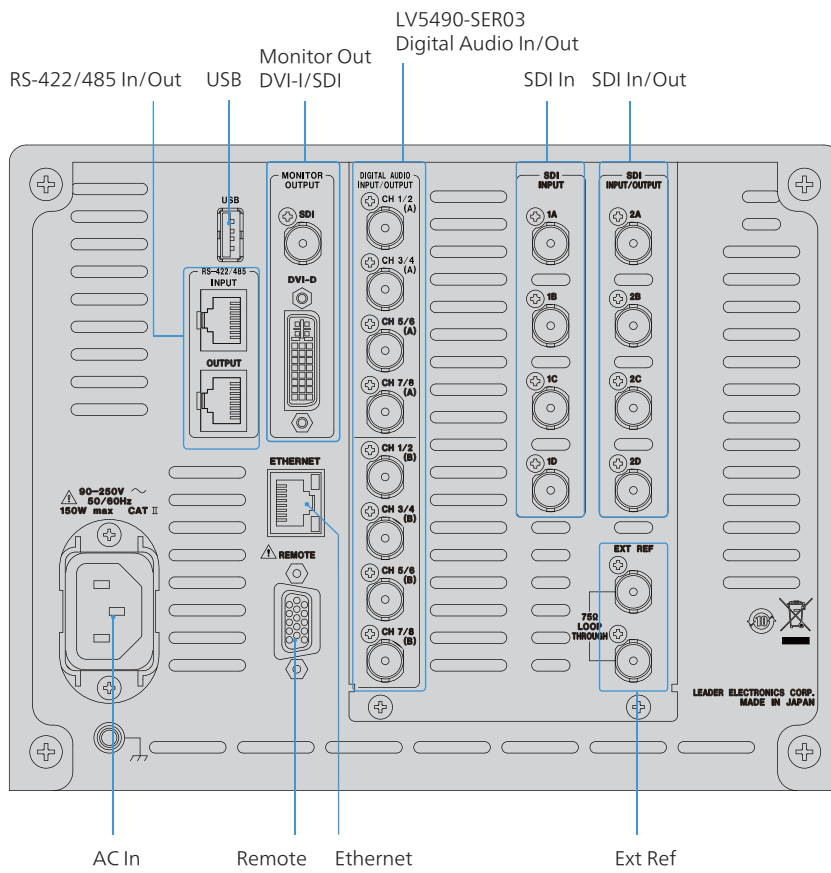
The LC2190 is a blank panel for the LR2490 rack mount adapter.

Use it when installing a single Leader measuring instrument in the LR2490.

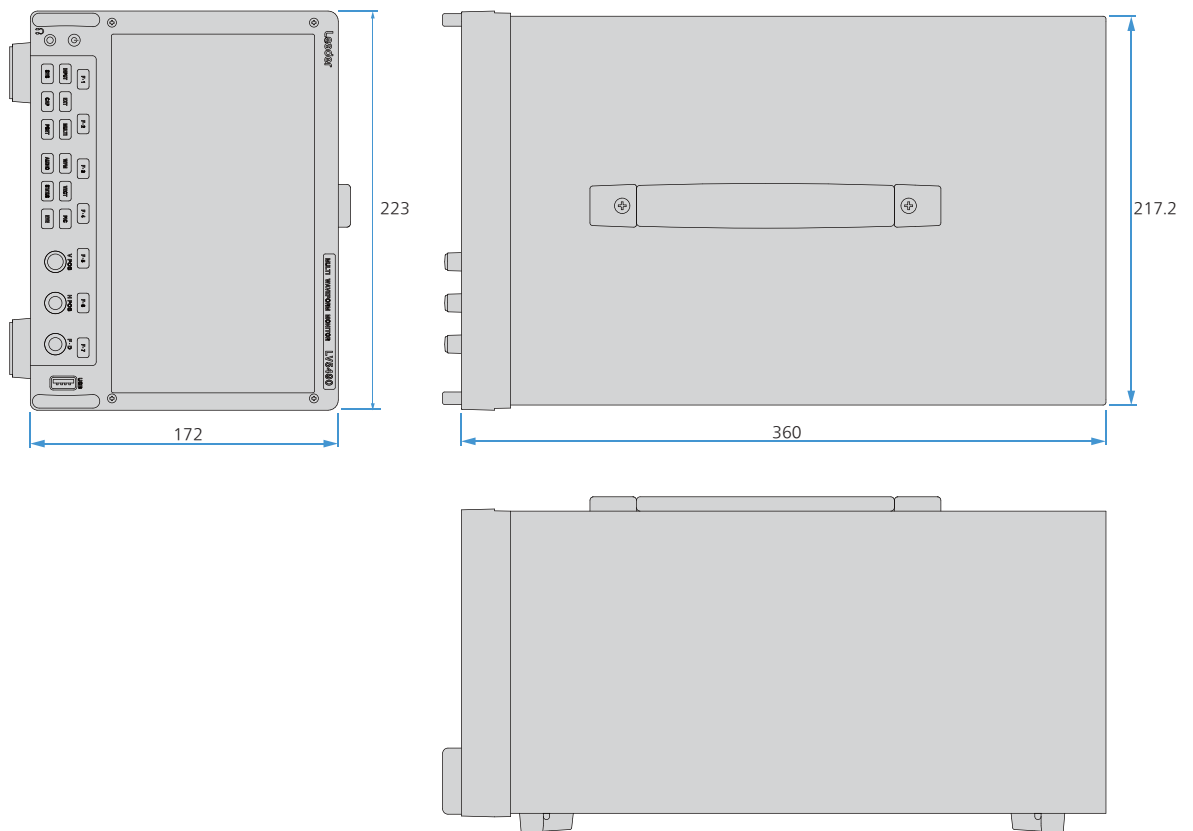




## Rear Panel



## Physical Specifications



# LV7390

## SDI RASTERIZER

4K 3GSDI HDSDI SDSDI HDR



### / General

The LV7390 is a rasterizer that can measure up to four SDI signals simultaneously. It supports 3G-SDI, HD-SDI, and SD-SDI input signals.

The measurement screen can be output at full HD resolution to SDI and DVI-I. The SDI output supports 3G-SDI and HD-SDI.

The LV7390 is equipped with a free layout function that enables the displayed screens to be arranged freely. It can be customized according to your application. An enhanced layout function, which is an advanced version of the free layout function, comes standard.

Further, the new operation keys allow quick operation.

Additional options are available for 4K formats and loudness display.

Example of external monitor display



### Simultaneous Display of Four Video Signals

The LV7390 has four SDI input connectors compatible with 3G-SDI, HD-SDI, and SD-SDI and can display up to four video signals simultaneously.

Serially relocked signals of each input signal is output from the four SDI output connectors.

### Full HD Display

The measurement screen can be output in SDI or DVI-I from the monitor output connector. The output signal can be displayed on an external LCD in full high definition resolution.

### Free Layout of Measurement Screens

The flexible free layout function not only enables video signal waveforms, video signal waveforms, pictures, and so on of the input SDI signals to be simultaneously displayed but also they can be displayed in the sizes and positions of your liking. Moreover, several SDI input signals can be displayed simultaneously and arranged in a manner that allows them to be compared. Different layout configurations can be achieved simply by using the mouse while viewing the monitor screen.

\* When multiple input signals are displayed simultaneously, each channel is displayed with the same layout.

Free layout display example 1



Free layout display example 2



### Enhanced Layout Function

This advanced version of the free layout function allows you to display a specific channel enlarged or arrange all display items freely. The enhanced layout function comes standard with the LV7390. It allows you to set the item size for each channel and arrange the layout of multiple channel displays freely.

Enhanced layout display example



### Operability to Assist VE

Dedicated keys are available for functions that are used frequently in video content production, providing much improved operability. Camera adjustment and the like can be performed smoothly and quickly.

### Camera ID, Iris, Tally Display

The RS-422/485 serial communication function can be used to display camera IDs, iris, and the like as well as tally display. Camera information can be monitored centrally on the monitor screen.

### Equivalent Cable Length Measurement

Equivalent cable length measurement is possible on four inputs. This function displays SDI signal attenuation in terms of a coaxial cable length, which can be used to check the margin that the system has.

### USB Mouse Operation

A USB mouse can be used to operate the panel. If the measurement screen is displayed on an external monitor in SDI or DVI-I, you can control the LV7390 by using a USB mouse while viewing the external monitor.

### Audio Display

The LV7390 is standard-equipped with level meters for eight channels that can be used to check embedded audio.

### Status Display

The status display also has a feature for detecting CRC and other types of errors. It also has event log and phase difference measurement features enabling you to monitor SDI signals in detail.

## CINELITE II

The CINELITE feature makes it easy to manage the levels of specific points on the picture display. On the video signal waveform and vector displays, a marker can be displayed at the position corresponding to a point on the picture display. Further, the CINEZONE feature makes it possible to check the luminance distribution of the whole picture display at a glance.

## Screen Capture

The LV7390 is equipped with a screen capture feature, which captures the entire display as still-image data. Not only can captured data be displayed by the LV7390, but it can also be compared with an input signal or saved to a USB memory device as bitmap data for viewing on a PC.

## External Remote Control Connector

The remote connector can be used to load presets, switch the input signal, and transmit alarms, and display tallies.

## Ethernet Port

By connecting the Ethernet interface to a PC, you can control the LV7390 remotely over TELNET, transfer files over FTP, control the LV7390 remotely and detect errors over SNMP, and control the LV7390 over HTTP.

## / Options

### LV7390-SER01, SDI INPUT Option

The LV7390 has four SDI input connectors compatible with 3G-SDI, HD-SDI, and SD-SDI and can display up to four video signals simultaneously.

Serially reclocked signals of each input signal is output from the four SDI output connectors.

### LV7390-SER01, VF SDI INPUT Option

The picture of an SDI signal separate from the measurement system can be displayed by adding the LV7390-SER01 to the dedicated picture display slot (VIEW FINDER SDI INPUT).

Waveforms and vectors of the main signal can be monitored while showing camera operation such as viewfinder out or the operation menu on the picture display.

### LV7390-SER03, DIGITAL AUDIO Option

Up to 16 channels of level meters supporting external digital audio can be displayed by adding the LV7390-SER03 option. In addition, detailed digital audio monitoring becomes possible using Lissajous display, surround display, loudness display, various analysis displays, and so on. DIN 1.0/2.3 I/O connectors can be switched between input and output in groups of four connectors (8 channels). Therefore, the LV7390 can also be used to extract and transmit the embedded audio's digital audio.

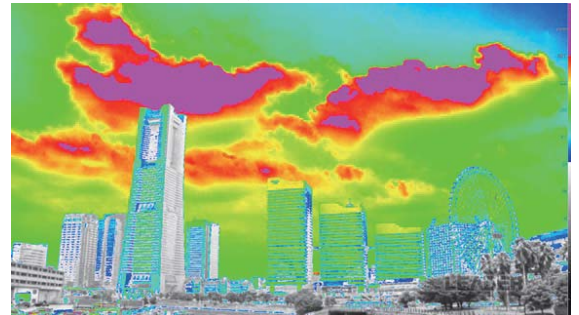
Example of loudness display



### LV7390-SER20, 4K Option

4K formats can be supported by adding the LV7390SER20 option. It also supports various 4K video formats (4096 × 2160, 3840 × 2160), such as 3G-SDI dual link and quad link and HD-SDI quad link. HDR zone display and HDR waveform display are also available. This option provides powerful support for high-definition video quality control in 4K content production.

Example of HDR zone display



### LV7290 Remote Controller

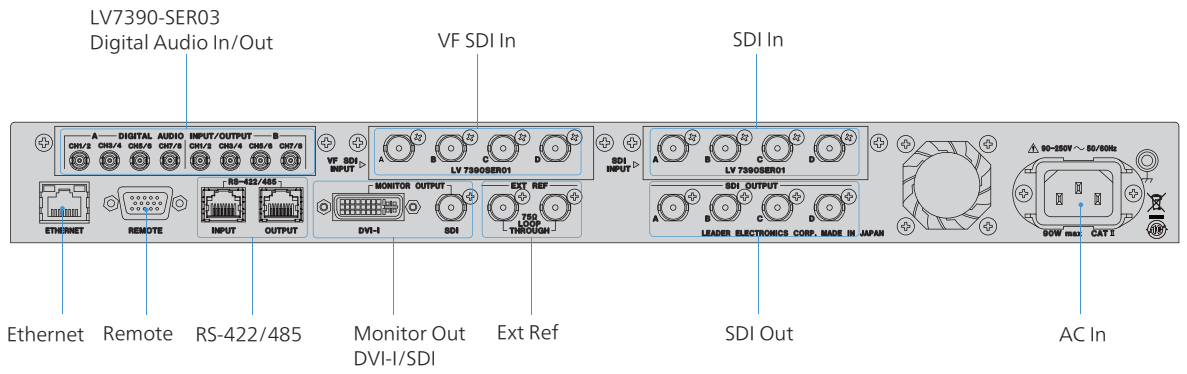
The LV7290 remote controller connects to the Ethernet port on the rear panel of the LV7390 and can be used to remotely control the LV7390. It provides controls similar to the LV7390 panel. It can be used as though you were using the LV7390 panel. A single unit can connect and control up to eight LV7390s.

Dimensions and weight: ≤ 482 (W) X 44 (H) X 110 (D) mm (excluding protrusions), 1.2 kg

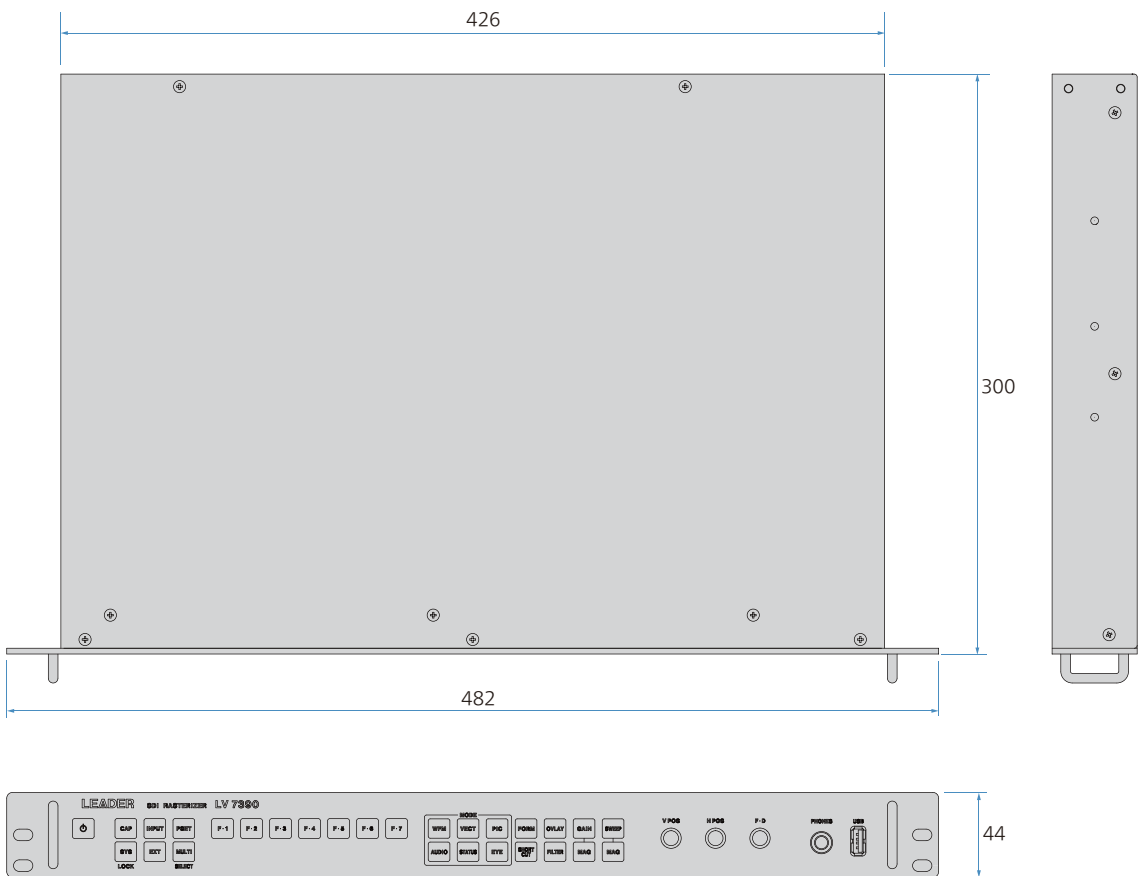
LV7290



## Rear Panel



## Physical Specifications



# LV5770A MULTI MONITOR

3GSDI HDSDI SDSDI



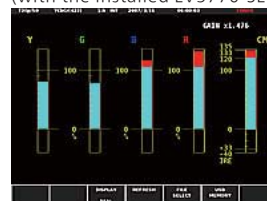
## General

The LV5770A is a multi monitor that can be customized with a variety of units to meet your needs. The LV5770A is highly cost effective because it supports full-format 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals. The LV5770A has a variety of features including simultaneous monitoring of two SDI signals, SDI signal frame capture, lipsync measurement, Pic Moni Output, and improved flexibility in laying out the display, all of which provide you with leading-edge technology.

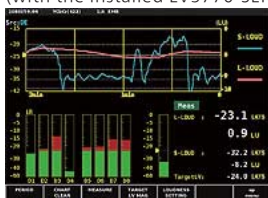
2-channel simultaneous display  
(with the installed LV5770-SER08,  
LV5770-SER09A, and LV5770-SER41/43)



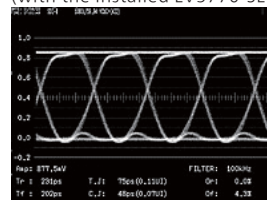
5 bar display  
(with the installed LV5770-SER08 and LV5770-SER09A)



Loudness display  
(with the installed LV5770-SER43)



Eye pattern display  
(with the installed LV5770-SER09A)



### **XGA Display and DVI-D Output**

The LCD display is a 6.3-inch XGA screen (the effective resolution is 1024 × 768). In addition, the screen images are transmitted from a DVI-D connector that supports single link TMDS, so the screen image can be displayed larger than is possible on the LV5770A through the use of an external LCD monitor display.

### **Pic Moni Output**

The input SDI signal can be generated as a Pic Moni Output signal. (This requires the LV5770-SER08 option or the LV5770-SER09A option.) However, analog composite input (LV5770-SER03A) cannot be generated as a Pic Moni Output signal.

### **Frame Capture and Screen Capture Features**

The LV5770A is equipped with a frame capture feature, which captures single frames in an SDI signal. Frames can be captured manually or automatically when errors occur. This feature is suitable for performing data analysis when errors occur. The LV5770A is also equipped with a screen capture feature, which captures the entire display as still-image data.

### **External Control Connectors**

The LV5770A has two external control connectors: an Ethernet port and a remote control connector. Connecting the LV5770A to a PC through the Ethernet port makes it possible to control the LV5770A over HTTP. The remote control connector can be used to load presets, switch the input signal, and transmit errors.

### **Headphone Output (6.3 mm)**

The headphone jack can be used to monitor audio. (This requires the LV5770-SER41/43 optional unit.)

### **LV5770-SER03A | TRI SYNC/COMPOSITE**

TRI SYNC and composite signals are supported.

### **LV5770-SER08 | SDI INPUT\***

The 3G, HD dual link, HD, and SD-SDI formats are supported. Two inputs can be displayed overlaid or side by side. Two input SDI signals can be generated from two outputs. Also, input A or B, whichever is selected, can be generated as a Pic Moni Output signal.

### **LV5770-SER09A | SDI INPUT/EYE\***

In addition to the LV5770-SER08 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.)

### **LV5770-SER41 | DIGITAL AUDIO (Loudness feature)**

Embedded audio and external digital audio are supported. (The eight I/O connectors—16 channels—are switched between input and output in groups of four connectors—8 channels.)

### **LV5770-SER42 | ANALOG AUDIO**

Up to 8 channels of analog audio are supported. (The LV5770A must be combined with the LV5770-SER41/43 unit.)

### **LV5770-SER43 | DIGITAL AUDIO (Loudness with 8ch Level Meter)**

16 channel Digital Audio input (Future)  
Loudness Measurement for Two Signals

**\* The LV5770-SER08 and LV5770-SER09A cannot be installed in the LV5770A at the same time.**

**LR2404A, CABINET**

The LR2404A is a cabinet for storing Leader's 3U half-rack size products.



**LR2770A, RACK MOUNT ADAPTER**

The LR2770A is a dual rack mount adapter used to install Leader's 3U half-rack size products in a 19-inch EIA standard rack. It allows two Leader products to be installed side by side.



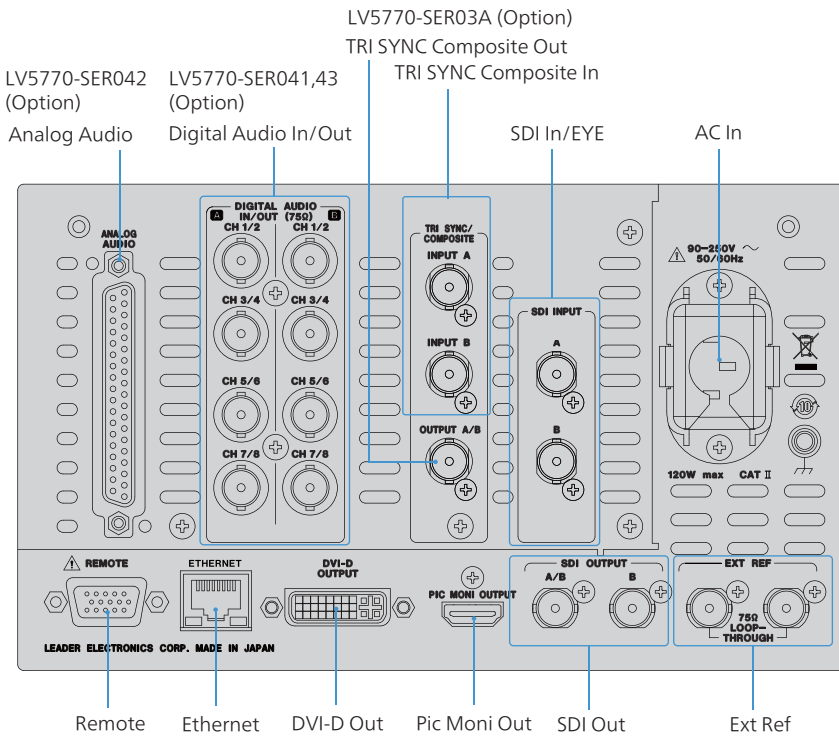
**LR2427B, CABINET**

The LR2427B is a cabinet for storing Leader's 3U half-rack size products. It comes with a carrying handle and case legs for easy carrying.



**LC2170, BLANKPANEL**

The LC2170 is a blank panel for the LR2700A (LR2770) rack mount adapter. Use it when installing a single Leader measuring instrument in the LR2770A.





# LV5333

## MULTI SDI MONITOR

3GSDI HDSDI SDSDI HDR



### General

The LV5333 is a multi SDI monitor that supports 3G, HD, and SD-SDI. It is a small, light-weight, low-power-consuming device designed for use in video content production sites. It features not only picture display, video signal waveform display, vectorscope display, and audio level display but also data analysis, equivalent cable length meter function, and frequency deviation measurement function for SDI signals. You can use it for accurate measurements and monitoring. In addition, the LV5333 is standard equipped with CINELITE II, a convenient function for analyzing brightness information of video signals. It can be used to quickly adjust the lighting at the filming site. HDR display can be supported with an option.

### **3G, HD, SD-SDI Inputs and Outputs**

3G, HD, SD-SDI inputs (A and B) are available, and the SDI signal of the selected input can be monitored. The SDI signal of the selected input is serially reclocked and then output from the SDI output connector.

### **TFT LCD**

The LV5333 is equipped with a 6.5 inch XGA (1,024 × 768) color TFT LCD.

### **Standard Equipped CINELITE II and 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. Furthermore, the CINELITE Advanced feature makes it possible to synchronize measurements with the video signal waveform display and vectorscope display.

### **Equivalent Cable Length Measurement**

The attenuation of the input SDI signal is displayed in terms of a 75 Ω coaxial cable length. This can be used to check the transmission system margin.

### **Frequency Deviation Measurement**

The deviation in the SDI signal sampling frequency can be measured. This can be used to verify the deviations in the field frequency and frame frequency.

### **Stereo Headphone Output and Digital Audio Output**

The LV5333 can separate the embedded audio from the SDI signal and output the two specified channels in stereo to the headphone output connector and digital audio output connector.

### **Time Code Display**

The LV5333 can decode SMPTE ST 12-2 ANC time codes (LTC or VITC) and SMPTE ST 266 time codes (D-VITC) and display them. These can be used as timestamps in event logs.

### **Screen Capture**

The displayed screen can be captured and displayed by itself or superimposed with input signals. Screen captures can be saved in a USB memory device or output as BMP data to a PC or the like via the Ethernet port.

### **Preset Settings (30 Settings)**

### **Remote Connector**

### **Ethernet Port**

### **Tripod and VESA Mounting**

### **Power Supply**

The LV5333 is equipped with an XLR DC input connector. It runs of 12 VDC power.

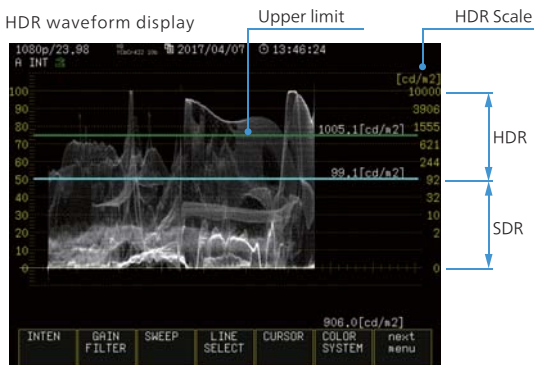
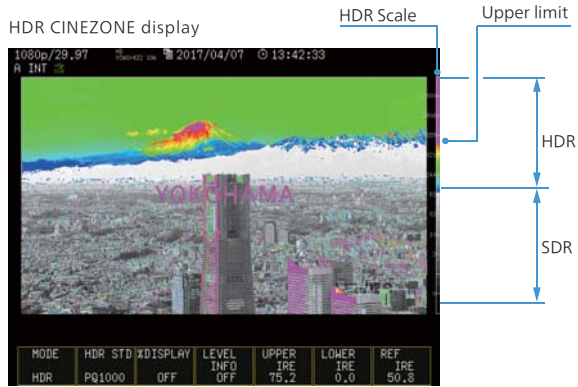
### **LV5333-OP70/LV5333-OP71 Battery Mount**

As a factory option, a battery adapter V mount (LV5333-OP70) or battery adapter QR gold mount (LV5333-OP71) can be attached. This makes it possible to run the LV5333 using a battery for video cameras and the like.

\* If a battery adapter is attached, the 75 mm VESA compliant mounting holes cannot be used.

### LV5333-SER02 HDR Support Option (License Option)

This function is used to evaluate HDR video signals using picture displays and waveform displays. On the picture display, you can use the HDR CINEZONE display, which adds color the HDR area according to the brightness, in order to easily check the brightness distribution. Further, on the waveform display, you can manage video signal levels including the HDR area using HDR scaling.



## Accessories

### SPU41A-105 AC Adapter

An AC adapter, sold separately, is also available, so commercial AC power can also be used.



### i0812-2790, SOFT CASE

The i0812-2790 is a soft case for storing the LV5333 Multi SDI Monitor.

In addition to protecting the product, the soft case comes with a convenient carrying handle and sun visor for outdoor use.



### LR2752, RACK MOUNT ADAPTER

The LR2752 is a dual rack mount adapter used to install Leader's 3U half-rack size products in a 19-inch EIA standard rack.

It allows two Leader products to be installed side by side.



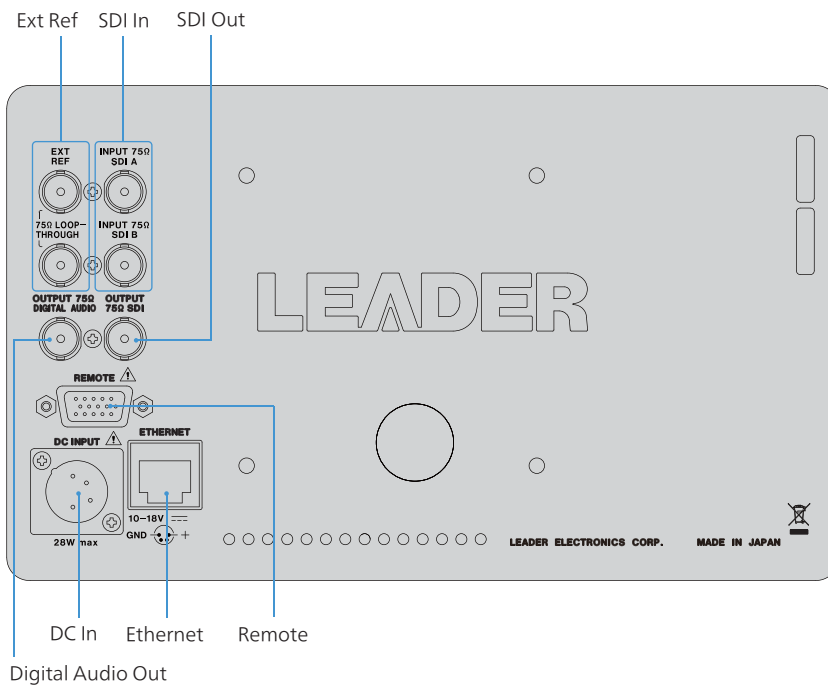
### LC2130, BLANKPANEL

The LC2130 is a blank panel for the LR2752 rack mount adapter.

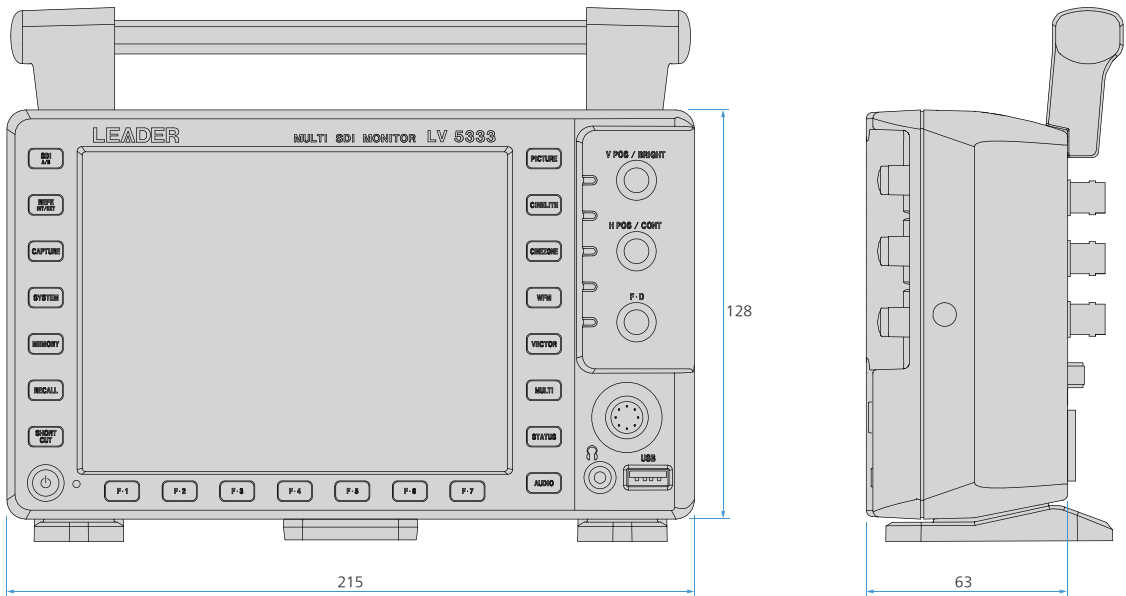
Use it when installing a single Leader measuring instrument in the LR2752.



## Rear Panel



## Physical Specifications



# LV5381 MULTI SDI MONITOR

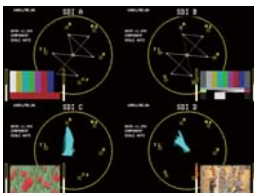
HDSDI SDSDI



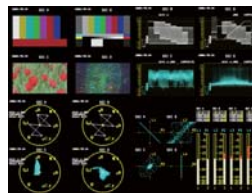
## General

The LV5381 is a waveform monitor that can monitor up to four SDI signals simultaneously. It is optimized for the level adjustment of the outputs of multiple installed cameras. In the video signal waveform display, vector display, and picture display, multiple input signals can be displayed on top of each other or lined up next to each other. It is also full of useful features such as a level meter display for embedded audio, an error display that indicates transmission errors, and a 5-bar display that shows video signal peak levels using five bars. Furthermore, the LV5381 can show different combinations of these displays in its multi-screen display.

### Display Examples



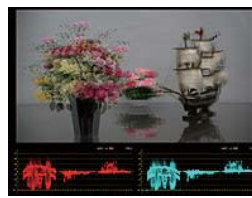
### Audio Lissajous Option LV5381-SER02



### Status Option LV5381-SER03



### 3D Assist Option LV5381-SER04



### **Simultaneous Monitoring of Four Inputs**

The LV5381 is a waveform monitor with a built-in 8.4-inch TFTLCD. It can display up to four SDI input signals of the same format simultaneously. The LCD is an XGA display (1024 x 768 pixels) that boasts high color reproducibility. This makes the LV5381 useful for picture monitoring as well.

### **Rich Assortment of Display Features**

Not only does the LV5381 have essential displays for video signal quality monitoring, such as a video signal waveform display and a vector display, it also has a rich assortment of other display features such as a picture display, audio level meter display, 5-bar display, transmission error detection, and gamut error detection.

### **Wide Variety of Display Formats**

In the video signal waveform display, vector display, and picture display, the LV5381 can display up to four 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 multiple cameras. In the video signal waveform and vector displays, the LV5381 can make different waveforms easier to see by using a different waveform color for each input channel.

### **Extremely Flexible Display Layouts**

Each of the different displays can be shown on a single screen, or the multi-screen 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, and audio level meter display can be shown as a thumbnail display on the one-screen display.

### **Video Signal Waveform Display**

The input Y CB CR signal can be converted to an RGB or pseudocomposite signal and shown on the video signal waveform display. The video signal waveform display has a rich assortment of features such as waveform magnification and line selection.

### **Picture Display**

The picture display has a wide variety of picture monitoring features, such as color temperature specification; brightness, contrast, and aperture adjustment; and the display of gamut error locations.

### **CINELITE II / CINELITE Advanced**

The LV5381 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.

### **Screen Capture Feature**

The display can be captured and stored as image data. The captured data can be displayed on the LV5381. Additionally, it can be saved as bitmap files to USB memory, which makes it possible to view the data on a PC.

### **External Sync Signal Input**

The LV5381 can receive a tri-level sync signal or an NTSC or PAL black burst signal as its external sync signal and then display video signal waveforms with this sync signal as its reference.

### **Presets**

Stores up to 30 front panel presets.

### **Key LEDs**

All the panel keys have LEDs. This makes it easy to find the keys even in dark environments.

### **Last Memory**

Equipped with a feature that stores panel settings to memory.

### **ID Display**

IDs can be assigned to input channels. IDs are entered from the LV5381 panel.

### **Stereo Headphone Output**

The LV5381 can deliver the embedded audio of an SDI signal in stereo through the headphone output jacks.

**LV5381-OP70, Remote and Tally Option (factory option)**

The addition of the external remote option enables the LV5381 to load presets and display tallies according to the signals that it receives through the rear-panel remote control connector. This makes it possible to link the LV5381 to a switcher or other device.

**LV5381-SER01, Dual Link Option**

The addition of the dual link option enables the LV5381 to monitor a pair of dual link signals simultaneously.

**LV5381-SER02, Audio Lissajous Option**

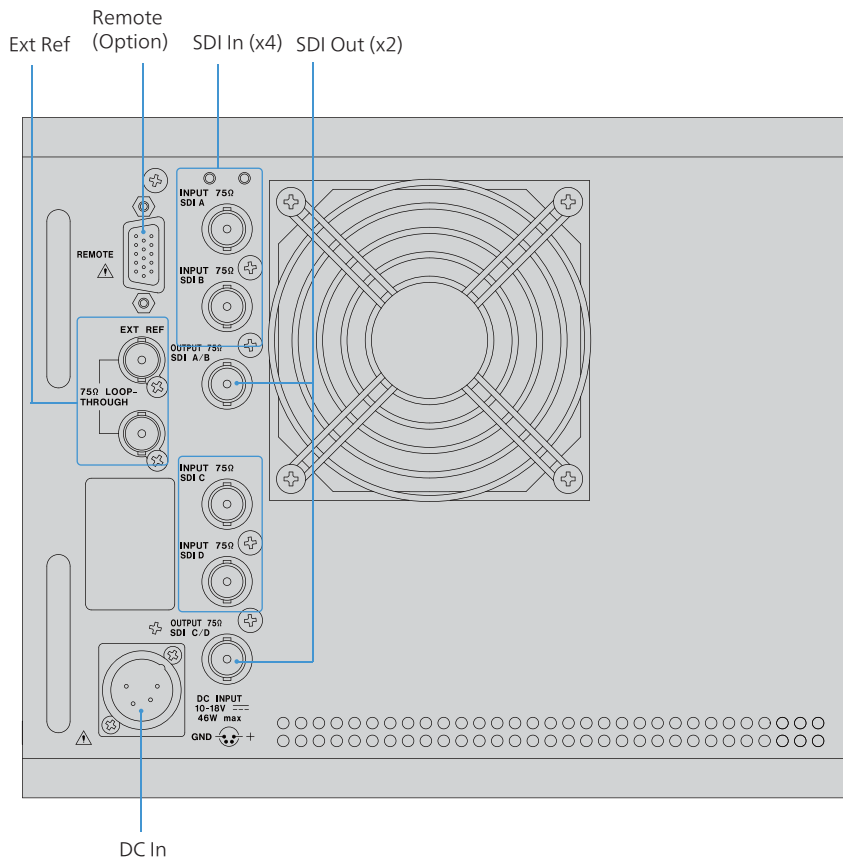
The addition of the audio lissajous option enables the LV5381 to display the lissajous curves and the numeric values of levels of the audio that is embedded in an SDI signal.

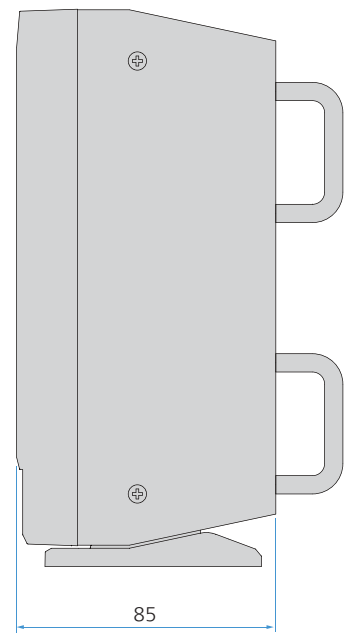
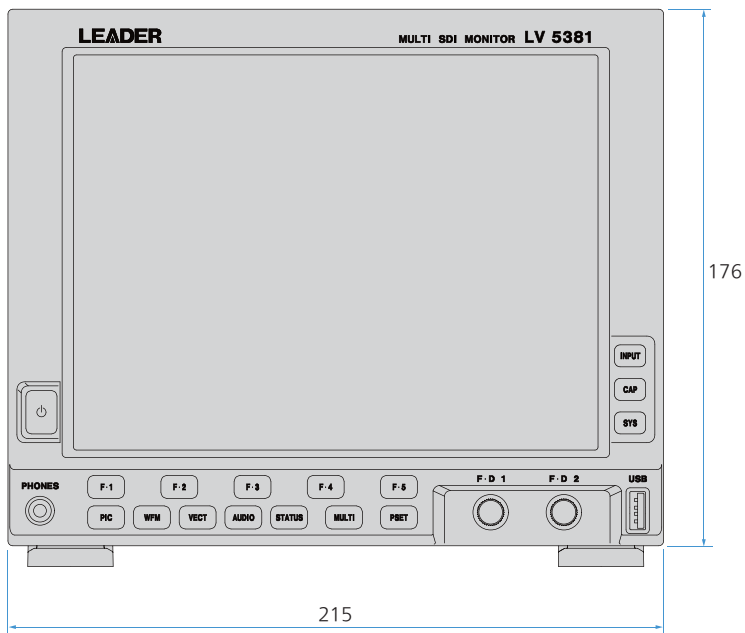
**LV5381-SER03, Status Option**

The addition of the status option enables the LV5381 to show analysis displays such as the data dump, phase difference, and event log displays.

**LV5381-SER04, 3D Assist Option**

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, and wipe.







# LT4610

## SYNC GENERATOR

4K 12GSDI 3GSDI HDSDI  
SDSDI IP



### / General

The LT4610 is 1U full-rack size sync signal generator that can output triple-rate SDI (3G-SDI/HD-SDI/SD-SDI) signals. It employs two power supply units for redundant operation to accommodate power supply failures. The genlock function for external sync signals enables SDI signals, six sets of analog black sync signals, and audio word-clock signals to be output synchronously. The genlock function is equipped with a STAY IN SYNC function that maintains the phase when errors occur in the input signal, making it possible to construct stable systems.

In addition to test pattern output including color bars and SDI check fields, the LT4610 can embed ID characters, QVGA logo marks, safety area markers, and embedded audio in SDI signal output.

### Triple-rate SDI Ready

SDI signal output supports 3G-SDI (level A and level B), HD-SDI (including dual link), and SD-SDI. There are two independent outputs of SDI signal output terminals. The pattern and phase can be set separately for each. (However, only a single output is available for 3G-SDI level B and HD dual link.)

### ID Character Overlay

ID characters can be overlaid at any position on the display. In addition, ID characters can be scrolled horizontally or displayed in a blinking state for checking whether the display has frozen.

### Logo Mark Overlay

A logo mark converted from bitmap can be overlaid at any position on the display at a standard 320 (dot) × 240 (line) size (QVGA size).

### Safety Area Markers

90% and 80% safety area markers can be overlaid on the display. For 3G-SDI and HD-SDI, a 4:3 aspect marker can be overlaid.

### Pattern Scrolling

Equipped with a function for scrolling patterns in eight directions. The speed can also be adjusted.

### Audio Embedding

The LT4610 can embed 32 channels (link A, link B, 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-HDI. The frequency, level, and the like can be set for each channel.

### Lip Sync Patterns (3G-SDI level A, HD-SDI, SD-SDI only)

The LT4610 can output lip sync patterns in which the video and audio are synchronized. In combination with a waveform monitor that features a lip sync function, such as the Leader's LV5770A, it is possible to accurately measure the offset between the video and audio in SDI signal transmissions.

### Genlock Function

The LT4610 can synchronize with NTSC/PAL black burst signals and HDTV tri-level sync signals. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported. A STAY IN SYNC function is available in case errors occur at the genlock input. The LT4610 also has a slow lock function to reduce the shock that occurs when genlock is performed again based on STAY IN SYNC.

### Analog Black Sync Signal Output

The LT4610 is equipped with six independent analog black sync signal and HDTV tri-level signal outputs, which makes it possible to vary the timing. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

### Word-Clock Signal Output

The LT4610 can output a 48 kHz word-clock signal synchronized with video signals.

### AES/EBU Signal Output

The LT4610 can output a 48 kHz AES/EBU signal synchronized with video signals. It is also equipped with a muted AES/EBU signal output.

### Real Time Clock

The LT4610 can output a 48 kHz word-clock signal synchronized with video signals.

### Ethernet

SNMP is supported as standard. When an error is detected, a TRAP is issued.

### Preset Memory Function

Up to 10 preset memories can be saved. Convenient registered presets can be recalled during operation. The LT4610 can be started with the same settings every time.

### External Memory Support

Logo data and preset data can be written and saved from the front panel using USB memory devices.

### Redundant Power Supply

Two power supplies are built in to provide redundancy. When errors occur in power supply units, alarms are indicated on the LT4610 panel. Errors can also be output as alarms using SNMP.

**LT4610-SER01 GPS Option**

This option adds (1) a GPS lock function, which locks to the frequency and time that can be obtained from GPS, (2) 10 MHz CW lock function, and (3) time code generator function.

**LT4610-SER02 12G-SDI Option**

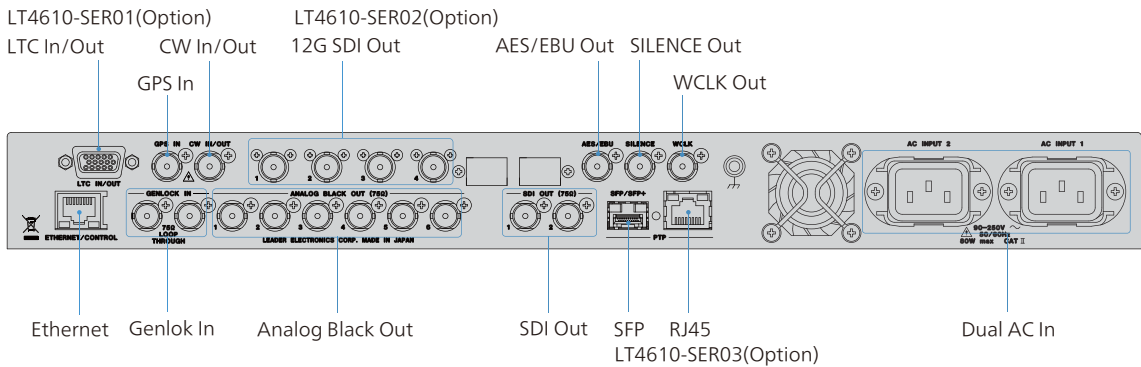
The LT4610-SER02 12G-SDI Option adds support for 12G-SDI. SDI signal output supports 4K 12G-SDI, 4K 3G-SDI quad, 4K HD SDI quad, 4K 3G dual, 3G-SDI (level A and level B), HD-SDI (including dual link), and SD-SDI. Four SDI signal output connectors are available. The format is the same for all four outputs, but you can set different patterns and phases for each.

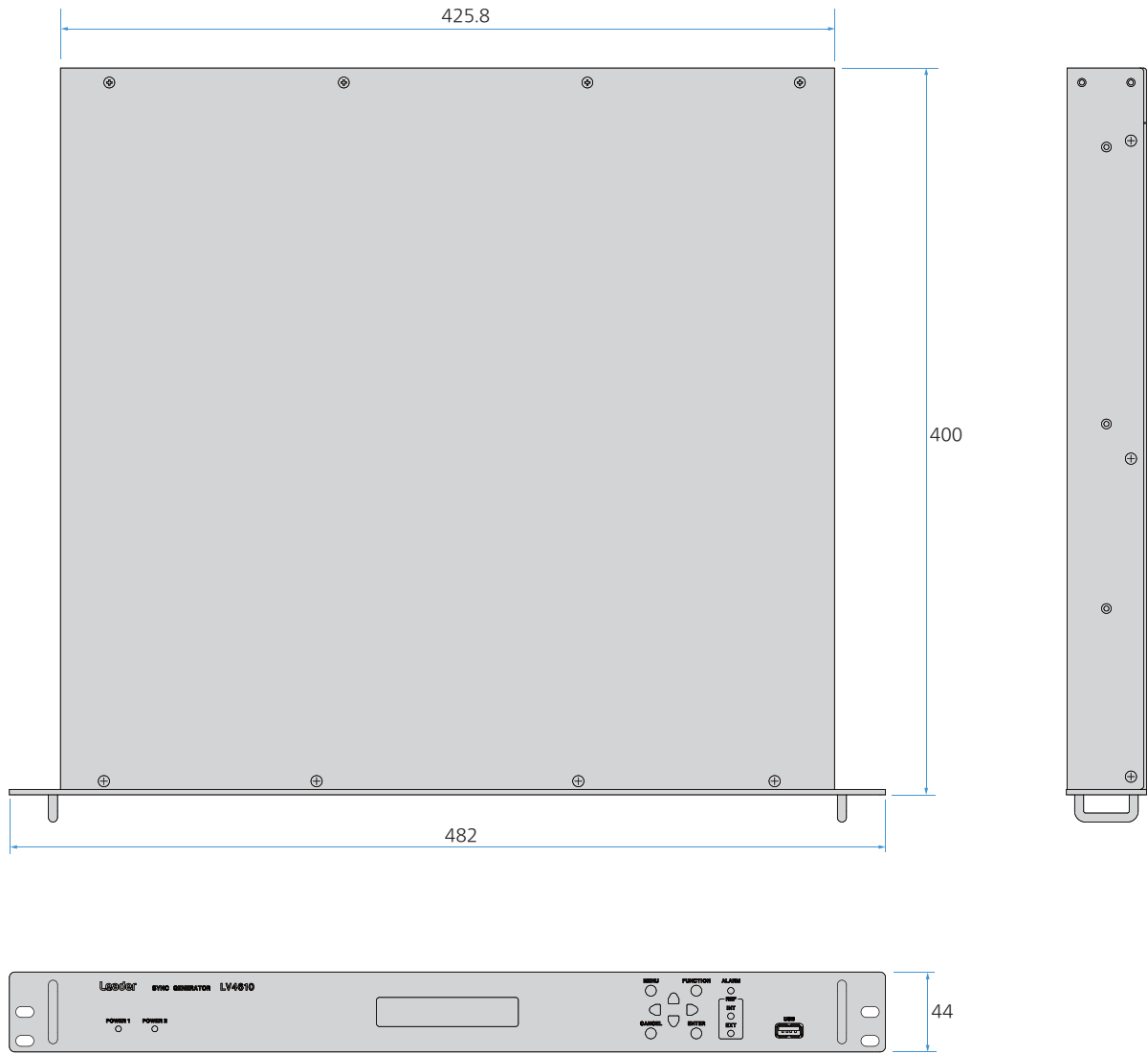
(However, only two outputs are available for 3G-SDI level B and HD dual link.)

**LC2183, LTC CABLE**

The LC2183 is a conversion cable used when combining an LT4448 changeover unit and LT4610 sink generator, or the like.

It converts a 25-pin D-sub LTC connector to two 15-pin D-sub LTC connectors. It can be used to connect to the PRIMARY and BACKUP connectors of the LT4610. It can also be used to convert to three XLR connectors for LTC output. The cable length is 1.5 m.





# LT4600A

## MULTIFORMAT VIDEO GENERATOR

3GSDI HDSDI SDSDI



### / General

The LT4600A multi-format video generator is a compact, 1U half-rack size SDI video signal generator that supports the triple-rate SDI (3G-SDI/HD-SDI/SD-SDI) format.

In addition to test pattern output including color bars and SDI check fields, the LT4600A is equipped with numerous features such as ID characters, QVGA logo marks, safety area markers, audio embedding, genlock function for external reference input signals, and three analog black signal outputs.

### Triple-rate SDI Ready

Supports 3G (level A and level B), HD (including dual link), and SD. The LT4600A provides two outputs for two signals. The pattern and timing of each signal can be adjusted separately. (However, only one signal can be used for 3G-B and HD (DL).)

### ID Character Overlay

ID characters can be overlaid at any position on the display. In addition, ID characters can be scrolled horizontally or displayed in a blinking state for checking whether the display has frozen.

### Logo Mark Overlay

A logo mark up to 320 (dot) × 240 (line) in size (QVGA size) can be overlaid at any position on the display. Logo marks are 4-level monochrome data converted from bitmap data.

### Safety Area Markers

90% and 80% safety area markers can be overlaid on the display. For 3G and HD, a 4:3 aspect marker can also be overlaid.

### Pattern Scrolling

Equipped with a function for scrolling patterns in eight directions. The speed can also be adjusted.

### Audio Embedding

The LT4600A can embed 32 channels (link A, link B, 4 channels each × 4 groups) of audio signals for 3G-B and 16 channels (4 channels × 4 groups) of audio signals for 3G-A, HD, and SD. The frequency, level, and the like can be set for each channel.

### Lip Sync Patterns

The LT4600A can output lip sync patterns in which the video and audio are synchronized. By using Leader's LV5770 (A), LV5800 (A), or LV7770, you can accurately measure the lip sync of the video and audio on SDI signals.

### Genlock Function

The LT4600A can synchronize with NTSC/PAL black burst signals and HD tri-level sync signals. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported. Furthermore, a Stay-in-Sync function is available in case errors occur at the genlock input.

### Analog Black Output

Equipped with three independent black signal outputs. The timing can be adjusted by selecting a NTSC/PAL black burst signal or a HD tri-level sync signal whose clock frequency is the same as in the SDI output format. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

### Word-Clock Output

Equipped with one 48 kHz word-clock output synchronized with video signals.

### AES/EBU Serial Digital Audio Output

Equipped with two 48 kHz AES/EBU outputs synchronized with video signals.

### Ethernet

Standard support for SNMP makes it easy to integrate the LT4600A in a network environment.

### External Memory

Firmware updating and user data writing and saving are possible by connecting USB memory devices on the front panel.

### Preset Settings

Up to 10 presets can be saved. You can recall a preset to start the LT4600A with the same settings every time.

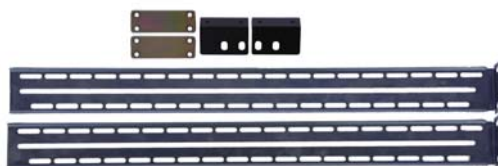
### AC Power Supply

90 to 250 VAC, 25W max. power consumption

### LR2478, Rack Mount Adapter

The LR2478 is a dual rack mount adapter used to install Leader's 1U half-rack size products in a 19-inch EIA standard rack.

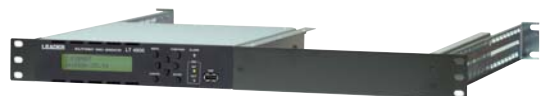
It allows two Leader products to be installed side by side.



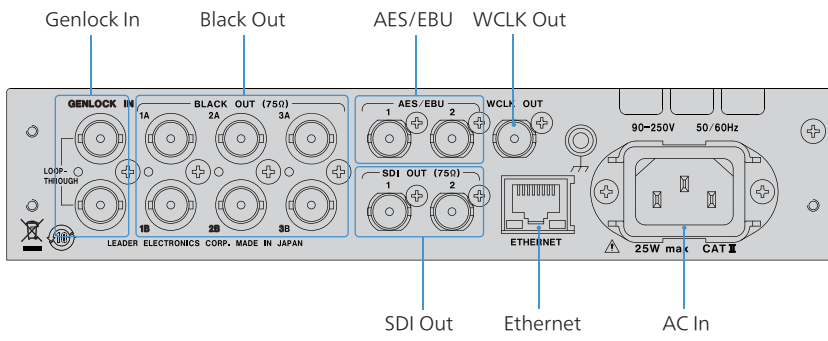
### LR2481, Rack Mount Adapter

The LR2481 is a rack mount adapter used to install a Leader's 1U half-rack size product in a 19-inch EIA standard rack.

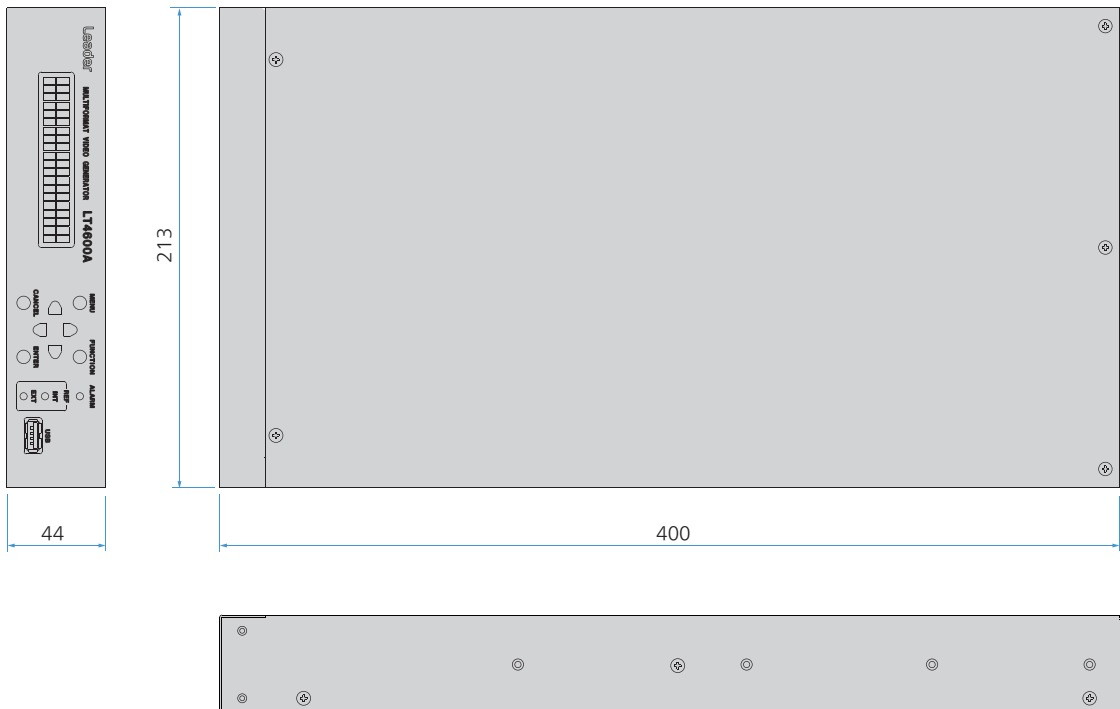
Because one side is a blank panel, use it to install a single Leader product.



## Rear Panel



## Physical Specifications



# LT4448 CHANGEOVER

3GSDI | 12GSDI | SDSDI



## / General

The LT4448 is a changeover unit that automatically switches the signal from the primary signal to the backup signal when problems are detected in the primary signal. Two systems of input signals (primary and backup) are connected to the LT4448, and the LT4448 detects errors in the amplitude of the primary input signal.

A single LT4448 provides 11 pairs of BNC and LTC channels. These channels can receive SDI, NTSC/PAL black burst, HD tri-level sync, AES/EBU digital audio, word-clock, and LTC signals.

It can be used in combination with the LT4610 (sink generator).



## Features

Provides 11 channels (a single channel consists of a primary input, a backup input, and an output) on a single unit.

Relays are used to switch between the primary signals and backup signals of channels 1 and 2. High-speed electronic switches are used to switch between the primary signals and backup signals of channels 3 to 11. For LTC, switching is possible between primary signals and backup signals for three inputs.

The input signal type can be selected. On channels 1 and 2, you can select SDI signals (3G, HD, SD), NTSC/PAL black burst signals, or HD3 tri-level sync signals. On channels 3 to 8, you can select NTSC/PAL black burst signals or HD3 tri-level sync signals. Channels 9 and 10 are exclusive to AES/EBU digital audio signals. Channel 11 is exclusive to word-clock signals (TTL input). LTC channels are exclusive to LTC signals (2 Vp-p differential input).

Combination with two LT4610s



LTC channels provide three systems of two inputs (primary and backup) and three systems of one output. In addition, an LTC cable (sold separately) can be used to connect to a LT4610 (sink generator).

A delay for starting the fault detection at power up can be set to approximately 1 minute or approximately 4 minutes depending on the rise time of the system signal source that the LT4448 is connected to.

Redundant power supplies are available for increased reliability. Alarms are generated when errors occur.

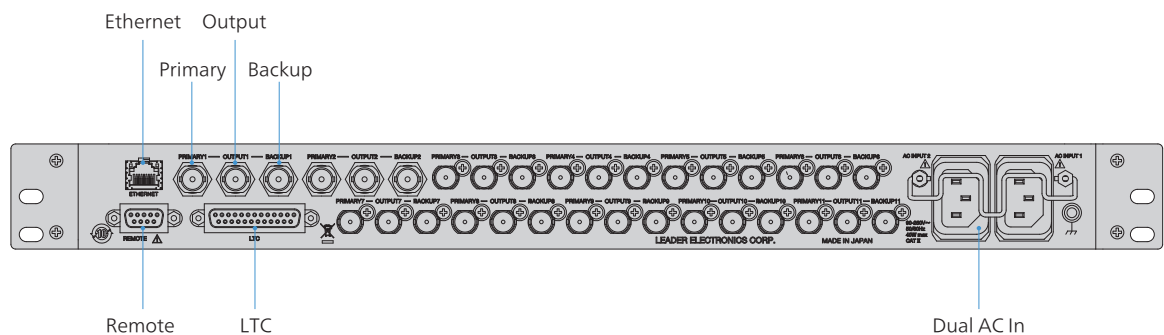
## Accessories

### LC2183, LTC CABLE

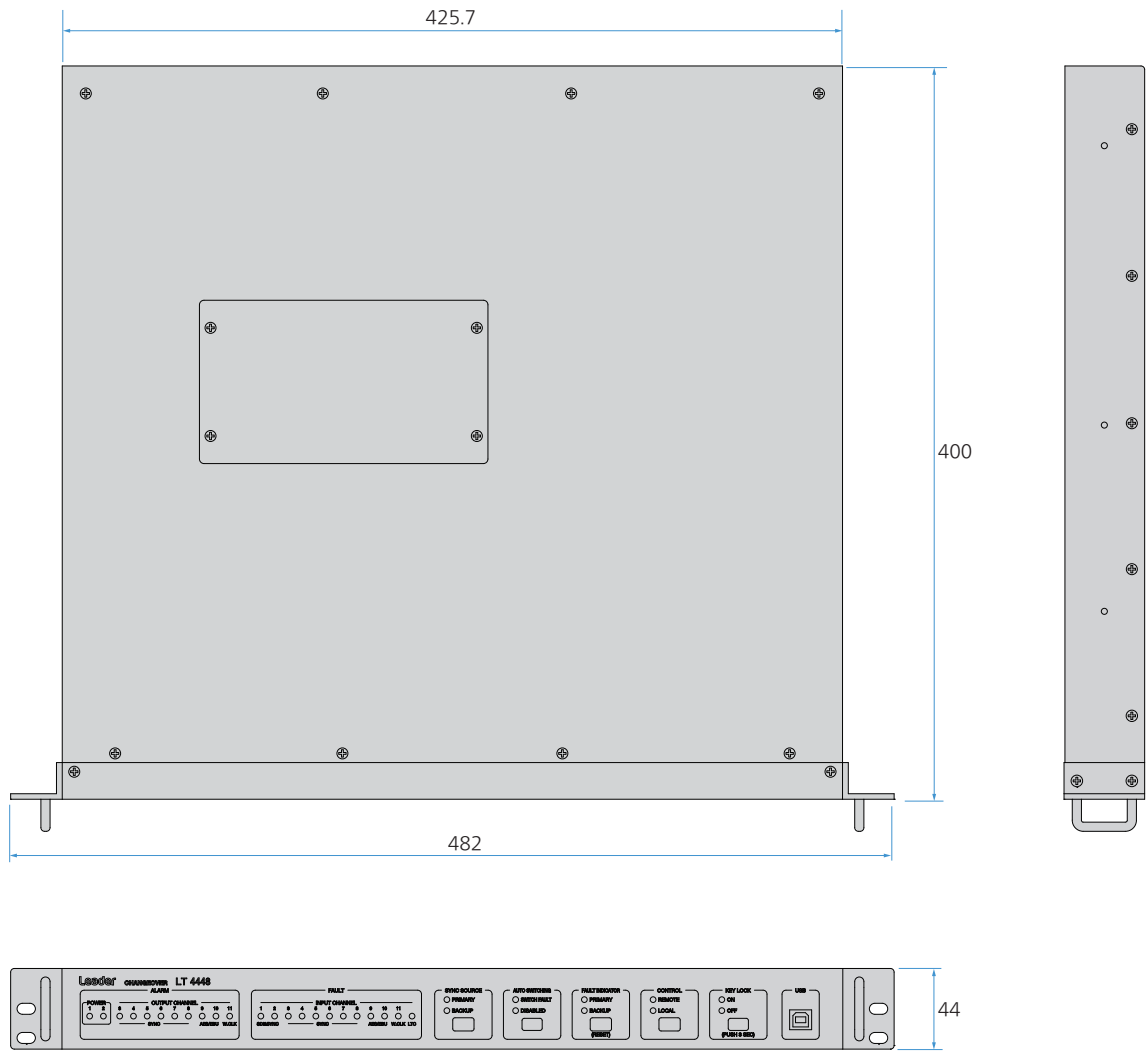
The LC2183 is a conversion cable used when combining an LT4448 changeover unit and LT4610 sink generator, or the like.

It converts a 25-pin D-sub LTC connector to two 15-pin D-sub LTC connectors. It can be used to connect to the PRIMARY and BACKUP connectors of the LT4610. It can also be used to convert to three XLR connectors for LTC output. The cable length is 1.5 m.

## Rear Panel



# Physical Specifications



[www.leader.co.jp/en](http://www.leader.co.jp/en)

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