# Your Desired combination of units allows a flexible waveform monitor

New

CE
Upon request


HD-SDI
SD-SDI

PATENTED:
Equivalent cable length measurement

Please use exclusive cabinet for Model LV 5800 (photograph shows LR 2427B)
The Panel design is subject to change.
The cabinet is sold separately.

## LV 5800 MULTI MONITOR

### ●GENERAL

The LV 5800 is a new type of multi monitor that allows you freely configure various input and output units according to your application.
You can construct a versatile system by combining dedicated input and output units.
In particular, simultaneous display and error monitoring of multiple SDI inputs are possible, and four-waveform parade display on the waveform monitor is also supported.

### ●FEATURES

**■ Four Input Slots**
Up to four input units can be inserted. Each input unit operates independently.

**■ Two Output Slots**
Up to two output units can be inserted. Each output unit operates independently.

**■ Display Function**
Employs a color TFT LCD monitor with XGA resolution (1,024 x 768).
The display function of each unit can be displayed on a full screen or 4 screen multi display.
The 4 screen display allows arbitrary combination of signals of different input units to be displayed.

**■ USB Connector**
Screen captures, records of data, and presets can be stored by connecting a USB memory to the USB connector on the front panel.

**■ Ethernet Connector**
Remote control through TELNET or FTP, error monitoring, and file transfer are possible by connecting a PC to the Ethernet connector on the rear panel.

**■ Remote Connector**
The remote connector on the rear panel allows recalling of presets, detection of errors, and switching of inputs.

**■ Low Noise Cooling System**
Equipped with a low noise fan. Fan speed controlled using a temperature sensor. If the fan stops due to a malfunction, an alarm can be displayed on the screen through the revolution sensor.

**■ Headphone Socket**
Sound can be monitored when the LV 58SER40 is installed.

LV 58SER20/LV 58SER01A/LV 58SER40/
LV 58SER02 for installation example

## Unit List

- **LV 58SER01A** SDI INPUT
- **LV 58SER02** EYE PATTERN UNIT
- **LV 58SER20** DVI-I OUTPUT UNIT
- **LV 58SER40** DIGITAL AUDIO UNIT

## ●SPECIFICATIONS LV 5800 MAIN FRAME

### Slot
- **Number of Slots for Input:** 4
- **Number of Slots for Output:** 2

### LCD Display
- **LCD Screen Type:** 6.3-inch TFT color
- **Display Format:** XGA Effective area 1024 x 768 dots
- **Clock Frequency:** 64.93 MHz (The input signal and the display clock signal have not been synchronized.)
- **Frame Frequency:** 59.94 MHz
- **Backlight Brightness:** Selects HIGH or LOW
- **Auto Shutoff:** Sets the time for the backlight to shutoff automatically.
- **Display Screen:** 1-screen display, 2-screen display, 4-screen display

### Screen Capture
- **Capture:** Image capture by the still picture of the display screen
  Records 1 screen in the internal memory.
- **Media:** Internal memory (RAM) or a USB memory

### Data Output:
Save data in B.M.P. format to a PC via a USB memory or Ethernet network. (When the unit equipped with video signal frame capture functions, such as LV 58SER01A is inserted.) Switches the frame capture and the image capture of the display screen.

### Presets
- **Number of Presets:** 60
- **Media:** Internal memory (RAM) or a USB memory
- **Recall Method:** Through the front panel, remote connector, and Ethernet network (Switches 8 points and 60 points for recalling through the remote connector.)
- **Copy:** Copies presets collectively to the USB memory or from the USB memory to the LV 5800.

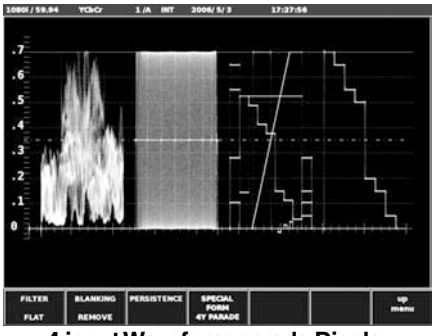
### External Reference Input
- **Input Signal:** Tri-level sync signal or NTSC/PAL black burst
- **Input Connector:** BNC connector 1 system 2 connectors
- **Input Impedance:** 15 kΩ Passive Loop-through
- **Input Return Loss:** ≥30 dB
- **Maximum Input Voltage:** ±5 V (DC + peak AC)

### External Control Connector
- **USB Connector**
  - **Specifications:** USB2.0
  - **Function:** Only a large capacity memory device is supported.
- **Ethernet Connector (Future)**
  - **Corresponding Standard:** IEEE802.3
  - **Input/Output Connector:** RJ-45
  - **Function:** Remote control from an external computer and monitoring of errors, etc.
  - **Type:** 10BASE-T/100BASE-TX
- **Remote Connector**
  - **Function:** Recalling of presets, monitoring of errors
  - **Control Signal:** LV-TTL level (LOW active)
  - **Control Connector:** 25-pin D-sub (female)
- **Headphone Output**
  - **PHONES connector:** Miniature jack (stereo)
  - **Function:** Like LV 58SER40 (DIGITAL AUDIO Unit), it is effective when the unit that has audio decoding function is inserted.

### Environmental Conditions
- **Operating Temperature:** 0 to 40 °C
- **Operating Humidity:** ≤ 85 % RH(without condensation)
- **Operating Environment:** Indoor use
- **Operating Altitude:** Up to 2,000 m
- **Overvoltage Category:** II
- **Pollution Degree:** 2
- **Power Requirements:** 90 to 250 VAC 50 Hz/60 Hz, 150 Wmax.

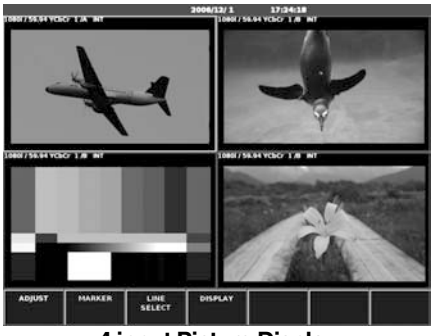
### Dimensions:
215(W) x 133(H) x 449(D) mm

### Accessories:
Power cord ..... 1
Cover/Inlet stopper ..... 1
Screws for rack mounting (inch specification) ..... 2
Instruction manual ..... 1
25-pin D-sub connector ..... 1
25-pin D-sub connector cover ..... 1



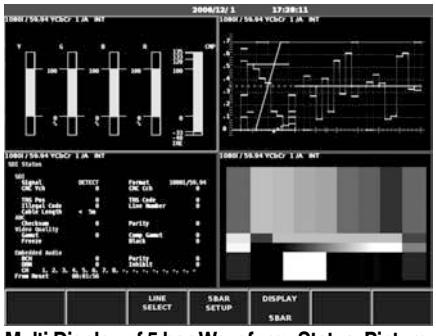
**4 input Waveform parade Display**

(Ex, LV 58SER01A 2 sets are installed)



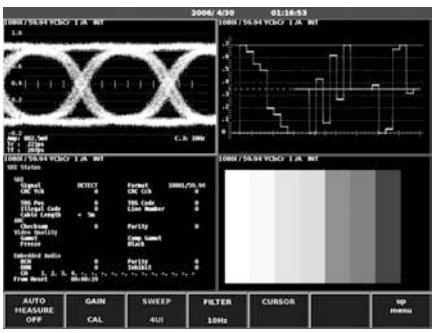
**4 input Picture Display**

(Ex, LV 58SER01A 2 sets are installed)



**Multi Display of 5 bar, Waveform, Status, Picture**

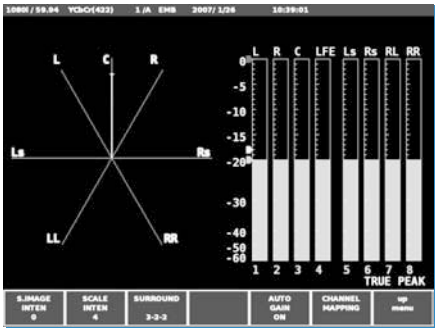
(Ex, LV 58SER01A 1 set is installed)



**Eye Pattern Display**

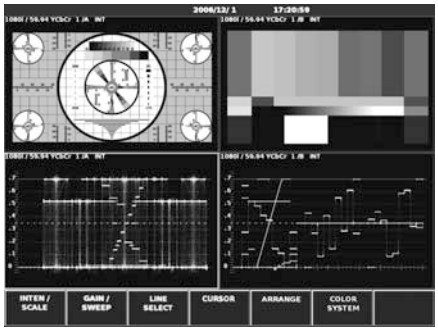
**Multi Display of Eyepattern, Waveform, Status, Picture**

(Ex, LV 58SER01A/LV 58SER02 1 set each are installed)



**Audio Display**

(Ex, LV 58SER40 1 set is installed)



**Multi Display**

(Ex, LV 58SER01A 1 set is installed)

# Diversified Units for Various Applications

## LV 58SER01A SDI INPUT


This unit is an SDI input unit that installed in a LV 5800 input slot. The unit allows waveform display, picture display, and error detection of the SDI signal on the LV 5800. Combination with other optional units allows various displays such as the eye pattern display of the SDI signal (LV 58SER02) and the Lissajous and level displays of the embedded audio (LV 58SER40).
The SDI signal that is inputted to the ACH or the BCH can be outputted respectively from the ACH/BCH Reclockout output connector by interlocking with the input key of the front panel.

### ●FEATURES

**■ Two-Channel Serial Digital I/O**
An SDI input unit contains two channels of SDI input connectors. The two connectors can also function as a dual link input of a single channel. SDI output that is reclocked using a serial signal is provided for each input. In addition, the SDI signal that is inputted to the ACH or the BCH can be outputted respectively from the ACH/BCH Reclockout output connector by interlocking with the input key of the front panel.

**■ Video Signal Display Function**
In addition to displaying the video waveforms, vectors, and pictures of the SDI signal on a full screen, 2- and 4-screen multi display can be shown. The multi display allows arbitrary combination of a single or multiple input signals to be displayed.
(Multi display in which link A and link B are separated during dual link operation is not allowed.)

**■ Error Detection Function**
Detects various errors related to the SDI, embedded audio, and ancillary data including CRC errors and EDH errors.

**■ Ancillary Data Analysis**
Supports various types of ancillary data for analysis display. In particular, closed caption data can be displayed overlapped on the picture. (future support)

**■ 5 BAR DISPLAY**
Peak levels of video signals can be displayed in place of the vectors.

**■ SDI-EXT REF Phase Display Difference Function**
The SDI-EXT REF phase difference display function shows the phase difference between the SDI signal and the external sync signal (EXT REF).

**■ Simultaneous Monitoring of Component and Composite Gamut Using the Five Bar Displays**

**■ Japanese Caption Display Function (to be supported in the future)**

**■ Embedded Audio Demultiplex Function**
The unit is equipped with a function for demultiplexing the embedded audio signal.
Level meter and Lissajous displays can be achieved when used in combination with the digital audio unit (LV 58SER40). The signal can also be output as AES/EBU.

**■ Dual link input**

### Video Formats and Corresponding Standards

Single Link System Video Signal Corresponding Formats and Corresponding Standards

| Format | Quantization | Scanning | Frame(Field) Frequency | Standard Supported |
|---|---|---|---|---|
| Y, $C_B$, $C_R$ 4:2:2 | 10bit | 1080i | 60/59.94/50 | SMPTE 274M |
| | | 1080p | 30/29.97/25/24/23.98 | SMPTE 292M |
| | | 1080PsF | 30/29.97/25/24/23.98 | SMPTE RP211<br>SMPTE 292M |
| | | 720p | 60/59.94/50/<br>30/29.97/25/24/23.98 | SMPTE 296M<br>SMPTE 292M |
| | | 525 | 59.94 | SMPTE 259M |
| | | 625 | 50 | |

Dual Link System Video Signal Corresponding Formats and Corresponding Standards

| Format | Quantization | Scanning | Frame(Field) Frequency | Standard Supported |
|---|---|---|---|---|
| GBR 4:4:4 | 10bit | 1080p | 30/29.97/25/24/23.98 | SMPTE 372M (1920x1080) |
| | | 1080PsF | 30/29.97/25/24/23.98 | |
| | | 1080i | 60/59.94/50 | |
| | 12bit | 1080p | 30/29.97/25/24/23.98 | |
| | | 1080PsF | 30/29.97/25/24/23.98 | |
| | | 1080i | 60/59.94/50 | |
| Y, $C_B$, $C_R$ 4:2:2 | 10bit | 1080p | 60/59.94/50 | |
| | 12bit | 1080p | 30/29.97/25/24/23.98 | |
| | | 1080PsF | 30/29.97/25/24/23.98 | |
| | | 1080i | 60/59.94/50 | |

The phase difference between link A and B is automatically corrected up to 100 clocks (approximately 1.4 µs) and displayed.

**Ancillary data standard:** SMPTE 291M
**Embedded audio standard:** HD-SDI: SMPTE 299M SD-SDI: SMPTE 272M
**Format Setting:** Automatic setting (In a dual link mode, only frame / field frequency is set automatically.)

### Input/Output Connector

**SDI Input**
**Input Connector:** BNC connector 2 connectors
For single link A ch / B ch 2 systems
For dual link link A / link B 1 system
**Input Impedance:** 75 Ω
**Input Return Loss:** 15 dB or more 5 MHz to serial clock frequency
**Maximum Input Voltage:** ±2 V (DC + peak AC )
**External Sync Signal Input**
**Input Signal:** Tri-level sync signal or NTSC/PAL black burst signal
**Input Connector:** BNC connector 1 system 2 connectors
**SDI Output**
**Output Connector:** BNC connector 2 connectors
Reclocks serially and outputs the input signal.
For single link A ch / B ch 2 systems
For dual link link A / link B 1 system
**Output Impedance:** 75 Ω
**Output Voltage:** 800 mVp-p ±10 %
**Output Return Loss:** 15 dB or more 5 MHz to serial clock frequency

### Waveform Display Function

**Waveform Operation**
**Display Mode**
**Overlay display:** Displays component signals overlaid
**Parade display:** Displays component signals side by side
**Gain Adjustment:** x1 / x5 / variable
**Blanking Period:** Show / hide selectable
**$YC_BC_R$→GBR conversion:** Converts $YC_BC_R$ signals into GBR and displays the result.
**Pseudo-Composite Display:** Artificially converts component signals into composite signals and displays the result.
**Timing Display:** Displays by calculating Y-$C_B$ and Y-$C_R$
Uses bowtie signals (authorised by Tektronix, inc.)
**Channel Assignment:** Selects GBR order or RGB order during GBR conversion display
**Line Select:** Displays the selected line
**Image Quality Adjustment:** Brightness adjustment
**Vertical axis**
**Sensitivity:** V scale 0 V to 0.7 V, -0.3 V to 0.7 V
% scale 0 % to 100 %, -50 % to 100 %
**Gain:** x1, x5, and variable
**Variable Gain:** x0.2 to x10
**Amplitude Accuracy:** ±0.5 %
**Frequency Response HDTV**
**Y Signal:** ±0.5 % 1 MHz to 30 MHz
**$C_B$, $C_R$ Signal:** ±0.5 % 0.5 MHz to 15 MHz
**Low-pass Attenuation:** 20 dB or more at 20 MHz
**Frequency Response SDTV**
**Y Signal:** ±0.5 % 1 MHz to 5.75 MHz
**$C_B$, $C_R$ Signal:** ±0.5 % 0.5 MHz to 2.75 MHz
**Low-pass Attenuation:** 20 dB or more at 3.8 MHz
**Horizontal Axis**
**Line Display**
**Display Format:** Overlay: 1H, 2H Parade: 1H, 2H, 3H
Timing: Y-$C_B$,Y-$C_R$ 4Y Parade*:4H
**Magnification:** Selects x1, x10, x20, ACTIVE, or BLANK

# Diversified Units for Various Applications

* As for 4Y parade mode, two LV 58SER01A (SDI INPUT unit) should be inserted, and four inputs need to synchronize in the same format each other together.

**Field Display**
- **Display Format:** Overlay: 1V, 2V (2V display not allowed for progressive)
  Parade: 1V, 2V, 3V
  Magnification: x1, x20, x40
- **Time Base Accuracy:** ±0.5 %

**Cursor Measurement**
- **Configuration:** Horizontal cursors: 2 cursors (REF and DELTA)
  Vertical cursors: 2 cursors (REF and DELTA)
- **Amplitude Measurement:** Measured in [%] and [V]
- **Time Measurement:** Displayed in [usec] or [msec]
- **Frequency Display:** Displays the frequency in which the time between cursors is considered a cycle.

## Vectorscope Display
- **Scale:** Selects 75 % or 100 % (Using a color bar)
- **Gain:** Selects x1, x5, IQ-MAG or variable
- **Variable gain:** x0.2 to x10
- **Amplitude Accuracy:** ±0.5 %
- **IQ Axis:** Selects show or hide
- **Pseudo-Composite Display:** Artificially converts component signals into composite signals which added BURST and displays the result. (the color matrix for HDTV signal is converted into SDTV)
- **Image Quality Adjustment:** Brightness adjustment

## Phase Difference Display
- **Display:** Displays the phase difference between the SDI signal and external sync signal numerically and graphically Holds and displays eight phase difference values being measured
- **Display Range:** V direction ±1 Field (for interlace)
  ±1/2 Frame (for progressive)
  H direction ±1/2 Line
  *The phase difference display in the H direction may fluctuate in the range of ±1 clock when the signal is switched.
- **Sync Signal:** HD tri-level sync signal or black burst signal
- **Phase Difference Measurement of Dual Link(future support):** Displays phase difference between Link A and B with the number of the parallel reclock. (including ±1 clock error)

## Picture Display
- **HDTV Display:** Displayed by sampling the pixels (R, G, and B are both same 8 bits)
- **SDTV Display:** Displayed by interpolating pixels (R, G, and B are both same 8 bits)
- **Marker Display:** Center marker
  4:3 or 16:9 marker display
  Safe action marker display
  Safe title marker display
- **Gamut Error Display:** Marks sections containing gamut errors within the picture
- **Line Select:** Displays the selected line as a marker
- **Image Quality Adjustment:** GBR gain adjustment, Contrast adjustment, Brightness adjustment

## Status Display
**Status Display of SDI Signal**
- **Signal Detection:** Detects the presence or absence of SDI signals.
- **Format:** Detection from correspondence video signal format
- **Equivalent Cable Length Measurement:** Converts the SDI signal attenuation into a coaxial cable length and displays the result.
- **Embedded Audio Channel:** Displays the embedded audio channel number.

**Error Detection of SDI signals**
- **CRC Error:** Detects transmission error of HD-SDI signals.
- **EDH Error:** Detects transmission error of SD-SDI signals.
- **TRS Error:** Detects errors in the TRS position and protection bit.
- **Line Number Error:** Line number errors in the HD-SDI signals are being detected.
- **Illegal Code Error:** Detects data in the range of 000h to 003h and 3FC to 3FF outside the TRS or ADF header.
- **Embedded Prohibition Error:** Detects the presence or absence of embedded audio at the embedded prohibition line.
- **Cable Length Meter Error:** Detects the signal attenuation and displays the result.

**Error Detection of Embedded Audio**
- **BCH Error:** Detects transmission errors of embedded audio packets in the HD-SDI signal.
- **DBN Error:** Detects sequential errors in audio packets.
- **Parity Error:** Detects parity errors in audio packet embedded in HD-SDI signals.

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

**Image Evaluation**
- **Gamut Error:** Detects the Gamut Errors by specifying time.
  Upper limit: 90.8 % to 109.4 % (0.1 % steps)
  Lower limit: -7.2 % to +6.1 % (0.1 % steps)
- **Composite Gamut Error:** Monitors the level error when the component signal is converted into composite signal
  Upper limit: 90.0 % to 135.0 % (0.1 % steps)
  Lower limit: -40.0 % to 20.0 % (0.1 % steps)
- **Level Error:** Detects Y $C_B$ $C_R$ level errors
  Y upper limit: -51 mV to 766 mV (1-mV resolution)
  Y lower limit: -51 mV to 766 mV (1-mV resolution)
  $C_B$ $C_R$ upper limit: -400 mV to 399 mV (1-mV resolution)
  $C_B$ $C_R$ lower limit: -400 mV to 399 mV (1-mV resolution)
- **Freeze Detection:** Detects video freeze
- **Black Detection:** Detects blackouts ni the video

## Event Log
- **Number of Logs:** Error items, time stamps, etc.

## 5 Bar Display
- **Bar Display:** Displays the Y GBR component Gamut or composite Gamut

## Analysis Function
**Data Dump Display**
- **Display Format:** Displayed by serial data sequence or channel separation .
- **Line Select:** Displays the selected line
- **Sample Select:** Displays the selected sample
- **Jump Function:** Move to EAV or SAV by one-key operation
- **Data Output:** Save data in text format to a PC via or Ethernet network (future support) a USB memory

**Audio Control Packets**
- **Display Content:** Analyzes and displays the audio control packets
- **Group Selection:** One group is selected from four groups.

**EDH Display**
- **Standard Supported:** SMPTE RP-165
- **Display Content:** Analyzes and displays the EDH packets.
  Displays the received CRC errors.

**Format ID Display**
- **Standard Supported:** SMPTE 352M ARIB STD-B39
- **Display Content:** Analyzes and displays the Format ID.

**Closed Caption Data Display**
- **Standard Supported:** ARIB STD-B37,EIA/CEA-608,EIA-708
- **Display Content:** Analyzes and displays the closed caption data.

**Inter-Stationary Control Data (NET-Q) Display**
- **Standard Supported:** ARIB STD-B39
- **Display Content:** Analyzes and displays the Inter-Stationary Control Data.

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

**Arbitrary ANC Packet Display**
- **Method of Specifying ANC:** Selects DID or SDID

**Time Code Display**
- **Corresponding Time Code:** Selects LTC or VITC SMPTE RP-188
- **Display Method:** Switches the display of internal clock, and the time code.

## Embedded Audio Processing
- **Clock Generation System:** SD-SDI: Generated from the video clock
  HD-SDI: Generated from the video clock
  Dual link (future support): Generated from the video clock

## Closed Caption Processing (future support)
The closed caption data that is multiplexed in the SDI signal can be overlaid on the picture display.
- **SMPTE System:** CEA/EIA-608-B embedded in the CDP packets as defined in CEA/EIA-708-B.
  CEA/EIA-608-B
  VBI(CEA/EIA-608-B Line21)

## Cable Length Measurement
- **Detection method:** Converts the SDI signal attenuation into a coaxial cable length and displays the result.
- **Supported Cables:** HD-SDI: Selects L-7CHD, LS-5CFB, or 1694A
  SD-SDI: Selects LS-5C2V, 8281, or 1505A
- **Display Range:** HD-SDI: From under 5 m to 130 m or more
  (For L-7CHD: From under 10 m to 200 m or more)
  SD-SD: From under 50 m to 300 m or more
- **Accuracy:** ±20 m
- **Resolution:** 5 m (For L-7CHD: 10 m)

## Frame Capture Function
- **Media:** Internal memory (RAM) or USB memory
- **Internal Memory Capacity:** Video data 1 Frame 2 Systems
  For Dual Link mode: 1Frame 1system
- **Data Output:** Save capture data to a PC via Ethernet network (future support) or a USB memory
- **Recalling Capture Data:** Recalls and displays the Picture/ Waveform/ Vector of 1 frame capture data.
  The capture data saved in the USB memory can be read back.
  (Reading back operation is possible only if an SDI input of the same format as the captured data is available)

**Power Consumption:** Supplied from LV 5800
70 Wmax. (If one unit is installed to the LV 5800)
18 Wmax. (additional power consumption for each additional unit installed to the LV 5800)

**Weight:** 0.28 kg

**Accessory:** Instruction manual ..... 1

**Precautions Concerning Dual Link Operation**
Aliasing occurs in the V sweep display of 1080p/60, 59.94, and 50, because the unit decimates the sampling data. The picture display is processed using 8 bits even if the quantization is set to 12 bits.
In addition, waveform display in external synchronization mode is not allowed if 1080p/60 (59.94) or 1080p/50 signal is applied.

# Diversified Units for Various Applications

## LV 58SER02 EYE PATTERN UNIT


This unit displays eye patterns. It is installed in a LV 5800 input slot. By combining with the LV 5800 input unit, eye pattern waveforms of SDI signals can be monitored. Automatic measurement of parameters such as amplitude, rise time, and fall time is also possible.

### ●FEATURES

■ **HD-SDI, SD-SDI Format Support**

■ **Six Systems of Eye Pattern Displays and Jitter Measurement**
Displays the SDI signal eye pattern or measures the jitter of one system among up to six systems by combining three SDI input units and selecting A or B among the three modules. (Two EYE units cannot be installed simultaneously.)

■ **Eye Pattern Display**
Displays the eye pattern of the timing jitter or alignment jitter by switching the filter.

■ **Jitter Measurement**
The jitter measurement by the phase detection method allows accurate jitter measurement even if the eye is barely open. In addition, timing jitter and alignment jitter can be measured.

■ **Automatic Measurement**
The eye pattern display allows automatic measurement of the eye pattern amplitude, rise time, and fall time. The jitter display allows automatic measurement of the timing jitter and alignment jitter values.

■ **Jitter Display Using Video Sweep**
Allows V sweep and H sweep displays.

■ **Simultaneous Display on the Multi Display**
The multi display allows the eye pattern waveform and jitter waveform to be displayed simultaneously. In addition, the eye pattern display screen automatically measures the eye pattern amplitude, rise time, and fall time, while the jitter display screen automatically measures the timing jitter and alignment jitter.

■ **Alarm Monitoring**
The alarm monitor mode allows the eye pattern amplitude, rise time, and fall time to be monitored with respect to the threshold level specified in advance. It also monitors the timing jitter and alignment jitter using the phase detection method. An alarm is displayed when the threshold level is exceeded. The alarm can also be logged.

### ●SPECIFICATIONS

**Supported Formats**

| | |
|---|---|
| **Data Rate** | |
| **HD-SDI:** | SMPTE292M 1.485 Gbps, or 1.485/1.001 Gbps |
| **SD-SDI:** | SMPTE259M 270 Mbps |
| **Eye Pattern** | |
| **Method:** | Equivalent time sampling method |
| **Amplitude Accuracy:** | 800 mV ±5 % for 800 mV input |
| **Time Axis:** | 2 / 4 / 16 Eye pattern Display |
| **Time Axis Accuracy:** | ±3 % |
| **Jitter Filter:** | 10 Hz HPF<br>100 Hz HPF<br>1 kHz HPF<br>100 kHz HPF |

**Jitter Detection**

| | |
|---|---|
| **Method:** | Phase detection method |
| **Time Axis:** | H rate or V rate |
| **Time Axis Accuracy:** | ±3 % |
| **Jitter Filter:** | 10 Hz HPF<br>100 Hz HPF<br>1 kHz HPF<br>100 kHz HPF |

(* Don't support JITTA measurement of a DVB-ASI standard.)

| | |
|---|---|
| **Power Consumption:** | Supplied from LV 5800<br>20 Wmax. |
| **Weight:** | 0.4 kg |
| **Accessories:** | Coaxial cable ..... 1<br>Instruction Manual ..... 1 |

## LV 58SER20 DVI-I OUTPUT UNIT


This unit is a DVI-I OUTPUT unit that outputs the contents displayed on the front LCD panel from the DVI-I connector to an external monitor. The unit is installed in a LV 5800 output slot.

### ●FEATURES

■ **DVI-I Connector**
The connector allows the screen displayed on the LV 5800 to be shown on an external monitor.
The DVI output provides both digital and analog output allowing the signal to be used on a wide variety of XGA-compatible monitors.

### ●SPECIFICATIONS

**DVI-I Connector**

| | |
|---|---|
| **Signal Format:** | Single Link T.M.D.S<br>Analog RGB |
| **Display Format:** | XGA (Effective area 1,024x768 dots) |
| **DDC Function:** | Not supported |
| **HOT PLUG Detection Function:** | Not supported |
| **Output Connector:** | DVI-I 1 system |
| **Power Consumption:** | Supplied from LV 5800<br>5 Wmax. |
| **Weight:** | 0.2 kg |
| **Accessory:** | Instruction manual ..... 1 |

# Diversified Units for Various Applications

## LV 58SER40 DIGITAL AUDIO UNIT

The unit operates as a digital audio I/O unit when installed in a LV 5800 input slot or a digital audio output unit (*1) when installed in an output slot. For the 16-channel (*2) data of AES/EBU 8 system, Lissajous, sound image, level meter, signal status displays can be shown (*3). If the LV 58SER01A (SDI input unit) is installed in the LV 5800, this unit can process the AES/EBU signal that is separated from the SDI signal.

*1 The operation when LV 58SER40 is installed in the output unit slot is to be supported in the future.
*2 The standard external I/O connector is 8 channels of 4 AES/EBU systems. By installing an optional external I/O connector board. the connector can be expanded to 16 channels of 8 AES/EBU systems.
*3 All of the AES/EBU input signals must be synchronized. In addition, the 48 kHz is the only supported sampling frequency.

### ●FEATURES

**■ 8-system 16-Channel AES/EBU I/O**
By installing optional external I/O connector board, the connector can be expanded to 16 channels of 8 AES/EBU systems. The unit operates as a digital audio I/O unit when installed in LV 5800 input slot or digital audio output unit when installed in an output slot.

**■ Various Display Functions**
- Displays the following items on the input AES/EBU signal.
  Single Lissajous display between two arbitrary channels, multi Lissajous display that shows 4 or 8 single Lissajous displays between two arbitrary channels, sound image display, and level meter display.
- Displays the following AES/EBU status bits.
  Channel status, user, validity, and parity bits.
  The various display and detection functions of this unit cannot be assigned simultaneously to the LV 5800 multi screen.

**■ 8-System 16-Channel (factory option)**

**■ Dolby-E (factory option)**

### ●SPECIFICATIONS

**Rear BNC Connector**
**Input/Output Connector:** BNC connector (4 systems 8 channels)
**Input/Output Impedance:** 75 Ω
**Selection of Input/Output Function:** Selects from menu.

**Input/Output Signal**
**Supported Format:** IEC-60958
**Sampling Frequency:** 48 kHz
**Maximum Input Voltage:** ±5 V (DC + peak AC)
**Output Voltage:** 1.0 Vp-p ±10 % (into 75 Ω)
**Input Signal Selection:** Selects the signal that inputs from a rear BNC connector, or the embedded signal in the SDI signal by the menu.

**Waveform Display Function**
**Lissajous Display:** Selects either the single-Lissajous display between arbitrary channels, or the multi-Lissajous display that displays with 8 channels or 16 channels.
**Sound Image Display:** Arbitrary channels are assigned to L/R/C/LFE/Ls(S)/Rs/LL/RR, and selects from 3-1 system, 3-2 system, or 3-2-2 system.

**Level Meter Display**
**Level Meter Display:** Displays the level of 8 channels or 16 channels by the bar graph.
(Only when the single-Lissajous is displayed, the selected level of two channels is displayed by the bar graph.)
**Response Mode Selection:** Selects True Peak/ Peak Program Meter (PPM)/ VU.
**Reference Level Setting:** -40.0 to 0.0 dBFS
**Warning Level Setting:** -40.0 to 0.0 dBFS
**Over Level Setting:** -40.0 to 0.0 dBFS0
**Dynamic Range Selection:** Selects 60 dBFS/ 90 dBFS.
**Peak Hold:** When the response mode of the level meter is VU, True Peak or Peak Program Meter (PPM) can be selected.
**Peak Hold Time:** 0.5 sec to 5 sec (0.5 sec steps)/HOLD
**Correlation Meter:** The correlation of two channels is displayed by the numerical value from -1 to 1.

**Status Display**
**Channel Status Bit Display:** Displays the dump or text of a channel status bit.
**User Data Bit Display:** Displays the dump of user data bit.

**Audio Signal Analysis Function**
**Mute Detection:** Detects on each channel. Displays the occurrence frequency of the mute signal.
**Detection Setting:** 1 to 5,000 msec
**Clip Detection:** Detects on each channel. Displays the occurrence frequency of the 0 dBFS signal.
**Detection Setting:** 1 to 100 samples
**Level Over Detection:** Detects on each channel. Displays the occurrence frequency of the signal that exceeds the setting value.
**Detection Setting:** 0 to -40 dBFS

**Power Consumption:** Supplied from LV 5800
9 Wmax.

**Weight:** 0.27 kg

**Accessory:** Instruction manual ..... 1

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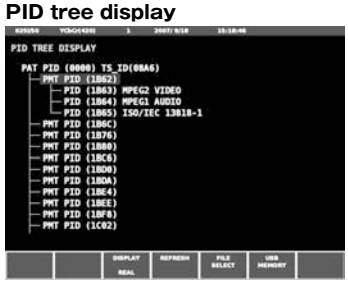
PRODUCTS NEWS

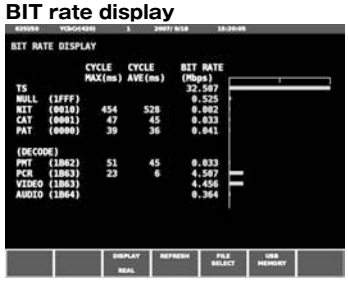
# MPEG DECODER

# LV 58SER04


**PID tree display**




**BIT rate display**




## Continuous monitoring of MPEG-2 TS signal is possible.

### ■GENERAL

The LV 58SER04 is an input unit that receives MPEG-2 TS (DVB-ASI) signals and displays video/audio information on the LEADER LV 5800 (Multi Monitor). Because it contains an MPEG-2 video decoder and audio decoder, it can display the signal using the video signal waveform display, vectorscope display, picture display, and audio display. The LV 58SER04A can also be used to monitor errors defined by ETSI ETR-290, to display PAT and PMT data, and to display the TS bit rate and the bit rate for each PID. These features are ideal for continuous monitoring of MPEG-2 TS signals in broadcasting stations and similar facilities.

In addition, the LV 58SER04 can do the following when combined with other units.

- Eye pattern display of DVB-ASI signals (when combined with the LV 58SER02).
- Lissajous and level displays of audio signals (when combined with the LV 58SER40A).

### ■FEATURES

**1 DVB-ASI Input Connector**

The unit comes with one DVB-ASI input connector.

**2 Video Decoding**

Decodes compressed video data on the MPEG-2 TS (MPEG-2 Video 4:2:2, 4:2:0) and displays a video signal waveform, vectorscope, or picture.*1

**3 Audio Decoding**

Combine with the LV 58SER40A (DIGITAL AUDIO unit) to decode audio data on the MPEG-2 TS and show Lissajous, sound image, and level meter displays as well as transmit digital audio signals.

The decodable audio data types are MPEG-2 AAC, Dolby*2 Digital (AC-3)*3, and LPCM (SMPTE 302M)

**4 PID Search**

Video and audio search for PID automatically.

**5 Error Detection**

Monitors and displays ETSI ETR 290 priority 1 and 2 errors.*4

**6 Status Display**

Displays packet bit rates and measures PCR jitter.
Displays PAT, PMT, and a selected packet dump.

**7 Eye Pattern Display**

Combine with the LV 58SER02 (EYE PATTERN unit) to display DVB-ASI eye patterns.*5

*1 Cannot descramble broadcast scrambling. May not be able to decode all MPEG-2 data formats.
*2 Dolby is a trademark of Dolby Laboratories.
*3 When decoding Dolby Digital(AC-3), Dolby E option is necessary to LV 58SER40A(DIGITAL AUDIO)separately.
*4 There are some limitations on the error detection feature.
*5 Jitter cannot be displayed even if the LV 58SER02 is used.

# Specifications LV 58SER04

**Standards**
- **Supported Standards:** ISO/IEC 13818-1
- **Profile and Level** MP@HL, MP@ML, 422@ML, 422P@HL

**DVB-ASI I/O**
- **Input Connector**
  - **Input Connector:** BNC-R
  - **Number of Input Connectors:** 1 connector, 75 Ω
  - **Maximum Input Voltage:** ±2 V (DC + peak AC)
- **Input Signal**
  - **Serial Clock:** 270 MHz
  - **Transmission Mode:** Packet/Burst
  - **Maximum Bit Rate:** 66 Mbps
  - **Supported Packet Sizes:** 188, 204, and 208 bytes
  - **Packet Size Detection:** Audio Detects supported packet sizes

**Decoding Function**
- **Video Formats:** 1920x1080i / 59.94, 60, 50 (4:2:0,4:2:2)
  1280x720p / 59.94, 60, 50 (4:2:0,4:2:2)
  720x480i / 59.94 (4:2:0,4:2:2)
  720x576i / 50 (4:2:0,4:2:2)
- **Audio Signals:** MPEG-2 AAC, Dolby Digital(AC-3), LPCM(SMPTE 302M)
  (LV 58SER40A (DIGITAL AUDIO) is necessary separately. In addition, when decoding Dolby Digital (AC-3), Dolby E option is necessary)

* This unit decodes only one set of video data and audio data.
Even if you use the LV 5800 multi display, the unit cannot decode different video and audio streams simultaneously.
If you assign the display showing the data that this unit is decoding to multiple displays and you change the PID of the data being decoded, the PIDs on all displays change simultaneously.

**Video Signal Waveform Display Function**
- **Waveform Operation**
  - **Display Mode:** Overlay display (displays component signals overlaid)
    Parade display (displays component signals side by side)
  - **Y, $C_B$, $C_R$ to G, B, R Conversion:** Converts Y, $C_B$, $C_R$ signals into G, B, R and displays the result
  - **Pseudo-Composite Display:** Displays component signals artificially as composite signals
  - **Channel Assignment:** G, B, R or R, G, B order (when displaying G, B, R converted signals)
  - **Line Select:** Displays the selected line
  - **Image Quality Adjustment:** Adjusts the brightness
- **Vertical Axis**
  - **Sensitivity**
    - **V Scale:** 0 to 0.7 V, -0.3 to 0.7 V
    - **% Scale:** 0 to 100 %, -50 to 100 %
    - **Gain:** x1, x5, variable
    - **Variable Gain:** x0.2 to x2
    - **Amplitude Accuracy:** ±0.5 %
  - **HDTV Frequency Characteristics**
    - **Y Signal:** ±0.5 % (1 to 30 MHz)
    - **$C_B$,$C_R$ signal:** ±0.5 % (0.5 to 15 MHz)
    - **Low-pass Attenuation:** 20 dB or more (at 20 MHz)
  - **SDTV Frequency Characteristics**
    - **Y Signal:** ±0.5 % (1 to 5.75 MHz)
    - **$C_B$,$C_R$ signal:** ±0.5 % (0.5 to 2.75 MHz)
    - **Low-pass Attenuation:** 20 dB or more (at 3.8 MHz)
- **Horizontal Axis**
  - **Line Display**
    - **Display Mode:** Overlay: 1H, 2H
      Parade: 1H, 2H, 3H
    - **Magnification:** x1, x10, x20, ACTIVE, BLANK
  - **Field Display**
    - **Display Mode:** Overlay: 1V, 2V *1
      Parade: 1V, 2V, 3V
    - **Magnification:** x1, x20, x40
    - **Time Accuracy:** ±0.5 %
  - **Cursor Measurement**
    - **Composition**
      - **Horizontal Cursors:** 2 cursors (REF and DELTA)
      - **Vertical Cursors:** 2 cursors (REF and DELTA)
    - **Amplitude Measurement:** Percentage and voltage displays
    - **Time Measurement:** Displays time in seconds
    - **Frequency Measurement:** Displays the frequency by considering the time between cursors to be a cycle

*1 The 2V display is not allowed if the input signal is progressive.

**Vectorscope Display**
- **Scale:** 75 %, 100 % (for the color bars)
- **Gain:** x1, x5, IQ-MAG, variable
- **Variable Gain:** x0.2 to x2
- **Amplitude Accuracy:** ±0.5 %
- **IQ Axis:** Show or hide
- **Pseudo-Composite Display:** Displays component signals by converting to composite signals that have burst added artificially.
  (The color matrix for HDTV signals is converted to SDTV.)
- **Image Quality Adjustment:** Adjusts the brightness

**Picture Display:**
- **HDTV Display:** Displayed by sampling pixels
- **SDTV Display:** Displayed by interpolating pixels
- **Marker Display:** Center marker display
  4:3 or 16:9 marker display
  Safe action marker display
  Safe title marker display
- **Line Select:** Marks the selected line
- **Display Size:** Optimized display, actual size display
- **Image Quality Adjustment:** GBR level adjustment, contrast adjustment, brightness adjustment

**Section and PCR Information**
- **PAT**
  - **PAT Detection:** Automatically recognizes packets whose PID is 0000h as PAT
  - **Cycle Measurement *2:** Measures the PAT cycle in 1-ms intervals
  - **PAT data display:** PAT dump display
- **PMT**
  - **PMT Detection:** Select the PID of the PMT to be decoded
  - **Cycle Measurement *2:** Measures the PMT cycle in 1-ms intervals
  - **PMT data display:** PMT dump display
- **NIT**
  - **NIT Detection:** Automatically detects packets with the NIT PID specified by the PAT.
  - **Cycle Measurement *2:** Measures the NIT cycle in 1-ms intervals
- **CAT**
  - **CAT Detection:** Recognizes packets whose PID is 0001h as CAT
  - **Cycle Measurement *2:** Measures the CAT cycle in 1-ms intervals
- **PCR**
  - **PCR detection:** Automatically detects packets with the PCR PID specified by the selected PMT
  - **Cycle Measurement *2:** Measures the PCR cycle in 1-ms intervals
  - **PCR jitter:** Measures the PCR accuracy based on the internal reference clock

*2: If a section is divided into multiple TS packets, the cycle is measured for each section.

**Dump Display**
- **Function:** Dump display of the PAT, PMT, and the dump display of the selected packet
- **Notation:** Displays binary and hexadecimal values and contents

**Bit Rate Display**
- **Function:** Displays the bit rate and cycle of the main sections and packets
- **Bar Display:** Displays the occupied bandwidth with respect to the TS bit rate using bars
- **Displayed Sections:** NIT, CAT, PAT, and PMT
- **Displayed Packets:** Video, audio, PCR, and null

**General Specifications**
- **Environmental Conditions:** Conforms to the LV 5800
- **Power Supply:** Supplied from the LV 5800
  70 W max. (if one unit is installed to the LV 5800)
  20 W max. (additional power consumption for each additional unit installed to the LV 5800)
- **Weight:** 0.4 kg
- **Accessory:** Instruction manual ..... 1

**SPECIFICATION CHANGES:** LEADER ELECTRONICS CORP. reserves the right to discontimue the sale of instruments and/or change the specifications of instrments at any time without responsibility for the incorporation of new features in the instrumens already sold.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