LV5770 Multi Monitor

3G/HD/SD-SDI , Loudness & 3D Assist

PICK HIT
BroadcastEngineering
2011

LV5770 MULTI -MONITOR

- Accepts Two 3G/HD/SD-SDI Sources And Provides Picture, Waveform, Vector, CINELITE, 5-Bar and Status Displays Individually and In Various Screen Combinations.
- Supports Dual Link & 3G Level A & B Operation.
- Built-In XGA Display (1024 x 768) For Superb, Crisp Waveforms And Picture Representations.
- Autonomous Monitoring & Error Detection; Alarm For Audio Silence/Video Freeze & Video Black.
- USB Connector Allows The Use Of A Jump-Drive For Storing Captured Screens, Presets And Software / Firmware Updates.
- Platform Can Monitor And Display Two Sources At The Same Time In Two or Four Split Screen Displays.
- DVI Rasterized Output Mirrors Built-In Screen.
- HDMI Program Output Of The Selected Source Is Provided.
- Supports Options Including Physical Layer Testing with Eye Pattern, Digital & Analog Audio and Composite Inputs.
- Ethernet Connectivity Allows For Remote Control Over The Web; Supports TELNET, FTP, HTTP & SNMP.
- Universal AC Power Supply Allows For World-Wide Use.

AVAILABLE OPTIONS

Eye Pattern Version (LV5770E) : ***LV5770 with Eye Pattern Option (OP09) Provides Eye & Jitter Measurements For 3G/HD/SD-SDI.***

Digital Audio Option (OP41) : ***Provides 16 Channels of AES/EBU I/O. Outputs Embedded Audio As Discreet AES/EBU.***

Digital Audio Option w. Dolby (OP41D) : ***Adds Dolby Evaluation & Decode Capabilities To OP41.***

Analog Audio Option (OP42) : ***Provides 8 Channels of Analog Audio I/O. Selected Digital Audio (Discreet or Embedded) Is Converted To Analog Audio.***

Composite Inputs Option (OP03) : ***Provides 2 Composite Inputs & Switched Monitor Output.***

- Eye Pattern & Jitter Measurement Capabilities (Option 09) For Evaluating The Condition Of SDI Feeds; SMPTE Recommended Filters And Auto-Measurement Is Provided.
- Digital Audio Capabilities (Option 41) Include Loudness Monitoring & Lip Sync Measurements & Permit Audio Analysis and Output of Embedded Audio; 16 Channels Of AES/EBU Can Be Set Up As Inputs or Outputs; 8 Channels Input and 8 Channels Output Configuration Is Also Available (Menu Selectable).
- Analog Audio Capabilities (Option 42) Provide For 8 Channels Of Analog Audio (In or Out). The Selected Digital Audio Can Be Converted And Output As Analog Audio. (Option 42 requires the presence of Option 41).
- Dolby Digital Support And Dolby Metadata Analysis Is Available As Option 41D.
- Two Composite Inputs (Option 03) With Switched Monitor Output Provide Picture, Waveform & Vector Test Screens For NTSC & PAL Composite Systems.

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LV5770 Multi Monitor Platform

Ins and Outs

Rear Panel Shown With :

- Analog Audio Option
- Digital Audio Option
- Composite Option

ALSO AVAILABLE :

- Eye Pattern Option

AES/EBU IN/OUT (option)

16 Channels of AES/EBU menu selectable as inputs or outputs. 8 inputs & 8 outputs can also be configured. Inputs being viewed can also be converted to analog (if so equipped).

COMPOSITE INPUTS (option)

Accepts 2 Composite Inputs And Provides Switched Monitor Output Of The Selected Composite Source.

UNIVERSAL POWER SUPPLY

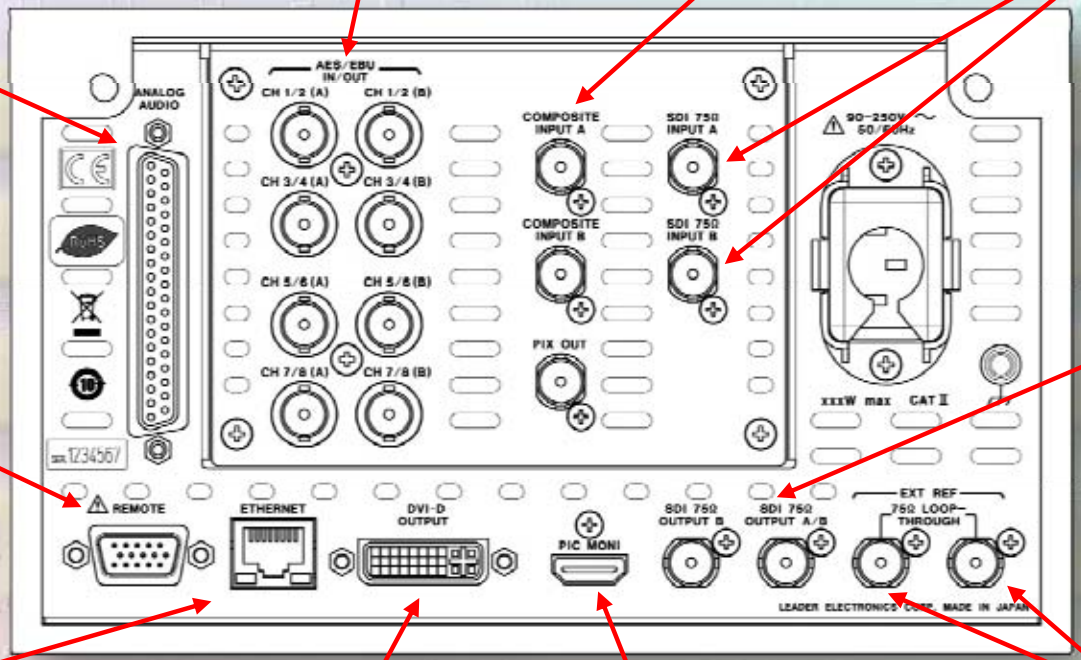
90 – 250 VAC (50/60 Hz)

SDI INPUTS

2 Serial Inputs Support 3G/HD/SD-SDI Operation (Auto-Detect). Picture, Waveform, Vector, 5-Bar, Status & Audio (option) Screens Can Be Displayed Individually, Simultaneously And In Various Screen Combinations.

ANALOG AUDIO (option)

Supports Up To 8-Channels Of Analog Audio (Input/Output). Instrument Converts Embedded Or Discreet AES/EBU To Analog Audio



REMOTE

Remote Connector Provides Remote Control Of Preset Selections

RECLOCKED LOOP-THROUGH & SWITCHED OUTPUT

SDI Outputs Can Be Used As Loop-Throughs To Feed Downstream Processes. CH-A Output Can Be Set As Switched Output Output The Selected Channel.

ETHERNET CONNECTIVITY

Ethernet Remote Control, Web Access And Remote Reporting

XGA OUTPUT

Standard DVI-D Computer Monitor Rasterizer Output Emulates Built-In Screen Display

HDMI OUTPUT

A Picture-Only Output Can Send The Selected SDI Input Source To An External HDMI Monitor

EXT REF INPUT

EXT REF Loop-Through Input Accepts Standard Tri-Level Sync And BB.

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Basic Multi Monitor

3G-SDI Future
HD-SDI
SD-SDI

Dual Link
CINELITE II

The cabinet is sold separately.

LV 5770 MULTI MONITOR

GENERAL

The LV 5770 is a multi monitor that can be customized with a variety of units to meet your needs.
The LV 5770 is highly cost effective because it supports full-format 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals. The LV 5770 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.

FEATURES

- **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 LV 5770 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 LV 5770SER08 option or the LV 5770SER09 option.) However, analog composite input (LV 5770SER03) cannot be generated as a Pic Moni Output signal.
- **Frame Capture and Screen Capture Features**
  The LV 5770 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 LV 5770 is also equipped with a screen capture feature, which captures the entire display as still-image data.
- **External Control Connectors (Future)**
  The LV 5770 has two external control connectors: an Ethernet port and a remote control connector. The Ethernet interface can be used to control the LV 5770 remotely over TELNET, perform file transfers over FTP, control the LV 5770 remotely and detect errors over SNMP, as well as perform other operations all from the connected PC. The remote control connector can be used to load presets, switch the input signal, and transmit errors.
- **Headphone Jack**
  The headphone jack can be used to monitor audio. (This requires the LV 5770SER41 optional unit.)

A Wide Variety of Factory Option Units (Sold separately)

- **LV 5770SER08**
  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.
- **LV 5770SER09**
  SDI INPUT/EYE*
  In addition to the LV 5770SER08 features, eye patterns can also be displayed.
  (The eye pattern display can be used on one of the two input SDI signals that you select.)
- **LV 5770SER41**
  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.)
- **LV 5770SER42**
  ANALOG AUDIO
  Up to 8 channels of analog audio are supported.
  (The LV 5770 must be combined with the LV 5770SER41 unit.)
- **LV 5770SER03**
  COMPOSITE VIDEO INPUT
  NTSC/PAL video signals are supported.

* The LV 5770SER08 and LV 5770SER09 cannot be installed in the LV 5770 at the same time.

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SPECIFICATIONS LV 5770

Video Output Connectors

DVI-D Output Connector

Output Connector:	One DVI-D connector
Output Signal:	Digital signal of the LCD display
Resolution:	XGA (1024 × 768)
Signal Format:	Single link TMDS
DDC:	Not supported
HOT PLUG Detection:	Not supported

Pic Moni Output Connector (LV 5770SER08 or LV 5770SER09 Option)

Output Connector:	One type A connector
Output Signal:	Selected SDI input (channel A or B) generated as Pic Moni output
DDC, HOT PLUG Detection Feature, CEC, ARC, HEAC, Lipsync:	Not supported
Audio:	SDI embedded audio channels 1 to 8 embedded in HDMI signals (LPCM only)

* Analog composite input (LV 5770SER03) cannot be generated as a Pic Moni Output signal.
* 720p/24, 1080PsF/30, 1080PsF/29.97, 1080PsF/25, 1080PsF/24, 1080PsF/23.98, 1080p (2048 × 1080)/24, 1080p (2048 × 1080)/23.98, 1080PsF (2048 × 1080)/24, and 1080PsF (2048 × 1080)/23.98 are not supported.

Control Connectors

USB Port

Specification:	USB 2.0
Supported Media:	Only USB memory devices are supported.
Function:	Used to save captured data, event logs, preset data, and data dumps.

Ethernet Port (Future)

Compliant Standard:	IEEE802.3
Supported Protocols:	TELNET, FTP, SNMP, HTTP
I/O Connector:	RJ-45
Function:	Used to control the LV 5770 from a PC and monitor errors and other events
Types:	10Base-T, 100Base-TX

Remote Control Connector

Function:	Used to recall presets, switch the video input system, switch between inputs A and B, and transmit alarms.
Control Signal:	LV-TTL level (low active)
Input Voltage Range:	0 to 5 VDC
Control Connector:	15-pin D-sub (female)

LCD

LCD Type:	6.3-inch color TFT
Display Format:	XGA. The effective resolution is 1024 × 768.
Backlight Brightness Switch:	High and low
Auto Shutoff:	LCD can be automatically turned off after a set period of time.

Screen Capture

Function:	Captures the display
Display:	Displays only the captured image or overlays the captured image over the input signal
Media:	Internal memory (RAM) and USB memory Only one screen capture can be stored in the internal memory.
Data Output:	Screen captures can be saved as bitmap files to USB memory, or they can be saved in a file format that the LV 5770 can load.
Data Input:	Data saved to USB memory can be loaded and displayed on the LV 5770.

Presets

Presets:	All panel operations can be stored in memory(*1)
Number of Presets:	30
Copying:	Preset configurations can be copied as a group to or from USB memory.

*1 The power on/off status

Alarm Output

Display:	The fan alarm indication is displayed when the fan stops rotating.
Remote Control Connector:	When an error occurs or the fan stops rotating, a signal is transmitted from the remote control connector to indicate this.

Front Panel

Key LEDs:	All keys are constantly dimly lit. The selected key lights more brightly.
Power Switch:	Electronic switch (which remembers whether the instrument is on or off)
Last Memory:	Backs up the panel settings to memory

Environmental Conditions

Operating Temperature:	0 to 40 °C
Operating Humidity:	85 %RH or less (no condensation)
Operating Environment:	Indoor use
Operating Altitude:	Up to 2000 m
Overvoltage Category:	II
Pollution Degree:	2

Power Requirements

Voltage:	90 to 250 VAC, 50 Hz/60 Hz
Power Consumption:	120 Wmax.

Dimensions and Weight

215 (W) × 133 (H) × 435 (D) mm (excluding protruding parts)
8 ½ (W) × 5 ¼ (H) × 17 ⅛ (D) inch
Approx. 4 kg (8.8 lbs.; excluding options and accessories)

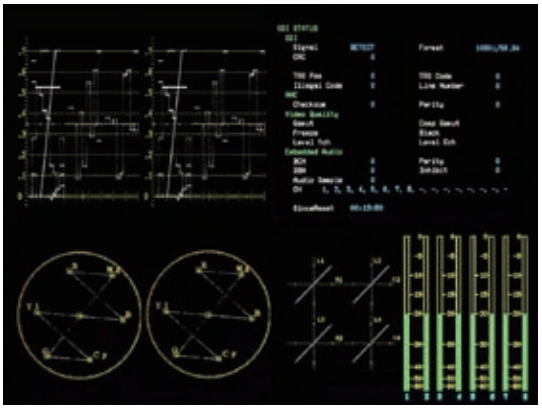
Accessories

Instruction manual	1
Power cord	1
Cover/inlet stopper	1
Rack-mount, ANSI screw	2
15-pin D-sub connector	1
15-pin D-sub connector cover	1

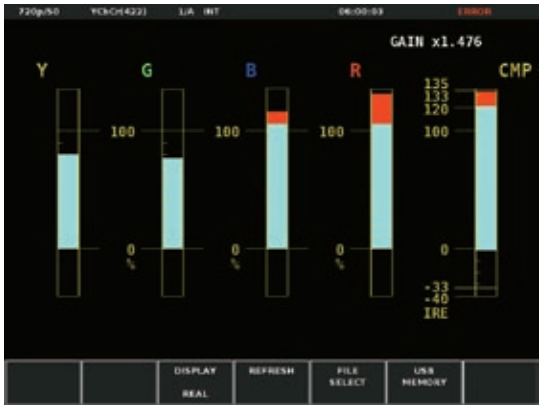
Sold Separately

Cabinet:	LR 2427B (with handle) LR 2404A (without handle)
Rack mount adapter:	LR 2700AI

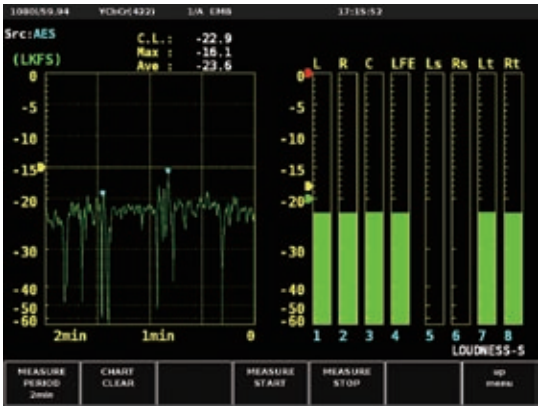
■ Display Examples



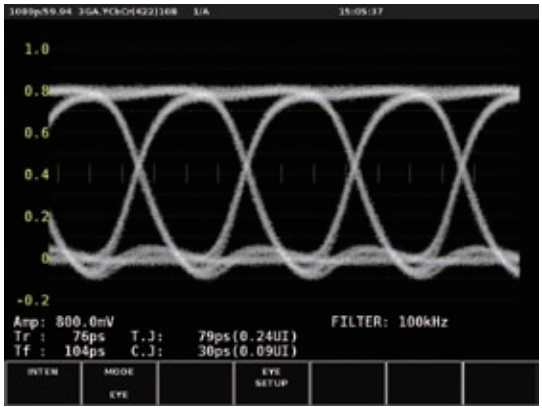
2-channel simultaneous display (with the LV 5770SER08, LV 5770SER09, and LV 5770SER41 installed)



5 bar display (with the LV 5770SER08 and LV 5770SER09 installed)



Loudness display (with the LV 5770SER41 installed)



Eye pattern display (with the LV 5770SER09 installed)

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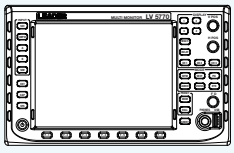
System Configuration

STEP 1
Platform



STEP 2
Option unit selection

LV 5770SER08 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.

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

LV 5770SER41 DIGITAL AUDIO
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.)

LV 5770SER42 ANALOG AUDIO
Up to 8 channels of analog audio are supported.
(The LV 5770 must be combined with the LV 5770SER41 unit.)

LV 5770SER03 COMPOSITE VIDEO INPUT
NTSC/PAL video signals are supported.

STEP 3
Completion

A multi monitor that meets your needs!

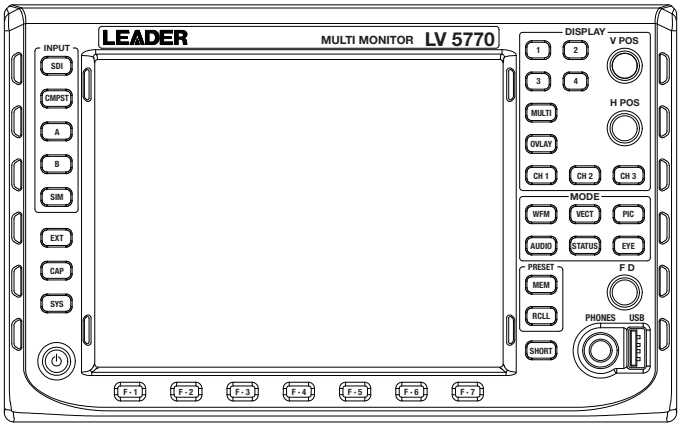
Note: The LV 5770SER08 and LV 5770SER09 cannot be installed in the LV 5770 at the same time.

Table of Option Unit Combinations

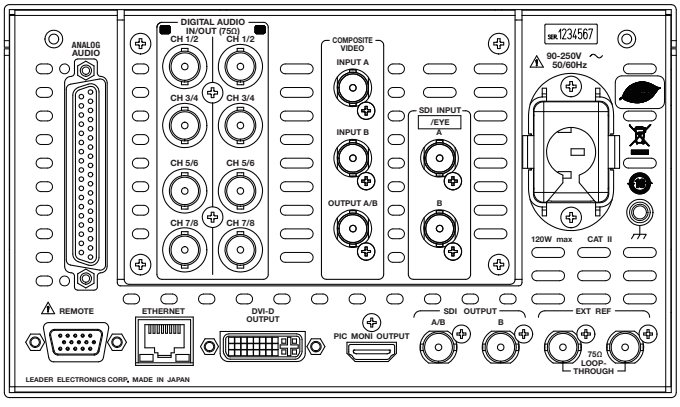
Combinations	LV 5770SER03 COMPOSITE VIDEO INPUT	LV 5770SER08 SDI INPUT	LV 5770SER09 SDI INPUT/EYE	LV 5770SER41 DIGITAL AUDIO	LV 5770SER42 ANALOG AUDIO
	No	Yes	No	No	No
	No	Yes	No	Yes	No
	No	Yes	No	Yes	Yes
	No	No	Yes	No	No
	No	No	Yes	Yes	No
	No	No	Yes	Yes	Yes
	No	No	No	Yes	No
	No	No	No	Yes	Yes
	Yes	Yes	No	No	No
	Yes	Yes	No	Yes	No
	Yes	Yes	No	Yes	Yes
	Yes	No	Yes	No	No
	Yes	No	Yes	Yes	No
	Yes	No	Yes	Yes	Yes
	Yes	No	No	Yes	No
	Yes	No	No	Yes	Yes
	Yes	No	No	No	No

Note: The LV 5770SER08 and LV 5770SER09 cannot be installed in the LV 5770 at the same time. The LV 5770SER42 cannot be used unless the LV 5770SER41 is also installed in the LV 5770.

■ Front Panel



■ Rear Panel



Example of an LV 5770 with an LV 5770SER03, LV 5770SER09, LV 5770SER41, and LV 5770SER42 installed.

(Connect Pic Moni Output to a monitor that supports HDMI input.)

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VIDEO

LV 5770 Platform Options

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

FEATURES

- **Two-Channel Simultaneous Display**
  The LV 5770 is equipped with a pair of SDI input connectors that support 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals. The two input signals can be displayed simultaneously. Even when one of the input signals is not being displayed, the LV 5770 still monitors the undisplayed signal for errors. In addition, the LV 5770 is equipped with SDI output connectors that can generate serial reclocked SDI signals from the input SDI signals. The A/B output connector generates the reclocked signal of the SDI signal applied to channel A or channel B. The output that is generated from this connector is switched between the two channels whenever an input key (A or B) is pressed.
- **Rich Assortment of Display Features**
  Not only does the LV 5770 have essential displays for video signal quality monitoring, such as a video signal waveform display and a vectorscope display, it also has a rich assortment of other display features such as a picture display, 5-bar display, and status display.
- **Wide Variety of Display Formats**
  In the video signal waveform display, vectorscope display, and picture display, the LV 5770 can display up to two input SDI signals on top of each other or side by side. This makes it suitable for adjusting the gain and black balance values of two video signals. In the video signal waveform and vectorscope displays, the LV 5770 can make different input channels easier to see by displaying them using different colors.
- **Extremely Flexible Display Layouts (When optional units are installed)**
  The 1-screen display feature can be used to show each of the different displays on a single screen, or the 4-screen multi display feature can be used to divide the screen into four areas with a different display shown in each area. The video signal waveform display and picture display can be shown on the 1-screen display.
- **Frame Capture and Screen Capture Features**
  The LV 5770 is equipped with a frame capture feature, which captures single frames of an SDI signal. The frame capture feature can be used to capture frames manually or automatically when errors occur. This feature is useful when performing data analysis when errors occur. Captured frame data can be displayed as still-image data on the video signal waveform, vectorscope, and picture displays. In addition, this data can be saved to a USB memory device.
  The LV 5770 is also equipped with a screen capture feature, which captures the entire display as still-image data.
- **Picture Monitor Output**
  The input SDI signal can be generated as an 8-bit signal. Regardless of the SDI input signal, the output format can be set to YC_BC_R4:2:2, YC_BC_R4:4:4, or RGB4:4:4. The signal can also be generated in 8 bits, 10 bits, or 12 bits.
- **SDI Signal Data Analysis Feature**
  On the status display, SDI signal transmission errors and various errors related to the embedded audio signal and ancillary data can be detected. The LV 5770 has event log, data dump, and external sync signal and SDI signal phase difference display features for analyzing SDI signals. Ancillary data can be displayed along with the embedded line numbers and numbers of the corresponding standards in a list. A variety of detailed ancillary data analyses can be displayed.
- **Timecode Display**
  The LV 5770 can display the LTC or VITC timecode that is embedded in an SDI signal and the D-VITC timecode of an SD-SDI signal. The timecode can also be used as the time stamp in the event log.
- **Superimposing Closed Caption Data**
  The closed caption data (EIA-608, VB708) that is embedded in an SDI signal can be superimposed on the picture display.

LV 5770SER09 only

- **Eye Pattern and Jitter Measurement Display**
  The LV 5770 can display the eye pattern and jitter waveforms of 3G-SDI, HD dual link, HD-SDI, and SD-SDI signals.
  An eye pattern's amplitude, rise time, fall time, timing jitter, current jitter, overshoot of the rising edge, and overshoot of the falling edge can be measured automatically.

SPECIFICATIONS

SDI Video Signal Formats and Standards

SD-SDI Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10 bits	525i	59.94	SMPTE 259M
		625i	50	

HD-SDI Video Signal Formats and Standards

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

HD Dual Link Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10 bits	1080p	60/59.94/50	SMPTE 372 (1920 × 1080)
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
YC_BC_R 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 × 1080)
		1080PsF		

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

3G-SDI Level A Video Signal Formats and Standards

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10 bits	1080p	60/59.94/50	SMPTE 424M SMPTE 425
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
YC_BC_R 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		720p	60/59.94/50 30/29.97/25/24/23.98	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		720p	60/59.94/50 30/29.97/25/24/23.98	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 × 1080)
		1080PsF		

The 3G-SDI formats will be released in September 2011.

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VIDEO LV 5770 Platform Options

LV 5770SER08
LV 5770SER09

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

Color System	Quantization	Scanning	Frame (Field) Rates	Standard Supported
YC_BC_R 4:2:2	10 bits	1080p	60/59.94/50	SMPTE 424M SMPTE 425
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
YC_BC_R 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
RGB 4:4:4	10 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
	12 bits	1080p	30/29.97/25/24/23.98	
		1080PsF		
		1080i	60/59.94/50	
		1080p	24/23.98	(2048 × 1080)
		1080PsF		

3G-SDI Level B HD-SDI 2 Mapping Video Signal Formats and Standards

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

Ancillary Data Standard: SMPTE291M
Format Setting: Automatic and manual
Automatic
3G-SDI and HD Dual Link: The LV 5770 detects the format information within the payload ID (SMPTE 352M) and automatically sets the format.
HD-SDI and SD-SDI: The LV 5770 determines the format from the input signal's synchronization information and automatically sets the format.
Manual: The video signal format is set manually.

Embedded Audio Playback Method (When an LV 5770 SER41 is installed)

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

Input/Output Connectors

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

External Sync Signal Input Connectors

Input Connectors: 1 pair of BNC connectors
Input Signal: Tri-level sync or NTSC/PAL black burst signal
Input Impedance: 15 kΩ passive loop-through
Maximum Input Voltage: ±5 V (DC + peak AC)
* If the video signal waveform is displayed using an external sync signal as the reference, inserting or removing an SDI signal or restarting the device may cause the waveform phase to be off by one clock.

Main Display Features

Input: SDI input
Input Mode: Single input mode and simul mode
(Only single input mode is available for HD dual link signals or when the composite option is installed.)
Single Input Mode: Displays a single input signal
Simul Mode: Displays up to two input SDI signals simultaneously
3G-SDI 2 Mapping Mode: Splits a 3G-SDI signal into two HD-SDI signals and displays them simultaneously
Simul Mode Display Format: Mixed, tiled, aligned (differs depending on the displayed contents)
3G-SDI 2 Mapping Mode Display Format: The same as the simul mode display format
Mixed Display: Two input signals are displayed on top of each other.
Tiled Display: Two input signals are displayed in separate areas.
Aligned Display: Two input signals are displayed side by side.
Display Size: 1-screen display, 2-screen display, 4-screen display
1-Screen Display: Displays a single, large screen (the thumbnail display can be turned on and off)
2-Screen Display: Splits the display into two screens (left and right)
4-Screen Display: Splits the display into four screens

Waveform Display

Simul Mode Display Format: Mixed, aligned
Waveform Operations
Display Mode
Overlay: Displays component signals overlaid
Parade: Displays component signals side by side
Blanking Interval: H and V blanking periods can be masked.
RGB Conversion: Converts a Y,C_B,C_R signal into an RGB signal and displays the result
Pseudo-Composite Display: Digitally converts component signals into composite signals and displays the result
Channel Mapping: On the RGB conversion display, the order can be set to GBR order or RGB order.
Line Select: Displays the selected line
Display Colors: Seven colors to choose from; a different color for each input channel
Vertical Axis
Gain: ×1 or ×5
Variable Gain: ×0.2 to ×2.0
Amplitude Accuracy: ±0.5 %
HD-SDI
Y Signal: ±0.5 % for 1 to 30 MHz
C_BC_R Signal: ±0.5 % for 0.5 to 15 MHz
Low-Pass Attenuation: ≥ 20 dB (at 20 MHz)
SD-SDI
Y Signal: ±0.5 % for 1 to 5.75 MHz
C_BC_R Signal: ±0.5 % for 0.5 to 2.75 MHz
Low-Pass Attenuation: ≥ 20 dB (at 3.8 MHz)
Horizontal Axis
Line Display: ×1, ×10, ×20, ACTIVE, or BLANK
Field Display: ×1, ×20, or ×40
Cursor Measurement
Composition: Horizontal Cursors: 2 (REF and DELTA)
Vertical Cursors: 2 (REF and DELTA)
Amplitude Measurement: mV , %, R%, DEC, HEX
Time Measurement: Second display
Frequency Display: Computes and displays the frequency with the length of one period set to the time between two cursors
Scale
Types: % scale, V scale, decimal scale, hexadecimal scale
Display Colors: Seven colors to choose from
Thumbnail Display: Picture, audio level meter (when an LV 5770SER41 is installed)

Vectorscope Display

Simul Mode Display Format: Mixed, tiled
Display Colors: Seven colors to choose from; a different color for each input channel
Blanking Interval: Masked(*)
Pseudo-Composite Display: Artificially converts component signals into composite signals and displays the result
Line Select: Displays the selected line
Gain: ×1, ×5, IQ-MAG
Variable Gain: ×0.2 to ×2.0
Amplitude Accuracy: ±0.5 %
Scale
Types: ITU-R BT.601, ITU-R BT.709, AUTO
Color Bar Saturation: 75 %, 100 %
IQ Axis: Show or hide
Display Colors: Seven colors to choose from
Thumbnail Display: Picture, audio level meter (when an LV 5770SER41 is installed), histogram
* On the multi-screen display, the blanking period depends on the video signal waveform display's blanking display settings.

5-Bar Display

Simul Mode Display Format: Tiled only
Function: Converts an SDI signal into Y, R, G, B, and composite values and then displays the five peak levels
Scale: mV, %
Error Level: Based on the gamut error, composite gamut error, and luminance error thresholds
Line Select: Displays the selected line
Thumbnail Display: Picture, audio level meter (when an LV 5770SER41 is installed)

Picture Display

Simul Mode Display Format: Mixed, tiled
Quantization: 8 bits
Display Size: Fit, full frame, real, ×2
Frame Rate: The frame rate is converted and displayed using the internal sync signal.

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VIDEO LV 5770 Platform Options

LV 5770SER08
LV 5770SER09

Aspect Marker Display:
- **HD-SDI:** 4:3, 13:9, 14:9, 2.39:1
- **SD-SDI:** 13:9, 14:9, 16:9

Aspect Marker Format: Line, shadow (99 levels), black
Safety Marker Size: ARIB TR-B4, SMPTE RP-218, user-defined
Line Select: Marks the selected line
AFD Display: Displays abbreviations for SMPTE 2016-1-2007 standard AFD codes
Gamut Error Display: Displays gamut error locations over the picture
Superimpose: Displays closed captions over the picture(*1)
- **Standard Supported:** EIA-708, EIA/CEA-608-B (EIA-708-B) SMPTE 334M, EIA/CEA-608-B (EIA/CEA-608-B) SMPTE 334M, VBI (EIA/CEA-608-B Line 21) CIA/EIA-608-B

CINELITE II Display: Displays the luminance information on the picture display
Thumbnail Display: Video signal waveform, audio level meter (when an LV 5770SER41 is installed)

*1 The closed caption display is not supported when the input signal is 3G-SDI or HD dual link.

Status Display

Signal Detection: Detects the presence of an SDI signal
Format Display: Displays the video signal format
Embedded Audio Channel: Displays the embedded audio channel numbers(*1)
SDI Signal Error Detection
- **CRC Error:** Detects transmission errors of 3G-SDI, HD-SDI, and HD dual link signals
- **EDH Error:** Detects transmission errors of SD-SDI signals
- **TRS Position Error:** Detects errors in the TRS position
- **TRS Code Error:** Detects errors in the TRS protection bits
- **Line Number Error:** Detects errors with the line numbers embedded in 3G-SDI, HD-SDI, and HD dual link signals
- **Illegal Code Error:** Detects data in the range of 000h to 003h and 3FCh to 3FFh outside the TRS and ADF header
- **Dual Link Phase Difference Error:** Detects errors when the phase difference between links A and B is 100 clocks or more

Ancillary Data Packet Error Detection
- **Checksum Error:** Detects transmission errors in the ancillary data
- **Parity Error:** Detects parity errors in the ancillary data header

Embedded Audio Packet Error Detection(*1)
- **BCH Error:** Detects transmission errors of audio packets
- **DBN Error:** Detects sequential errors in audio packets
- **Parity Error:** Detects parity errors in audio packets

Image Quality Error Detection
Gamut Error: Detects gamut errors
- **Detection Range:** Upper Limit 90.8 to 109.4 %
  Lower Limit: -7.2 to 6.1 % in 0.1 % steps

Composite Gamut Error: Detects level errors that occur when component signals are converted to composite signals
- **Detection Range:** Upper Limit 90.0 to 135.0 %
  Lower Limit: -40 to 20 % in 0.1 % steps

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

Black Error: Detects video blackouts(*2)
- **Black Level Specification:** 0 to 100 %
- **Area Specification:** 1 to 100 %
- **Time Specification:** 1 to 300 frames

Level Error: Detects YC_BC_R level errors(*2)

*1 If the input signal is 3G-SDI level B, only stream 1 is supported. If the input signal is HD dual link, only link A is supported.
*2 This is not supported when the input signal is 3G-SDI or HD dual link.

Event Log

Function: Records detected errors, events—such as the LV 5770 switching between input signals, and time stamps.
Recording Capacity: Up to 1000 events
Operation: Records all events from start to finish
Data Output: Can be saved in text format to a USB memory device

SDI Analysis Features

Data Dump Display
- **HD, SD-SDI Display Format:** Displays data separated by serial data sequence or by channel
- **3G-SDI Display Format:** Stream 1, stream 2, stream 1 and stream 2 simultaneously
- **HD Dual Link Display Format:** Link A, link B, link A and B simultaneously
- **Line Select:** Displays the selected line
- **Sample Select:** Displays the selected sample
- **Jump Function:** Moves to an EAV or SAV
- **Data Output:** Save data in text format to a USB memory device

Phase Difference Display
- **Function:** Displays the phase difference between a reference signal and an SDI video signal numerically and graphically
- **Reference Signal**
  - **3G, HD, SD-SDI:** External sync signal, channel A of the SDI signal
  - **HD Dual Link:** External sync signal, link A
- **Display Range**
  - **Vertical:** 1 frame
  - **Horizontal:** ±1 line

Audio Control Packet(*1)
- **Display Content:** Displays audio control packet analysis
- **Group Selection:** Select one group from four groups.

EDH Display (Only for SD)
- **Standard Supported:** SMPTE RP-165
- **Display Content:** Analyzes and displays EDH packets and displays received CRC errors

Payload ID Display: Analyzes and displays payload information
Closed Caption Analysis Display(*2)
- **Standard Supported:** ARIB STD-B37, EIA-708-B, EIA/CEA-608-B
- **Display Content:** Analyzes and displays the closed caption signal

Inter-Stationary Control Signal (NET-Q) Display(*2)
- **Standard Supported:** ARIB STD-B39
- **Display Content:** Analyzes and displays inter-stationary control signals
- **Logging Feature:** Q-signal logging

Data Broadcast Trigger Signal(*2)
- **Standard Supported:** ARIB STD-B35

V-ANC User Data Display(*2)
- **Standard Supported:** ARIB TR-B23

Arbitrary ANC Packet Display (Only for link A when the link format is set to dual)
- **Method of specifying ANC:** DID, SDID

AFD Packet Display(*2)
- **Standard Supported:** SMPTE 2016-1-2007

*1 If the input signal is 3G-SDI level B, only stream 1 is supported. If the input signal is HD dual link, only link A is supported.
*2 This is not supported when the input signal is 3G-SDI or HD dual link.

Ancillary Data List Display

List Display Content: Presence or absence of each ancillary data type, embedded line number, and number of packets per frame(*1)

*1 This is not supported when the input signal is 3G-SDI or HD dual link.

Lip Sync Measurement (When an LV 5770SER41 is installed)

Function: Measures the phase difference between an SDI video signal and digital audio
Reference Signal: Generated by a LEADER TSG that can create the signal necessary for lip sync measurements
Compliant Audio: SDI embedded audio, digital audio
Measurement Range: 100 ms, 200 ms, 1 s, 2 s, 5 s
Measurement Resolution: 1 ms
Frame Capture Feature (To be supported in the future)
- **Function:** Captures frame data

Closed Caption Packet Display

Standard Supported

Feature	Standard Supported	DID	SDID
EIA-708 CC decode feature	SMPTE334M	161h	101h
EIA/CEA-608-B CC decode feature (EIA-708-B)	SMPTE334M	161h	101h
EIA/CEA-608-B CC decode feature (EIA/CEA-608-B)	SMPTE334M	161h	102h
VBI (EIA/CEA-608-B line 21) CC decode feature	CIA/EIA-608-B		

CDP Packet Display Content: CDP packet header information
Frame rate, presence or absence of timecode packet, presence or absence of closed caption packet and validity of this packet, presence or absence of closed caption service packet and validity of this packet, presence or absence of the FUTURE data packet, timecode (when the timecode packet is present), closed caption data (when the closed caption packet is present and valid), presence or absence of the CC1 to CC4 packets, the TEXT1 to TEXT4 packets, and the XDS packet

XDS Packet Display Content: Contents adviser information
Copy management information

ProgramDescription Packet Display Content:
Stuffing Descriptor, AC3 Audio Descriptor, Caption Service Descriptor, Content Advisory Descriptor, Extended Channel Name Descriptor, Service Location Descriptor, Time-Shifted Service Descriptor, Component Name Descriptor, DCC Departing Request Descriptor, DCC Arriving Request Descriptor, Redistribution Control Descriptor

Time Display Feature

Time Display: Current time, timecode
Current Time Display: The time based on the internal clock
Timecode: LTC, VITC, D-VITC (SD-SDI only)
Standard Supported
- **LTC, VITC:** SMPTE 12M-2
- **D-VITC:** SMPTE 266M

LV 5770SER09

Eye Pattern and Jitter Measurement Display

Display: Displays the input 3G-SDI, HD-SDI, HD dual link, or SD-SDI waveform before equalizing
Jitter Display: Displays the jitter waveform of the 3G-SDI, HD-SDI, HD dual link, or SD-SDI input signal

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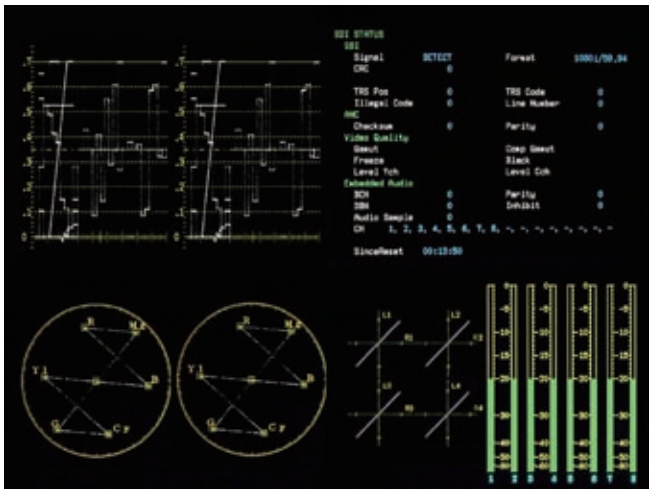
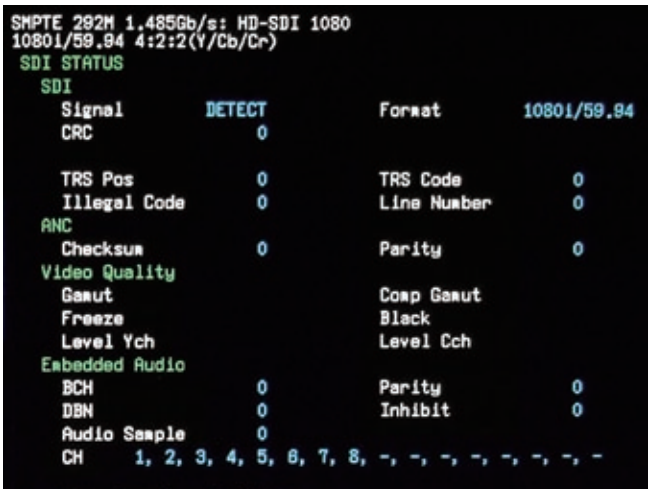
LV 5770 Platform Options

LV 5770SER08
LV 5770SER09

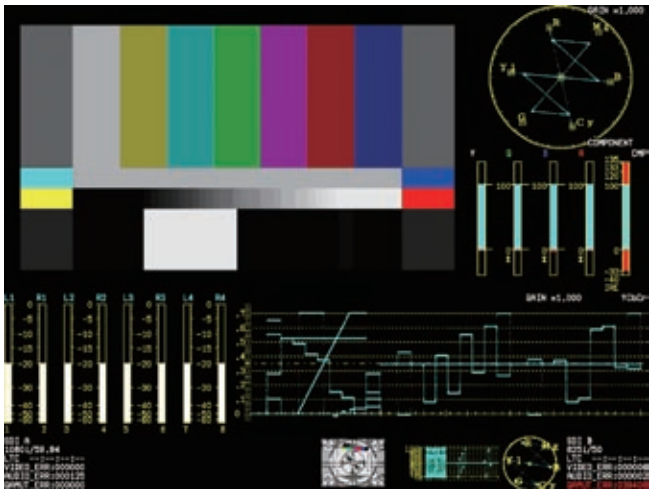
■ Display Examples



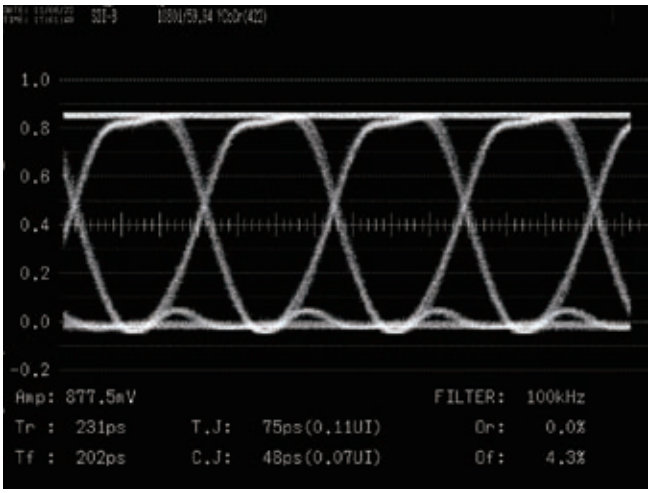
2-channel simultaneous display



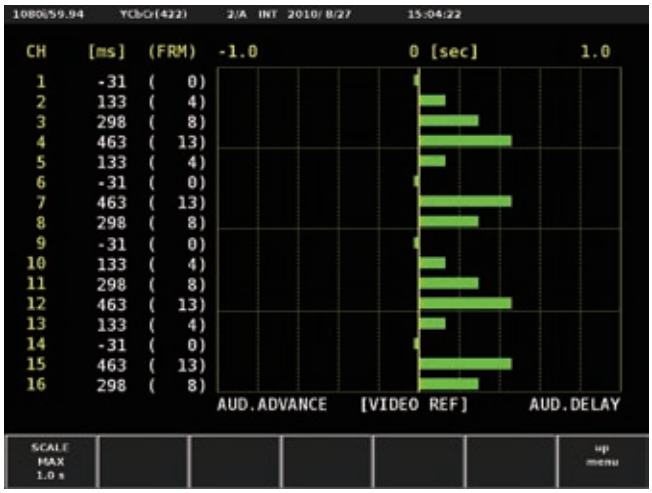
Status display



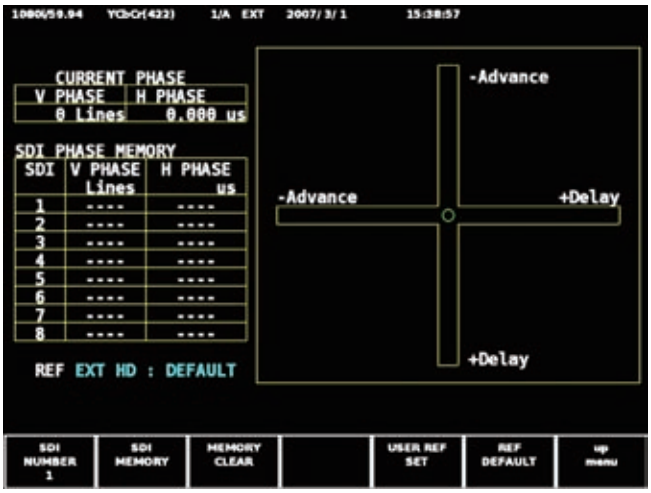
User-defined layout (option)



Eye pattern display of a 3G-SDI signal
(only when the LV 5770SER09 is installed)



Lip sync display
(when the LV 5770SER41 and LT 4400SER01 are installed)



SDI - EXT REF phase difference display

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LV 5770 Platform Options

LV 5770SER41 DIGITAL AUDIO

FEATURES

- **Digital Audio I/O**
  The addition of the digital audio option (LV 5770SER41) enables the LV 5770 to display not only embedded audio (when an LV 5770SER08 or LV 5770SER09 is installed) but also external digital audio. The eight I/O connectors—16 channels—can be switched between input and output in groups of four connectors—8 channels. Therefore, the LV 5770 can also be used to extract and transmit the embedded audio's digital audio.
- **Dolby Decode (Factory Option)**[*1]
  The addition of the Dolby decode feature enables the LV 5770 to decode and display the Dolby-E or Dolby digital signal that is compressed in the embedded audio (which requires the LV 5770SER08 or LV 5770SER09) or digital audio input signal.

SPECIFICATIONS

I/O Connectors

I/O Connectors:	BNC connector Group A—4 connectors, 8 channels Group B—4 connectors, 8 channels
I/O Switching:	Switching between the connections (4 connectors, 8 channels)
I/O Impedance:	75 Ω
Maximum Input Voltage:	±5 V (DC + peak AC)
Output Voltage:	1.0 Vp-p ± 10 % (into 75 Ω)
Supported Formats:	AES, EBU, Dolby-E (factory option), Dolby-Digital (factory option)
Sampling Frequency:	48 kHz
Output Signal:	Channels 1 to 8 of the SDI embedded audio, channels 9 to 16 of the SDI embedded audio, the 8 channels that are displayed on the screen (the Dolby feature is used to decode and generate the signals)

* The LV 5770SER08 or LV 5770SER09 is required to generate embedded audio signals.

Headphone Output

Output Connector:	One 6.3 mm stereo jack
Output Signal:	2 channels from the audio channels that are being displayed on the screen (downmixed L_T and R_T can also be selected)
Sampling Frequency:	Only 48 kHz
Volume Adjustment:	Adjusted from the menu

Digital Audio Display

Simul Mode Display Format:	Tiled only The channel A audio and channel B audio must be synchronized with each other.
Input Signal:	SDI embedded input (this requires an LV 5770SER08 or LV 5770SER09), digital audio input
Displayed Channels:	Up to 8 channels
Channel Selection	
SDI Embedded:	Any two groups from groups 1, 2, 3, and 4
Digital Audio Input:	Switchable between A and B (set to the inputs)
Display Type:	Level meter, Lissajous, surround, status

Meter Display

Level Meter Display	
Displayed Channels:	Two or eight
Dynamic Range:	-60 dBFS, -90 dBFS
Meter Response Mode:	TRUE PEAK, PPM type I, PPM type II, VU, LOUDNESS-F, LOUDNESS-S
Peak Hold Response Mode:	TRUE PEAK, PPM type I, PPM type II
Peak Hold Time:	0.5 to 5.0 s (in 0.5 s steps), HOLD
Level Setting:	Reference level, warning level, over level (-40.0 to 0.0 dBFS for each level)

Waveform Display

Lissajous Display	
Displayed Channels:	Two (single) or eight (multi)
Display Mode:	X-Y or MATRIX

Surround Display

Function:	Displays a graphical representation of a sound field
Surround Format:	5.1
Channel Mapping:	L, R, C, LFE, Ls (S), Rs, LL, RR
Center Channel Format:	NORMAL, PHANTOM CENTER
Gain:	×1, AUTO
Correlation Display:	Detects the case of the channel being 180 ° out of phase with its adjacent channels

Loudness Display (To be supported in the future)

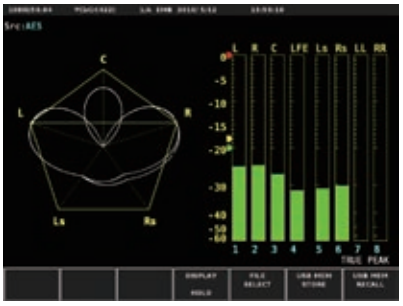
Specifications:	ARIB, EBU, ITU-R BS. 1770-2
Meter Display:	Momentary-Loudness, ShortTerm-Loudness, LongTerm-Loudness, TruePeak, PPM, VU
Display Mode:	Absolute values (LKFS), relative values (LK)
Chart Display:	2 min, 10 min, 30 min, 1 h, 2 h, 4 h

Status Display

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 the input signal level exceeds the specified level 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 samples
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 LV 5770 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
Code Violation:	Counts the number of times that the state of the input signal's biphase modulation is abnormal
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
Dolby E Meter Data:	Text display (factory option)
Dolby Digital Meter Data:	Text display (factory option)

■ Display Examples

Loudness display



Surround display

*1 Dolby is a trademark of Dolby Laboratories.

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LV 5770 Platform Options

LV 5770SER42 ANALOG AUDIO

FEATURES

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

SPECIFICATIONS

Audio Input/Output

I/O Connectors:	37-pin D-sub (female)
Input Signal Format:	DC-coupled balanced input
Number of Input Channels:	8 (4 stereo pairs)
Input Impedance:	≥ 20 kΩ
Output Signal Format:	DC-coupled balanced output
Number of Output Channels:	8
Output Impedance:	50 Ω (nominal)
Output Signal:	8-channel audio signal that is displayed on the screen (Dolby*—available as a special order—signals are decoded and generated as analog signals.)
Maximum Output Level:	10 kΩ load 24 dBu 600 Ω load 4 dBu

Headphone Output Jack (LV 5770SER41 option)

Output Connector:	One stereo jack
Output Signal:	2 channels from the audio channels that are being displayed on the screen (downmixed L_T and R_T can also be selected)
Sampling Frequency:	Only 48 kHz
Volume Adjustment:	Adjusted from the menu

Analog Audio Display

Input Signal:	Analog audio input
Displayed Channels:	Up to 8 channels (4 stereo pairs)
Display Type:	Level meter, Lissajous, surround
Level Meter Display	
Displayed Channels:	Two or eight
Dynamic Range:	-60 dBFS / -90 dBFS
Level Accuracy:	± 0.3 dB (1 kHz)
Frequency Range:	30 Hz to 20 kHz ±0.4 dB 20 Hz to 20 kHz +0.4 dB -0.6 dB
Meter Response Mode:	TRUE PEAK, PPM type I, PPM type II, VU
Peak Hold Response Mode:	TRUE PEAK, PPM type I, PPM type II
Peak Hold Time:	0.5 to 5.0 s (in 0.5 s steps), HOLD
Level Setting:	Reference level, warning level, over level (-40.0 to 0.0 dBFS for each level)
Lissajous Display	
Displayed Channels:	Two (single) or eight (multi)
Display Mode:	X-Y or MATRIX
Surround Display	
Function:	Displays a graphical representation of a sound field
Surround Format:	5.1
Channel Mapping:	L, R, C, LFE, Ls (S), Rs, LL, RR
Center Channel Format:	NORMAL, PHANTOM CENTER
Gain:	×1, AUTO
Correlation Display:	Detects the case of the channel being 180 ° out of phase with its adjacent channels

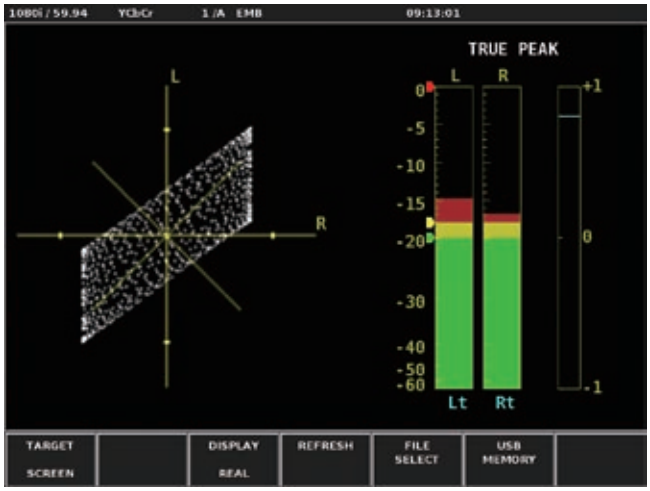
* To use the analog audio feature, the LV 5770SER41 is also required in addition to the LV 5770SER42.

Accessories

37-pin D-sub connector	1
37-pin D-sub connector cover	1
Cable	2

* Dolby is a tradmark of Dolby Laboratories.

■ Display Examples



Lissajous display

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LV 5770 Platform Options

LV 5770SER03 COMPOSITE VIDEO INPUT

FEATURES

- **Rich Assortment of Display Features**
  Not only does the LV 5770 have essential displays for video signal quality monitoring, such as a video signal waveform display and a vectorscope display, it also has a rich assortment of other display features such as a picture display.
  This unit is installed in the LV 5770, and i is used to display and measure the analog NTSC or PAL video signals.
  The LV 5770's newest functions related to waveforms such as the waveform monitor, vectorscoop, simple picture monitor, SCH measurements, and EXT REF phase display function can be used on analog video signals of NTSC and PAL formats.
- **Extremely Flexible Display Layouts (When optional units such as the LV 5770SER08, LV 5770SER09, and LV 5770SER41 are installed)**
  The 1-screen display feature can be used to show each of the different displays on a single screen, or the 4-screen multi display feature can be used to divide the screen into four areas with a different display shown in each area. The video signal waveform display, picture display, and audio level meter display can be shown as a thumbnail display on the 1-screen display.

SPECIFICATIONS

Formats and Standards

Input Signal:	NTSC or PAL composite video signal
Standard Supported:	SMPTE 170M, ITU-R BT.470

I/O Connectors

Input Connectors:	2 BNC connectors (channels A and B are selectable)
Input Impedance:	75 Ω
Input Return Loss:	≥ 30 dB (at up to 6 MHz)
Maximum Input Voltage:	±5 V (DC + peak AC)
Output Connector:	1 BNC connector
Output Signal:	Channel A or B—whichever is selected—of the composite option, the active signal
Output Impedance:	75 Ω
Output Amplitude:	1 Vp-p ± 5 % (into 75 Ω)
Frequency Response:	±5 % (25 Hz to 5 MHz) -10 to +5 % (5 to 5.6 MHz)

External Sync Signal Input Connectors

Input Connectors:	1 pair of BNC connectors
Input Signal:	Tri-level sync or NTSC/PAL black burst signal
Input Impedance:	15 kΩ passive loop-through
Input Return Loss:	≥ 30 dB (50 kHz to 30 MHz into 75 Ω)
Maximum Input Voltage:	±5 V (DC + peak AC)

* If the video signal waveform is displayed using an external sync signal as the reference, inserting or removing an SDI signal or restarting the device may cause the waveform phase to be off by one clock.

Waveform Display

Waveform Operations

Line Select:	Displays the selected line
Sweep Modes:	H and V
Display Colors:	Seven colors to choose from; a different color for each input channel

Vertical Axis

IRE Scale (NTSC):	-40 to 100 IRE
V Scale (PAL):	-0.3 to 0.7 V
Gain:	×1, ×5
Variable Gain:	×0.2 to ×2
Amplitude Accuracy:	±1 %
Frequency Response:	±2 % (25 Hz to 5 MHz) -7 to +3 % (5 to 5.6 MHz)

Transient Characteristics (for 1 V full scale, flat, 2 T pulse, and 2 T bar)

Overshoot:	±2 %
Preshoot:	±1 %
Ringing:	±2 %
Pulse/Bar Ratio:	±1 %
Vertical Tilt:	±1 %
Filter:	Luminance filter
DC Restore:	Back porch clamp

Horizontal Axis

Operation Mode:	1-waveform display, 4-waveform display
Display Format	
Line Display:	1H, 2H
Line Display:	×1, ×10, ×20
Field Display:	1 V, 2 V
Field Display:	×1, ×20, ×40
Time Accuracy:	±1 %
Line Select:	Displays the selected line
Cursor Measurement	
Horizontal Cursors:	2 (REF and DELTA)
Time Measurement:	Second display
Frequency Measurement:	The frequency is measured in Hz with the length of one period set to the time between two cursors.
Vertical Cursors:	2 (REF and DELTA)
Amplitude Measurement:	V or % display
Thumbnail Display:	Picture, audio level meter*

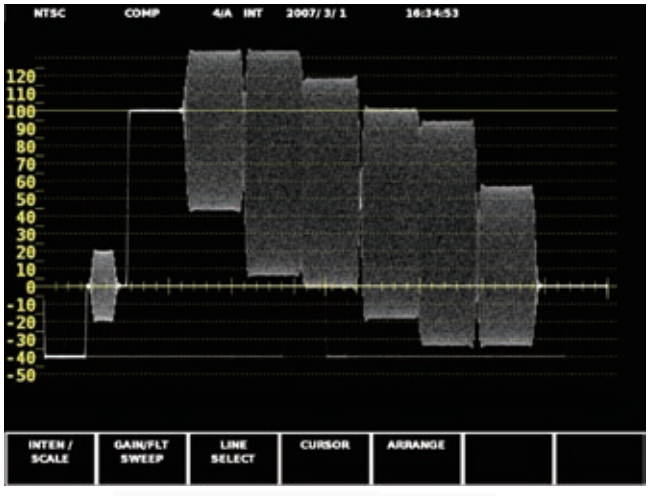
Vectorscope Display

Line Select:	Displays the selected line
Gain:	×1, ×5, IQ-MAG
Variable Gain:	×0.2 to ×2
Amplitude Accuracy:	±3 %
Phase Accuracy:	±2 °
Phase Adjustment Range:	360 °
Scale	
Color Bar Saturation:	75 %, 100 % (color bar)
IQ Axis:	Show, hide
Display Colors:	Seven colors to choose from
Setup (NTSC):	0 %, 7.5 %
NTSC Display (PAL):	NTSC display, PAL display
SCH Display:	The SCH value is displayed as a digital value.
Thumbnail Display:	Picture, audio level meter*, histogram

Picture Display

Quantization:	8 bits
Display Size:	Fit, full frame, real
Frame Rate:	The frame rate is converted and displayed using the internal sync signal.
Aspect Marker Display:	16:9
Aspect Marker Format:	Line, shadow (99 levels), black
Safety Marker Size:	SMPTE RP-218, user-defined
Line Select:	Marks the selected line
Thumbnail Display:	Video signal waveform, audio level meter*, histogram

■ Display Example



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