

LV5300A WAVEFORM MONITOR

LV5350 WAVEFORM MONITOR

LV7300 RASTERIZER

LV7300-SER01	SDI INPUT
LV7300-SER02	SDI INPUT / EYE
LV5300-SER11 / LV5350-SER11	BATTERY ADAPTER V MOUNT
LV5300-SER12 / LV5350-SER12	BATTERY ADAPTER QR GOLD
LV5300-SER20 / LV5350-SER20 / LV7300-SER20	AUDIO
LV5300-SER21 / LV5350-SER21 / LV7300-SER21	CLOSED CAPTION
LV5300-SER22 / LV5350-SER22 / LV7300-SER22	CIE
LV5300-SER23 / LV5350-SER23 / LV7300-SER23	HDR
LV5300-SER24 / LV5350-SER24 / LV7300-SER24	TSG
LV5300-SER25 / LV5350-SER25 / LV7300-SER25	FOCUS ASSIST
LV5300-SER26 / LV5350-SER26 / LV7300-SER26	LAYOUT
LV5300-SER27 / LV5350-SER27 / LV7300-SER27	TALLY
LV5300-SER28 / LV5350-SER28 / LV7300-SER28	4K
LV5300-SER40 / LV5350-SER40 / LV7300-SER40	EXTENDED VEC

Specification

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1. SDI Video Formats and Standards (SER01/SER02/SER28)

Table 1-1 SD video signal formats and standards

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

Table 1-2 HD video signal formats and standards

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

Table 1-3 3G-A video signal formats and standards

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

Table 1-4 3G-B-DL Video Signal Formats and Standards

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

Table 1-5 3G(DL)-4K Video Signal Formats and Standards

Division Transmission System	Color System	Quantization	Image	Frame Frequency/Scanning	Supported Standard
Square	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	-
2 sample interleave	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

- * You also need the SER28.
- * When these signals are displayed, phase differences of up to 100 clocks (approx. 0.67 μs) between links are automatically corrected.
- * 3G-B DS links are supported.

Table 1-6 6G video signal formats and standards

Division Transmission System	Color System	Quantization	Image	Frame Frequency/Scanning	Supported Standard
2 sample interleave	YCbCr 4:2:2	10bit	3840×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2081-10
			4096×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2048-1 SMPTE ST 2081-10

- * You also need the SER28.
- * If you input 6G-SDI signal without the Sync Bit Insertion, the instrument displays "NO SIGNAL" and cannot receive the signal.

Table 1-7 12G video signal formats and standards

Division Transmission System	Color System	Quantization	Image	Frame Frequency/Scanning	Supported Standard
2 sample interleave	YCbCr 4:2:2	10 bit	3840×2160	60/59.94/50 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
				48/47.95/P	-
		12 bit	4096×2160	60/59.94/50/48/47.95 /P	SMPTE ST 2048-1 SMPTE ST 2082-10
			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	SMPTE ST 2048-1 SMPTE ST 2082-10
			3840×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	YCbCr 4:4:4	10 bit	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	SMPTE ST 2048-1 SMPTE ST 2082-10
		12 bit	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	SMPTE ST 2048-1 SMPTE ST 2082-10
	RGB 4:4:4	10 bit	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	SMPTE ST 2048-1 SMPTE ST 2082-10
		12 bit	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	SMPTE ST 2048-1 SMPTE ST 2082-10

- * 12G-SDI TYPE 1 is supported.
- * You also need the SER28.
- * If you input 12G-SDI signal without the Sync Bit Insertion, the instrument displays "NO SIGNAL" and cannot receive the signal.

2. SDI Audio Formats and Standards (SER01/SER02/SER20)

Supported Standard

12G, 6G, 3G, HD	SMPTE ST 299
SD	SMPTE ST 272
Sampling Frequency	48 kHz
Quantization	24 bit
Format	L-PCM
Clock Generation	Generated from the video clock
Synchronization	Synchronized to the video signal
	All SDI signals must be synchronized during Simul Display.

SDI Audio Channel Separation

Separates up to four groups (16 channels) from any SDI input.

3. SDI Input Connector (SER01/SER02/ SER28)

Connector Type	BNC
Number of Input Connectors	2 (SDI INPUT 1, 2)
Input Impedance	75Ω
Input Return Loss	
5 MHz to 1.485 GHz	-15 dB or more
1.485 to 2.970 GHz	-10 dB or more
2.970 to 5.940 GHz	-7 dB or more (SDI INPUT 1)
5.940 to 11.880 GHz	-4 dB or more (SDI INPUT 1)
Maximum Input Voltage	±1 V (DC + peak AC)
12G-SDI Input	SDI INPUT 1
Eye Pattern, Jitter Display	Eye pattern, jitter display is possible only on SDI INPUT 1.

4. SDI Output Connector (SER01/SER02/SER24/SER28)

Connector Type	BNC
Number of Output Connectors	2 (SDI INPUT 1, 2)
Output Impedance	75Ω
Output Return Loss	
5 MHz to 1.485 GHz	-15 dB or more
1.485 to 2.970 GHz	-10 dB or more
2.970 to 5.940 GHz	-7 dB or more (SDI OUTPUT 1)
5.940 to 11.880 GHz	-4 dB or more (SDI OUTPUT 1)
Output Voltage	800 mVp-p ± 10 % (into 75 Ω)

Output Signal (LV5300A/LV5350)

- SDI OUTPUT 1 Reclock output of SDI INPUT 1 or selected reclock output of SDI INPUT 1/2 (*1)
- SDI OUTPUT 2 Reclock output of SDI INPUT 2 (*1), SDI monitor output, TSG output, or 3D-LUT output

SDI Monitor Output Signal

Outputs the LCD screen in HD, 3G-A, or 3G-B-DL.

SDI Monitor Output Format

Color System	Quantization	Image	Frame (Field) Frequency/Scanning	Supported Standard
YCbCr 4:2:2	10bit	1920×1080	60/59.94/50 /I	SMPTE ST 274
			24/23.98 /PsF (*2)	
			60/59.94/50/48/47.95 /P	

SDI Monitor Output Synchronization

Synchronizes to the refresh rate of the LCD (free run)

Output Signal (LV7300)

- SDI OUTPUT 1 Reclock output of SDI INPUT 1 or selected reclock output of SDI INPUT 1/2 (*1)
- SDI OUTPUT 2 Reclock output of SDI INPUT 2 (*3), TSG output, or 3D-LUT output

*1 When SDI system setting is 2K SD/HD/3G-B-DL/3G-A and input signal is 6G-SDI, reclock output is not possible.

*2 Equivalent to 48I when the SDI input is 48P.

*3 This is not output when the input is 6G-SDI, 12G-SDI.

5. External Reference Input

- Connector Type BNC
- Number of Input Connectors 1 pair
- Input Impedance 15 kΩ passive loop-through
- Input Return Loss ≥ 30 dB for 50 kHz to 30 MHz into 75 Ω
- Maximum Input Voltage ±5 V (DC + peak AC)
- Input Signal Tri-level sync or NTSC/PAL black burst signal
- Function Video signal waveform display and phase difference display based on the phase of an external sync signal

* The display position of the video signal waveform display and the measured phase of the phase difference display based on the phase of the external sync signal may vary by ±1 clock depending on the timing when the external sync signal or SDI signal is connected or disconnected or when the device is restarted.

* Video signal waveform display based on the phase of an external sync signal is not possible for the following formats.

- 3G's 720/30P, 720/29.97P, 720/25P, 720/24P, 720/23.98P
- 3G(DL), 6G, 12G
- Frame frequency 48P, 47.95P

* Phase difference display based on the phase of an external sync signal is not possible for the following formats.

- 3G's 720/30P, 720/29.97P, 720/25P, 720/24P, 720/23.98P
- Frame frequency 48P, 47.95P

6. Monitor Output Connector (LV7300)

SDI Output Connector

Function	Output the displayed screen to an SDI monitor
Output Connector	BNC
Number of Output Connectors	1
Output Impedance	75Ω
Output Return Loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97 GHz	10 dB or more
Output Voltage	800 mVp-p ± 10 % (into 75 Ω)
Output Signal	Outputs the LCD screen in HD, 3G-A, or 3G-B-DL.
Output Format	

Color System	Quantization	Image	Frame (Field) Frequency/Scanning	Supported Standard
YCbCr 4:2:2	10 bit	1920×1080	60/59.94/50 /I 24/23.98 /PsF (*1)	SMPTE ST 274
			60/59.94/50/48/47.95 /P	

Synchronization	Synchronized with the LCD refresh rate (free run)
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TMDS Output Connector

Function	Output the displayed screen to an HDMI monitor (*2)
Output Connector	HDMI
Number of Output Connectors	1
Signal Format	Single Link T.M.D.S
DDC	Not supported
HOT PLUG Detection	Not supported
Output Signal	Outputs the LCD screen
Image	1920×1080
Frame Frequency	60P, 59.94P, 50P, 48P, 47.95P
Synchronization	Synchronized with the LCD refresh rate (free run)
Touch Control	Touch control possible by connecting the USB touch panel interface of a touch panel monitor to the LV5300A, LV5350 or LV7300 (*3)

*1 Equivalent to 48I when the SDI input is 48P.

*2 LEADER does not guarantee the operation on all HDMI monitors.

*3 LEADER does not guarantee that all touch panel type monitors will work with the LV7300.

7. Headphone Output

Output Connector	
LV5300A, LV5350	One 3.5 mm mini jack (stereo)
LV7300	One stereo jack
Output Signal	2 channels from the audio signals that are being displayed on the screen (downmixed Lt and Rt are also possible)
Sampling Frequency	48 kHz
Volume Adjustment	Using the menu
Power Output	100 mW maximum (into 8 Ω load)

8. Control Connectors

USB Port	
Port Type	Standard A
Number of Ports	2
Specifications	USB 2.0
Compatible Devices	USB memory, USB mouse, touch panel monitor
USB Memory Feature	Saves capture data, preset data, event log data, and data dumps
Supported USB Memory Format	FAT32 (*1)
USB Mouse Feature	Used to control on the screen
Touch panel monitor	Touch control of the displayed screen (*2, *3)
Ethernet Port	
Supported Standard	IEEE802.3
Supported Protocol	
TELNET (*4)	Command control, status query
FTP	File transfer
SNMP	Command control, alarm query
HTTP	Remote monitoring and control from a Web browser
SNTP	Internal clock synchronization
Connector Type	RJ-45
Function	Remote control from an external PC or remote controller (*4), file transfer, status information query
Type	10Base-T, 100Base-TX, 1000Base-T

Remote Connector

Port Type	15-pin D-sub (female)
Locking Screws	Inch screws (No.4-40UNC)
Number of Ports	1
Control Signal	LV-TTL level (low active)
Input Voltage Range	0 to 5 V DC All inputs are pulled up to +3.3 V (control is also possible using +5 V)
Function	Load preset settings, switch input signals, transmit alarm signals, and activate tally
Alarm Output	Outputs alarms signals when a format alarm occurs, when various errors occur, when the fan malfunctions, or when the internal temperature is abnormal

*1 We do not guarantee the operation of all USB-HDDs and USB memory. The this instrument may not operate normally depending on the connected USB device.

*2 Pinch out and swipe operations are not supported.

*3 LEADER does not guarantee that all touch panel type monitors will work with the LV7300.

*4 You cannot use TELNET and the LV7290 at the same time.

9. Front Panel

Display (LV5300A/LV5350)

LCD Type	7-inch color TFT
Resolution	1920×1080
Refresh Rate	60 Hz, 59.94 Hz, 50 Hz (free run)
Touch Panel	Electrostatic touch panel Tapping the display shows touch keys
Key LEDs	All the keys are dimly back-lit. The selected key is lit more brightly.
Power Switch	Electronic switch (which remembers whether the instrument is on or off)
Last Memory	Backs up the panel settings to memory
Key Lock	Lock by holding down the SYS key. Prevents unintentional operations on the instrument.

10. Capturing

Screen Capture

Function	Captures the screen
Display	Displays only the captured image or overlays the captured image over the input signal
Media	Internal memory (RAM) and USB memory You can only save one screen capture to the internal memory.
Data Output	Saved to bitmap format to a USB memory device or to a file format that the instrument can load (BSG).
Data Input	Data saved to a USB memory device can be loaded and displayed on the instrument.

11. TSG (SER24/SER28)

Table 11-1 HD video signal formats and standards

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

Table 11-2 3G-A, 3G-B-DL video signal formats and standards

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

Table 11-3 6G video signal formats and standards

Division Transmission System	Color System	Quantization	Image	Frame Frequency/Scanning	Supported Standard
2 sample interleave	YCbCr 4:2:2	10bit	3840×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1
			4096×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2081-10
					SMPTE ST 2048-1
					SMPTE ST 2081-10

* You also need the SER28.

Table 11-4 12G video signal formats and standards

Division Transmission System	Color System	Quantization	Image	Frame Frequency/Scanning	Supported Standard
2 sample interleave	YCbCr 4:2:2	10 bit	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 2048-1 SMPTE ST 2082-10
			3840×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	YCbCr 4:4:4	10 bit	4096×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2048-1 SMPTE ST 2082-10
			3840×2160	30/29.97/25/24/23.98 /P	SMPTE ST 2036-1 SMPTE ST 2082-10
	RGB 4:4:4	10 bit	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	SMPTE ST 2048-1 SMPTE ST 2082-10

* You also need the SER28.

Output Pattern

100% color bar, 75% color bar, HD multiformat color bar (*1), 4K multiformat color bar (*1), color raster, gamma, cross hatch, 10 step, limit lamp, check field, lip sync pattern (SER20), HDR color bar (SER23) (*1), black raster

YCbCr/RGB on/off, Level Adjustment

When the following patterns are selected, you can turn on and off YCbCr or RGB separately.

When COLOR RASTER pattern is selected, you can set the YCbCr or RGB levels separately. Moreover, if Structure is set to RGB, You can set R, G, and B level in interlocking.

Pattern	YCbCr/RGB on/off separately	YCbCr/RGB level adjustment separately	RGB level adjustment interlocking
100% color bar	Yes		
75% color bar	Yes		
HD multiformat color bar	Yes		
4K multiformat color bar	Yes		
Color raster	Yes	Yes	Yes
Gamma	Yes		
Cross hatch	Yes		
10 step	Yes		
Limit lamp	Yes		
Check field			
Lip sync pattern			
HDR color bar	Yes		
Black raster			

Scrolling (*2)	ON, OFF
Direction	Eight directions (up, down, left, right, and their combinations)
Speed Range and Unit	Per frame (field) 4 to 124 dots, in 4 dot steps
Moving Box (*2)	ON, OFF
Colors	WHITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE, BLACK
Speed	1 to 3
Embedded Audio	
Number of Embedded Channels	16 channels max. (*3)
Embedding On/Off	On/off at the audio group level
Audio Level	-20d BFS, -18 dBFS, 0 dBFS, mute
Audio Frequency	1 kHz
CRC Error Addition	An incorrect CRC is inserted into the Y component of the first line.

*1 It cannot be set in horizontal 1280, 4096, and 2048 pixel format.

*2 Either scrolling, or moving box can be turned on.

*3 For 4096×2160 6G and 2048×1080 3G-B-DL, only 8 channels are embedded.

12. Presets

Preset	Saves panel settings (with a few exceptions)
Number of Presets	60
Preset Loading Method	Front panel or remote connector (*1)
Copying	All preset data can be copied from the instrument to a USB memory device or from a USB memory device to the instrument. (To be shared by LV5300A, LV5350, and LV7300)

*1 The number of presets loaded from the remote connector can be 8 or 60.

* The time it takes to recall a preset varies depending on the option configuration and the measurement screen. Also, the response time may differ when controlling via a network.

13. Display

Number of simultaneously displayed SDI input signals

SD, HD, 3G-A, 3G-B-DL	2
3G(DL)-4K (SER28)	1
6G (SER28)	1
12G (SER28)	1

Display Mode

Single display	Displays a single input signal
Simul Display	Displays two input signals simultaneously

Alarm Indications

System Alarm Indication	Displays an alarm when the fan malfunctions or when the internal temperature is abnormal
Error Indication	Displays an error when an receive signal error occurs

Display Layout

Multi Display	Control the WFM/PIC and other display functions in multiple areas from a single screen
---------------	--

Customized Layout (SER26)

Function	Freely arrange the windows shown with the WFM, VECT, PIC, AUDIO, STATUS, and EYE (LV5300A/LV7300-SER02) keys (one of each), and a window consisting of six displays shown with MULTI
Display Format	Displays up to two single link input signals in tiled, mixed, V aligned, or H aligned mode.
Normal Mode	Each display area is divided evenly.
Tiled Display	The windows are divided into two quadrants.
Mixed Display	The windows are cascaded.
V Aligned Display	The windows are arranged top to bottom.
H Aligned Display	The windows are arranged side by side.
Tile Mode	The display contents arranged in the display are shown in two quadrants per screen.
V Aligned Mode	The display contents arranged in the display are shown in two vertical divided windows per screen.
H Aligned Mode	The display contents arranged in the display are shown in two horizontally divided windows per screen.

Enhanced Layout (SER26)

Function	When multiple channels of single link are displayed, the selected channel is automatically shown in a specific area. You can make the specific area larger than the other areas to show the selected channel enlarged.
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Time Display	
Displayed Contents	Current time, time code
Current Time Display	The time based on the internal clock
Time Code Display	LTC, VITC, D-VITC (SD only)
Supported Standard	
LTC, VITC	SMPTE ST 12-2
D-VITC	SMPTE ST 266
Tally Display (SER27)	Turn on and off the tally display by controlling through the remote connector
Camera ID Display (SER27)	Shows the camera ID set with the instrument's menu
Iris Display (SER27)	Shows the Iris set with the instrument's menu

14. Video Signal Waveform Display

Waveform Control

Display Mode	
Overlay	Overlays component signals
Parade	Displays component signals side by side
Blanking Interval	H and V blanking periods can be masked.
RGB Conversion	Converts a YC _B C _R signal into an RGB signal and displays the result
Channel Assignment	GBR or RGB order
Pseudo-Composite Display	Artificially converts component signals into composite signals and displays the result
Line Select	Displays the selected line
Sweep Modes	H, V
Color	7 colors to choose from

Vertical Axis

Gain	×1, ×5, ×10
Variable Gain	
Gain x1	×0.2 to ×2.0
Gain x5	×1.0 to ×10.0
Gain x10	×2.0 to ×10.0
Amplitude Accuracy	±0.5% (single default display)
3G (1080/60P, 1080/59.94P, 1080/50P)	
Y Signal	±0.5 % (1 to 60 MHz)
C _B C _R Signal	±0.5 % (0.5 to 30 MHz)
Low-Pass Attenuation	≥ 20 dB (at 40 MHz)

3G, HD (1080/60P, 1080/59.94P, 1080/50P)

Y Signal	$\pm 0.5\%$ (1 to 30 MHz)
C _B C _R Signal	$\pm 0.5\%$ (0.5 to 15 MHz)
Low-Pass Attenuation	≥ 20 dB (at 20 MHz)

SD

Y Signal	$\pm 0.5\%$ (1 to 5.75 MHz)
C _B C _R Signal	$\pm 0.5\%$ (0.5 to 2.75 MHz)
Low-Pass Attenuation	≥ 20 dB (at 3.8 MHz)

Horizontal Axis

Line Display

Display Format	Overlay (1H, 2H) Parade (1H, 2H, 3H)
Magnification	$\times 1$, $\times 10$, $\times 20$, ACTIVE, BLANK

Field Display

Display Format	Overlay (1V, 2V) (*1) Parade (1V, 2V, 3V)
Magnification	$\times 1$, $\times 20$, $\times 40$
Time Accuracy	$\pm 0.5\%$ (single default display)

Cursor Measurement

Composition

Horizontal Cursors	2 (REF and DELTA)
Vertical Cursors	2 (REF and DELTA)
Simultaneous Display	Displays the horizontal cursors and vertical cursors simultaneously
Amplitude Measurement	mV, %, R%, DEC, HEX
Time Measurement	Second display
Frequency Display	Computes and displays the frequency with the length of one period set to the time between two cursors
Cursor Value Display	Displays measured values at the cursors

Scale

Type	%, V, decimal, hexadecimal
Display Colors	7 colors to choose from

HDR Scale (SER23) Adds an HDR scale to each scale for HDR

*1 2V display is not possible when the input signal is progressive.

15. Vector Display

Vector Mode	Vector, RGB vector (SER40), YCbCr vector (SER40)
Display Colors	7 colors to choose from
Blanking Interval	H and V blanking periods can be masked (according to the video signal waveform display settings).
Pseudo-Composite Display	Artificially converts component signals into composite signals and displays the result
Line Select	Displays the selected line
Gain	×1, ×5, IQ-MAG
Variable Gain	
Gain x1	×0.2 to ×2.0
Gain x5	×1.0 to ×10.0
Gain IQ-MAG	
Not SD, component display	0.620 to 6.240
SD, component display	0.580 to 5.840
Not SD, pseudo-composite display	0.570 to 5.700
SD, pseudo-composite display	0.520 to 5.260
Amplitude Accuracy	±0.5 %
Scale	
Type	AUTO, ITU-R BT.601, ITU-R BT.709, DCI, ITU-R BT.2020
Color Bar Saturation	75%, 100%
IQ Axis	Show or hide
ARIB Check Marker	OFF, STD-B66, STD-B72
Display Colors	7 colors to choose from
Variable Scale	ON, OFF
Color Wheel	ON, OFF
Vector Marker Display	Displays a marker and numeric value at the specified location on the vector display
Number of Markers	1
Numeric Display	Displays the marker position numerically
Cb	Displays the C _B position as a percentage
Cr	Displays the C _R position as a percentage
deg	Displays the hue in degrees.
d	Displays the distance from the center as a percentage
Variable Marker	Marker and frame resizing
Histogram Display	Displays the Y, R, G, and B histograms
5-Bar Display	
Function	Converts an SDI signal into Y, R, G, B, and composite values, and then displays the five peak levels.
Channel Assignment	RGB, GBR
Scale	%, mV, HEX, DEC
Error Level	Based on the gamut error, composite gamut error, and

Line Select	luminance error thresholds
Low-Pass Filter	Displays the selected line
	The same as for gamut errors

16. Picture Screen

Quantization	8 bit (internal signal processing is performed with signed 12 bit or higher)
Level Mapping	Maps the black level to 0 (8bit), SDI code value (when receiving 10 bit RGB) 1024 to 255 (8 bit)
Display Sizes	Reduced, actual size, ×2 (4K not supported), full frame (4K not supported)
Quality Adjustment and Color Selection	Brightness, contrast, RGB gain, RGB bias, chroma gain, monochrome display (RGB gain, RGB bias, chroma gain not valid)
Frame Rate	Converts the frame rate based on the LCD frame rate (60P, 59.94P, 50P)
SCTE-104 Display	
Function	SCTE-104 message monitoring
Supported Standard	SMPTE 2010, ANSI/SCTE 104
Supported Format	For Dual / Quad Link, Link1 only (Link cannot be changed)
Supported Input Channel	SDI INPUT 1 / 2 / 3 / 4 (DS1 only)
Display	Superimpose when SCTE-104 message is detected
Display Location	OFF / Top left / Top right / Bottom left / Bottom right
Display Time	1 to 10 seconds (1 second step)
SPLICE Display	When a splice_request_data message is detected, the details of the message are displayed
Aspect Marker Display	
3G (17:9 aspect ratio)	16:9, 14:9, 13:9, 4:3, 2.39:1
3G (16:9 aspect ratio), HD	17:9, 14:9, 13:9, 4:3, 2.39:1, AFD (*1)
SD	16:9, 14:9, 13:9, AFD (*1)
Aspect Marker Format	Line, shadow (99 levels), or black
Safety Marker Size	ARIB TR-B4, SMPTE RP-218, or user-defined
AFD Display (*1)	Displays abbreviations for SMPTE ST 2016-1-2007 standard AFD codes
Line Select	Marks the selected line
Error Indication	Displays markers in the gamut error and level error areas

*1 AFD Supports only SD or HD.

17. Superimpose Display (SER21)

Displays closed captions, European closed captions, and Japanese closed captions over the picture

Closed Caption

Supported Standards (Mapping Standards)

EIA-708 SMPTE ST 334

Supported Languages English / Danish / Dutch / Faroese / Finnish / French / German / Icelandic / Irish / Italian / Norwegian / Portuguese / Spanish / Swedish / Korean

EIA/CEA-608-B (EIA-708-B)

SMPTE ST 334

EIA/CEA-608-B (EIA/CEA-608-B)

SMPTE ST 334

VBI (EIA/CEA-608-B Line21)

CIA/EIA-608-B

Supported Languages English / Spanish / French / Portuguese / German / Danish / Italian / Finnish / Swedish

Supported Video Formats SD, HD, 3G-A, 3G-B-DL,
3G(DL)-4K (close caption decoding only for link 1),
6G (close caption decoding only for sub 1),
12G (close caption decoding only for sub 1)

European Closed Caption

Supported Standards

Teletext VBI (ITU-R BT. 653-3 System B) (SD only), OP47

Supported Languages English / Czech / Slovak / Estonian / French / German / Italian / Romansh / Lithuanian / Polish / Portuguese / Spanish / Romanian / Serbian / Croatian / Slovenian / Swedish / Finnish / Hungarian / Turkish / Ukrainian / Romanian / Bulgarian

Simple Japanese Closed Caption Display

	Displays a simple Japanese closed caption on the picture display. (Select HD, SD, analog, or portable closed caption to display. Select language 1 or 2.)
Supported Standard	ARIB STD-B37 short form data
Supported Video Formats	SD, HD, 3G-A, 3G(DL)-4K (close caption decoding only for link 1), 12G (close caption decoding only for sub 1)
525i/59.94 (SMPTE 259M)	
Display	Display position control is supported only for HD and SD closed captions.
Characters	Only Kanji, roman numerals, katakana, hiragana, additional characters (ARIB STD-B24), additional kanji (ARIB STD-B24), and 1-byte DRCS are displayed.
Character Sizes	Supports only standard, medium, small, and specified size codes
Logging	
Logged Events	Clear screen command, text closed caption display event, time code, TV commercial material check result
Data Format	Text
TV Commercial Material Checking	
Function	Checks whether closed caption displays are present during the closed caption prohibited time
Check Period	The material start time and end time can be specified using timecodes.
Log Display Color	
Closed Caption during Prohibited Time	Red
Closed Caption Not during Prohibited Time	Green
Check Result Display	Displays OK or NG when measurements are complete

18. CINELITE Display

Function	Video levels are displayed numerically.
f Stop Display (not supported on the SER23)	Displays f Stop values relative to a reference point Set in reference to an object with an 18% reflectance f Stop gamma correction
Fundamental Gamma	ITU-R BT.709, hybrid log gamma (HLG)(SER23), PQ (SER23), S-Log3 (SER23)
User Correction Table	3 types (data acquired with a real device)
% Display (SDR)	
Narrow Range	Displays the luminance level or RGB level as a percentage with the SDI code value 64 assumed to be 0% and the SDI code value 940 assumed to be 100%
Full Range	Displays the luminance level or RGB level as a percentage with the SDI code value 0 assumed to be 0% and the SDI code value 1023 assumed to be 100%
Gradation Display	
Narrow Range	Displays the luminance or RGB value with the SDI code value 64 assumed to be 0 and the SDI code value 940 assumed to be 255
Full Range	Displays the luminance or RGB value with the SDI code value 0 assumed to be 0 and the SDI code value 1023 assumed to be 255
CV Display	Decimal, hexadecimal Displays the SDI signal code value as YCBCR or RGB according to the input signal (only for measurement size 1×1)

HDR Display (SER23)

HLG

System Gamma OFF

Narrow Range

Displays the relative HLG luminance with the SDI code value 64 assumed to 0% and 940 assumed to be 1200% or 100%

Full Range

Displays the relative HLG luminance with the SDI code value 0 assumed to 0% and 1023 assumed to be 1200% or 100%

System Gamma ON

Narrow Range

Assuming a Display with a peak brightness of 1000 Nits

Displays the relative HLG luminance with the SDI code value 64 assumed to 0Nits and 940 assumed to be 1000Nits

Full Range

Displays the relative HLG luminance with the SDI code value 0 assumed to 0Nits and 1023 assumed to be 1000Nits

PQ

Converts the luminance level to the display's Nits and displays the result

Narrow Range

SDI code value 64 to 940 are assumed to be 0Nits to 10000Nits

Full Range

SDI code value 0 to 1023 are assumed to be 0Nits to 10000Nits

S-Log3

Converts the reflectance to IRE with SDI code value 95 assumed to be 0% and 589 assumed to be 100% and displays it as a percentage

C-Log

Displays the percentage with the SDI code value 128 assumed to 0% and 614 assumed to be 100%

Log-C

EI200

Displays the percentage with the SDI code value 95 assumed to 0.39% and 853 assumed to be 83%

EI400

Displays the percentage with the SDI code value 95 assumed to 0.39% and 917 assumed to be 90%

EI800

Displays the percentage with the SDI code value 95 assumed to 0.39% and 976 assumed to be 95%

EI1600

Displays the percentage with the SDI code value 95 assumed to 0.39% and 1022 assumed to be 94%

Measured Points

3

Measurement Sizes

1 × 1 pixel, 3 × 3 pixels, and 9 × 9 pixels

19. CINELITE Advanced Display

Function	Synchronizes the markers on the waveform display, vector display, and chromaticity diagram display to the points selected with CINELITE
Waveform Display Link Markers	Synchronizes the markers on the waveform display to the points selected with CINELITE
Number of Link Markers	Up to 16 (for YRGB, YGBR display) (including the 4 reference points)
Vector Link Markers	Synchronizes the markers on the vector display to the points selected with CINELITE
Number of Link Markers	Up to 4 (including the 1 reference point)
Vector Numeric Display	Displays numerically the active marker position
Cb	Displays the C_B position as a percentage
Cr	Displays the C_R position as a percentage
deg	Displays the hue as an angle ($^{\circ}$).
d	Displays the distance from the center as a percentage
CIE Chromaticity Diagram Display Link Markers (SER22)	Synchronizes the markers on the CIE chromaticity diagram display to the points selected with CINELITE
Number of Link Markers	Up to 4 (including the 1 reference point)

20. CINEZONE Display

SDR Display

Gradation and Step

Function	Adds colors to the display in accordance with luminance levels
Display Colors	Linear (1024 colors), step (12 colors)
Upper Limit	Values equal to or greater than the upper limit are displayed in white
Narrow Range	-6.3 to 109.4 %
Full Range	1.0 to 100.0 %
Lower Limit	Values less than the lower limit are displayed in black
Narrow Range	-7.3 to 108.4 %
Full Range	0.0 to 99.0 %

Search

Function	Monochrome display of the set luminance level range Color display within $\pm 0.5\%$ of the set luminance level
Display Colors	Green
Level Setting	
Narrow Range	-7.3 to 109.4 %
Full Range	0.0 to 100.0 %
Upper Limit	Values equal to or greater than the upper limit are displayed in red
Narrow Range	-6.3 to 109.4 %
Full Range	1.0 to 100.0 %
Lower Limit	Values less than the lower limit are displayed in blue
Narrow Range	-7.3 to 108.4 %
Full Range	0.0 to 99.0 %

False Color

Function	Adds colors to the display of the set luminance level range
Display Colors	11 colors (Red, Orange, Yellow, Straw, Pink, Light Pink, Cyan, Green, Teal or Light Blue, Blue, Purple)

HDR display (SER23)

Function	Adds colors to the display in accordance with luminance levels
HDR Area Setting	Displays color according to the brightness
SDR Area Setting	Monochrome display
Upper Limit	Displays magenta for values exceeding the limit Ref.LEVEL to 100% (code values 64 to 940 or 0 to 1023 assumed to be 100%)
Lower Limit	Displays black for values less than the limit 0% to Ref.LEVEL% (code values 64 to 940 or 0 to 1023 assumed to be 100%)

21. Focus Assist (SER25)

Detection Sensitivity	LOW, MIDDLE, HIGH
Highlight Display Color	WHITE, GREEN, BLUE, RED
Picture Luminance Level	OFF, EMBOSS, 25%, 50%, 75%, 100%

22. CIE Chromaticity Diagram Display (SER22)

Display Standard	CIE1931 (xy display), CIE1976 (u'v' display)
Display Type	Chromaticity diagram display, color temperature display
Display Mode	
Chromaticity Diagram Display	Luminance display, color display
Color Temperature Display	Luminance display
Colorimetry	ITU-R BT.601(525), ITU-R BT.601(625), BT.709, DCI, ITU-R BT.2020
Clipping	
ON	Clips negative values of the input signal to zero
OFF	Displays negative values of the input signal according to ITU-R BT.1361
Smoothing	Displays by averaging data every two pixels
Accuracy	±0.005 (relative to the measurement coordinate value)
Chromaticity Diagram Display Scale	
Triangle	Select two from ITU-R BT.601 (525), ITU-R BT.601 (625), ITU-R BT.709, DCI, and ITU-R BT.2020
User-defined Triangle	Set a single user-defined triangle
Background	Color sample, white background, black background
Sub scale	Color temperature curve, grid (0.1 steps), white point (D65/DCI W), triangle name (each can be turned on or off)
Cursor	Displays the cursor position in coordinates
Gamma	ITU-R BT.709, user (1.5 to 3.0), HLG (SER23), PQ (SER23), S-Log3 (SER23), C-Log (SER23), Log-C (SER23)

23. HDR Display (SER23)

Supported Standard	ITU-R BT.2100 (HLG: Hybrid Log Gamma, Full range / Narrow range), ITU-R BT.2100 (PQ: Perceptual Quantization, Full range / Narrow range), S-Log3, C-Log, Log-C
Supported Formats	All formats except SD-SDI
Function	
Video Waveform Display	Scale, cursor
Vector Display	Histogram
Picture Screen	
HDR CINEZONE	
HDR CINELITE	
MAX CLL, MAX FALL (CEA-861 Supported)	Supports HLG and PQ
START	MAX CLL, MAX FALL computation start
STOP	MAX CLL, MAX FALL computation stop
MAX CLL, MAX FALL Error	When the measurement result is equal to or greater than the specified threshold, it is displayed turns red and recorded as the event log.

24. Audio Display

Input Signal	SDI embedded audio
Format	L-PCM
Sampling Frequency	48 kHz
Quantization	24 bit
Supported Standard	
3G, HD	SMPTE ST 299
SD	SMPTE ST 272
Clock Generation	Generated from the video clock
Synchronization	Must be synchronized to the video clock. All SDI signals must be synchronized.
Channel Separation	Separates up to two groups (8 channels) from an SDI input.
Maximum Number of Display Channels	8 (from any SDI input, displayed in groups)
Display Types	Level meter, Lissajous (SER20), correlation meter (SER20), surround (SER20), status (SER20)

Level meter

Displayed Channels	8ch
Dynamic Range	SDI-60 dBFS, -90 dBFS, reference level $\pm$ 3 dB
Level Accuracy	$\pm$ 0.3 dB (-50 to 0 dBFS, 1 kHz, signal source impedance 40 Ω or less)
Frequency Response	30 Hz to 20 kHz $\pm$ 0.4 dB (4 dBu, 1 kHz reference, TRUE PEAK response) 20 Hz to 20 kHz + 0.4 dB, -0.6 dB (4 dBu, 1 kHz reference, TRUE PEAK response)
Meter Response Model	TRUE PEAK, PPM type I , PPM type II , VU
Peak Hold Time	0.0 to 5.0 s (in 0.5 s steps), HOLD
Level Setting	-40.0 to 0.0 dBFS (standard level, warning level, over level)
Level Numeric Display	Displays the levels numerically Numeric display in red when level-over is detected Displays a blue "M" when mute is detected (ON/OFF selectable. The displays changes to a blue ■ when the layout size is small.) Displays "U.L" when audio is not detected

Lissajous Display (SER20)

Displayed Channels	2 channels $\times$ 1 2 channels $\times$ 4
Display Mode	X-Y, MATRIX
Correlation Meter	Displays the correlation between two channels as a value from -1 to 1
Channel Assignment	
SINGLE LISSAJOU	L, R
MULTI LISSAJOU	L1, R1 to L4, R4

Surround Display (SER20)

Function	Displays a graphical representation of a sound field
Surround Format	5.1 channels
Channel Mapping	L, R, C, LFE, Ls, Rs, Lt, Rt
Center Channel Format	NORMAL, PHANTOM CENTER
Gain	$\times$ 1, AUTO

Status Display (SER20)

Level	Audio levels are displayed using numbers (dBFS).
Error Detection	Counts the number of errors that occur for each channel
Level Over	Counts the number of times that the level of the input signal exceeds the set value
Detection Setting	-40.0 to 0.0 dBFS
Clipping	Counts the number of times that a received signal exceeds the maximum signal value for the specified number of consecutive samples
Detection Setting	1 to 100 sample
Mute	Counts the number of times that the length of a received mute signal exceeds the specified period
Detection Setting	1 to 5000 ms
Parity Error	Counts the number of times that the input signal's parity bit and the parity bit recalculated by the instrument differ
Validity Error	Counts the number of times that the input signal's validity bit is 1
CRC Error	Counts the number of times that the CRC of the channel status bits and the calculated CRC are different
Elapsed Time	Displays the amount of time that has elapsed since the instrument was reset
Channel Status Bits	Dump display, text display
User Data Bits	Dump Display

25. Status Display

Signal Detection	Detects the presence of an SDI signal
Format Display	Displays the video signal format
Frequency Deviation Display	
Function	Displays the sampling frequency deviation Displays an error if ± 10 ppm is exceeded
Measurement Range	± 100 ppm
Precision	± 2 ppm
Equivalent Cable Length Display	
Function	Displays SDI signal attenuation in terms of cable length Displays an error if the specified cable length is exceeded
Supported Cables	
12G	L-5.5CUHD
3G, HD	LS-5CFB, 1694A
SD	L-5C2V, 8281
Display Range	
12G	< 10 m, 10 to 80 m, > 80 m
3G	< 10 m, 10 to 100 m, > 100 m
HD	< 10 m, 10 to 130 m, > 130 m
SD	< 50 m, 50 to 200 m, > 200 m
Precision	
12G, 3G, HD	± 20 m
SD	± 30 m
Resolution	10 m
Error Count Display	Up to 999999 errors for each error type
Count Period	1 second, 1 field (frame)
Embedded Audio Channel Display	
	Displays the embedded audio channel numbers
* If the input signal is 3G-B-DL, only stream 1 is supported.	
SDI Signal Error Detection	
CRC Error	Detects 3G and HD signal transmission errors
EDH Error	Detects SD signal transmission errors
TRS Position Error	Detects TRS embedding position errors
TRS Code Error	Detects TRS protection bit errors
Line Number Error	Detects errors with the line numbers embedded in 3G and HD signals
Illegal Code Error	Detects data within the range of 000 to 003h and 3FC to 3FFh in locations other than TRS and ADF

Ancillary Data Packet Error Detection

Checksum error	Detects ancillary data transmission errors
Parity Error	Detects ancillary data header parity errors

Embedded Audio Packet Error Detection (*1)

BCH Error	Detects audio packet transmission errors
DBN Error	Detects audio packet continuity errors
Parity Error	Detects audio packet parity errors
Embedded Position Error	Detects the presence of audio in lines where it should not be embedded
Sample Counter Error	Detects asynchronous audio by measuring the number of audio samples

*1 If the input signal is 3G-B-DL, only stream 1 is supported.

Video Error Detection

Freeze Error	Detects freezing of video within the specified time range
Detection Method	Video interval checksum
Time Specification	2 to 300 frames

Black Error	Detects video blackouts
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Black Level Specification	0 to 100%
Area Specification	1 to 100%
Time Specification	1 to 300 frames

Level Error	Detects luminance level errors and chrominance level errors
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Luminance Level Detection Range

Upper limit	-51 to 766 mV
Lower Limit	-51 to 766 mV

Chrominance Level Detection Range

Upper limit	-400 to 399 mV
Lower Limit	-400 to 399 mV

Gamut Error Detects gamut errors

Detection Range

Upper limit 90.8 to 109.4%

Lower Limit -7.2 to 6.1%

Low-Pass Filter

Format	Low-Pass Filter	
	HD/SD: 1 MHz	HD: 2.8 MHz SD: 1 MHz
SD 720×487	Approx. 1 MHz (EBU R103-2000)	Approx. 1 MHz
SD 720×576	Approx. 1 MHz (EBU R103-2000)	Approx. 1 MHz
HD 1280×720	Approx. 1 MHz	Approx. 2.8 MHz
HD 1920×1080 (frame rate ≤ 30 Hz)	Approx. 1 MHz (IEEE STD 205)	Approx. 2.8 MHz
HD 1920×1080 (frame rate > 30 Hz)	Approx. 2 MHz	Approx. 5.5 MHz
HD 2048×1080 (frame rate ≤ 30 Hz)	Approx. 1 MHz (IEEE STD 205)	Approx. 2.8 MHz
HD 2048×1080 (frame rate > 30 Hz)	Approx. 2 MHz	Approx. 5.5 MHz
4K 3840×2160 (frame rate ≤ 30 Hz)	Approx. 4 MHz	Approx. 11 MHz
4K 3840×2160 (frame rate > 30 Hz)	Approx. 8 MHz	Approx. 22 MHz
4K 4096×2160 (frame rate ≤ 30 Hz)	Approx. 4 MHz	Approx. 11 MHz
4K 4096×2160 (frame rate > 30 Hz)	Approx. 8 MHz	Approx. 22 MHz

Area Specification 0.0 to 5.0%

Time Specification 1 to 60 frames

Composite Gamut Error Detects level errors that occur when component signals are converted to composite signals

Detection Range

Upper limit 90.0 to 135.0%

Lower Limit -40.0 to 20.0%

Low-Pass Filter The same as the gamut error

Area Specification 0.0 to 5.0%

Time Specification 1 to 60 frames

SDI Analysis Features

Event Log Display

Function Records detected errors, events—such as the instrument switching between input signals, and timestamps.

Log Capacity Up to 1000 events

Operation Logs all events from start to finish

Data Output Overwrite mode, Stop after 1,000 events

Data Dump Display

Display Format	Displays serial data sequence or displays each color component separately
SD, HD, 3G-A	PICTURE, stream 1, stream 2
3G-B-DL	PICTURE, link A, link B
3G(DL)-4K (SER28)	PICTURE, link 1, link 2
6G (SER28), 12G (SER28)	PICTURE, sub 1, sub 2, sub 3, sub 4
Display Format Details	
PICTURE	Links or streams 1 and 2 are combined and displayed in a picture structure.
Stream 1/2	Displays each stream in a transmission structure
Link A, B, 1, 2, 3, 4	Displays the selected link
Line Select	Displays the selected line
Sample Select	Displays from the selected sample
Jump Feature	Jumps to an EAV or SAV
Data Output	Text output to USB memory

Phase Difference Display

Function	Displays the phase difference between a reference signal and an SDI signal numerically and graphically
Reference Signal	
SD, HD, 3G-A, 3G-B-DL	External sync signal, Ach
3G(DL)-4K (SER28)	External sync signal, Ach
6G (SER28), 12G (SER28)	External sync signal
Display Range	
Vertical	1 frame For 3G-B-DL 47.95P to 60P, ± 1 frame measurement possible
Horizontal	± 1 line

- * If the reference signal is set to an external sync signal, the measured phase may vary by ± 1 clock depending on the timing when the external sync signal or SDI signal is connected or disconnected or when the power is turned on and off.

SDI Ancillary Data List Display

List Display Details	Presence or absence of each ancillary data type, embedded line number, and number of packets per frame
Dump Display	The selected ancillary data is displayed in hexadecimal or binary.

EDH Display (Only for SD)

Supported Standard	SMPTE RP 165
Displayed Contents	Analyzes and displays EDH packets and displays received CRC errors
Display Format	Text, hexadecimal, binary

Payload ID Display

Supported Standard	SMPTE ST 352
Displayed Contents	Analyzes and displays payload information
Display Format	Text and binary

Displaying Audio Control Packets

Supported Standard	SMPTE ST 299-1, SMPTE ST 272
Displayed Contents	Displays audio control packet analysis
Display Format	Text, hexadecimal, binary
Display Format	1, 2, 3, 4

Japanese Closed Caption Display (*1)

Supported Standard	ARIB STD-B37
Displayed Contents	Analysis display of closed caption signals
Display Format	Text, hexadecimal, binary

English Closed Caption Display

Supported Video Formats	SD, HD, 3G-A, 3G-B-DL, 3G(DL)-4K (close caption decoding only for link 1), 6G (close caption decoding only for sub 1), 12G (close caption decoding only for sub 1)
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CDP Packet Display Details

CDP packet header information

Presence or absence of timecode packet,
Presence or absence of closed caption packet and validity of this packet,
Presence or absence of closed caption service packet and validity of this packet,
Presence or absence of the FUTURE data packet

Time Code When time code packets are present

Closed Caption Data When valid closed caption packets are present

Presence or absence of CC1 to 4, TEXT1 to 4, XDS packets

XDS Packet Display Details

Contents adviser information

Copy management information

Display content of ProgramDescription packet

Stuffing Descriptor

AC3 Audio Descriptor

Caption Service Descriptor

Content Advisory Descriptor

Extended Channel Name Descriptor

Service Location Descriptor

Time-Shifted Service Descriptor

Component Name Descriptor

DCC Arriving Request Descriptor

DCC Arriving Request Descriptor

Redistribution Control Descriptor

Inter-Stationary Control Signal (NET-Q) Display (*1)

ARIB STD-B39

Analysis display of inter-stationary control signals

Text, hexadecimal, binary

Q signal logging

Analysis display of the format ID

Outputs Q signal logs in CSV format through a USB memory device

Data Broadcast Trigger Signal Display (*1)

ARIB STD-B35

Text, hexadecimal, binary

V-ANC User Data Display (*1)

ARIB TR-B23

Hexadecimal, binary

AFD Packet Display

SMPTE ST 2016-3

Text, hexadecimal, binary

SCTE-104 Display

Function

SCTE-104 message monitoring

Supported Standard

SMPTE 2010, ANSI/SCTE 104

Supported Format

For Dual / Quad Link, Link1 only (Link cannot be changed)

Supported Input Channel

SDI INPUT 1 / 2 / 3 / 4 (DS1 only)

Display

Superimpose when SCTE-104 message is detected

Display Time

1 to 10 seconds (1 second step)

Log

Records when SCTE-104 message is detected

DUMP Display

Displays DUMP data when SCTE-104 message is detected

SPLICE Display

When a splice_request_data message is detected, the details of the message are displayed

SPLICE Log

Records when a splice_request_data message is detected

SR Live Packet Display

Text, hexadecimal, binary

ARRI Metadata Display

Text, hexadecimal, binary

User-Defined ANC Packet Display

DID, SDID

Y, C

Hexadecimal, binary

*1 Supported video formats are as follows:SD, HD, 3G-A, 3G(DL)-4K (close caption decoding only for link 1), 12G (close caption decoding only for sub 1)

Lip Sync Display (SER20)

	Displays the phase difference between the video and audio
Lip Sync Measurement Function	Measures the time difference between the SDI signal and digital audio signal and displays the results numerically and graphically
Reference Signal	A Leader TSG that supports lip syncing (*1)
Measurement Method	Measures the time difference when the luminance level of the video signal exceeds the specified value and when the audio level signal exceeds the specified value
Luminance Level Setting	25 to 100%
Audio Signal Level Setting	-30 to 0 dBFS
Supported Audio Signals	Embedded audio signal
Measurement Range (Bar Display)	± 50 ms, ± 100 ms, ± 500 ms, ± 1.0 s, ± 2.5 s
Measurement Range (Numeric Display)	± 3999 ms
Measurement Resolution	1 ms

*1 TSG patterns not made by Leader may be supportable by specifying the video signal setting and audio signal setting.

26. Eye Pattern (LV5300A/LV7300-SER02)

SDI Input Connector	SDI INPUT 1
Display	Displays the input SDI waveform before equalizing
Number of Displays	
1-Screen Display	Displays the eye pattern of the selected filter in a single screen
2-Screen Display	Displays the timing filter and eye pattern of the selected filter in two screens
Waveform Display Color	7 colors to choose from
Scale Display Color	7 colors to choose from
Method	Equivalent time sampling
Amplitude Accuracy	800 mV $\pm$ 5 % (for 800 mV input)
Time Axis	
2 UI Display	
12G (SER28)	12.5 ps/div
6G (SER28)	25 ps/div
3G	50 ps/div
HD	100 ps/div
SD	550 ps/div
4 UI Display	
12G (SER28)	25 ps/div
6G (SER28)	50 ps/div
3G	100 ps/div
HD	200 ps/div
SD	1100 ps/div
16 UI Display	
12G (SER28)	100 ps/div
6G (SER28)	200 ps/div
3G	400 ps/div
HD	800 ps/div
SD	4400 ps/div
Time Axis Accuracy	$\pm$ 3 %
Jitter Filter	
10Hz	HPF 10Hz
100Hz	HPF 100Hz
1 kHz	HPF 1 kHz
100 kHz	HPF 100 kHz
TIMING	HPF 10Hz
ALIGNMENT	
12G (SER28), 6G (SER28)	HPF 100 kHz
3G, HD	HPF 100 kHz
SD	HPF 1 kHz
Cursor Measurement	Amplitude measurement using Y cursors Time measurement using X cursors Rise time and fall time measurement using the TrTf cursor

Automatic Measurement Items

	Eye pattern's amplitude
	Rise time (the time for the signal to rise from 20 to 80 % of its amplitude)
	Fall time (the time for the signal to fall from 80 to 20 % of its amplitude)
	Timing jitter
	Jitter
	Rising edge overshoot
	Falling edge overshoot
Histogram Display	Displays the frequency distribution of the eye pattern waveform amplitudes

27. Jitter Display (LV5300A/LV7300-SER02)

SDI Input Connector	SDI INPUT 1
Display	Displays the jitter component of an SDI signal
Number of Displays	
1-Screen Display	Displays the jitter waveform of the selected filter in a single screen
2-Screen Display	Displays the timing jitter and the jitter waveform of the selected filter in two screens
Waveform Display Color	7 colors to choose from
Scale Display Color	7 colors to choose from
Method	Phase detection method
Gain	×16, ×8, ×4, ×2, ×1
Measurement Range	
12G (SER28)	
×16	0.00 to 1.20 UI
×4	1.20 to 4.80 UI
×2	4.80 to 9.60 UI
×1	9.60 to 19.20 UI
3G, HD, SD, 6G (SER28)	
×8	0.00 to 1.20 UI
×2	1.20 to 4.80 UI
×1	4.80 to 9.60 UI
Time Axis	1H, 2H, 1V, 2V (*1)
Time Axis Accuracy	±3 %

Jitter Filter

10Hz	HPF 10Hz
100Hz	HPF 100Hz
1 kHz	HPF 1 kHz
100 kHz	HPF 100 kHz
TIMING	HPF 10Hz

ALIGNMENT

12G (SER28), 6G (SER28)	
	HPF 100 kHz
3G, HD	HPF 100 kHz
SD	HPF 1 kHz

Cursor Measurement Jitter value measurement through the use of cursors

Automatic Measurement Display Feature

Displays the jitter value in seconds (sec) and unit intervals (UI)

Automatic Measurement Items

Timing jitter, alignment jitter, jitter

Accuracy Input jitter frequency: 1 kHz. Filter setting: 10 Hz, within measurement range

0 UI < automatic measured value $\leq$ 1 UI	$\pm 10\% + 0.07$ UI
1 UI < automatic measured value $\leq$ 7 UI	$\pm 10\%$

*1 2V display is not possible when the input signal is progressive.

28. Tally Display (SER27)

Number of Displays	3 (TALLY-1, TALLY-2, TALLY-EXT) (*1)
Display Colors	7 colors to choose from
Control Method	Remote connector, RS-422/485 connector (SER27)

*1 The number of displays per channel. Arranged using the customized layout feature or the enhanced layout feature.

29. Camera ID Display (SER27)

Number of Displays	2 (LABEL-1, LABEL-2) (*1)
Iris Display	1 (IRIS) (*1)
Control Method	Instrument

*1 The number of displays per channel. Arranged using the customized layout feature or the enhanced layout feature.

30. General Specifications

Environmental Conditions

Operating Temperature	0 to 40 °C
Operating Humidity Range	85 %RH or less (no condensation)
Optimal Temperature	10 to 30 °C
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	I
Pollution Degree	2

Power Requirements

Voltage	DC 10 to 18 V
Power Consumption	
LV5300A	80 W max.
LV5350	60 W max.
LV7300	80 W max.

Dimensions

LV5300A	215 (W) × 132 (H) × 132 (D) mm (excluding protrusions)
LV5350	215 (W) × 132 (H) × 85 (D) mm (excluding protrusions)
LV7300	213 (W) × 44 (H) × 300 (D) mm (excluding protrusions)

Weight

LV5300A	2.95 kg max. (excluding accessories and battery option)
LV5350	2.5 kg max. (excluding accessories and battery option)
LV7300	2.25 kg max. (including options, excluding accessories)

Accessories	AC adaptor (GST90A-12)(LV7300) 1
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