

Leader



Video Test Instruments

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Leader ZEN



LV5300 Waveform Monitor

LV5350 Waveform Monitor

LV5600 Waveform Monitor

LV7300 Rasterizer

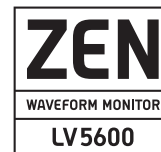
LV7600 Rasterizer



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 Audio, Audio multiplexed to IP, external input AES/EBU, analog Audio.

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.

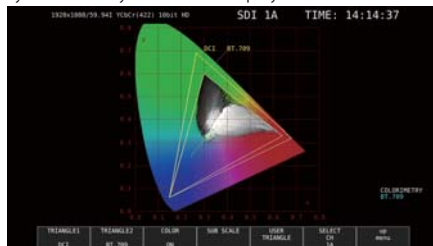
Transmission quality analysis function

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



Audio 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.

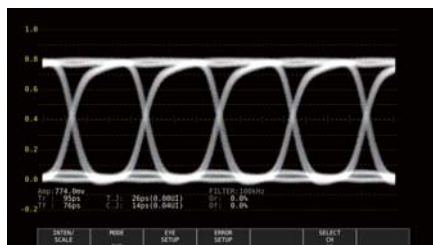
* Dolby and Dolby Digital, Dolby Digital Plus, Dolby E are registered trademarks of Dolby.Z

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.

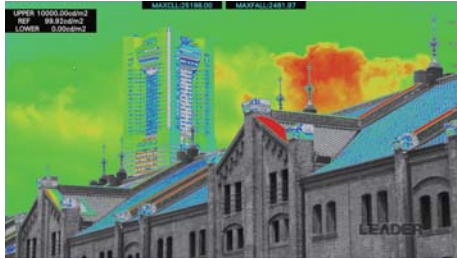
Ethernet terminal

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.

Options

List of hardware options

Model Name	Type Number		Function
	LV5600	LV7600	
SDI INPUT	LV5600-SER01	LV5600-SER01	SD, HD, 3G SDI input *1
SDI INPUT/EYE	LV5600-SER02	LV5600-SER02	SD, HD, 3G SDI input and eye pattern display *1
DIGI/ANA AUDIO	LV5600-SER03	LV7600-SER03	Digital/analog Audio 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		Function
	LV5600	LV7600	
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 *3
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	Customizable 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-SER03 / LV7600-SER03,

Digital and analog audio I/O and displays (16 ch)

- Audio 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 Audio

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 audios are synchronized with each other.

- Digital audio input/output Terminal

Input/output terminal DIN 1.0/2.3 connector

Number of Input/output terminals

Group A 4 terminals 8ch

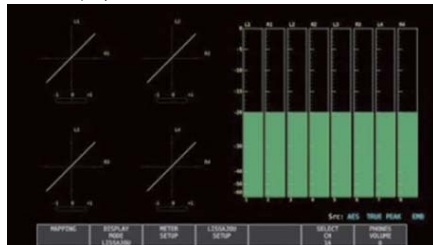
Group B 4 terminals 8ch

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.

- Audio 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

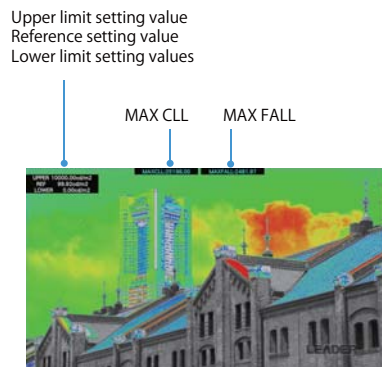
LV5600-SER23 / LV7600-SER23,

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/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.

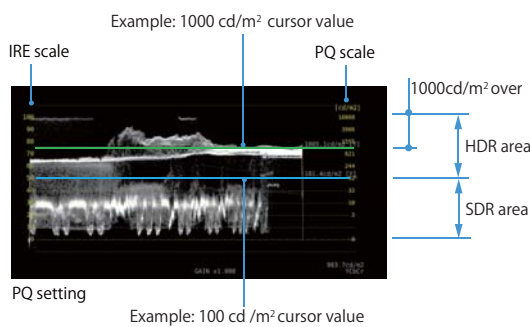
- Above the upper limit value is colored with magenta.

- 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.



PQ setting

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.

LV5600-SER24 / LV7600-SER24,

SDI signal generation function

SDI signal generation function can handle from HD-SDI to 12G-SDI.

Simplified UHDTV multi-format 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.

* When outputting 3G (DL) -4K signal and 3G (QL) -4K signal, LV 5600-SER 28 is required for LV5600 and LV7600-SER 28 is required for LV7600.

* When outputting the 12 G-4 K signal, LV5600 - LV5600 - SER28 and LV5600-SER 29, LV7600 requires LV7600-SER 28 and LV7600-SER 29.

• 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, Check field, 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 WHITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE, BLACK

Speed 1 to 3

• Embedded Audio

Number of superimposed channels maximum 16 ch

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

Audio 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.

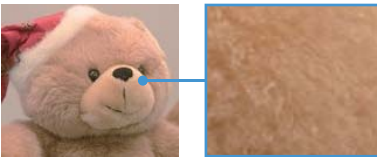
LV5600-SER25 / LV7600-SER25, Focus assist function

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)

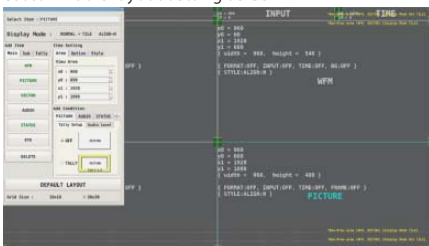


Enlarged view
(After focus adjustment)

LV5600-SER26 / LV7600-SER26, Customizable layout function

• Customizable 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.

Customizable layout setting screen



Layout Set measurement screen



• Display channel Function

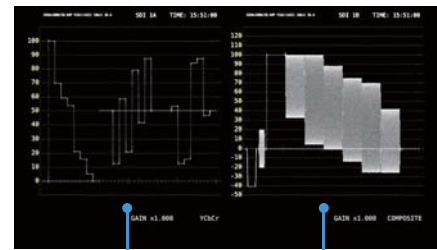
1SDI input signals of 1 to 4 input terminals can be allocated to A to D display channels.

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.

* It is not possible to monitor errors in the background of input channels not assigned to display channels.

Display channel display image



Component Composite

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

It 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 LV5600/LV7600. A single unit can connect and control up to eight LV5600/LV7600s.

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 /P	
			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 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF	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
30/29.97/25/24/23.98 /P					
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	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 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF	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	
			30/29.97/25/24/23.98 /P		
			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	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 /P	SMPTE ST 425-1	
			30/29.97/25/24/23.98 /PsF	SMPTE ST 2048-2	
XYZ 4:4:4	12bit	2048×1080	30/25/24 /P	SMPTE ST 372	
			30/25/24 /PsF	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	
			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	
			30/29.97/25/24/23.98 /P	SMPTE ST 372	
	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
				30/29.97/25/24/23.98 /P	SMPTE ST 372
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	
			30/29.97/25/24/23.98 /P	SMPTE ST 372	
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
			30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1	
		2048×1080	30/29.97/25/24/23.98 /P	SMPTE ST 372	
	30/29.97/25/24/23.98 /PsF		SMPTE ST 425-1		
	30/29.97/25/24/23.98 /P		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		
XYZ 4:4:4	12bit	2048×1080	30/25/24 /P	SMPTE ST 372	
			30/25/24 /PsF	SMPTE ST 428	

* 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
YCbCr 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
YCbCr 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
		12bit	3840×2160	30/29.97/25/24/23.98 /P
	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
		12bit	3840×2160	30/29.97/25/24/23.98 /P
	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
YCbCr 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
YCbCr 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
	12bit	2048×1080	60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 SMPTE ST 425-3
			60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 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
	12bit	2048×1080	60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 SMPTE ST 425-3
			60/59.94/50/48/47.95 /P	SMPTE ST 2048-2 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(Square)

Color System	Quantization	Image	Frame Frequency / Scanning	Compliant Standard
YCbCr 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	-

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

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

Color System	Quantization	Image	Field Frequency / Scanning
YCbCr 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.

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, YCbCr 4:2:2 (10 bits)

TMD5 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, SNTF

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

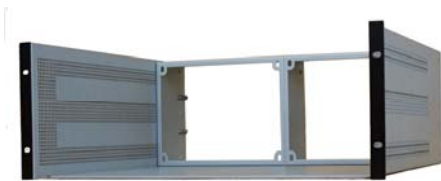
Display (LV5600)	
Liquid crystal display	7 type TFT color liquid crystal
Resolution	1920x1080
Refresh rate	60 Hz, 59.94 Hz, 50 Hz (Free run or frequency synchronization to external synchronization signal)
Touch panel	Electrostatic capacity type touch panel
General specifications	
Environmental conditions	
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	Indoors
Usable altitude	up to 2,000 m
Overvoltage 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)	LR2560
10 GbE multimode SFP + transceiver	AFBR-709 SMZ
10 GbE single mode SFP + transceiver	AFCT-739SMZ
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)
AFCT-739SMZ (10 GbE single mode)

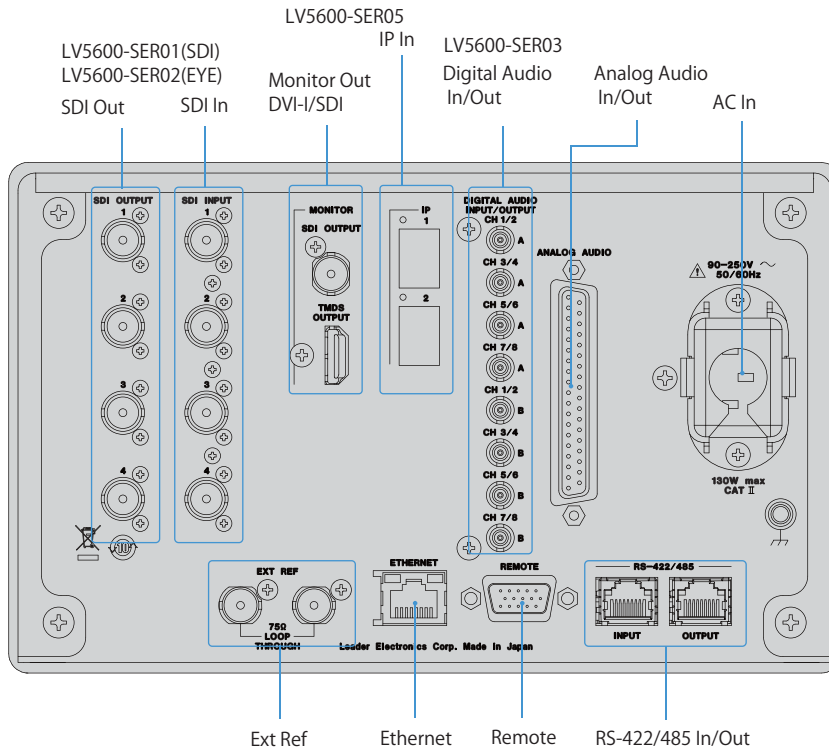


LC2565, BLANK PANEL

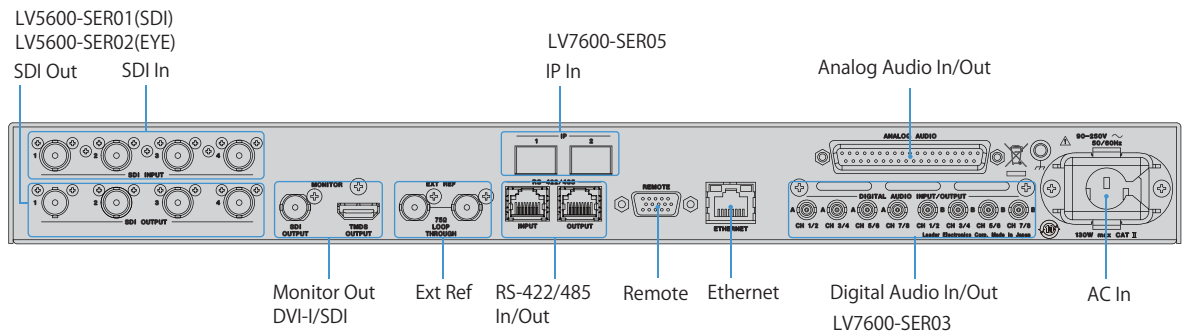
The LC2565 is a blank panel for the LR2560 rack mount adapter. Use it when installing a single LV5600 waveform monitor in the LR2560.



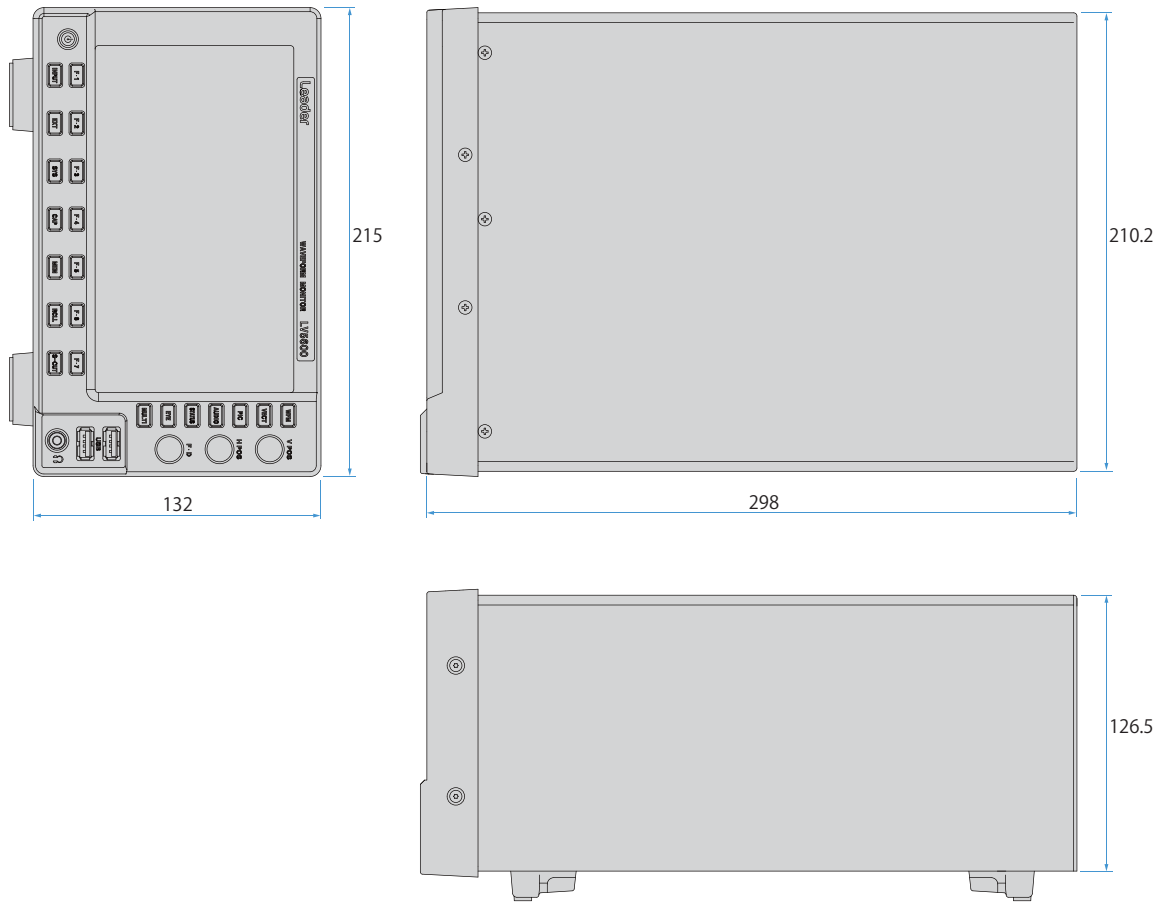
LV5600



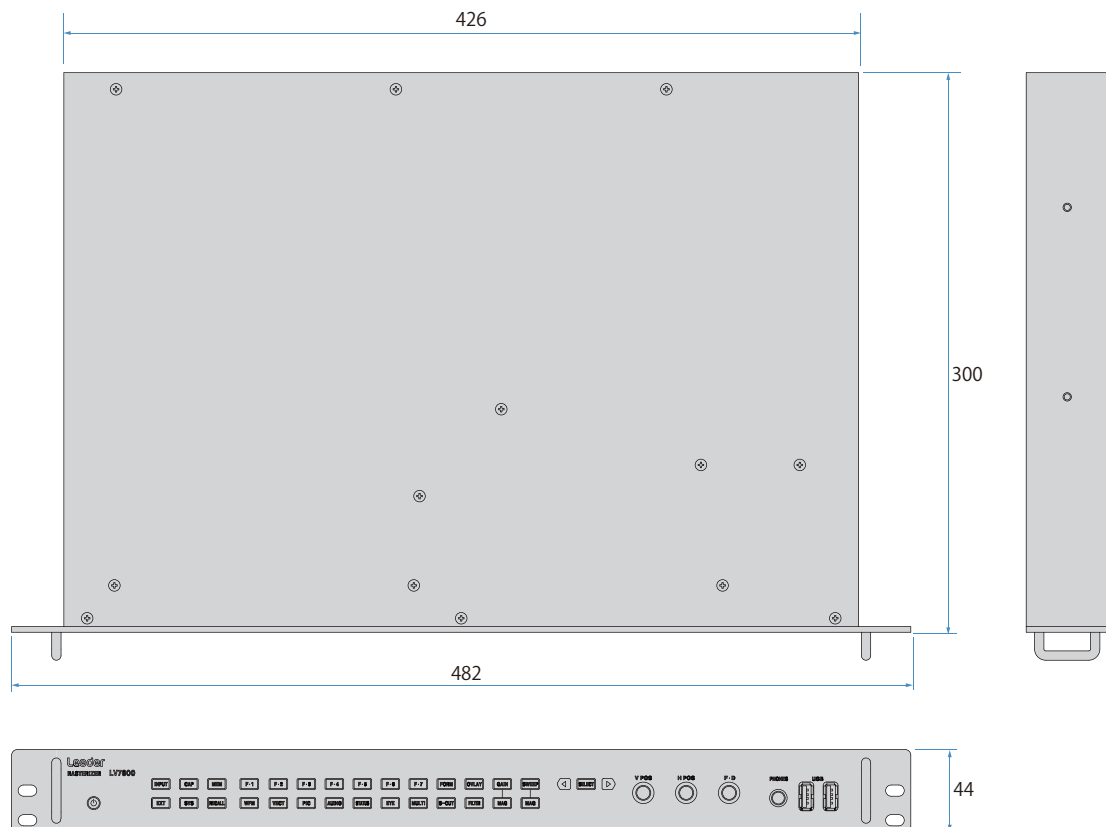
LV7600



LV5600



LV7600





LV5300 WAVEFORM MONITOR

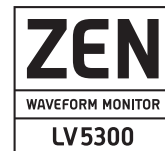
4K 12GSDI 3GSDI HDSDI
SDSDI EYE

LV5350 WAVEFORM MONITOR

4K 12GSDI 3GSDI HDSDI
SDSDI

LV7300 RASTERIZER

4K 12GSDI 3GSDI HDSDI
SDSDI EYE



/ General

The LV5300/LV5350/LV7300 are a space-saving, compact WAVEFORM MONITOR specialized for 4K/HD/SD-SDI video signals. The LV5300/LV5350 are 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 audio.

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/LV5350 adopt 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

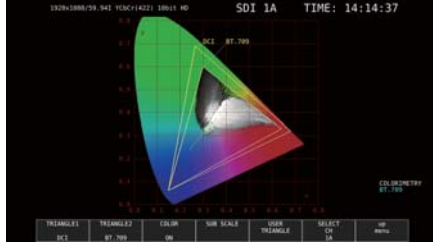
In addition to monitoring of various transmission errors, external synchronization phase difference display, lip sync measurement, SDI signal frequency deviation measurement function, an ancillary data analysis function with increased importance as a 4K video signal is also realized.

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



Audio analysis function

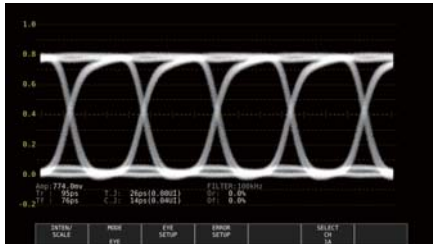
For audio signals, SDI signals and audio signals superimposed on SDI signals can be displayed on a level meter. Furthermore, Lissajous display, mute, clip error detection, loudness measurement, etc. are available. Audio format is compatible with L-PCM.

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 supports SD-SDI, HD-SDI, 3G-SDI, 12G-SDI single link. Simplified UHD TV multi-format 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.

* For 4K format only 12G-SDI is possible.

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.

* The LV 5300 / LV 5350 do not support external monitor 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.

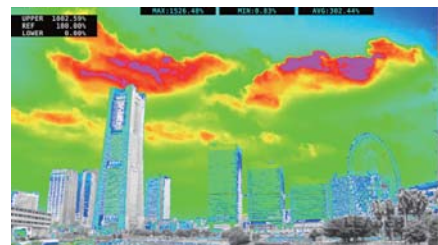
Ethernet terminal

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/m²) 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			Description
	LV5300	LV5350	LV7300	
SDI INPUT	—	LV5350 standard	LV7300-SER01	SD, HD, 3G SDI input
SDI INPUT/EYE	LV5300 standard	—	LV7300-SER02	SD, HD, 3G SDI input and eye pattern display *
BATTERY ADAPTER V MOUNT	LV5300-SER11	LV5350-SER11	—	Battery adapter: V-Mount
BATTERY ADAPTER QR GOLD	LV5300-SER12	LV5350-SER12	—	Battery adapter: QR-Gold

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

Software option list

Model Name	Type Number			Description
	LV5300	LV5350	LV7300	
AUDIO	LV5300-SER20	LV5350-SER20	LV7300-SER20	Embedded audio analysis
CLOSED CAPTION	LV5300-SER21	LV5350-SER21	LV7300-SER21	Closed captioning
CIE	LV5300-SER22	LV5350-SER22	LV7300-SER22	CIE display
HDR	LV5300-SER23	LV5350-SER23	LV7300-SER23	HDR analysis
TSG	LV5300-SER24	LV5350-SER24	LV7300-SER24	SDI signal generation
FOCUS ASSIST	LV5300-SER25	LV5350-SER25	LV7300-SER25	Focus assist
LAYOUT	LV5300-SER26	LV5350-SER26	LV7300-SER26	Customizable layout
TALLY	LV5300-SER27	LV5350-SER27	LV7300-SER27	ID, Iris, Tally displays
4K	LV5300-SER28	LV5350-SER28	LV7300-SER28	4K 12G SDI format support

LV5350 standard / LV7300-SER01, SDI Input

LV5300 standard / 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, video signal quality (QoE) freezes error, error black, gamut error detection, etc. are equipped as standard equipment.

- Audio 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/LV5350- SER20/LV7300- 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

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 audio 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 standard/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/ LV5350-SER11, Battery adapter: V-Mount

V mount adapter for battery compatible with IDX battery.

LV5300-SER12 / LV5350-SER12, Battery adapter: QR-Gold

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

LV5350-SER11 V Mount

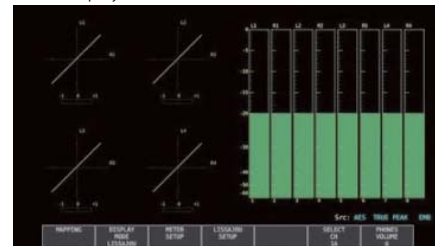
LV5350-SER12 Antonbauer



LV5300-SER20 / LV5350-SER20 / LV7300-SER20, Embedded audio 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 / LV5350-SER21 / LV7300-SER21, Closed captioning

- Closed captioning

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

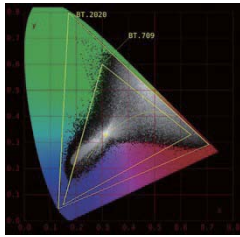


LV5300-SER22 / LV5350-SER22 / LV7300-SER22, CIE chart display function

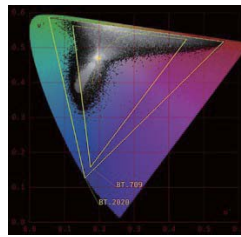
- CIE display function

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

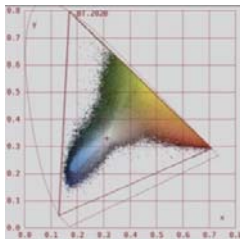
xy chromaticity coordinate display



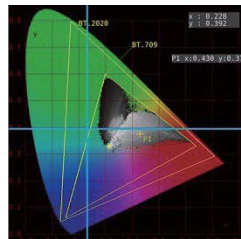
u' v' chromaticity coordinate display



xy coordinate color indication



A light blue is a measurement function cursor

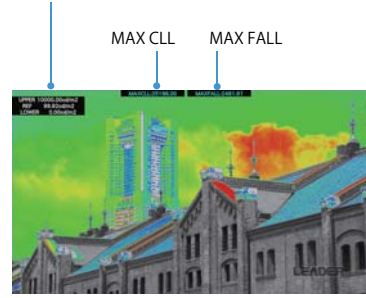


LV5300-SER23 / LV5350-SER23 / LV7300-SER23, HDR analysis
 In addition to HLG and PQ provided by ITU-R BT.2100, the level monitoring of the HDR signal corresponding to S-log3 and the level management at the assumed luminance (cd/m²) in a display considering OOTF are possible. The video signal waveform 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.

Upper limit setting value
 Reference setting value
 Lower limit setting values



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

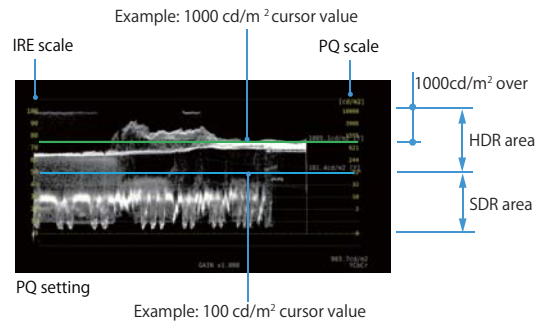
- Above the upper limit value is colored with magenta.

- 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 / LV5350-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.

The SDI signal generation function of 12G-SDI requires LV5300-SER28/LV7300-SER28options.

* The LV5300/LV5350/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, Check field, 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 audio

1Number of superimposed channels maximum 16 ch

ON/OFF of superimposition ON/OFF in audio group unit
audio level- 20 dBFS, -18 dBFS, 0 dBFS, Mute

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

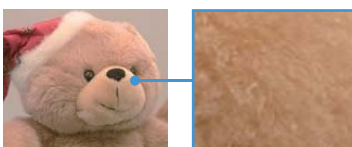
LV5300-SER25 / LV5350-SER25 / LV7300-SER25, Focus assist function

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)

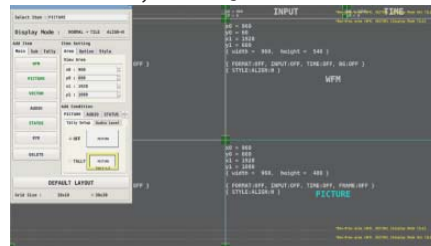


Enlarged view
(After focus adjustment)

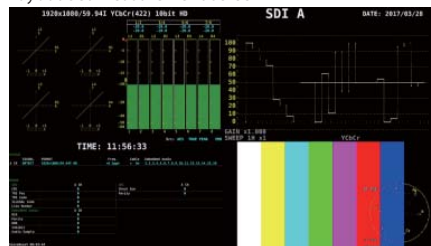
LV5300-SER26 / LV5350-SER26 / LV7300-SER26, Customizable layout function

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

Customizable layout setting screen



Layout Set measurement screen



LV5300-SER27 / LV5350-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 / LV5350-SER28 / LV7300-SER28,

4K video signal compatible function

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 LV5300/LV5350/LV7300 and can be used to remotely control the LV5300/LV5350/LV7300. A single unit can connect and control up to eight LV5300/LV5350/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 /P	
			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			
			60/59.94/50 /I	SMPTE ST 274			
			30/29.97/25/24/23.98 /P	SMPTE ST 425-1			
	12bit	1920×1080	30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1			
			30/29.97/25/24/23.98 /P				
		2048×1080	30/29.97/25/24/23.98 /P		SMPTE ST 425-1		
			30/29.97/25/24/23.98 /PsF	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					
	30/29.97/25/24/23.98 /PsF	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 /P	SMPTE ST 425-1				
		30/29.97/25/24/23.98 /PsF	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				
	30/29.97/25/24/23.98 /PsF		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 /P	SMPTE ST 425-1				
		30/29.97/25/24/23.98 /PsF	SMPTE ST 2048-2				
		XYZ 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				
	30/29.97/25/24/23.98 /PsF		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 /P	SMPTE ST 425-1				
30/29.97/25/24/23.98 /PsF		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			

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	SMPTE ST 425-1
				SMPTE ST 2048-2
			60/59.94/50 /I	SMPTE ST 274
			30/29.97/25/24/23.98 /P	SMPTE ST 372
	12bit	1920×1080	30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1
			30/29.97/25/24/23.98 /P	SMPTE ST 372
		2048×1080	30/29.97/25/24/23.98 /P	SMPTE ST 372
			30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1
			30/29.97/25/24/23.98 /P	SMPTE ST 2048-2
			30/29.97/25/24/23.98 /PsF	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
			30/29.97/25/24/23.98 /P	SMPTE ST 372
			30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1
			30/29.97/25/24/23.98 /P	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
			30/29.97/25/24/23.98 /P	SMPTE ST 372
			30/29.97/25/24/23.98 /PsF	SMPTE ST 425-1
			30/29.97/25/24/23.98 /P	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
	30/29.97/25/24/23.98 /P		SMPTE ST 372	
	30/29.97/25/24/23.98 /PsF		SMPTE ST 425-1	
	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	
	30/29.97/25/24/23.98 /P	SMPTE ST 2048-2		
XYZ 4:4:4	12bit	2048×1080	30/25/24 /P	SMPTE ST 372
			30/25/24 /PsF	SMPTE ST 425-1
				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	SMPTE ST 425-1
			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	SMPTE ST 425-1

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
				SMPTE ST 2082-10
			30/29.97/25/24/23.98 /P	SMPTE ST 2036-1
			30/29.97/25/24/23.98 /P	SMPTE ST 2082-10
	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	SMPTE ST 2036-1
				SMPTE ST 2082-10
			30/29.97/25/24/23.98 /P	SMPTE ST 2036-1
			30/29.97/25/24/23.98 /P	SMPTE ST 2082-10
YCbCr 4:4:4	10bit	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	SMPTE ST 2036-1
			SMPTE ST 2082-10	
	30/29.97/25/24/23.98 /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	SMPTE ST 2036-1	
	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	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	SMPTE ST 2036-1
			SMPTE ST 2082-10	
	30/29.97/25/24/23.98 /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	SMPTE ST 2036-1	
	30/29.97/25/24/23.98 /P	SMPTE ST 2082-10		

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

External synchronize input terminal		For Ethernet terminal control	
Input terminal	BNC terminal	Approved standard	
Number of input terminals	1 line 2 terminals		IEEE802.3
Input impedance	15 k Ω Passive loop through	Supported protocols	TELNET, FTP, SNMP, HTTP, SNTP
Input return loss	30 dB or more (50 kHz to 30 MHz, 75 Ω termination)	Input/output terminals	RJ-45
Maximum input voltage	\pm 5 V (DC + peak AC)	Function Remote operation with an external PC or remote controller, File transfer, get status information	
Input signal	Ternary synchronization signal or NTSC/PAL black burst signal 10 Field ID correspondence	Types	10Base-T, 100Base-TX, 1000Base-T
Function	SDI reference signal input for video signal waveform display and phase difference display	Remote terminal	
		Terminal shape	D Sub 15 pins (female)
		Number of terminals	1
		Control signal	LV- TTL level (LOW active)
Headphone output terminal		Function	Preset recall, input signal switching, alarm output, tally
Output terminal	LV5300/LV5350 3.5 mm Mini jack 1 terminal (stereo) LV7300 Standard jack 1 terminal (stereo)	Alarm output	When a format alarm, various errors, fan abnormality, or internal temperature occurs
Output signal	On the screen of the displayed audio signal, arbitrary 2 ch (Downmixed Lt, Rt is also acceptable)	Display (LV5300/LV5350)	
		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)
Monitor output terminal (LV7300)		Touch panel	Electrostatic capacity type touch panel
SDI output terminal		General specifications	
Function	Output screen for SDI monitor	Environmental conditions	
Output terminal	BNC terminal	Operating temperature range	0 to 40 $^{\circ}$ C
Number of output terminals	1	Operating humidity range	85% RH or less (with no condensation)
Output signal	Output liquid crystal display screen is output with HD, 3G-A, 3G-B-DL. 1920x1080 60, 59.94, 50 I/P, YC _B C _R 4:2:2 (10 bits)	Performance guarantee temperature range	10 to 30 $^{\circ}$ C
TMDS output terminal		Usage environment	
Function	The displayed screen is output for HDMI monitor.	Indoors	
Output terminal	HDMI terminal	Usable altitude	up to 2,000 m
Number of output terminals	1	Overvoltage category	I
Signal format	Single Link T.M.D.S	Pollution degree	2
DDC function	Not supported	Power supply	
HOT PLUG detection function	Not supported	Voltage	DC 10 to 18 V
Output signal	Output liquid crystal display screen is output. 1920x1080 60 P, 59.94 P, 50 P	Power consumption	TBD W max.
Control terminal		Dimensions	
USB terminal		LV5300	215 (W)x132 (H)x120 (D) mm (No protruding part included)
Terminal shape	Standard A	LV5350	215 (W)x132 (H)x85 (D) mm (No protruding part included)
Number of terminals	2	LV7300	213 (W)x44 (H)x300 (D) mm (No protruding part included)
Standard	USB 2.0	Weight	
Compatible device	USB memory, USB mouse, touch panel type monitor	LV5300	TBD kg max. (Including options, accessories not included)
		LV5350	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 LV5350)	LR2530
Rack mount adapter (for LV7300)	LR2731/LR2732
AC adapter (LV7300 is included)	SPU61A-105

Accessories

LR2530, RACKMOUNT ADAPTER

The LR2530 is a dual rack mount adapter used to install LV5350 waveform monitors in a 19-inch EIA standard rack. It allows two LV5350s 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 LV5350 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.

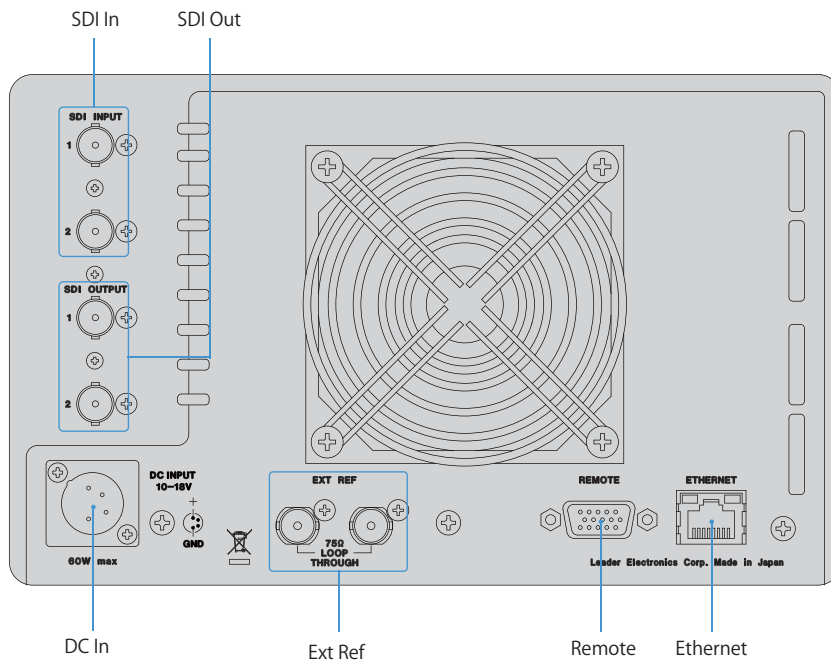
AC Adapter

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

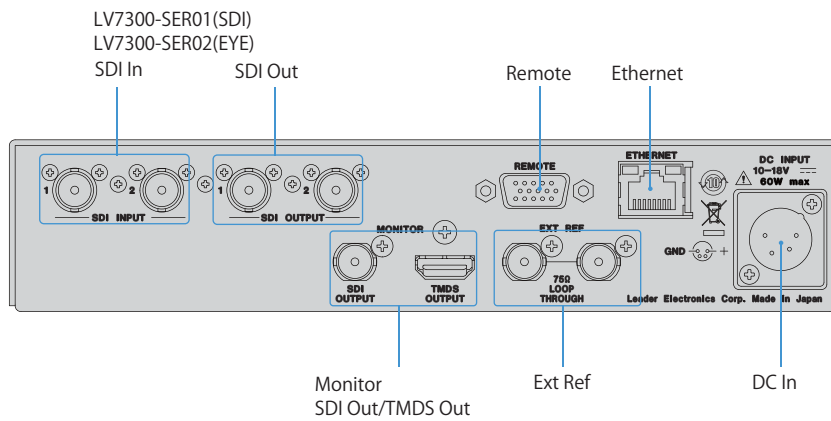
* An AC adapter is attached to the LV7300.



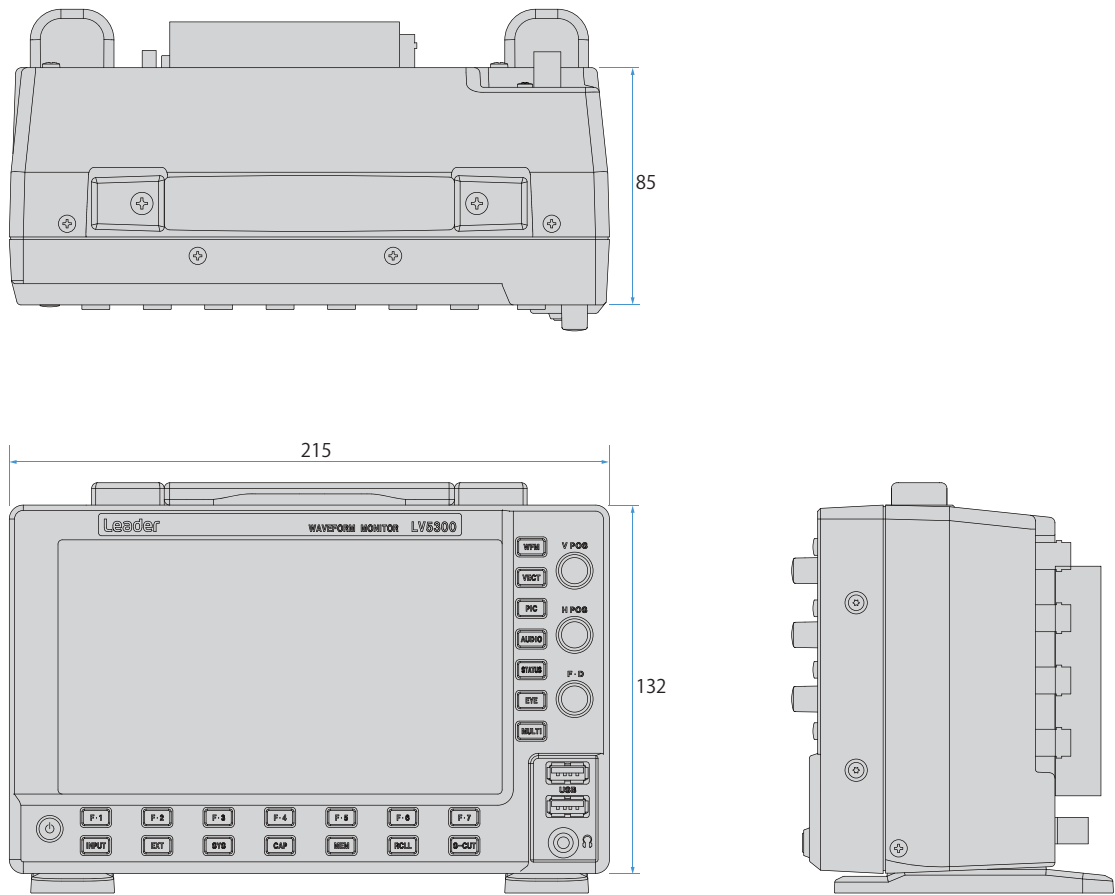
LV5350



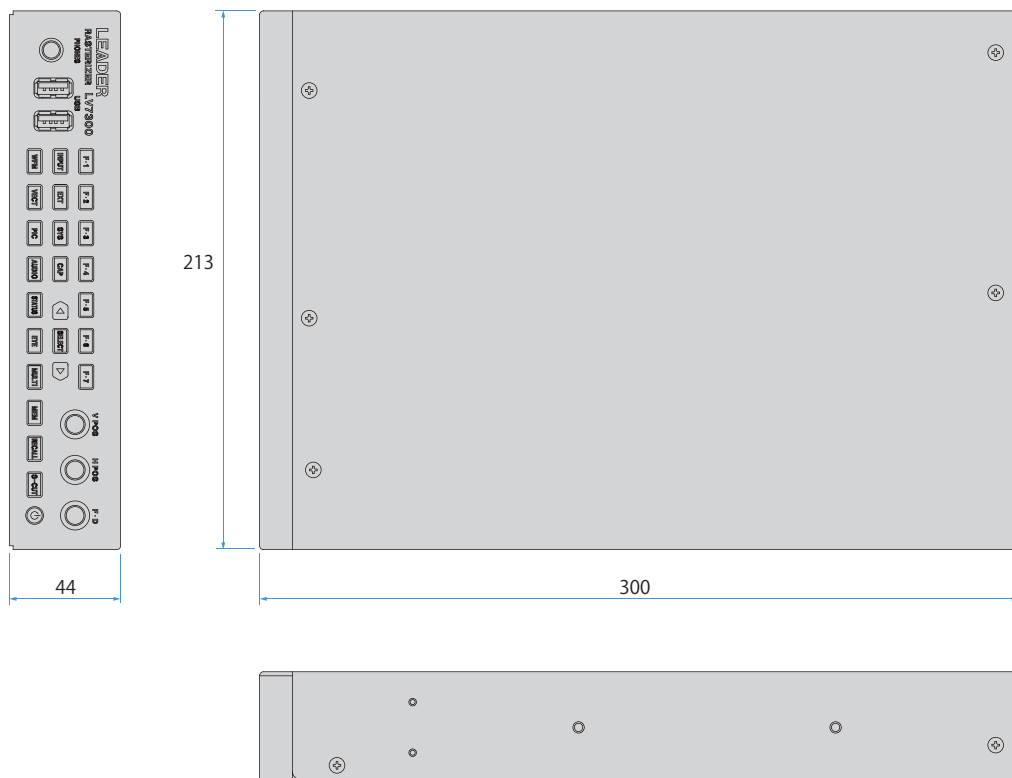
LV7300



LV5350



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.

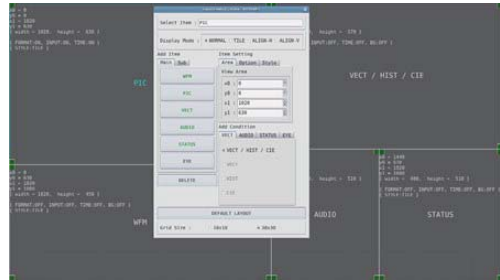
Fan Control

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.

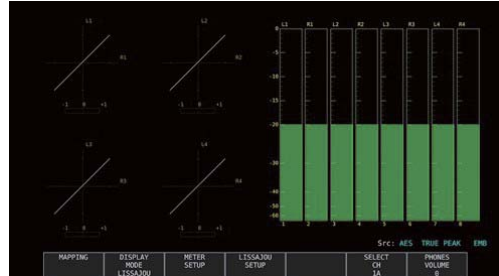
LV5490-SER01/02/06/08, Frame Capture Feature

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.

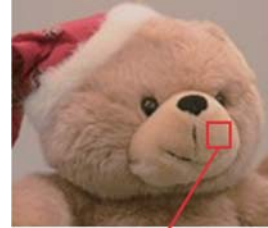
Audio display



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.)

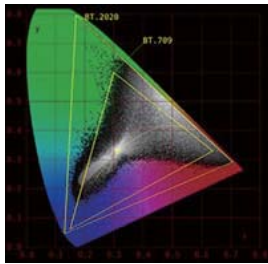


LV5490-SER05, CIE Chromaticity Coordinate Display

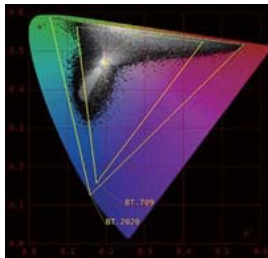
This is a chromaticity diagram display function that supports ITU-R BT.601, ITU-R BT.709, and ITU-R BT.2020 colorimetries. Display mode supports CIE 1931 (xy display) and CIE 1976 (u'v' display). The chromaticity diagram display function can display two color-space triangles. As such, it can be used 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



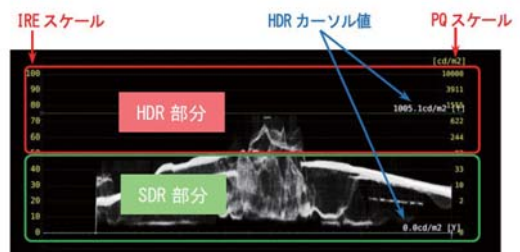
HDR zone display



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

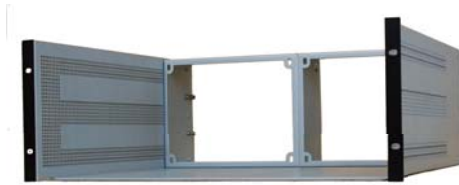


/ Accessories

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.



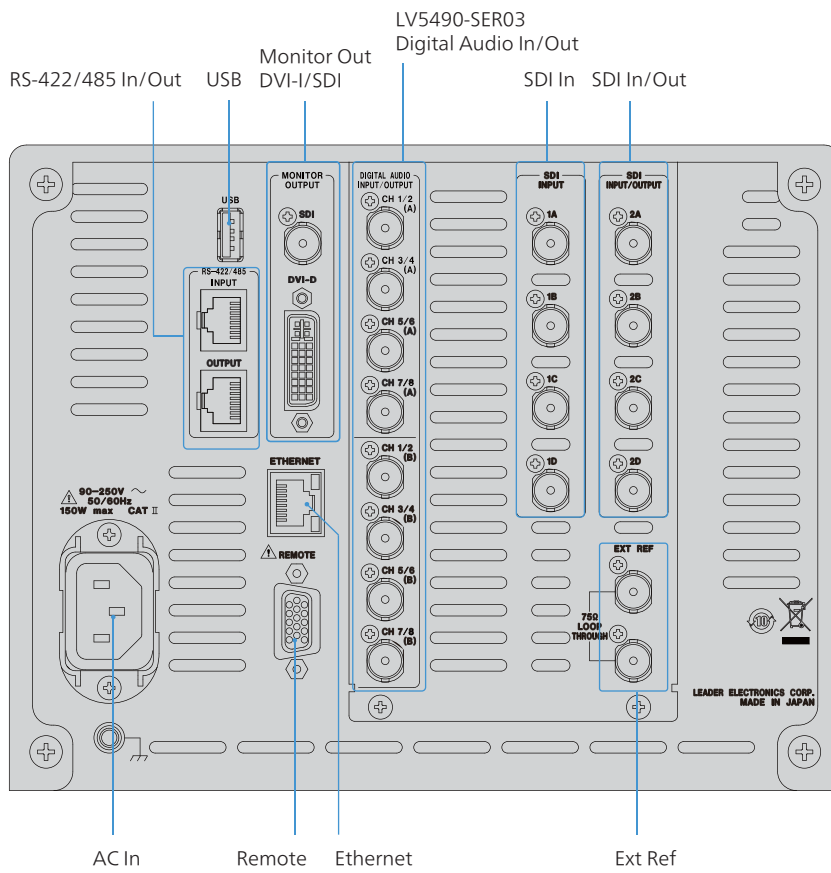
LC2190, Blank Panel

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

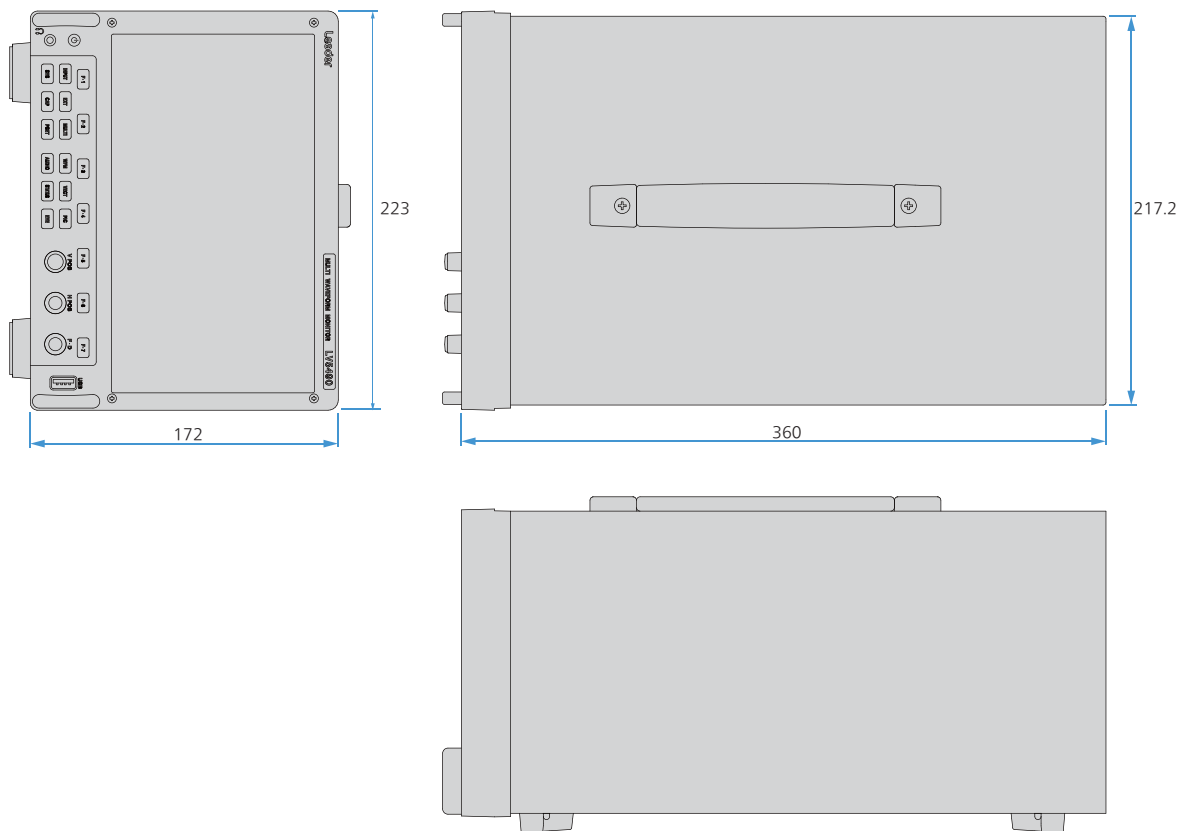
Use it when installing a single Leader measuring instrument in the LR2490.



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.

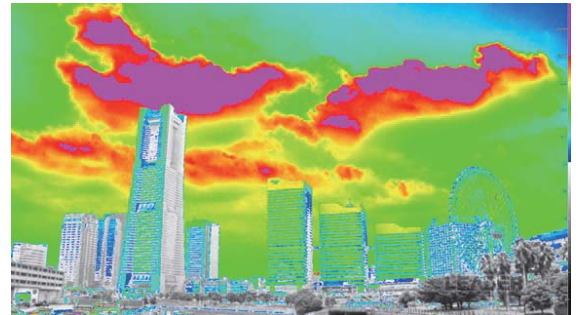
Example of loudness display



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

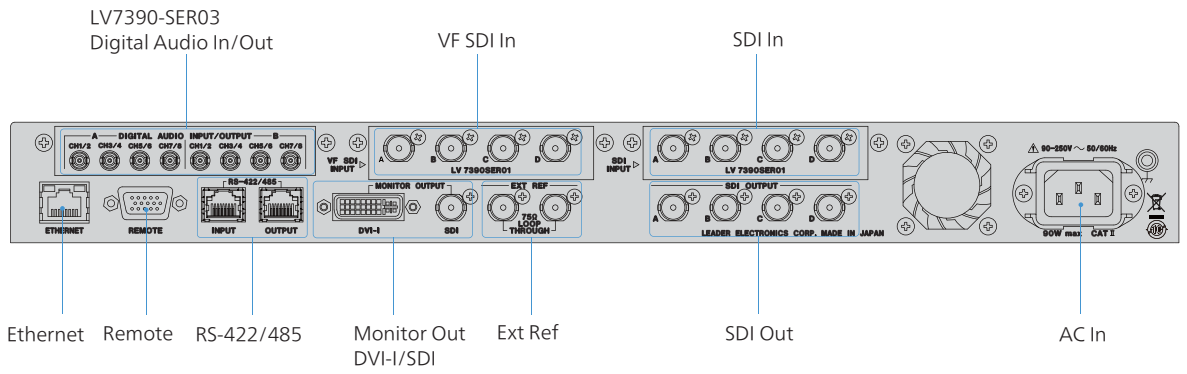
The LV7290 remote controller connects to the Ethernet port on the rear panel of the LV7390 and can be used to remotely control the LV7390. It provides controls similar to the LV7390 panel. It can be used as though you were using the LV7390 panel. A single unit can connect and control up to eight LV7390s.

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

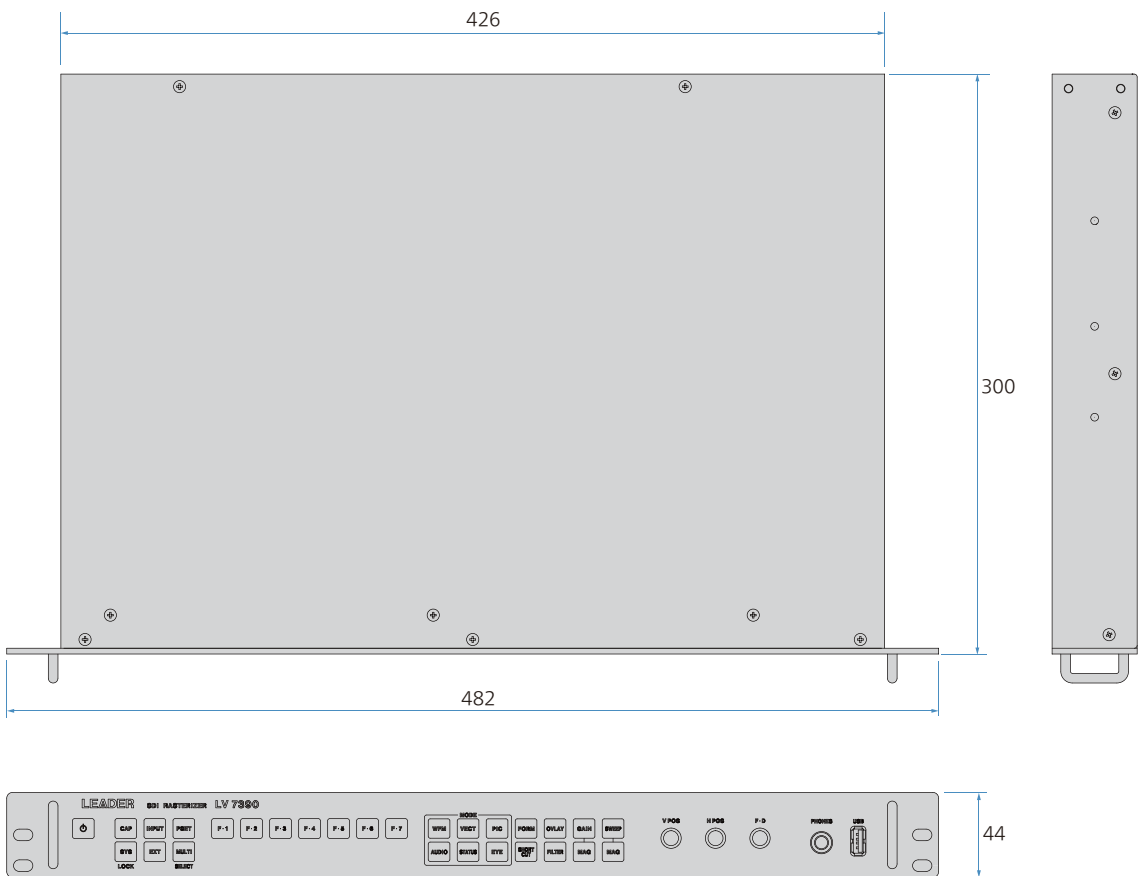
LV7290



Rear Panel



Physical Specifications



LV5770A MULTI MONITOR

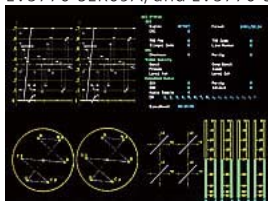
3GSDI HDSDI SDSDI



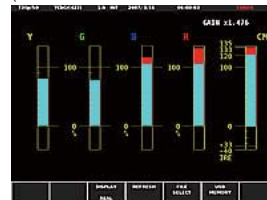
General

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)



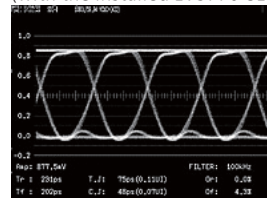
5 bar display
(with the installed LV5770-SER08 and LV5770-SER09A)



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.



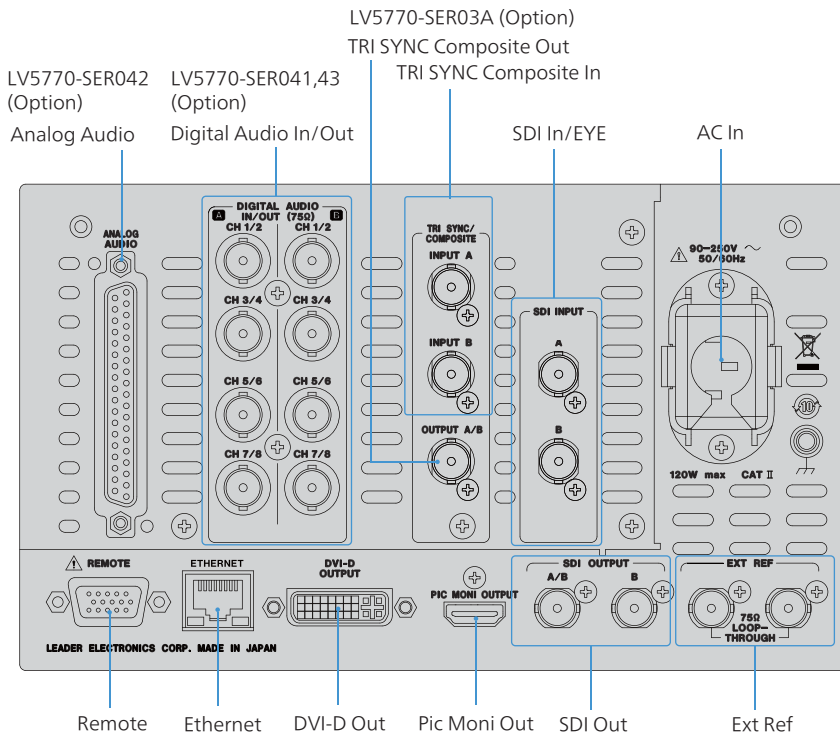
LR2427B, CABINET

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.

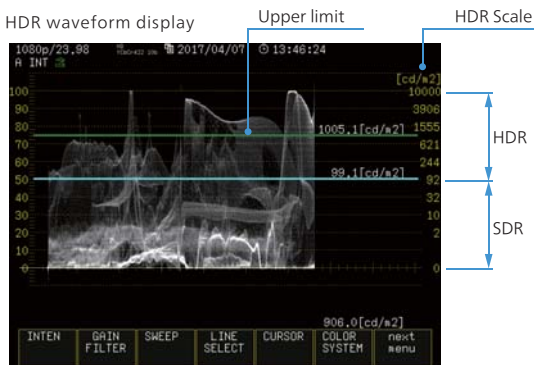
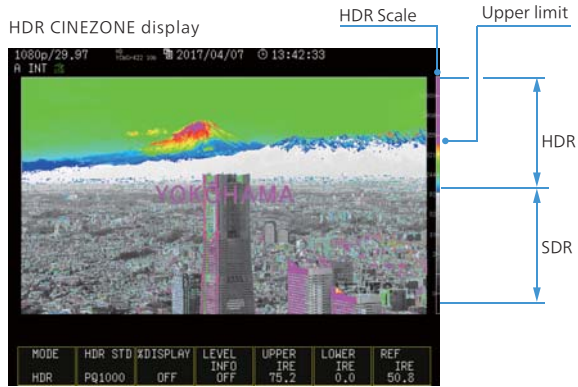
LV5333-OP70/LV5333-OP71 Battery Mount

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.



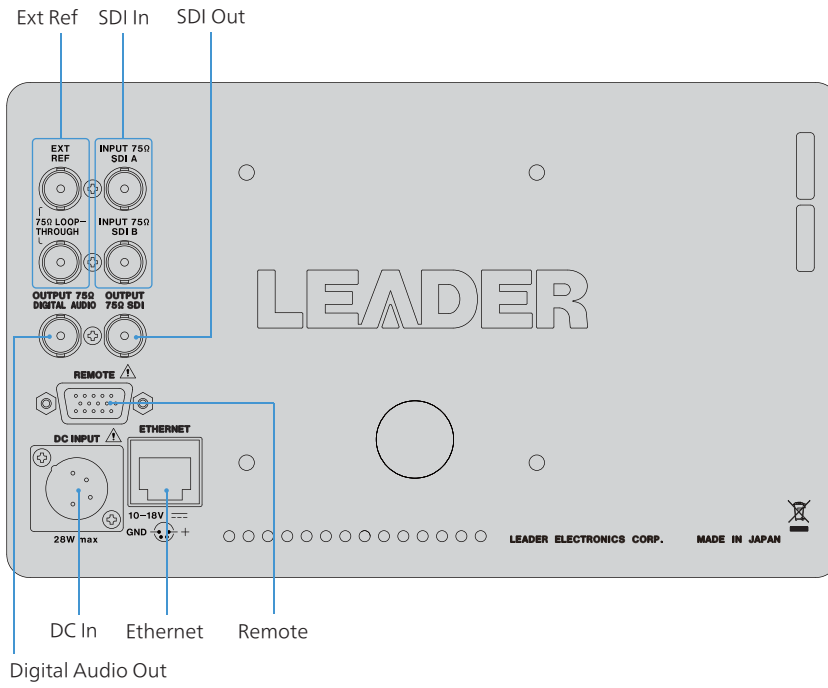
LC2130, BLANKPANEL

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

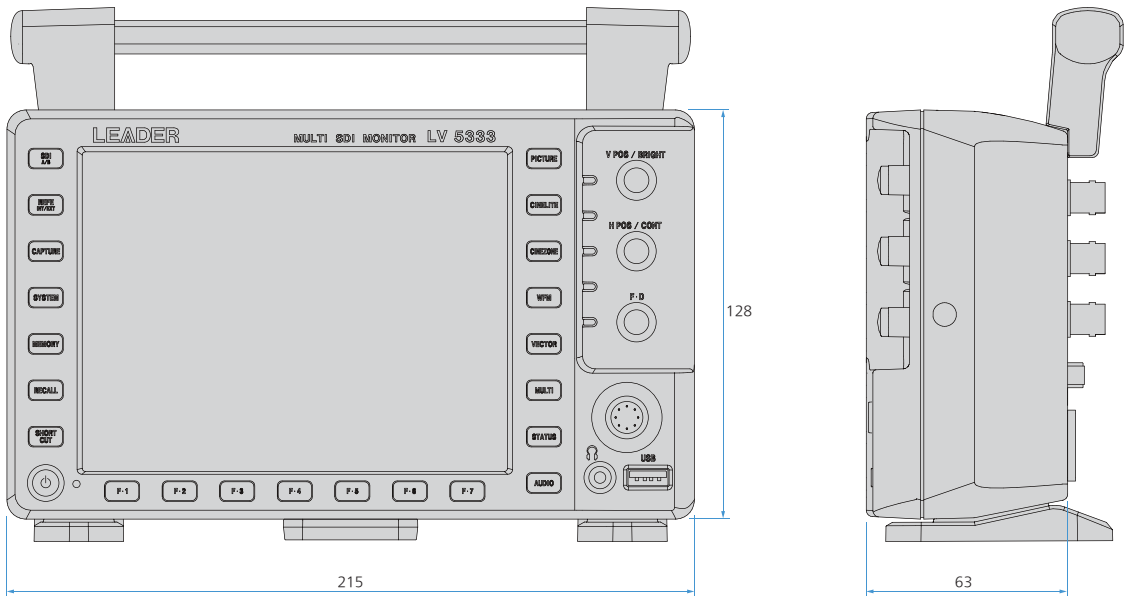
Use it when installing a single Leader measuring instrument in the LR2752.



Rear Panel



Physical Specifications



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

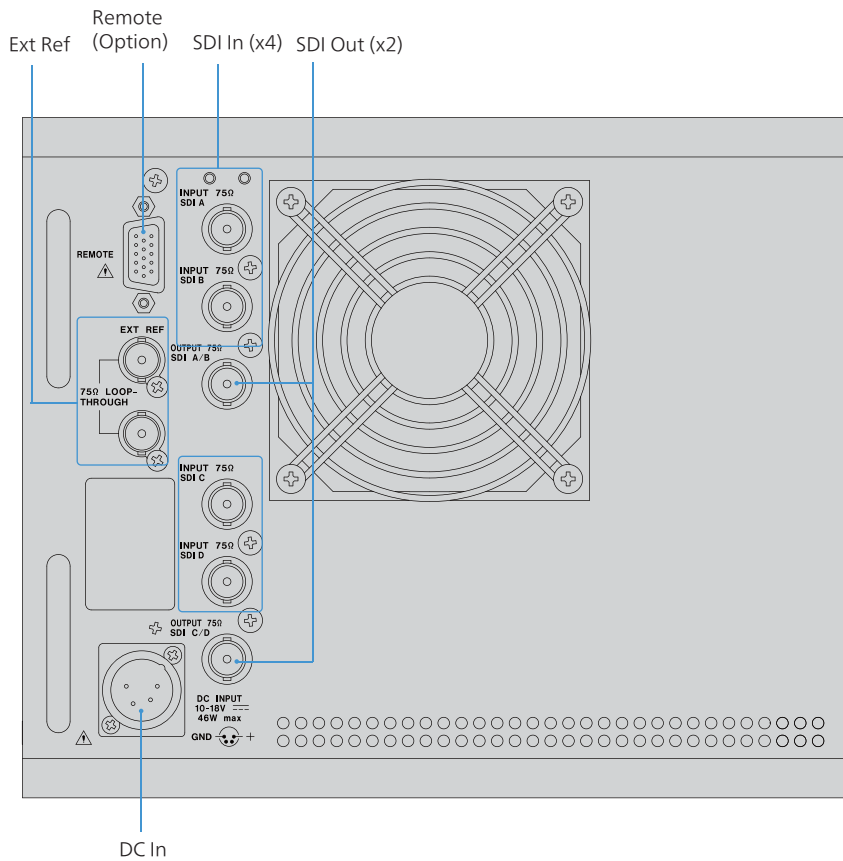
The addition of the audio lissajous option enables the LV5381 to display the lissajous curves and the numeric values of levels of the audio that is embedded in an SDI signal.

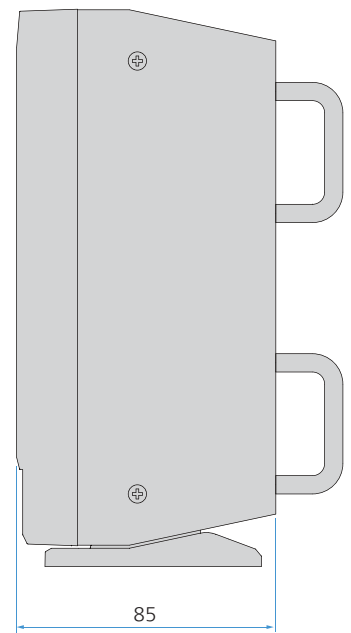
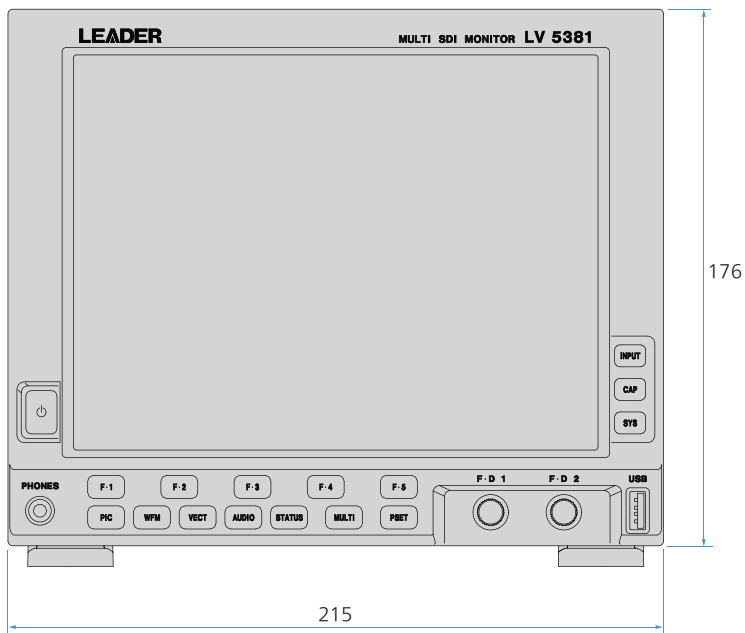
LV5381-SER03, Status Option

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

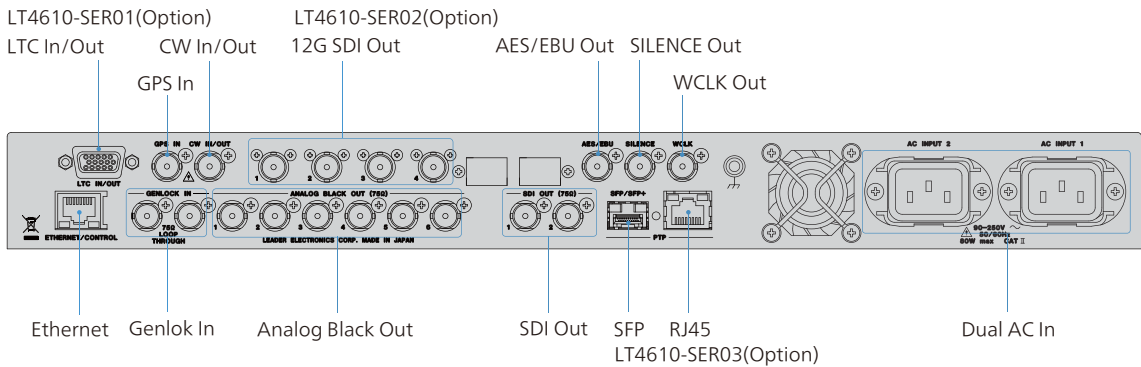
The LT4610-SER02 12G-SDI Option adds support for 12G-SDI. SDI signal output supports 4K 12G-SDI, 4K 3G-SDI quad, 4K HD SDI quad, 4K 3G dual, 3G-SDI (level A and level B), HD-SDI (including dual link), and SD-SDI. Four SDI signal output connectors are available. The format is the same for all four outputs,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

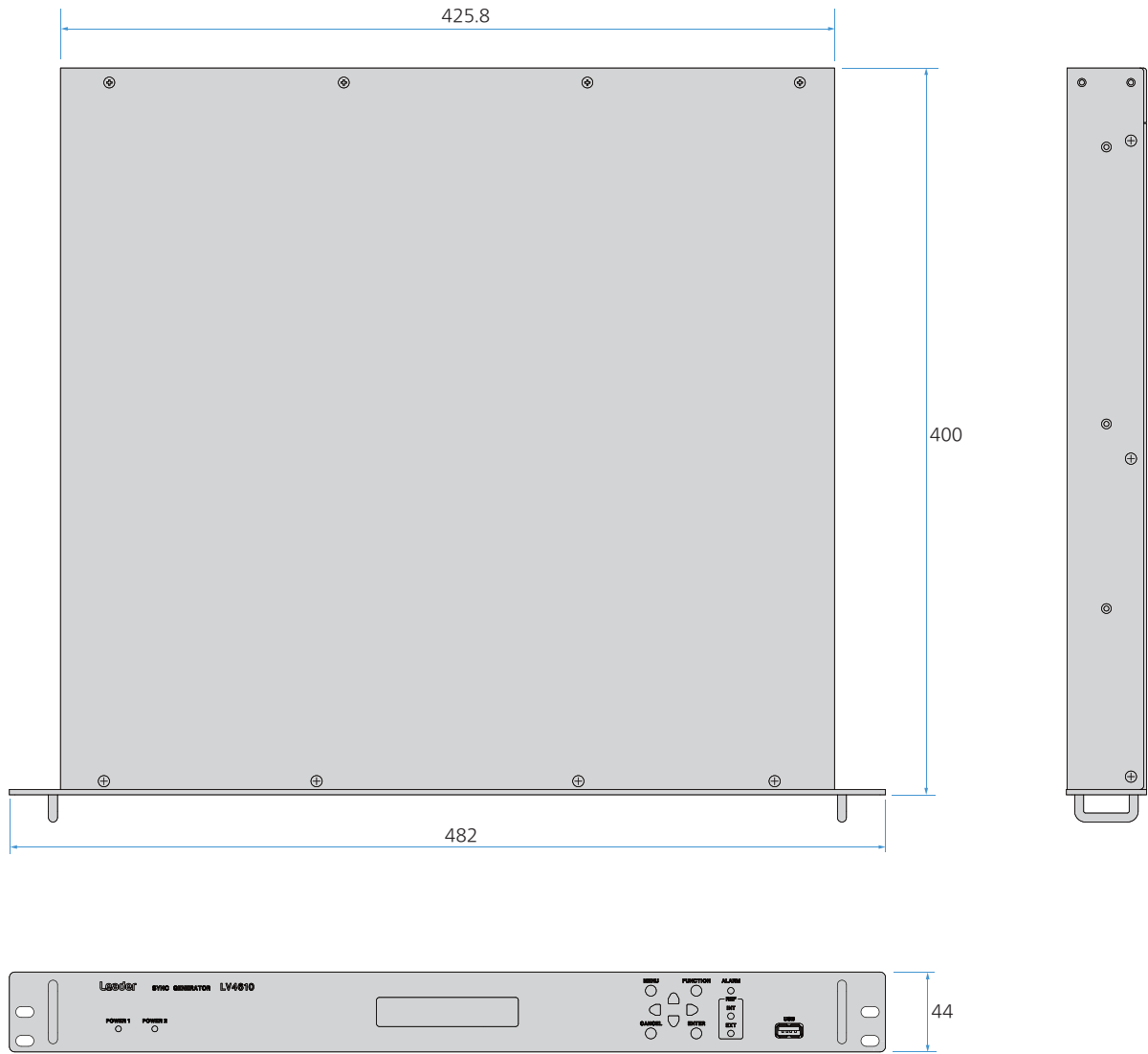
(However, only two outputs are available for 3G-SDI level B and HD dual link.)

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.

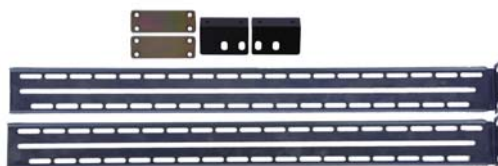
AC Power Supply

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.



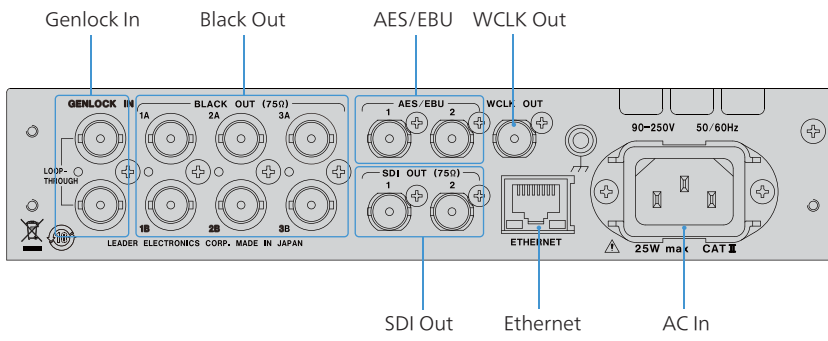
LR2481, Rack Mount Adapter

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.

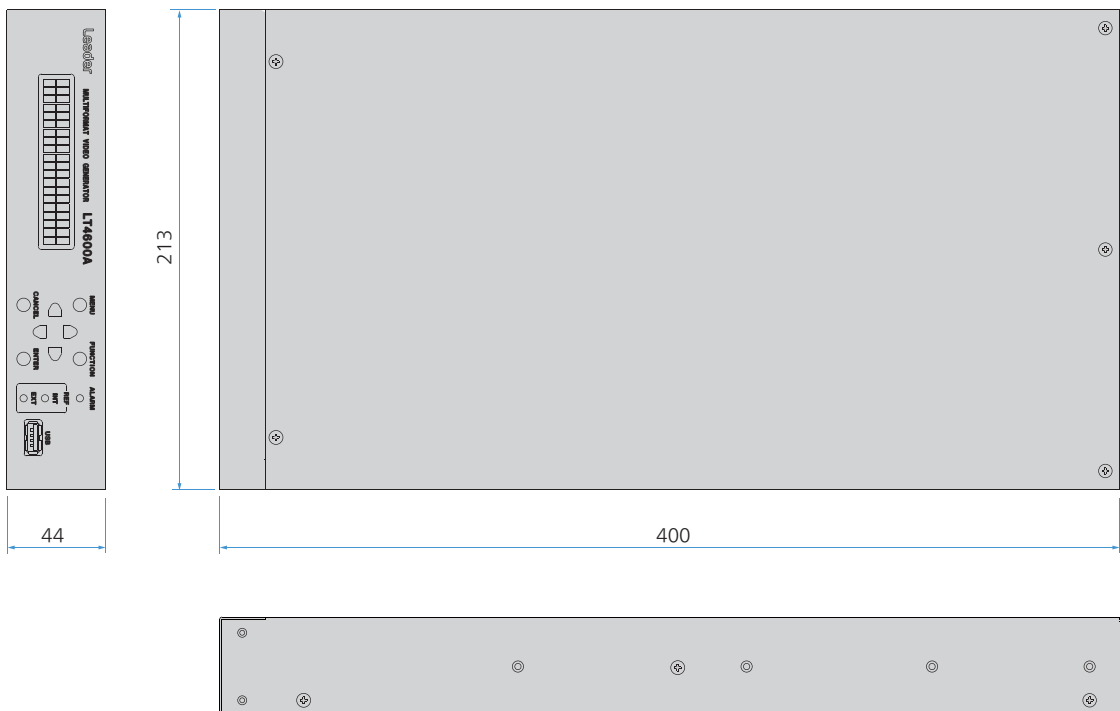
Because one side is a blank panel, use it to install a single Leader product.



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.

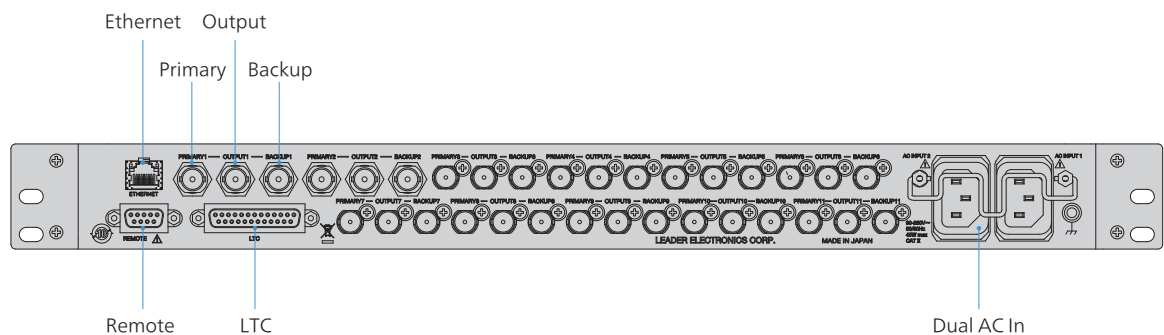
Accessories

LC2183, LTC CABLE

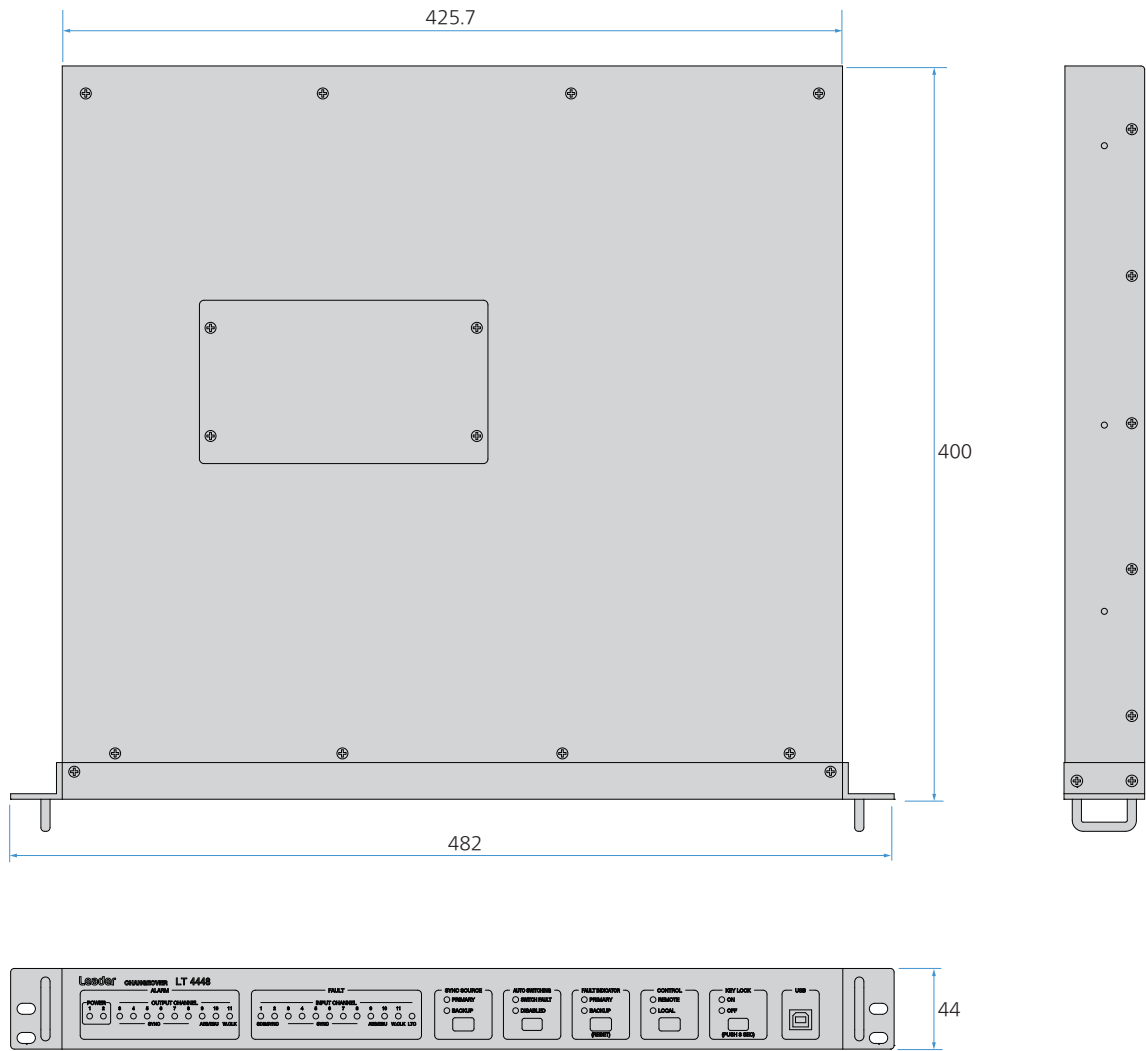
The LC2183 is a conversion cable used when combining an LT4448 changeover unit and LT4610 sink generator, or the like.

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



Leader

LT 4611

SYNC GENERATOR



Overview

LT4611 is a synchronized signal generator in 1U full rack size that outputs an analog video synchronized signal and audio word clock in the station. The GENLOCK function to the external synchronized signal enables operation synchronizing to the input signal. A broad lineup of options is available, enabling GPS synchronizing, PYP synchronizing, discrete pattern output, digital audio output and time code output by 12G-SDI, 3G-SDI, HD-SDI and SD-SDI. Two built-in power supply units enables duplex redundant operation of power source in case of power supply malfunction.

Features

Triple rate SDI compatible

Standard SDI signal output is compatible with 12G-SDI (4K), 3G-SDI (level A, level B), HD-SDI (including dual link), and SD-SDI. Independent dual-lines output is available for SDI signal output terminal, which is capable of individual setting of pattern and phase. (single-line only for 3G-SDI level B and HD dual link)

12G-SDI compatible

SDI signal output is compatible with 12G-SDI(4K), 3G-SDI (level A, level B), HD-SDI (including dual link), and SD-SDI, and four outputs of SDI signal output terminals are available. While the formats are common for four outputs, pattern and phase can be set individually. (dual-lines only for 3G-SDI level B and HD dual link)

Superimposing ID characters

ID characters can be superimposed on any arbitrary position on the screen. Lateral scroll or flashing display are available for checking freeze state.

Superimposing logo mark

Logo mark converted into four gradations of monochrome data from the bit map with size of maximum 320 (dot) x 240 (line) (GVGA size) can be superimposed on any arbitrary position on the screen.

Safety area marker

Safety area marker of 90% and 80% can be superimposed on the screen, and an aspect marker of 4:3 cans also be superimposed for 3G, HD.

Pattern scroll

Function to scroll a pattern in eight directions is available. Speed is also changeable.

Superimposing embedded audio

Embedded audio of 32 channels (link A, link B, each 4 ch x 4 groups) can be superimposed for 3G-B, and 16 channels (4 ch x 4 group) for 3G-A, HD and SD. Frequency and level, etc. can be set for each channel.

Lip Sync pattern

Lip Sync pattern in which video image and sound are synchronized is output. Using our LV 5770 (A and others enables accurate measuring of the Lip Sync of the video image and sound on SDI signal.

GENLOCK function

Synchronizing to NTSC/PAL black burst signal and HDTV triple-level synchronized signal is available. It is also compatible with NTSC/PAL black burst signal with field reference pulse, and NTSC black burst signal with 10 field ID. In addition, the stay-in synchronizing function is installed for the occurrence of abnormalities in the GENLOCK input.

Analog black output

Timing is changeable with independent 6-lines of analog black synchronized signal output installed. It is also compatible with NTSC/PAL black burst signal with field reference pulse, and NTSC black burst signal with 10 field ID.

Word clock output

Single-line output is available for the word clock of 48 kHz synchronized with video signal.

AES/EBU serial digital audio output

Single-line output is available for the AES/EBU signal of 48 kHz of sampling frequency synchronized with video signal. In addition, single-line of AES/EBU signal in mute state is available.

Real time clock

The clock can be kept counting even when the power supply is turned off thanks to battery back-up of the real time clock.

The clock can be also kept counting even without GPS reception when LT4611SER01 is installed.

Ethernet

Standard support of SNMP enables easy integration into network environment.

Preset function

A maximum of ten types of preset can be internally saved. Registered useful preset can be called anytime during the operation to start-up with the identical setting anytime.

External memory compatible

Logo data and preset data can be loaded and saved by using USB memory from the front panel.

Duplex power supply

Duplex power supply is available by integrating two power supply units. Alarm can be displayed on the main panel screen and alarm can be output by SNMP in case of an abnormal state of the power supply unit.

LT 4610SER01 GPS

By installing this option, you can add GPS lock function to lock to frequency and time obtained from GPS, and with 10 MHz CW lock function and time code generator function. The time code generator is capable of free-run based on internal clock information as well as output of ATC (LTC) and LTC Embedded Time Code based on clock information of GPS, LTC and VITC. A hold-over function is available to retain phase and frequency of output signal when GPS signal and CW signal are lost. This unit can be also used as NTP server during GPS lock.

LT 4610SER02 12G-SDI

SDI signal output is compatible with 4K 12G-SDI, 4K 3G-SDI quad, 4K HDSDI quad, 4K 3G dual, 3G-SDI (level A, level B), HDSDI (including dual link), and SD-SDI, and four outputs of SDI signal output terminals are available. While the formats are common for four outputs, pattern and phase can be set individually. (dual-lines only for 3G-SDI level B and HD dual link)

LT 4610SER03 PTP

LT 4610SER 03 is an option corresponding to PTP (IEEE 1588).It can be used in combination with LT 4610SER01 (GPS option) or as a standalone grand master.

LT 4611SER21 SYNC 3 OUT ADD

Option to add three outputs of analog video synchronized signal output. It becomes six outputs and six lines added to standard three outputs. Signal format can be set per each output.

LT 4611SER22 SDI OUTPUT

SDI signal output is compatible with 12G-SDI (4K), 3G-SDI (level A, level B), HD-SDI (including dual link), and SD-SDI. Independent dual-lines output is available for SDI signal output terminal, which is capable of individual setting of pattern and phase. (single-line only for 3G-SDI level B and HD dual link)

LT 4611SER23 AUDIO OUTPUT

The LT 4611SER23 can output a 48 kHz AES/EBU signal synchronized with the video signals. It is also equipped with a muted AES/EBU signal output.

Standard

Compatible standards

Analog black signal	
NTSC black burst signal	SMPTE ST 170, SMPTE ST 318, SMPTE RP 154
PAL black burst signal	ITU-R BT1700, EBU N14
HD triple level synchronized signal	SMPTE ST 240, SMPTE ST 274, SMPTE ST 296

Input/output terminal

GENLOCK input terminal	
Connector	BNC connector dual terminal
Input signal	Analog composite synchronized signal Analog component synchronized signal
Format	Loop thru
Input impedance	75Ω
Max. input voltage	± 5 V (DC + peak AC)
Operation input level range	± 6 dB
External lock range	± 5 ppm

Analog black output terminal

Connector	BNC connector Three terminal three lines
Output signal	Analog composite synchronized signal Analog component synchronized signal
Output impedance	75Ω
Synchronizing level	
NTSC	40 ± 1 IRE
PAL	-300 ± 6mV
HD	± 300 ± 6mV
Blanking	0 ± 15mV

Word clock output terminal

Connector	BNC connector single terminal
Output frequency	48 kHz
Output amplitude	3.5 V or more (at 75 Ω end, high level)

Control terminal

Ethernet terminal	
Standards	IEEE 802.3
Protocol	SNMP v2c
Connector	RJ-45
Function	Sending trap (at detecting abnormality) Sending operation status (GENLOCK synchronizing state, etc.)
Type	10BASE-T/100BASE-TX (auto switching)
USB terminal	
Standards	USB 2.0
Compatible media	USB memory device

Function	Save and load of preset data Load of logo data Firmware update Acquisition of MIB file
Connector	USB Type A
LED display	
Number of characters	20 ch × 2 lines
Backlight	ON/OFF
GENLOCK function	
Signal format	NTSC-BB, NTSC-BB+Ref, NTSC-BB+ID, NTSC-BB+Ref+ID, NTSC-BB+S, NTSC-BB+S+Ref, NTSC-BB+S+ID, NTSC-BB+S+Ref+ID, PAL-BB, PAL-BB+Ref, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/24I, 1125/23.98I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P
Timing variable	
Changeable range	
NTSC black burst signal	± 5 frame
PAL black burst signal	± 2 frame
HD triple-level synchronized signal	1 frame (frame entire range)
FINE	Cover 1 changeable unit
GENLOCK mode	
INTERNAL	Operating with internal reference signal
EXTERNAL	Operating with external reference signal
EXT-REF / GPS(SER01) / 10MHz CW(SER01)	
Recovery mode	
IMMEDIATE	At recovering external reference signal, reset action
FAST	At recovering external reference signal, quick re-synchronizing action
SLOW	At recovering external reference signal, slow re-synchronizing action
HOLD	At recovering external reference signal, retain STAY IN SYNC state
Analog black output	
Signal format	three lines can be set independently NTSC-BB, NTSC-BB+Ref, NTSC-BB+ID, NTSC-BB+Ref+ID, NTSC-BB+S, NTSC-BB+S+Ref, NTSC-BB+S+ID, NTSC-BB+S+Ref+ID, PAL-BB, PAL-BB+Ref, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/24I, 1125/23.98I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P

Timing variable	
Setting	Three lines can be set independently
Changeable range	
NTSC black burst signal	± 5 frames
PAL black burst signal	± 2 frames
HD triple-level synchronized signal	1 frame (frame entire range)
Changeable unit	
NTSC/PAL black burst signal	0.0185 μs unit
HD Triple level synchronized signal	0.0135 μs unit

•Word clock output

Timing variable	
Variable range	± 1 AES/EBU frame
Variable unit	512 fs unit

•Preset function

Preset	Saving panel setting (*1)
Number of presets	10
Recall method	Front panel
Copy method	Copy from this unit to USB memory or copy from USB memory to this unit

※Last memory is not supported. Setting to "POWER ON RECALL" enables start-up in the state saved in the preset when the power supply is turned ON each time.

※1 Logo data and information specific for the equipment (IP address, clock time, etc.) cannot be saved.

•Log function

Item to save	Panel operation, GENLOCK status change, power supply and fan, etc.
Copy method	Copy from this unit to USB memory

•Internal reference transmitter

Reference frequency	13.5 MHz
Frequency accuracy	± 0.1 ppm (25 ± 5 °C)

•Internal clock backup battery

Power source	Lithium primary battery
Battery operation period approximately	5 years (depending on environment of saving and operation)

•General specification

Environmental condition	
Operating temperature range	0 to 40 °C
Operating humidity range	85 % RH or less (no dew condensation)
Performance guarantee temperature range	10 to 35 °C
Usage environment	Indoor
Operation elevation	Up to 2,000 m
Over voltage category	I
Contamination level	2
Power supply	
Voltage	AC 90 to 250 V
Power consumption	80 W max.
Dimension	482(w)x44(H)x400(D)mm (excluding projection)
Weight	
LT4611 only	3.6 kg
Accessory	Power supply cord 2 Cover inlet stopper 2 CD-ROM (logo application, operation manual)

LT 4611SER01 GPS

•GPS lock

Compatible standards	SMPTE ST 2059
GPS Input terminal	
Connector	BNC connector single terminal
Input impedance	50 Ω
Antenna, pre-amplifier power supply	
Voltage	5 V / 3.3 V / OFF
Current	Max 50 mA (integrated over current protection circuit)
GPS receiver	
Receiving frequency	1575.42 MHz (L1)
Receiving code	C/A code
Receiving sensitivity	-130 dBm or more (input level to antenna)
Status	NO SIGNAL, TRACKING, LOCKED, STAY IN SYNC
Hold over function	Maintain frequency and phase immediately before termination of GPS signal

•10MHz CW lock

CW input terminal	
Connector	BNC connector single terminal
Input impedance	50 Ω
Input signal level	0.5 to 2 Vp-p
Input signal frequency	10 MHz
Pull-in frequency range	± 5 ppm

Output signal level	3.3 V CMOS
Output signal frequency	10 MHz/1 PPS
Hold over function	Maintain frequency immediately before termination of 10MHz CW signal

•LTC input/output

Compatible standards	SMPTE 12M -1
Input/output	
Connector	D-SUB 15 pins (both for input and output)
Input number	1
Input impedance	10 kΩ balanced
Input signal level	0.5 to 4 Vp-p
Input number	3
Output impedance	600 Ω balanced
Output signal level	2 Vp-p ± 10%

•Time code

Reference time	Internal/GPS/LTC/VITC
Frame rate	Synchronizing to ANALOG BLACK 1
Drop frame mode	ON/OFF
ATC setting	
LTC insertion setting	ON/OFF
LTC setting	
Output setting	ON/OFF
AES/EBU Time code insertion setting	ON/OFF
Threshold second	
Application setting	Timer setting of application date and time
Summer time	
Application setting	Timer setting of application date and time

LT 4611SER02 12G-SDI

•Compatible standards

SDI embedded audio	
12G, HD, HD(DL)	SMPTE ST 299
SD	SMPTE ST 272
SDI payload ID	SMPTE ST 352

•Output terminal

SDI output terminal	
Connector	BNC connector four terminals
12G, 3G-A, HD, SD	four lines
3G-B, HD(DL)	two lines
Output impedance	75Ω
Output amplitude	800mVp-p ± 10%
Output return loss	
5MHz~1.485GHz	15dB or more
1.485~2.97GHz	10dB or more
2.97~6GHz	7dB or more
6~12GHz	4dB or more
Overshoot	less than 10%
Rise and drop time	
3G	135ps or less (between 20 and 80%)
HD, HD(DL)	270ps or less (between 20 and 80%)
SD	0.4ns or more, 1.5 ns or less (between 20 and 80%)
DC offset	0±0.5V

•SDI video output

SDI signal	
Bit rate	
3G	2.970Gbps, 2.970/1.001Gbps
HD, HD(DL)	1.485Gbps, 1.485/1.001Gbps
SD	270Mbps
Timing variable	
Variable range	Frame entire range
Changeable unit	
V	line unit
H	clock unit(148.5MHz, 148.5/1.001MHz, 74.25MHz, 74.25/1.001MHz, 27MHz)

•Test pattern

12G, 3G(QD)	UHDTV multi format color bar 4K pattern (ARIB STD-B66)
3G, HD	100% color bar, 75% color bar, multiformat color bar (ARIB STD-B28, pattern 2 section selectable from 100% white/75% white/+I), flat field white 100%, black 0%, red 100%, green 100%, blue 100%

SD

525i/59.94	100% color bar, 75% color bar, SMPTE color bar, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
625i/50 100%	100% Color bar, EBU color bar, BBC color bar, flat field white 100%, black 0%, red 100%, green 100%, blue 100%

※At 4K (3G (QD) - A 2SI) setting, UHDTV multi format color bar 4K pattern (ARIB STD-B66) can be output. Also, simple pattern of UHDTV multi format color bar 4K pattern (ARIB STD-B66) can be output from fixed pattern.

Auto switch function	Automatically switch in the sequence of selectable pattern
Switching time	1 to 255 sec

-Natural image display

Date storage	Eight data of 4K can be saved
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※Although natural image is saved, data deployment for the natural image may take time when the power is turned on again.
 ※Moving box, ID character cannot be superimposed.

-Component ON/OFF

Function	ON/OFF is available per each component of Y/G, Cb/B, Cr/R independently
ON	Output set Y/G, Cb/B, Cr/R signal

OFF	
Y/G	040h/040h
Cb/B	200h/040h
Cr/R	200h/040h

※Enabled only when test pattern is selected.

-Moving box

ON / OFF

-Embedded audio

Superimposed channel	ON / OFF enabled on a group basis
12G, 3G-A, HD, SD	16ch (4 ch × 4 groups)
3G-B	32ch (link A, link B each 4 ch × 4 groups)
Sampling frequency	48 kHz sample (synchronized with video signal)
Resolution	20 bit/24 bit
Pre-emphasis	OFF / 50/15 / CCITT (CS bit only switchable)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0dBfs (1 dBfs step)
Audio click	OFF/1 to 4 sec

-ID characters

Number of characters	Maximum 20
Size [dot]	32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
Brightness	100% / 75% (black only for background)
Display position	Any position on screen
Display position variable unit	V 1 line unit H 1 dot unit

Flashing display (※1)	OFF / 1 to 9 sec
Scroll function (※1)	

Function	Scroll including background of ID character
Direction	Two directions (left/right)

Speed range and unit	
Interlace	Field unit 0 to 256 dot, 2 dot unit
Progressive	Frame unit 0 to 256 dot, 2 dot unit

※1 Flashing display and scroll function can be set simultaneously

-Pattern scroll

Direction	eight directions (up/down/left/right and combination)
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Speed range and unit	
Interlace	Field unit V 0 to 256 line, 1 line unit H 0 to 256 dot, 2 dot unit
Progressive	Frame unit V 0 to 256 line, 1 line unit H 0 to 256 dot, 2 dot unit

•SDI formant and standards (4k)

3G (DL)-4k video signal format and standards

Divided transmission system	Color system	Quantization accuracy	Image	Frame frequency/scanning	Compatible standards
Square	YCbCr 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-3, 2036-1
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-3, 2048-1
Two samples interleaved	YCbCr 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-3, 2036-1
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-3, 2048-1

HD(QL) video signal format and standards

Divided transmission system	Color system	Quantization accuracy	Image	Frame frequency/scanning	Compatible standards
Square	YCbCr 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	-

3G(QL) video signal format and standards

Divided transmission system	Color system	Quantization accuracy	Image	Frame frequency/scanning	Compatible standards	
Square	YCbCr 4:2:2	10bit	3840 × 2160	60/59.94/50/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	60/59.94/50/48/47.95/P	SMPTE ST 425-5, 2048-1	
		12bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
		10bit	YCbCr 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1
				4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1
	12bit	YCbCr 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
	RGB 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
		12bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
10bit		YCbCr 4:2:2	3840 × 2160	60/59.94/50/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	60/59.94/50/48/47.95/P	SMPTE ST 425-5, 2048-1	
12bit	YCbCr 4:2:2	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1		
		4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1		
Two samples interleaved	YCbCr 4:4:4	10bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
		12bit	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
	4096 × 2160		30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1		
	10bit	RGB 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1	
			4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1	
12bit	RGB 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2036-1		
		4096 × 2160	30/29.97/25/24/23.98/P	SMPTE ST 425-5, 2048-1		

12G video signal format and standards

Divided transmission system	Color system	Quantization accuracy	Image	Frame frequency/scanning	Compatible standards	
Two samples interleaved	YCbCr 4:2:2	10bit	3840 × 2160	60/59.94/50/P	SMPTE ST 2082-10, 2036-1	
			4096 × 2160	60/59.94/50/48/47.95/P		
		12bit	3840 × 2160	30/29.97/25/24/23.98/P		
			4096 × 2160	30/29.97/25/24/23.98/P		
		10bit	YCbCr 4:4:4	3840 × 2160		30/29.97/25/24/23.98/P
				4096 × 2160		30/29.97/25/24/23.98/P
	12bit	YCbCr 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P		
			4096 × 2160	30/29.97/25/24/23.98/P		
	10bit	RGB 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P		
			4096 × 2160	30/29.97/25/24/23.98/P		
	12bit	RGB 4:4:4	3840 × 2160	30/29.97/25/24/23.98/P		
			4096 × 2160	30/29.97/25/24/23.98/P		

LT 4611SER03 PTP (IEEE 1588)

•Compatible standards

Internet protocol version	IPv4
PTP standards	IEEE 1588-2008
Compatible profile	SMPTE ST 2059 / AES67 / General

•RJ-45 terminal

Number of terminal	1
Terminal shape	RJ-45
Compatible standards	IEEE 802.3
Type	10Base-T / 100Base-TX / 1000Base-T

•SFP cage

Number of terminal	1
Terminal shape	SFP cage
Compatible standards	MSA compliant
Compatible module and type	
SFP transceiver RJ-45	1000BASE-T
SFP + Transceiver optical	10GBASE-SR and 10GBASE-SW
※SFP/SFP + module are sold separately	

•Master function

Number of controllable master	2
Communication mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Announce message rate	0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz

Sync message rate	0.0078s 128Hz / 0.015s 64Hz / 0.0315s 32Hz / 0.625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz
Priority 1	0 ~ 255
Priority 2	0 ~ 255
Number of connectable slave	500

※This is when the sync message rate is 0.625 s 16 Hz.

•Slave function

Communication mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Delay message rate	0.0078s 128Hz / 0.015s 64Hz / 0.0315s 32Hz / 0.625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz
Announce time out	0.1 s to 1 s

•Item sold separately

SFP transceiver RJ-45	Model number: LFP415 Function: 1000BASE-T
SFP + transceiver optical	Model number: AFBR-709SMZ Function: 850nm, 10GBASE-SR/SW
SFP + transceiver optical	Model number: AFCT-739SMZ Function: 1310nm, 10GBASE-SR/SW

LT 4611SER21 SYNC 3 OUT ADD

•Compatible standards

Analog black signal	
NTSC black burst signal	SMPTE ST 170, SMPTE ST 318, SMPTE RP 154
PAL black burst signal	ITU-R BT1700, EBU N14
HD triple level synchronized signal	SMPTE ST 240, SMPTE ST 274, SMPTE ST 296

•Input/output terminal

Analog black output terminal	
Connector	BNC connector Three terminal three lines
Output signal	Analog composite synchronized signal Analog component synchronized signal
Output impedance	75Ω
Synchronizing level	
NTSC	40±1 IRE
PAL	-300±6mV
HD	±300±6mV
Blanking	0±15mV

•Analog black output

Signal format	three lines settable independently NTSC-BB、NTSC-BB+Ref、NTSC-BB+ID、 NTSC-BB+Ref+ID、NTSC-BB+S、NTSC-BB+S+Ref、 NTSC-BB+S+ID、NTSC-BB+S+Ref+ID、PAL-BB、 PAL-BB+Ref、525/59.94I、525/59.94P、 625/50I、625/50P、1125/60I、1125/59.94I、 1125/50I、1125/24I、1125/23.98I、1125/30P、 1125/29.97P、1125/25P、1125/24P、 1125/23.98P、750/60P、750/59.94P、750/50P、 750/30P、750/29.97P、750/25P、750/24P、 750/23.98P
Timing variable	
Setting	Three lines settable independently
Changeable range	
NTSC black burst signal	± 5 frame
PAL black burst signal	± 2 frame
HD triple-level synchronized signal	1 frame(frame entire range)
Changeable unit	
NTSC/PALblack burst signal	0.0185 μs unit
HD Triple level synchronized signal	0.0135 μs unit

LT 4611SER22 SDI OUTPUT

•Compatible standards

SDI embedded audio	
3G、HD、HD(DL)	SMPTE ST 299
SD	SMPTE ST 272
SDI payload ID	SMPTE ST 352

•Input/output terminal

SDI output terminal	
Connector	BNC connector dual terminal
3G-A、HD、SD	Two lines
3G-B、HD(DL)	Single line
Output impedance	75Ω
Output amplitude	800mVp-p±10%
Output return loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97GHz	10 dB or more
Overshoot	less than 10%
Rise and drop time	
3G	135 ps or less (between 20% and 80%)
HD、HD(DL)	270 ps or less (between 20% and 80%)
SD	0.4 ns or more, 1.5 ns or less (between 20 and 80%)
DC offset	0±0.5V
GENLOCK input terminal	
Connector	BNC connector dual terminal
Input signal	Analog composite synchronized signal Analog component synchronized signal
Format	Loop thru
Input impedance	75Ω
Max. input voltage	± 5 V (DC + peak AC)
Operation input level range	±6dB
External lock range	±5ppm

Analog black output terminal

Connector	BNC connector Six terminal six lines
Output signal	Analog composite synchronized signal Analog component synchronized signal
Output impedance	75Ω

•SDI video output

SDI signal	
Bit rate	
3G	2.970Gbps、2.970/1.001Gbps
HD、HD(DL)	1.485Gbps、1.485/1.001Gbps
SD	270Mbps
Timing variable	
Variable range	Frame entire range
Changeable unit	
V	line unit
H	clock unit
Dual link	Link B is ± 10 μs variable
Test pattern	
3G、HD	100% color bar/75% color bar/multi format color bar (ARIB STD-B28, pattern 2 section selectable from 100% white/75% white/+I)/check field/flat field white 100%, black 0%, red 100%, green 100%, blue 100%
SD	
525i/59.94	100% color bar/75% color bar/SMPTE color bar/check field/flat field white 100 %, red 100%, green 100%, blue 100%
625i/50	100% color bar/EBU color bar/BBC color bar/check field/flat field white 100%,black 0%, red 100%, green 100%, blue 100%
Auto switch function	Automatically switch in the sequence of selectable pattern (excluding check field, flat field)
Switching time	1 to 255 sec

Pattern scroll	
Direction	Eight directions (up/down/left/right and combination)
Speed range and unit	
Interlace	Field unit
V	0 to 256 line, 1 line unit
H	0 to 256 dot, 2 dot unit
Progressive	Frame unit
V	0 to 256 line, 1 line unit
H	0 to 256 dot, 2 dot unit

※Disabled when check field pattern is selected.

Safety area marker	
3G、HD	Action safety area (90%) Title safety area (80%) 4:3 aspect (ON/OFF is available separately)
SD	Action safety area (90%) Title safety area (80%) (ON/OFF is available separately)

※Disabled when check field pattern is selected.

ID characters	
Number of characters	Maximum 20 characters
Size [dot]	32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
Brightness	100% / 75% (black only for background)
Display position	Any position on screen
Display position variable unit	
V	1 line unit
H	1 dot unit
Flashing display (※1)	OFF / 1 to 9 sec
Scroll function (※1)	
Function	Scroll including background of ID character
Direction	Two directions (left/right)
Speed range and unit	
Interlace	Field unit
	0 to 256 dot, 2 dot unit
Progressive	Frame unit
	0 to 256 dot, 2 dot unit

※ Disabled when check field pattern is selected.

※1 Flashing display and scroll function can be set simultaneously

Logo mark	
Maximum size	320(dot) × 240(line)(QVGA size)
Number of logo mark storable in main body	Maximum four types
Display position	Any position on screen
Display position variable unit	
V	1 line unit
H	1 dot unit
Display level	Level 0 to 3, each level can be set discretely
File format	
Conversion method	Converted by logo application
After conversion	Dedicated format (.lg)
Logo mark data transfer	Saved in USB memory to transfer to main body

※ Disabled when check field pattern is selected.

Component ON/OFF	
Function	ON/OFF is available per each component of Y/G, Cb/B,Cr/R independently
ON	Output set Y/G, Cb/B, Cr/R signal
OFF	
Y/G	040h/040h
Cb/B	200h/040h
Cr/R	200h/040h

※ Disabled when check field pattern is selected.

Video image superimposing	
Display priority order	IDcharacter > Logo mark > Safety area marker > Test pattern (Order of display cannot be changed)
Simultaneous display	IDcharacter, Logo mark, Safety area marker and Test pattern is available.

Embedded audio	
Superimposing channel	ON/OFF is available per group
3G-A、HD、SD	16ch (4 ch × 4 groups)
3G-B	32ch (link A, link B each 4 ch × 4 groups)
Sampling frequency	48 kHz sample (synchronized with video signal)
Resolution	20 bit/24 bit
Pre-emphasis	OFF / 50/15 / CCITT (CS bit only switchable)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFs (1 dBFs step)

Audio click	OFF / 1 to 4 sec
※ Superimposing sound (including packet) is disabled when check field pattern is selected.	
※ Frequency and level and audio click can be set for each channel.	
※ The following restriction is applied for SD (525i/59.94).	
• For 16ch output, resolution is 20 bit.	
• For resolution of 24 bit, up to three groups (12 ch) can be output.	

Lip Sync pattern	
Setting	SDI1 synchronizes with AES/EBU
※ Disabled when check field pattern is selected.	
※ Safety marker, ID character and logo mark cannot be superimposed.	
※ Audio click setting of embedded audio is disabled to output sound synchronizing with lip sync pattern.	

• Lip Sync pattern Setting SDI1+AES/EBU and SDI2 can be set discretely.

• SDI format and standards

3G-A format and standards

Color system	Quantization accuracy	Image	Frame (field) frequency/scanning	Compatible standards
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50/P 60/59.94/50/I	SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
			60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
YCbCr 4:4:4	10bit	1280 × 720 1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 296 SMPTE ST 425 SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
RGB 4:4:4	10bit	1280 × 720 1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 296 SMPTE ST 425 SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P	

3G-B format and standards

Color system	Quantization accuracy	Image	Frame (field) frequency/scanning	Compatible standards
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50/P 60/59.94/50/I	SMPTE ST 274 SMPTE ST 372 SMPTE ST 425
	12bit	1920 × 1080	30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
			60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
YCbCr 4:4:4	10bit	1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P	
RGB 4:4:4	10bit	1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P	

HD (DL) format and standards

Color system	Quantization accuracy	Image	Frame (field) frequency/scanning	Compatible standards
YCbCr 4:2:2	10bit	1920 × 1080	60/59.94/50/P 60/59.94/50/I	SMPTE ST 274 SMPTE ST 372
	12bit	1920 × 1080	30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
			60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	
YCbCr 4:4:4	10bit	1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P	
RGB 4:4:4	10bit	1920 × 1080	60/59.94/50/ 30/29.97/25/24/23.98/P 60/59.94/50/I 30/29.97/25/24/23.98/P 30/29.97/25/24/23.98/PsF	SMPTE ST 274 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I 30/29.97/25/24/23.98/P	
			60/59.94/50/I 30/29.97/25/24/23.98/P	

HD, SD format and standards

Color system	Quantization accuracy	Image	Frame (field) frequency/scanning	Compatible standards	
YCbCr 4:2:2	10bit	1280 × 720	60/59.94/50/ 30/29.97/25/24/23.98/P	SMPTE ST 292 SMPTE ST 296	
			60/59.94/50/I 30/29.97/25/24/23.98/P	SMPTE ST 292 SMPTE ST 274	
		1920 × 1080	30/29.97/25/24/23.98/PsF	SMPTE ST 292 SMPTE RP 211	
			24/23.98/PsF	SMPTE ST 292 SMPTE RP 211	
			720 × 487	59.94/I	SMPTE ST 259
			720 × 576	50/I	SMPTE ST 125

LT 4611SER23 AUDIO OUT

Compatible standards

AES/EBU signal ANSI S4.40, AES3-2009、
AES11-2009、SMPTE ST276

Input/output terminal

AES/EBU digital audio output terminal
Connector BNC connector single terminal
Output amplitude 1Vp-p±0.1V
Output impedance 75Ω unbalanced
AES/EBU Silence output terminal
Connector BNC connector single terminal
Output amplitude 1Vp-p±0.1V
Output impedance 75Ω unbalanced

AES/EBU digital audio output

Timing variable
Variable range ± 1 AES/EBU frame
Changeable unit 512 fs unit
Sampling frequency 48 kHz sample (synchronized with video signal)
Resolution 20 bit/24 bit

Pre-emphasis OFF / 50/15 / CCITT (CS bit only switchable)
Frequency SILENCE / 400Hz / 800Hz / 1kHz
Level -60 to 0 dBFs (1 dBFs step)
Lip Sync Synchronized with SDI1
Audio click OFF / 1 to 4 sec
Sampling clock accuracy Grade 2 (±10ppm)
※ Frequency and level and audio click can be set for each channel.
※ Turning OFF every channel enables output as digital audio signal (DARS).

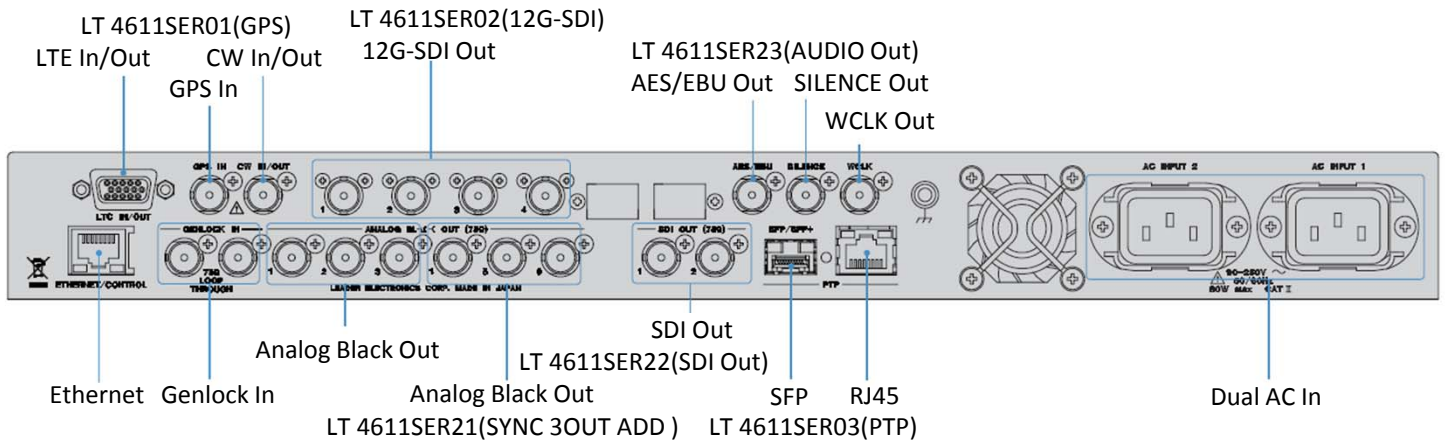
AES/EBU Silence output

Timing variable
Variable range ± 1 AES/EBU frame
Changeable unit 512 fs unit
Sampling frequency 48 kHz sample (synchronized with video signal)
Resolution 20 bit
Pre-emphasis OFF
Frequency SILENCE
Level MUTE
Sampling clock accuracy Grade 2 (±10ppm)

Lip Sync pattern

Setting SDI1+AES/EBU and SDI2 can be set discretely.

Rear panel



Item sold separately

SFP transceiver RJ-45

Maker: BLACK BOX
Model number: LFP415
Function: 1000BASE-T



SFP + transceiver optical

Maker: FOIT
Model number: AFBR-709SMZ
Function: 850nm, 10GBASE-SR/SW



SFP + transceiver optical

Maker: FOIT
Model number: AFCT-739SMZ
Function: 1310nm, 10GBASE-SR/SW



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