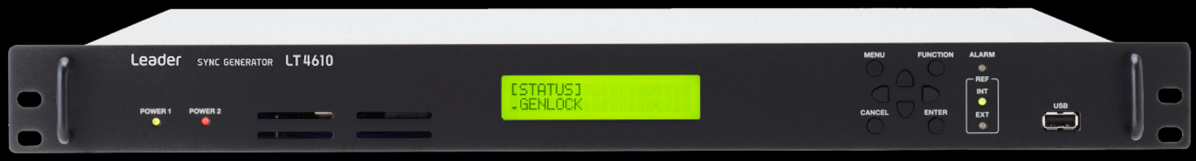
Leader



8K 4K 12G-SDI▪PTP▪GPS▪BDS lock
Time Code▪Duplex Power Supply

LT4610 Sync Generator
LT4611 Sync Generator

Version3.1

Leader

LT4610

SYNC GENERATOR

GENLOCK | BB | Tri-level | GPS | PTP | TC
8K | 4K | 12GSDI | 3GSDI | HDSDI | SDSDI
WC | AES-EBU

General

The LT4610 is a 1U full rack size sync generator that can operate in synchronization with GPS, PTP, CW, and internal reference signals, as well as Genlock that supports external analog video synchronization signals.
It supports analog video sync signals, AES / EBU digital audio output, word clock, and time code, and also supports 3G / HD / SD-SDI output and 12G-SDI output compatible with 4K and 8K.
In addition, it supports the PTP grand master function and PTP slave function, and can manage the optimum synchronization system according to the system.
The genlock function is equipped with a STAY IN SYNC function that retains the phase when an abnormality occurs in the input analog video synchronization signal, and the power supply unit performs redundant operation, enabling highly reliable system construction.

Features

Genlock Function
Various output signals can be synchronized by applying NTSC/PAL black burst signals, which are analog video sync signals, and HDTV tri-level sync signals. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

Stay-in-Sync and Slow Lock Functions
A Stay-in-Sync function is available in case errors occur at the genlock input. In addition, a slow lock function is available to reduce the shock that occurs when genlock is performed again based on stay-in-sync. This makes it possible to construct an extremely reliable synchronization system.

Analog Video Sync Signal Output
Six analog video sync signals can be output. The phase of each output can be adjusted independently.
NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

GPS/BDS Synchronization (LT4610SER01, LT4610SER04)
By connecting a GPS antenna, the LT4610SER01 can generate and output each signal by locking it to frequencies and times obtained from gps. The LT4610SER04 also supports BDS by connecting GNSS antennas.

PTP (LT4610SER03)
PTP synchronization corresponds to the grandmaster and slave functions.
You can choose reference signal from PTP, GPS, analog BB or internal.

Time Code I/O (LT4610SER01)
The ATC (LTC) can be embedded in LTC outputs from internal time, GPS, LTC, and VITC time information, and SDI signal outputs, or VITC in analog video synchronous signal outputs.

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

12G-SDI Support (LT4610SER02)
Four output connectors can be added to support 12G-SDI, 3G-SDI (level A, level B) and HD-SDI (including dual links).
In addition, it corresponds to the 8K video signal by adding 8K software option.

Lip Sync Patterns (Standard, LT4610SER02, LT4610SER24)
This option can output lip sync patterns in which the video and audio are synchronized. In combination with a waveform monitor that features a lip sync function, such as the Leader's LV5600, it is possible to measure the offset between the video and audio in SDI signal transmissions.

User Pattern Output
User pattern can be output in addition to built-in patterns such as color bars.

Audio Embedding (Standard, LT4610SER02 ,LT4610SER24)
The LT4610 can embed 32 channels (stream 1, stream 2, 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-HDI. The frequency, level, and the click can be set for each channel.

AES/EBU Signal Output
The LT 4610 can output a 48 kHz AES/EBU signal synchronized with video signals. It is also equipped with a muted AES/EBU signal output.

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

Real Time Clock
The real time clock is backed up by a battery. There is no need to reset the clock even when the power is turned off and on.

Ethernet
SNMP is supported. When an error is detected, a TRAP is issued. Further, the LT4610 can be controlled through HTTP.

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

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

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

Options

List of options

	Model number	Model name	Main functions
Hardware options	LT4610SER01	GPS/TC	GPS synchronization, 10 MHz CW I/O, LTC I/O
	LT4610SER02	12G-SDI	12G-SDI (4K) pattern output. Natural picture support with 3G-SDI quad link.
	LT4610SER03	PTP	PTP grand master, slave function.
	LT4610SER04	GPS/BDS/TC	GPS/BDS synchronization, 10 MHz CW I/O, LTC I/O
Software option	LT4611SER24	8K	8K SDI pattern output *You need the LT4610SER02 to install the LT4610SER24 in the LT4610.

LT4610SER01 GPS/TC

GPS Synchronization

A GPS antenna can be connected to generate and output signals by locking to the frequency and clock obtained from the GPS Satellite.

Time Code I/O

The time code generator can run in free run mode based on internal time information. It can also embed ATC (LTC) in SDI signal output or VITC in analog video sync signal output based on a GPS, LTC, or VITC time information.
It also features a holdover function, which retains the phase and frequency of the output signal when GPS signals or CW signals are lost. Further, when LT4610 is locked to GPS, it can also be used as an NTP server.

CW I/O

The CW I/O connector not only receives 10 MHz CW but also outputs 10 MHz CW or 1PPS, whichever is selected.

LTC I/O

The LTC I/O connector can receive 1 LTC input and 3 LTC outputs, and outputs two separate alarms

LT4610SER02 12G-SDI

12G-SDI (4K) Support

Four output connectors supporting 12G-SDI, 3G-SDI (level A, level B), HD-SDI (including dual link), and SD-SDI are available to accommodate the 4K video format. The format is the same for all four outputs, but you can set different patterns and phases for each.
Only two outputs are available for 3G-SDI level B and HD dual link.

User Pattern Generation

In addition to internal patterns such as the color bar, SD, HD (2K), and 4K user patterns can be output.

ID Character Overlay

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

Safety Area Markers

90% and 80% safety area markers can be overlaid on the display. For 12G-SDI, 3G-SDI and HD-SDI, a 4:3 aspect ratio marker can be overlaid.

Pattern Scrolling

This option is equipped with a function for scrolling patterns in eight directions. The moving speed can be varied.

Moving Box

A moving box can be overlaid on the display. Its color, size, and moving speed can be varied.

Audio Embedding

This option can embed 32 channels (stream 1 (*1), stream 2 (*1), 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-SDI. The frequency, level, and the click can be set for each channel.

*1 On the menu, stream 1 and stream 2 are displayed as LINK-A and LINK-B, respectively.

Lip Sync Patterns

This option can output lip sync patterns in which the video and audio are synchronized. In combination with a waveform monitor that features a lip sync function, such as the Leader's LV5600, it possible to measure the offset between the video and audio in SDI signal transmissions.

LT4610SER03 PTP

PTP Grand Master Function

This option supports the Precision Time Protocol defined in IEEE 1588-2008 and operates as a PTP grand master. SMPTE ST 2059, AES67, and General profiles are supported. The PTP time source is obtained from the internal clock or GPS.

PTP Slave Function

When a host PTP grand master is present in the system, the LT4611 Sync Generator operates as a PTP slave and can operate as a master to even lower devices.

10GbE Ready

In addition to the RJ-45 port, a 10GbE SFP+ module, sold separately, can be used.

LT4610SER04 GPS/BDS/TC

GPS/BDS Synchronization

A GNSS antenna can be connected to generate and output signals by locking to the frequency and clock obtained from the GPS or BDS.
*Other features are the same as the LT4610SER01.

LT4610SER24 8K

The LT4610SER24 is a software option for the LT4610 that adds the ability to output the 8K patterns from the 12G-SDI connectors, when the LT4610 is equipped with the hardware option LT4610SER02.

12G-SDI 8K

QUAD LINK 12G-SDI 8K (7680 x 4320) can be output.

User Pattern Output

User pattern can be output in addition to built-in patterns such as color bars.

Audio Embedding

The LT4610SER24 can embed 16 channels (4 channels × 4 groups) of audio signals for 12G-SDI. The frequency, level, and the click can be set for each channel.

Lip Sync Patterns

The LT4610SER24 can output lip sync patterns in which the video and audio are synchronized.

The selectable patterns

Fixed Pattern

SDI output with standard configuration

Pattern		SDI format		
		Other than those on the right	720x487:SD	720x576:SD
COLOR BAR	100%	YES	YES	YES
	75%	YES	YES	NO
	MULTI 100%	YES	NO	NO
	MULTI 75%	YES	NO	NO
	MULTI (+I)	YES	NO	NO
	SMPTE	NO	YES	NO
	EBU	NO	NO	YES
	BBC	NO	NO	YES
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES
CHECK FIELD		YES	YES	YES

SDI output with optional LT4610SER02

Pattern		SDI format				
		Other than those on the right	720x487:SD	720x576:SD	3840x2160	4096x2160
COLOR BAR	100%	YES	YES	YES	YES	YES
	75%	YES	YES	NO	YES	YES
	MULTI 100%	YES	NO	NO	YES	YES
	MULTI 75%	YES	NO	NO	YES	YES
	MULTI (+I)	YES	NO	NO	YES	YES
	SMPTE	NO	YES	NO	NO	NO
	EBU	NO	NO	YES	NO	NO
	BBC	NO	NO	YES	NO	NO
	ARIB STD-B66-2	NO	NO	NO	YES (*1)	S (*1、2)
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES	YES	YES
CHECK FIELD		YES	YES	YES	NO	NO

*1 In ARIB STD-B66-2, the color system is 422(YCbCr) 10 bit.
*2 Because ARIB STD-B66-2 is a fixed pattern that is 3840x2160 in size, 256 dots on the right side will display black if the pattern is displayed in the 4096x2160 size.

SDI output with optional LT4610SER02 and LT4610SER24

Pattern		SDI format		
		3840x2160 12G	4096x2160 12G	7680x4320 12G
COLOR BAR	100%	YES	YES	YES
	75%	YES	YES	NO
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES

User Pattern

SDI output with LT4610SER02

Pattern	SDI format				
	SD	HD(2K)	4K(SQD)	4K(2SI)	8K (*1)
User Pattern	YES	YES	YES	YES	YES
UHDColorBar	NO	NO	NO	YES	YES
HLGCB	NO	NO	YES	YES	NO
SLog3_LiveHDR_narrow_v11	NO	YES	NO	YES	YES

- For User patterns, prepare 8K: 7680 x 4320, 4K: 3840 x 2160, 4096 x 2160, HD: 1280 x 720, 1920 x 1080, 2048 x 1080, SD: 720 x 487, 720 x 576 image files.
- *1 8K requires LT4610SER24.

Patterns

Sample LT4610SER02 user patterns

UHD COLOR BAR

HLG COLOR BAR

SLog3_LiveHDR_narrow_v111

Lip sync patterns

The lip-sync pattern outputs audio synchronized with the video signal. Leader's lip-sync compatible waveform monitor can measure the difference in timing between the audio and video for each channel.

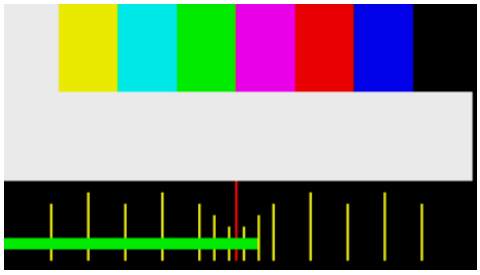
- Pattern: Displays the pattern selected in the SDI menu.
- Raster: Displays a white raster when the slide bar of the scale is 0-+15 [frame], and a black raster at other times.
- Scale: The green slide bar scrolls from left to right. (Approximately 6 seconds at 1080 / 59.94I)The center scale turns red when the slide bar is 0-+15 [frame].

Pattern (Selectable)

Raster

Scale

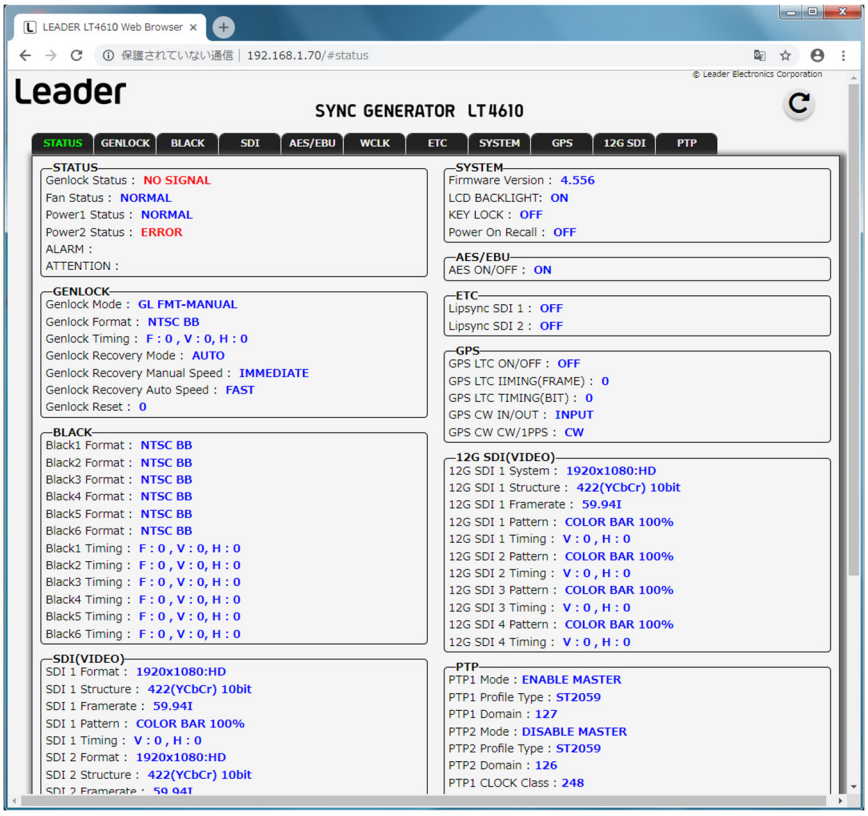
Lip sync pattern



When the slide bar is 0-+15 [frame]

Web Browser

You can use ETHERNET to control the instrument from a web browser.



SPECIFICATIONS

Compliant Standards

SDI Embedded Audio

3G、HD、HD (DL)	SMPTE ST 299
SD	SMPTE ST 272
SDI Payload ID	SMPTE ST 352

Analog Video Sync Signal

NTSC Black Burst Signal	SMPTE ST 170、SMPTE ST 318、SMPTE RP 154
PAL Black Burst Signal	ITU-R BT 1700、EBU N14
HD Tri-Level Sync Signal	SMPTE ST 240、SMPTE ST 274、SMPTE ST 296
AES/EBU	ANSI S4.40、AES3-2009、AES11-2009、SMPTE ST 276

SDI Formats and Standards

HD, SD Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1280 × 720	60/59.94/50/ 30/29.97/25/24/23.98/P	SMPTE ST 292 SMPTE ST 296
		1920 × 1080	60/59.94/50/I	SMPTE ST 292 SMPTE ST 274
			30/29.97/25/24/23.98/P	
			24/23.98/PsF	SMPTE ST 292 SMPTE RP 211
		720 × 487	59.94/I	SMPTE ST 259
		720 × 576	50/I	

HD(DL) Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920 × 1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 372
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
YC_BC_R 4:4:4	10bit 12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
RGB 4:4:4	10bit 12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	

3G-A Video Signal Formats and Standards

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

3G-B Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920 × 1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 372 SMPTE ST 425
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
YC_BC_R 4:4:4	10bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
RGB 4:4:4	10bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	

I/O Connectors

SDI Output Connector

Connector	2 BNC connectors
3G-A, HD, SD	2
3G-B, HD(DL)	1
Output Impedance	75 Ω
Output Amplitude	800 mVp-p±10%
Output Return Loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97 GHz	10 dB or more
Overshoot	Less than 10%
Rise and Fall Times	
3G	≤ 135 ps (20 to 80%)
HD, HD(DL)	≤ 270 ps (20 to 80%)
SD	0.4 ns to 1.5 ns (20 to 80%)
DC Offset	0±0.5 V

Genlock Input Connector

Connector	2 BNC connectors
Input Signal	Analog composite sync signal Analog component sync signal
Format	Loop-through
Input Impedance	15 kΩ
Maximum Input Voltage	±5 V (DC + peak AC)
Operating Input Level Range	±6 dB
External Lock Range	±5 ppm
Jitter	1 ns (when genlock is in use)

Analog Video Sync Signal Output Connector

Connector	6 BNC connectors, 6 outputs
Output Signal	NTSC black burst signal PAL black burst signal HD tri-level sync signal
Output Impedance	75 Ω
Sync Level	
NTSC	40±1 IRE
PAL	-300±6 mV
HD	±300±6 mV
Blanking	0±15 mV

AES/EBU Digital Audio Output Connector

Connector	1 BNC connector
Output Amplitude	1 Vp-p±0.1 V
Output Impedance	75 Ω unbalanced

AES/EBU Silence Output Connector

Connector	1 BNC connector
Output Amplitude	1 Vp-p±0.1 V
Output Impedance	75 Ω unbalanced

Word-Clock Output Connector

Connector	1 BNC connector
Output Frequency	48 kHz
Output Amplitude	3.5 V or more (high level not terminated with 75 Ω) 2.4 V or more (high level terminated with 75 Ω)

Control Connectors

Ethernet Port

Specifications	IEEE 802.3
Protocol	
SNMP v2c	Command operation and trap transmission Transmission of operation status (e.g., genlock synchronization status)
HTTP	Remote monitoring and control froma Web browser
Connector	RJ-45
Type	10BASE-T/100BASE-TX auto switching

USB Port
- Specifications: USB 2.0
- Supported Media: USB memory device
- Function: Saving and recalling presets, genlock log, logo, and ID characters
  Updating firmware
  Retrieving MIB files
- Connector: USB Type A

LCD

Number of Characters: 20 characters × 2 lines
Backlight: On / Off

SDI Video Output

SDI Signal
- Bit Rate
  - 3G: 2.970Gbps, 2.970/1.001Gbps
  - HD, HD(DL): 1.485Gbps, 1.485/1.001Gbps
  - SD: 270 Mbps

Timing Adjustment
- Adjustment Range: Entire frame
- Adjustment Unit
  - V: Lines
  - H: Clocks (148.5 MHz, 148.5/1.001 MHz, 74.25 MHz, 74.25/1.001 MHz, 27 MHz)

Test Patterns
- 3G, HD: 100% color bar, 75% color bar, multiformat color bar (ARIB STD-B28, pattern 2 area can be set to 100% white, 75% white, or +I), check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
- SD
  - 525/59.94I: 100% color bar, 75% color bar, SMPTE color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
  - 625/50I: 100% color bar, EBU color bar, BBC color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
- Automatic Switching: Automatically switches between selectable color bar patterns
  - Switch Time: 1 to 255 sec

Pattern Scrolling
- Direction: Eight directions (up, down, left, right, and their combinations)
- Speed Range and Unit
  - Interlace: In unit of fields
    - V: 0 to 256 lines, in 1 line steps
    - H: 0 to 256 dots, in 2 dot steps
  - Progressive: In unit of frames
    - V: 0 to 256 lines, in 1 line steps
    - H: 0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.

Safety Area Markers
- 3G, HD: Action safe area (90%)
  Title safe area (80%)
  4:3 aspect ratio
  (can be turned on and off separately)
- SD: Action safe area (90%)
  Title safe area (80%)
  (can be turned on and off separately)

* Not available when the check field pattern is selected.

ID Characters
- Number of Characters: Up to 20 characters
- Size [Dots]: 32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
- Intensity: 100%, 75% (black only for the background color)
- Display Position: Anywhere on the display
- Display Position Adjustment Resolution
  - V: 1 line
  - H: 1 dot
- Blinking Display (*1): ON / OFF
  - ON TIME: 1 to 9 sec, in 1 sec step
  - OFF TIME: 1 to 9 sec, in 1 sec step
- Scrolling (*1)
  - Function: Scroll including the ID character background
  - Direction: Two directions (left and right)
  - Speed Range and Unit
    - Interlace: In unit of fields
      0 to 256 dots, in 2 dot steps
    - Progressive: In unit of frames
      0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.
*1 The blinking display and scrolling can be used simultaneously.

Logo Mark
- Logo Mark Data: 4-level monochrome data from level 0 to 3
- Maximum Size: 320 (dots) × 240 (lines) (QVGA size)
- Number of Logo Marks That Can Be Saved in the LT4610: Up to 4
- Display Position: Anywhere on the display
- Display Position Adjustment Resolution
  - V: 1 line
  - H: 1 dot
- Display Level: Any level from 0 to 3
- File Format
  - Before Conversion: 24-bit full color bitmap format (.bmp)
  - After Conversion: Original format (.lg)
- Conversion Color Matrix: Y = (0.212 × R) + (0.701 × G) + (0.087 × B)
  Converts 256-level monochrome data (Y) to 4 levels (levels 0 to 3) using specified thresholds
- Conversion Method: Using the logo application
- Logo Mark Data Transfer: Save the data to a USB memory device and transfer to the LT4610.

* Not available when the check field pattern is selected.

Component On/Off
- Function: Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.

* Not available when the check field pattern is selected.

Image Overlay
- Display Precedence: ID characters > logo mark > safety area markers > test pattern
  (The display order cannot be changed.)
- Simultaneous Display: ID characters, logo mark, safety area markers, and test pattern can be displayed simultaneously.

Embedded Audio
- Embedded Channels: Can be turned on and off at the group level
  - 3G-A, HD, SD: 16 channels
    (4 channels × 4 groups)
  - 3G-B: 32 channels (stream 1, stream 2, 4 channels each × 4 groups)
- Sampling Frequency: 48 kHz sampling (synced with the video signal)
- Resolution: 20 bits, 24 bits Pre-emphasis OFF, 50/15, CCITT (only the CS bit is switched)
- Frequency: SILENCE / 400Hz / 800Hz / 1kHz
- Level: -60 to 0 dBFS (1 dBFS steps)
- Audio Click: OFF, 1 / 2 / 4 sec

* Audio (including packets) cannot be embedded when the check field pattern is selected.
* The frequency, level, and audio click can be set for each channel.
* The following limitations apply for SD (525/59.94I).
  • For 16 channel output, the resolution is set to 20 bits.
  • Up to three groups (12 channels) can be output at 24-bit resolution.

Genlock Function

Signal Formats	NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, PAL BB, PAL BB+REF, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 1125/24PsF, 1125/23.98PsF, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P
Timing Adjustment	
Adjustment Range	
NTSC Black Burst Signal	±5frames
PAL Black Burst Signal	±2frames
HD Tri-Level Sync Signal	1 frame (entire frame)
FINE	Covers 1 adjustment unit (adjustment unit: 13.5 MHz, clock width: 74.1 nsec)
Genlock Mode	
INTERNAL	Operates using the internal reference signal
EXTERNAL	Operates using an external reference signal GL FMT-AUTO / GL FMT-MANUAL / GPS(SER01) / GNSS(SER04) / 10MHz CW(SER01/SER04) / PTP(SER03)
Recovery Mode	
AUTO	Resynchronizes according to the auto setting when the external reference signal recovers
MANUAL	Retains the STAY IN SYNC state when the external reference signal recovers
Auto Setting	
IMMEDIATE	Resets the lock when the external reference signal recovers
FAST	Quickly resynchronizes when the external reference signal recovers
SLOW	Slowly resynchronizes when the external reference signal recovers
Manual Setting	
IMMEDIATE	Resets the lock when the external reference signal recovers
FAST	Quickly resynchronizes when the external reference signal recovers
SLOW	Slowly resynchronizes when the external reference signal recovers
Genlock Reset	Resynchronizes immediately.

Analog Video Sync Signal Output

Signal Formats	Each of the 6 outputs can be set separately. NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, NTSC BB+SETUP, NTSC BB+S+REF, NTSC BB+S+ID, NTSC BB+S+R+ID, PAL BB, PAL BB+REF, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 1125/24PsF, 1125/23.98PsF, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P
Timing Adjustment	Can be set separately for each of the 6 outputs
Adjustment Range	
NTSC Black Burst Signal	±5 frames
PAL Black Burst Signal	±2 frames
HD Tri-Level Sync Signal	1 frame (entire frame)
Adjustment Unit	
NTSC/PAL Black Burst Signal	In units of 0.0185 µs (54 MHz clock unit)
HD Tri-Level Sync Signal	In units of 0.0135 µs (74.25/1.001 MHz clock unit or 74.25 MHz clock unit)

AES/EBU Digital Audio Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits
Pre-emphasis	OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec
Lip Sync	Synchronization with SDI1
Sampling Clock Accuracy	Grade 2 (±10 ppm)

* The frequency, level, and audio click can be set for each channel.
* Turn off all channels to output a digital audio reference signal (DARS).。

AES/EBU Silence Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits / 24 bits
Pre-emphasis	OFF
Frequency	SILENCE
Level	MUTE
Sampling Clock Accuracy	Grade 2 (±10 ppm)

Word-Clock Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)

Lip Sync Patterns

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

* Not available when the check field pattern is selected.
* Safety area markers, ID characters, and logo mark cannot be overlaid.
* The audio click setting of embedded audio is disabled, and audio synchronized to the lip sync pattern is output.

Preset Settings

Preset	Saves the panel settings (*1)
Number of Presets	10
Recall Method	Front panel
Copy Method	Copy from the LT4610 to a USB memory device or copy from the USB memory device to the LT4610

*1 Logo data and device-specific information (e.g., IP address, time) cannot be saved.

Logging Feature

Saved Items	Genlock status change
Copy Method	Copy from the LT4610 to a USB memory device

Internal Reference Generator

Reference Frequency	13.5MHz

Internal Clock

Power Supply	Primary lithium battery
Battery Operation Period	Approx. 3 years (depending on the storage and operating environments)

General Specifications

Environmental Conditions	
Operating Temperature	0 to 40 ℃
Operating Humidity Range	85 %RH or less (no condensation)
Optimal Temperature	10 to 35 ℃
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	Ⅱ
Pollution Degree	2
Power Requirements	
Voltage	90 to 250 VAC
Power Consumption	80 W max.
Dimensions	482 (W) × 44 (H) × 400 (D) mm (excluding protrusions)
Weight	3.6 kg (excluding SER01, SER02, SER03, and SER04) 3.8 kg (including SER01 or SER04, SER02, and SER03)
Accessories	Power cord ..... 2 Cover/Inlet stopper ..... 2 CD-ROM (Logo App, instruction manual)... 1

LT4610SER01 GPS/TC

GPS Lock

Compliant Phase Control: Standard SMPTE ST 2059-1

GPS Input Connector
- Connector: 1 BNC connector
- Input Impedance: 50 Ω
- Antenna, Pre-amp Power Supply
  - Voltage: 5 V / 3.3 V / OFF
  - Current: 50 mA max. (built-in overcurrent protection circuit)

GPS Receiver
- Receive Frequency: 1575.42 MHz (L1)
- Receive Code: C/A code
- Receive Sensitivity: -130 dBm or more (input level to the antenna)
- Status: NO SIGNAL, TRACKING, LOCKED, STAY IN SYNC

Holdover Function: Retains the previous frequency and phase when the GPS signal is interrupted

CW I/O

CW I/O Connector
- Connector: 1 BNC connector (shared input and output)
- Input Impedance: 50 Ω
- Input Signal Level: 0.5 to 2 Vp-p
- Input Signal Frequency: 10 MHz
- Locking Frequency Range: ±5 ppm
- Output Signal Level: 3.3 V LVCMOS
- Output Signal Frequency: 10 MHz / 1 PPS

Holdover Function: Retains the previous frequency when the 10 MHz CW signal is interrupted

LTC I/O

I/O Connectors
- Connector: D-SUB 15 pin (shared input and output)
- LTC
  - Number of Inputs: 1
  - Input Impedance: 600 Ω balanced
  - Input Signal Level: 0.5 to 4 Vp-p
  - Number of Outputs: 3
  - Output Impedance: 600 Ω balanced
  - Output Signal Level: 2 Vp-p±10%
- Alarm
  - Number of Outputs: 2
  - Output Signal: Level 5 V CMOS

Time Code

Reference Time: Internal / GPS / LTC / VITC / PTP (when the LT4610 is equipped with the hardware option LT4610SER03)

Frame Rate: Synchronizes to ANALOG BLACK 1 (LTC OUT)

Dropped Frame Mode: On / Off

ATC Setting
- LTC Insertion Setting: On / Off

LTC Setting
- Output Setting: On / Off

AES/EBU Time Code Insertion Setting: On / Off

Leap Second
- Application Setting: Set the application date/time with a timer

Daylight Savings Time
- Application Setting: Set the application date/time with a timer

LT4610SER02 12G-SDI

Compliant Standards

SDI Embedded Audio
- 12G, 3G, HD, HD (DL): SMPTE ST 299
- SD: SMPTE ST 272

SDI Payload ID: SMPTE ST 352

SDI Formats and Standards

The SDI format is the same for all four outputs.

SD Video Signal Formats and Standards

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

HD Video Signal Formats and Standards

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	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 SMPTE ST 292-1
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	

3G-A Video Signal Formats and Standards

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

3G-B-DL, HD (DL) Video Signal Formats and Standards

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

* For 3G-B-DL, SDI1 settings apply to SDI1 and SDI2, and SDI3 settings apply to SDI3 and SDI4.

3G-B-DS Video Signal Formats and Standards

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

* Only SDI1 and SDI3 are supported.

3G(DL)-2K Video Signal Formats and Standards

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
RGB 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:2:2	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3

3G(DL)-4K Video Signal Formats and Standards (Square)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 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

3G(DL)-4K Video Signal Formats and Standards (2 sample Interleave)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 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

HD (QL) Video Signal Formats and Standards (Square)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98/P	-
			30/29.97/25/24/23.98/PsF	-
		4096 × 2160	30/29.97/25/24/23.98/P	-
			30/29.97/25/24/23.98/PsF	-

3G (QL) Video Signal Formats and Standards (Square)

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

3G (QL) Video Signal Formats and Standards (2 sample interleave)

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

12G Video Signal Formats and Standards (2 sample Interleave)

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

SDI Output Connector

Connector	4 BNC connectors
12G, 3G-A, HD, SD	4 outputs
3G-B, HD (DL)	2 outputs
Output Impedance	75 Ω
Output Amplitude	800 mVp-p ± 10%
Output Return Loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97 GHz	10 dB or more
2.97 to 6 GHz	7 dB or more
6 to 12 GHz	4 dB or more
Rise and Fall Times	
12G	≤ 45 ps (20 to 80%)
3G	≤ 135 ps (20 to 80%)
HD, HD (DL)	≤ 270 ps (20 to 80%)
SD	0.4 ns to 1.5 ns (20 to 80%)
DC Offset	0±0.5 V

SDI Pattern Generation

The SDI pattern generation settings can be set separately for each output. But the fixed pattern and user pattern cannot be generated simultaneously.
*You cannot format them separately.

SDI Signal	
Bit Rate	
12G	11.880 Gbps, 11.880/1.001 Gbps
3G	2.970 Gbps, 2.970/1.001 Gbps
HD, HD (DL)	1.485Gbps, 1.485/1.001Gbps
SD	270Mbps
Timing Adjustment	
Adjustment Range	Entire frame
Adjustment Unit	
V	Lines
H	Clocks (148.5 MHz, 148.5/1.001 MHz, 74.25 MHz, 74.25/1.001 MHz, 27 MHz)
Test Patterns	
12G, 3G, HD	100% color bar, 75% color bar, multiformat color bar (ARIB STD-B28, pattern 2 area can be set to 100% white, 75% white, or +I), ARIB STD-B66-2 color bar (3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only), check field (3G, HD), flat field white 100%, black 0%, red 100%, green 100%, blue 100%
SD	
525/59.94I	100% color bar, 75% color bar, SMPTE color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
625/50I	100% color bar, EBU color bar, BBC color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
Automatic Switching	Automatically switches between selectable color bar patterns
Switch Time	1 to 255 sec

* The selectable patterns depend on the SDI format.
* In ARIB STD-B66-2 color bar display, the color system is 422(YCbCr) 10 bit.

User Pattern Display	Select one from INT-1 to 8.
Storage Memory	SD, HD (2K), 4K, up to 25 patterns each
Display Memory (INT_1 to 8)	Transfer the SD, HD (2K), 4K (2SI), 4K (SQD) pattern data (up to 8 patterns each) from the storage memory to the display memory
File Format	24-bit full color bitmap format (.bmp) TIFF format (.tif), IMG format (.img)
Archiver Pattern	IMG format (.img)
UHDColorBar	ARIB STD-B66 UHDTV MULTIFORMAT COLOR BAR (3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only)
HLGCB	ARIB STD-B72 Colour Bar Test Pattern for HLG HDR-TV System Recommendation ITU-R BT.2111 HLG (3G(QL) and 12G 422 (YCbCr) 10bit only)
SLog3_LiveHDR_narrow_V11	S-Log3(Live HDR) Ver1.11 narrow range scale (HD and 3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only)

* After turning on the power, transfer the data from the storage memory to the display memory. It takes about 5 minutes to transfer the data of a 4K user pattern. If the power is cut off after a memory transfer, the data in the display memory will be cleared. The data in the storage memory will be retained even when the power is turned off, so after turning on the power, perform a memory transfer operation again. You can also set the power on load function that automatically transfers data after the power is turned on.
* If the power is cut off while data is being accessed, the data may become corrupted. Do not turn off the power while data is being accessed.
* In the user pattern display, the color system is 422(YCbCr) 10 bit.

Component On/Off	
Function	Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.

* Not available when the check field pattern is selected.

Safety Area Markers	
12G, 3G, HD	Action safe area (90%) Title safe area (80%) 4:3 aspect ratio (can be turned on and off separately)
SD	Action safe area (90%) Title safe area (80%) (can be turned on and off separately)

* Not available when the check field pattern or user pattern is selected.

Moving Box	
Box Color	Select from white, yellow, cyan, green, blue, red, magenta, black
Speed Setting V/H	LOW / MIDDLE / HIGH
Size Setting V/H	SIZE 1 to 5

* Not available when the check field pattern is selected.

Pattern Scrolling	
Direction	Eight directions (up, down, left, right, and their combinations)
Speed Range and Unit	
Interlace	In unit of fields
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps
Progressive	In unit of frames
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.

ID Characters	
Number of Characters	Up to 20 characters
Size [Dots]	32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
Intensity	100%, 75% (black only for the background color)
Display Position	Anywhere on the display
Display Position	Adjustment Resolution
V	1 line
H	1 dot
Blinking Display (*1)	ON / OFF
ON TIME	1 to 9 sec, in 1 sec step
OFF TIME	1 to 9 sec, in 1 sec step

Scrolling (*1)

Function	Scroll including the ID character background
Direction	Two directions (left and right)
Speed Range and Unit	
Interlace	In unit of fields 0 to 256 dots, in 2 dot steps
Progressive	In unit of frames 0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.
*1 The blinking display and scrolling can be used simultaneously

Logo Mark

Logo Mark Data	4-level monochrome data from level 0 to 3
Maximum Size	320 (dots) × 240 (lines) (QVGA size)
Number of Logo Marks That Can Be Saved in the LT4610	Up to 4
Display Position	Anywhere on the display
Display Position Adjustment Resolution	
V	1 line
H	1 dot
Display Level	Any level from 0 to 3
File Format	
Before Conversion	24-bit full color bitmap format (.bmp)
After Conversion	Original format (.lg)
Conversion Color Matrix	Y = (0.212 × R) + (0.701 × G) + (0.087 × B) Converts 256-level monochrome data (Y) to 4 levels (levels 0 to 3) using specified thresholds
Conversion Method	Using the logo application
Logo Mark Data Transfer	Save the data to a USB memory device and transfer to the LT4610.

* Not available when the check field pattern is selected.

Image Overlay

Display Precedence	ID characters > safety area markers > logo mark > test pattern (The display order cannot be changed.)
Simultaneous Display	ID characters, logo mark, safety area markers, and test pattern can be displayed simultaneously.

Embedded Audio

Embedded Channels	Can be turned on and off at the group level
3G-A, HD, SD	16 channels (4 channels × 4 groups)
3G-B	32 channels (stream 1, stream 2, 4 channels each × 4 groups)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits
Pre-emphasis	OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec

* Audio (including packets) cannot be embedded when the check field pattern is selected.
* The frequency, level, and audio click can be set for each channel.
* The following limitations apply for SD (525/59.94I).
• For 16 channel output, the resolution is set to 20 bits.
• Up to three groups (12 channels) can be output at 24-bit resolution.

Lip Sync Patterns

Setting	SDI1, SDI2, SDI3, and SDI4 can be set separately.

* Not available when the check field pattern is selected.
* The audio click setting of embedded audio is disabled, and audio synchronized to the lip sync pattern is output.

User Payload ID

Setting	ON / OFF

* You can edit the user payload ID only in a web browser.

LT4610SER03 （PTP）

Compliant Standards

Internet Protocol Version	IPv4
PTP Standard	IEEE 1588-2008
Supported Profile	SMPTE ST 2059 / AES67 / General

RJ-45 Port

Number of Ports	1
Port Type	RJ-45
Compliant Standards	IEEE 802.3
Type	10Base-T / 100Base-TX / 1000Base-T

SFP / SFP+ Port

Number of Ports	1
Port Type	SFP cage
Compliant Standards	MSA
Supported Modules and Types	
SFP transceiver RJ-45	1000BASE-T
SFP+ optical transceiver	10GBASE-SR and 10GBASE-SW

* The SFP/SFP+ module is optional.

Master Function

Number of Controllable Master Devices	2
Communication Mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain Number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Announce Message Rate	0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz
Sync Message Rate	0.0078s 128Hz / 0.015s 64Hz / 0.0312s 32Hz / 0.625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz

* The message rate setting range varies depending on the profile.

Priority 1	0 to 255
Priority 2	0 to 255
Number of Connectable Slaves	1000

* When the sync message rate is 8Hz in theoretical value.

Slave Function

Communication Mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain Number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Delay Message Rate	0.0078s 128Hz / 0.015s 64Hz / 0.0312s 32Hz / 0.0625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz
Announce Timeout Count	2 to 10

LT4610SER04 GPS/BDS

GNSS Lock

Compliant Phase Control Standard SMPTE ST 2059-1

GNSS Input Connector
- Connector: 1 BNC connector
- Input Impedance: 50 Ω
- Antenna, Pre-amp Power Supply
  - Voltage: 5 V / 3.3 V / OFF
  - Current: 50 mA max. (built-in overcurrent protection circuit)

GNSS Receiver
- Receive Frequency
  - GPS: 1575.42MHz (L1)
  - BDS: 1561.098MHz (B1)
- Receive Sensitivity: GPS : -130dBm or more (input level to the antenna)
  BDS : -120dBm or more (input level to the antenna)
- Status: NO SIGNAL, TRACKING, LOCKED, STAY IN SYNC
- Holdover Function: Retains the previous frequency and phase when the GPS signal or GPS signal is interrupted

CW I/O

CW I/O Connector
- Connector: 1 BNC connector (shared input and output)
- Input Impedance: 50 Ω
- Input Signal Level: 0.5 to 2 Vp-p
- Input Signal Frequency: 10 MHz
- Locking Frequency Range: ±5 ppm
- Output Signal Level: 3.3 V LVCMOS
- Output Signal Frequency: 10 MHz / 1 PPS
- Holdover Function: Retains the previous frequency when the 10 MHz CW signal is interrupted.

LTC I/O

I/O Connectors
- Connector: D-SUB 15 pin (shared input and output)
- LTC
  - Number of Inputs: 1
  - Input Impedance: 600 Ω balanced
  - Input Signal Level: 0.5 to 4 Vp-p
  - Number of Outputs: 3
  - Output Impedance: 600 Ω balanced
  - Output Signal Level: 2 Vp-p ±10%
- Alarm
  - Number of Outputs: 2
  - Output Signal Level: 5 V CMOS

Time Code

- Reference Time: Internal / GNSS / LTC / VITC / PTP(when the LT4610 is equipped with the hardware option LT4610SER03)
- Frame Rate: Synchronizes to ANALOG BLACK 1 (LTC OUT)
- Dropped Frame Mode: On / Off

ATC Setting
- LTC Insertion Setting: On / Off

LTC Setting
- Output Setting: On / Off

AES/EBU Time Code Insertion Setting: On / Off

Leap Second
- Application Setting: Set the application date/time with a timer

Daylight Savings Time
- Application Setting: Set the application date/time with a timer

LT4610SER24 8K

Compliant Standard

- SDI Embedded Audio: SMPTE ST 299
- SDI Payload ID: SMPTE ST 352

SDI Formats and Standards

12G(QL) 8K Video Signal Formats and Standards (2 sampleInterleave)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	7680×4320	60/59.94/50/48/47.95/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
YC_BC_R 4:4:4	10bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
RGB 4:4:4	10bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1

8K SDI Pattern Generation

- SDI Signal: 11.880 Gbps, 11.880/1.001 Gbps
- Test Patterns: 100% color bar, 75% color bar, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
- Automatic Switching: Automatically switches between selectable color bar patterns
- Switch Time: 1 to 255 sec
- User Pattern Display: Select one from INT-1 to 8.
- Storage Memory: Up to 25 patterns
- Display Memory (INT_1 to 8): Transfer the pattern data (up to 8 patterns) from the storage memory to the display memory
- File Format: 24-bit full color bitmap format (.bmp) TIFF format (.tif), IMG format (.img)

* In the user pattern display, the color system is 422(YCbCr) 10 bit.
* When user pattern display is selected, simultaneous display other than user pattern display is not possible.

Component On/Off
- Function: Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.
- Safety Area Markers: Action safe area (90%) Title safe area (80%) 4:3 aspect ratio (can be turned on and off separately)

Moving Box
- Box Color: Select from white, yellow, cyan, green, blue, red, magenta, black
- Speed Setting V/H: LOW / MIDDLE / HIGH
- Size Setting V/H: SIZE 1 to 5

* Not available when the user pattern is selected.

Pattern Scrolling
- Direction: Eight directions (up, down, left, right, and their combinations)
- Speed Range and Unit
  - Progressive: In unit of fields
  - V: 0 to 256 lines, in 4 line steps
  - H: 0 to 256 dots, in 8 dot steps

Embedded Audio
- Embedded Channels: Can be turned on and off at the group level 16 channels (4 channels × 4 groups)
- Sampling Frequency: 48 kHz sampling (synced with the video signal)
- Resolution: 20 bits, 24 bits
- Pre-emphasis: OFF, 50/15, CCITT (only the CS bit is switched)
- Frequency: SILENCE / 400Hz / 800Hz / 1kHz
- Level: -60 to 0 dBFS (1 dBFS steps)
- Audio Click: OFF, 1 / 2 / 4 sec

* The frequency, level, and audio click can be set for each channel.

Lip Sync Patterns

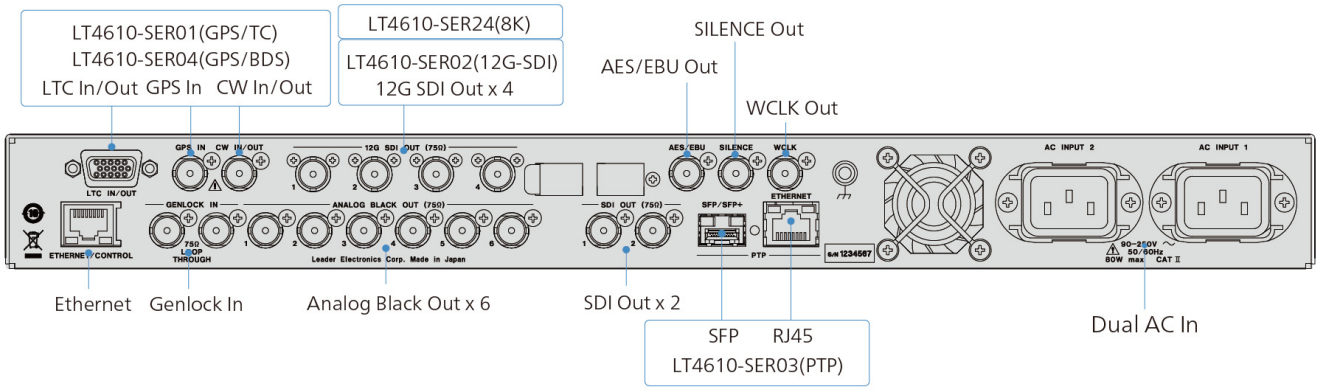
- Setting: Set by SDI1

User Payload ID

- Setting: ON / OFF

* You can edit the user payload ID only in a web browser.

Rear Panel



Related accessories

LC2141 (SFP RJ-45)
Speed : 1000Mbps
Connector : RJ-45

LC2148 (SFP+ MULTI-MODE)
Transmission Distance : 300m
Wave ength : 850nm
Supported standards : 10GBASE-SR/SW
Connector : LC

LC2145 (SFP+ SINGLE-MODE)
Transmission Distance : Max 10,000m
Wave ength : 1310nm
Supported standards : 10GBASE-LR/LW

LT4610 / LT4611 Comparison table

	LT4610	LT4611
Genlock	Standard	Standard
SYNC 3 Outputs (BB/tri-level) 1～3	Standard	Standard
SYNC 3 Outputs (BB/tri-level) 4～6	Standard	LT4611SER21
SDI 2 Outputs 3G/HD/SD SDI	Standard	LT4611SER22
Word-Clock Signal Output	Standard	Standard
AES/EBU Signal Output AES/EBU Silence Output	Standard	LT4611SER23
GPS/TC	LT4610SER01	LT4610SER01
GPS/BDS/TC	LT4610SER04	LT4610SER04
12G-SDI 4K Outputs	LT4610SER02	LT4610SER02
PTP	LT4610SER03	LT4610SER03
12G-SDI 8K Output	LT4610SER24	LT4611SER24

*If you add the LT4611SER21, LT4611SER22, and LT4611SER23 to the LT4611 to make them equivalent to the LT4610, the LT4611 will be more expensive than the LT4610.

Leader

LT4611

SYNC GENERATOR

GENLOCK	BB	Tri-level	GPS	PTP	TC
8K	4K	12GSDI	3GSDI	HDSDI	SDSDI
WC	AES-EBU				

General

The LT4611 is a 1U full rack size sync generator that can operate in synchronization with GPS, PTP, CW, and internal reference signals, as well as Genlock that supports external analog video synchronization signals.
It supports analog video sync signals, AES / EBU digital audio output, word clock, and time code, and also supports 3G / HD / SD-SDI output and 12G-SDI output compatible with 4K and 8K.
In addition, it supports the PTP grand master function and PTP slave function, and can manage the optimum synchronization system according to the system.
The genlock function is equipped with a STAY IN SYNC function that retains the phase when an abnormality occurs in the input analog video synchronization signal, and the power supply unit performs redundant operation, enabling highly reliable system construction.
LT4611 has slimmed down the standard functions from the standard specifications of the LT4610, the SDI output function, audio output function, and three of the six analog sync signal output systems to be prepared as optional product. Functions can be added as needed, allowing you to configure the system with specifications that meet your objectives.

Features

Genlock Function
Various output signals can be synchronized by applying NTSC/PAL black burst signals, which are analog video sync signals, and HDTV tri-level sync signals. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

Stay-in-Sync and Slow Lock Functions
A Stay-in-Sync function is available in case errors occur at the genlock input. In addition, a slow lock function is available to reduce the shock that occurs when genlock is performed again based on stay-in-sync. This makes it possible to construct an extremely reliable synchronization system.

Analog Video Sync Signal Output
Six analog video sync signals can be output. The phase of each output can be adjusted independently.
NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

GPS/BDS Synchronization (LT4610SER01, LT4610SER04)
By connecting a GPS antenna, the LT4610SER01 can generate and output each signal by locking it to frequencies and times obtained from gps. The LT4610SER04 also supports BDS by connecting GNSS antennas.

PTP (LT4610SER03)
PTP synchronization corresponds to the grandmaster and slave functions.
You can choose reference signal from PTP, GPS, analog BB or internal.

Time Code I/O (LT4610SER01)
The ATC (LTC) can be embedded in LTC outputs from internal time, GPS, LTC, and VITC time information, and SDI signal outputs, or VITC in analog video synchronous signal outputs.

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

12G-SDI Support (LT4610SER02)
Four output connectors can be added to support 12G-SDI, 3G-SDI (level A, level B) and HD-SDI (including dual links).
In addition, it corresponds to the 8K video signal by adding 8K software option.

Lip Sync Patterns (LT4610SER02, LT4611SER22, LT4611SER24)
This option can output lip sync patterns in which the video and audio are synchronized. In combination with a waveform monitor that features a lip sync function, such as the Leader's LV5600, it is possible to measure the offset between the video and audio in SDI signal transmissions.

User Pattern Output
User pattern can be output in addition to built-in patterns such as color bars.

Audio Embedding (LT4610SER02, LT4611SER22, LT4611SER24)
The LT4611 can embed 32 channels (stream 1, stream 2, 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-HDI. The frequency, level, and the click can be set for each channel.

AES/EBU Signal Output
The LT4611 can output a 48 kHz AES/EBU signal synchronized with video signals. It is also equipped with a muted AES/EBU signal output.

Word-Clock Signal Output
The LT4611 can output a 48 kHz word-clock signal synchronized with video signals.

Real Time Clock
The real time clock is backed up by a battery. There is no need to reset the clock even when the power is turned off and on.

Ethernet
SNMP is supported. When an error is detected, a TRAP is issued. Further, the LT4611 can be controlled through HTTP.

Preset Memory Function
Up to 10 presets can be saved. Convenient registered presets can be recalled during operation. The LT4611 can be started with the same settings every time.

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

Redundant Power Supply
Two power supplies are built in to provide redundancy. When errors occur in power supply units, alarms are indicated on the LT4611 front panel. Errors can also be output as alarms using SNMP traps.

Options

List of options

	Model number	Model name	Main functions
Hardware options	LT4610SER01	GPS/TC	GPS synchronization, 10 MHz CW I/O, LTC I/O
	LT4610SER02	12G-SDI	12G-SDI (4K) pattern output. Natural picture support with 3G-SDI quad link.
	LT4610SER03	PTP	PTP grand master, slave function.
	LT4610SER04	GPS/BDS/TC	GPS/BDS synchronization, 10 MHz CW I/O, LTC I/O
Software option	LT4611SER21	SYNC 3 OUT ADD	3 additional analog sync signal output connectors with independent phase adjustment function
	LT4611SER22	SDI OUTPUT	2 SD-SDI, HD-SDI, 3G-SDI output connectors
	LT4611SER23	AUDIO OUTPUT	2 AES/EBU output connectors
	LT4611SER24	8K	8K SDI pattern output *You need the LT4610SER02 to install the LT4611SER24 in the LT4611.

LT4610SER01 GPS/TC

GPS Synchronization
A GPS antenna can be connected to generate and output signals by locking to the frequency and clock obtained from the GPS.

Time Code I/O
The time code generator can run in free run mode based on internal time information. It can also embed ATC (LTC) in SDI signal output or VITC in analog video sync signal output based on a GPS, LTC, or VITC time information.
It also features a holdover function, which retains the phase and frequency of the output signal when GPS signals or CW signals are lost. Further, when GPS lock is in effect, the LT4611 can also be used as an NTP server.

CW I/O
The CW I/O connector not only receives 10 MHz CW but also outputs 10 MHz CW or 1PPS, whichever is selected.

LTC I/O
The LTC I/O connector receives LTC1, outputs LTC3, and outputs two separate alarms.

LT4610SER02 12G-SDI

12G-SDI (4K) Support
Four output connectors supporting 12G-SDI, 3G-SDI (level A, level B), HD-SDI (including dual link), and SD-SDI are available to accommodate the 4K video format. The format is the same for all four outputs, but you can set different patterns and phases for each.
Only two outputs are available for 3G-SDI level B and HD dual link.

User Pattern Generation
In addition to internal patterns such as the color bar, SD, HD (2K), and 4K user patterns can be output.

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

Safety Area Markers
90% and 80% safety area markers can be overlaid on the display. For 12G-SDI, 3G-SDI and HD-SDI, a 4:3 aspect marker can be overlaid.

Pattern Scrolling
This option is equipped with a function for scrolling patterns in eight directions. The moving speed can be varied.

Moving Box
A moving box can be overlaid on the display. Its color, size, and moving speed can be varied.

Audio Embedding
This option can embed 32 channels (stream 1 (*1), stream 2 (*1), 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-HDI. The frequency, level, and the like can be set for each channel.
*1 On the menu, stream 1 and stream 2 are displayed as LINK-A and LINK-B, respectively.

Lip Sync Patterns
This option can output lip sync patterns in which the video and audio are synchronized. In combination with a waveform monitor that features a lip sync function, such as the Leader's LV 5770A, it possible to measure the offset between the video and audio in SDI signal transmissions.

LT4610SER03 PTP

PTP Grand Master Function
This option supports the Precision Time Protocol defined in IEEE1588-2008 and operates as a PTP grand master. SMPTE ST 2059, AES67, and General profiles are supported. The PTP time source is obtained from the internal clock or GPS.

PTP Slave Function
When a host PTP grand master is present in the system, this option operates as a PTP slave and can operate as a master to even lower devices.

10GbE Ready
In addition to the RJ-45 port, a 10GbE SFP+ module, sold separately, can be used.

LT4610SER04 GPS/BDS/TC

GPS Synchronization
A GNSS antenna can be connected to generate and output signals by locking to the frequency and clock obtained from the GPS or BDS.
*Other features are the same as the LT4610SER01.

LT4611SER21 (SYNC 3 OUT ADD)
Software option for the LT 4611 only. It is a standard feature on the LT4610.

Three Additional Analog Sync Signal Outputs
In addition to the three outputs on the standard LT 4611, three analog video sync signal outputs can be added. NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.

Independent Phase Adjustment
The phases of all analog video sync signal outputs can be adjusted.

LT4611SER22 (SDI OUTPUT)

Software option for the LT4611 only. It is a standard feature on the LT4610.

Triple-rate SDI Ready

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

ID Character Overlay

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

Logo Mark Overlay

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

Safety Area Markers

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

Pattern Scrolling

This option is equipped with a function for scrolling patterns in eight directions. The moving speed can be varied.

Audio Embedding

This option can embed 32 channels (stream 1 (*1), stream 2 (*1), 4 channels each × 4 groups) of audio signals for 3G-SDI level B and 16 channels (4 channels × 4 groups) of audio signals for 3G-SDI level A, HD-SDI, and SD-HDI. The frequency, level, and the like can be set for each channel.

*1 On the menu, stream 1 and stream 2 are displayed as LINK-A and LINK-B, respectively.

Lip Sync Patterns

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

LT4611SER23 (AUDIO OUTPUT)

Software option for the LT 4611 only. It is a standard feature on the LT4610.

AES/EBU Signal Output

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

LT4611SER24 8K

The LT4611SER24 is a software option for the LT4611 that adds the ability to output the 8K patterns from the 12G-SDI connectors, when the LT4611 is equipped with the hardware option LT4610SER02.

12G-SDI 8K

QUAD LINK 12G-SDI 8K (7680 x 4320) can be output.

User Pattern Output

User pattern can be output in addition to built-in patterns such as color bars.

Audio Embedding

The LT4611SER24 can embed 16 channels (4 channels × 4 groups) of audio signals for 12G-SDI. The frequency, level, and the like can be set for each channel.

Lip Sync Patterns

The LT4611SER24 can output lip sync patterns in which the video and audio are synchronized.

The selectable patterns

Fixed pattern

SDI output with standard configuration

Pattern		SDI format		
		Other than those on the right	720x487:SD	720x576:SD
COLOR BAR	100%	YES	YES	YES
	75%	YES	YES	NO
	MULTI 100%	YES	NO	NO
	MULTI 75%	YES	NO	NO
	MULTI (+I)	YES	NO	NO
	SMPTE	NO	YES	NO
	EBU	NO	NO	YES
	BBC	NO	NO	YES
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES
CHECK FIELD		YES	YES	YES

SDI output with optional LT4610SER02

Pattern		SDI format				
		Other than those on the right	720x487:SD	720x576:SD	3840x2160	4096x2160
COLOR BAR	100%	YES	YES	YES	YES	YES
	75%	YES	YES	NO	YES	YES
	MULTI 100%	YES	NO	NO	YES	YES
	MULTI 75%	YES	NO	NO	YES	YES
	MULTI (+I)	YES	NO	NO	YES	YES
	SMPTE	NO	YES	NO	NO	NO
	EBU	NO	NO	YES	NO	NO
	BBC	NO	NO	YES	NO	NO
	ARIB STD-B66-2	NO	NO	NO	YES (*1)	S (*1、2)
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES	YES	YES
CHECK FIELD		YES	YES	YES	NO	NO

*1 In ARIB STD-B66-2, the color system is 422(YCbCr) 10 bit.
*2 Because ARIB STD-B66-2 is a fixed pattern that is 3840x2160 in size, 256 dots on the right side will display black if the pattern is displayed in the 4096x2160 size.

SDI output with optional LT4610SER02, LT4611SER24.

Pattern		SDI format		
		3840x2160 12G	4096x2160 12G	7680x4320 12G
COLOR BAR	100%	YES	YES	YES
	75%	YES	YES	NO
FLAT FIELD 100% / FLAT FIELD 0% / RED FIELD 100% / GREEN FILED 100% / BLUE FIELD 100%		YES	YES	YES

User Pattern

SDI output of LT4610SER02

Pattern	SDI format				
	SD	HD(2K)	4K(SQD)	4K(2SI)	8K (*1)
User pattern	YES	YES	YES	YES	YES
UHDColorBar	NO	NO	NO	YES	YES
HLGCB	NO	NO	YES	YES	NO
SLog3_LiveHDR_narrow_v11	NO	YES	NO	YES	YES

- For User patterns, prepare 8K: 7680 x 4320, 4K: 3840 x 2160, 4096 x 2160, HD: 1280 x 720, 1920 x 1080, 2048 x 1080, SD: 720 x 487, 720 x 576 image files.
- *1 8K requires LT4610SER24.

Patterns

Sample LT4610SER02 user patterns

UHD COLOR BAR

HLG COLOR BAR

SLog3_LiveHDR_narrow_v111

Lip sync patterns

The lip-sync pattern outputs audio synchronized with the video signal. Leader's lip-sync compatible waveform monitor can measure the difference in timing between the audio and video for each channel.

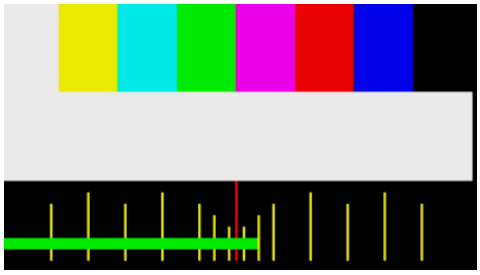
- Pattern: Displays the pattern selected in the SDI menu.
- Raster: Displays a white raster when the slide bar of the scale is 0-+15 [frame], and a black raster at other times.
- Scale: The green slide bar scrolls from left to right. (Approximately 6 seconds at 1080 / 59.94I)The center scale turns red when the slide bar is 0-+15 [frame].

Pattern (Selectable)

Raster

Scale

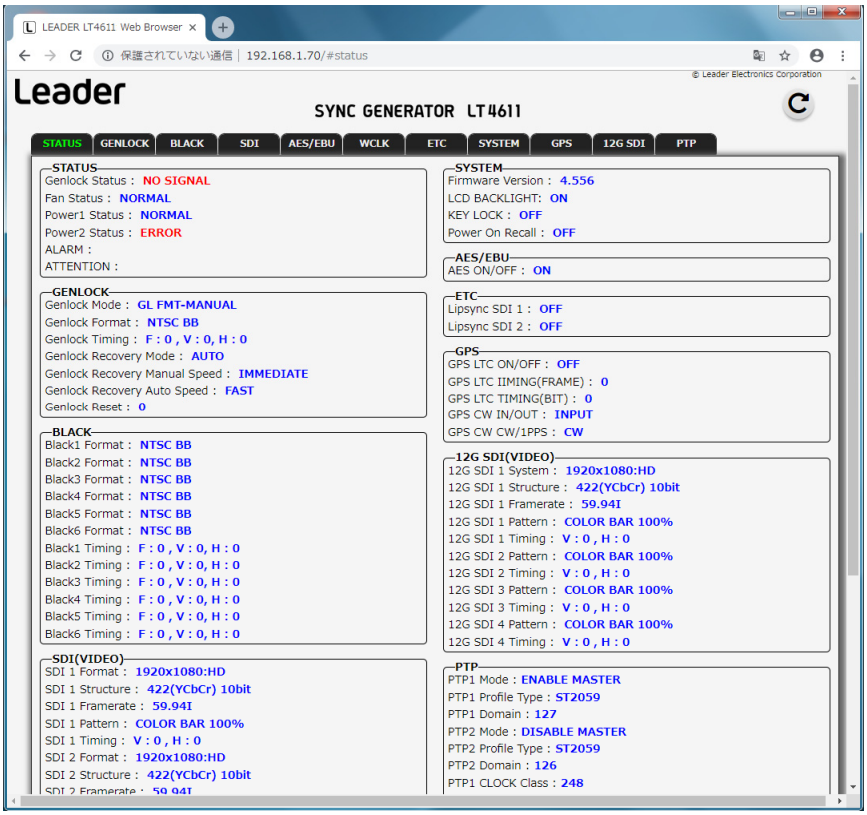
Lip sync pattern



When the slide bar is 0-+15 [frame]

Web Browser

You can use ETHERNET to control the instrument from a web browser.



SPECIFICATIONS

Compliant Standards

Analog Video Sync Signal
- NTSC Black Burst Signal: SMPTE ST 170, SMPTE ST 318, SMPTE RP 154
- PAL Black Burst Signal: ITU-R BT 1700, EBU N14
- HD Tri-Level Sync Signal: SMPTE ST 240, SMPTE ST 274, SMPTE ST 296

I/O Connectors

Genlock Input Connector
- Connector: 2 BNC connectors
- Input Signal: Analog composite sync signal
Analog component sync signal
- Format: Loop-through
- Input Impedance: 15 kΩ
- Maximum Input Voltage: ±5 V (DC + peak AC)
- Operating Input Level Range: ±6 dB
- External Lock Range: ±5 ppm
- Jitter: 1 ns (when genlock is in use)

Analog Video Sync Signal Output Connector
- Connector: 3 BNC connectors, 3 outputs
- Output Signal: NTSC black burst signal
PAL black burst signal
HD tri-level sync signal
- Output Impedance: 75 Ω
- Sync Level
  - NTSC: 40±1 IRE
  - PAL: -300±6 mV
  - HD: ±300±6 mV
  - Blanking: 0±15 mV

Word-Clock Output Connector
- Connector: 1 BNC connector
- Output Frequency: 48 kHz
- Output Amplitude: 3.5 V or more (high level not terminated with 75 Ω)
2.4 V or more (high level terminated with 75 Ω)

Control Connectors

Ethernet Port
- Specifications: IEEE 802.3
- Protocol
  - SNMP v2c: Command operation and trap transmission
Transmission of operation status
(e.g., genlocksynchronization status)
  - HTTP: Remote monitoring and control from a Web browser
- Connector: RJ-45
- Type: 10BASE-T/100BASE-TX auto switching

USB Port
- Specifications: USB 2.0
- Supported Media: USB memory device
- Function: Saving and recalling presets, genlock log, logo, and ID characters
Updating firmware
Retrieving MIB files
- Connector: USB Type A

LCD

- Number of Characters: 20 characters × 2 lines
- Backlight: On / Off

Genlock Function

Signal Formats: NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, PAL BB, PAL BB+REF, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 1125/24PsF, 1125/23.98PsF, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P

Timing Adjustment
- Adjustment Range
  - NTSC Black Burst Signal: ±5frames
  - PAL Black Burst Signal: ±2frames
  - HD Tri-Level Sync Signal: 1 frame (entire frame)
  - FINE: Covers 1 adjustment unit (adjustment unit: 13.5 MHz, clock width: 74.1nsec)

Genlock Mode
- INTERNAL: Operates using the internal reference signal
- EXTERNAL: Operates using an external reference signal
GL FMT-AUTO / GL FMT-MANUAL /
GPS(SER01) / GNSS(SER04) /
10MHz CW(SER01/SER04) / PTP(SER03)

Recovery Mode
- AUTO: Resynchronizes according to the auto setting when the external reference signal recovers
- MANUAL: Retains the STAY IN SYNC state when the external reference signal recovers

Auto Setting
- IMMEDIATE: Resets the lock when the external reference signal recovers
- FAST: Quickly resynchronizes when the external reference signal recovers
- SLOW: Slowly resynchronizes when the external reference signal recovers

Manual Setting
- IMMEDIATE: Resets the lock when the external reference signal recovers
- FAST: Quickly resynchronizes when the external reference signal recovers
- SLOW: Slowly resynchronizes when the external reference signal recovers

Genlock Reset: Resynchronizes immediately.

Analog Video Sync Signal Output

Signal Formats: Each of the 3 outputs can be set separately.
NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, NTSC BB+SETUP, NTSC BB+S+REF, NTSC BB+S+ID, NTSC BB+S+R+ID, PAL BB, PAL BB+REF, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 1125/24PsF, 1125/23.98PsF, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P

Timing Adjustment: Can be set separately for each of the 3 outputs
- Adjustment Range
  - NTSC Black Burst Signal: ±5 frames
  - PAL Black Burst Signal: ±2 frames
  - HD Tri-Level Sync Signal: 1 frame (entire frame)
- Adjustment Unit
  - NTSC/PAL Black Burst Signal: In units of 0.0185 µs (54 MHz clock unit)
  - HD Tri-Level Sync Signal: In units of 0.0135 µs (74.25/1.001 MHz clock unit or 74.25 MHz clock unit)

Word-Clock Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)

Preset Settings

Preset	Saves the panel settings (*1)
Number of Presets	10
Recall Method	Front panel
Copy Method	Copy from the LT 4611 to a USB memory device or copy from the USB memory device to the LT 4611

*1 Logo data and device-specific information (e.g., IP address, time) cannot be saved.

Logging Feature

Saved Items	Genlock status change
Copy Method	Copy from the LT 4611 to a USB memory device

Internal Reference Generator

Reference Frequency	13.5 MHz

Internal Clock

Power Supply	Primary lithium battery
Battery Operation Period	Approx. 3 years (depending on the storage and operating environments)

General Specifications

Environmental Conditions	
Operating Temperature	0 to 40 ℃
Operating Humidity Range	85 %RH or less (no condensation)
Optimal Temperature	10 to 35 ℃
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	Ⅱ
Pollution Degree	2
Power Requirements	
Voltage	90 to 250 VAC
Power Consumption	80 W max.
Dimensions	482 (W) × 44 (H) × 400 (D) mm (excluding protrusions)
Weight	3.6 kg (excluding SER01, SER02, SER03, and SER04) 3.8 kg (including SER01 or SER04, SER02, and SER03)
Accessories	Power cord ..... 2 Cover/Inlet stopper ..... 2 CD-ROM (Logo App, instruction manual)... 1

LT4610SER01 GPS/TC

GPS Lock

Compliant Phase Control	Standard SMPTE ST 2059-1
GPS Input Connector	
Connector	1 BNC connector
Input Impedance	50 Ω
Antenna, Pre-amp Power Supply	
Voltage	5 V / 3.3 V / OFF
Current	50 mA max. (built-in overcurrent protection circuit)
GPS Receiver	
Receive Frequency	1575.42 MHz (L1)
Receive Code	C/A code
Receive Sensitivity	-130 dBm or more (input level to the antenna)
Status	NO SIGNAL, TRACKING, LOCKED, STAY IN SYNC
Holdover Function	Retains the previous frequency and phase when the GPS signal is interrupted

CW I/O

CW I/O Connector	
Connector	1 BNC connector (shared input and output)
Input Impedance	50 Ω
Input Signal Level	0.5 to 2 Vp-p
Input Signal Frequency	10 MHz
Locking Frequency Range	±5 ppm
Output Signal Level	3.3 V LVCMOS
Output Signal Frequency	10 MHz / 1 PPS
Holdover Function	Retains the previous frequency when the 10 MHz CW signal is interrupted

LTC I/O

I/O Connectors	
Connector	D-SUB 15 pin (shared input and output)
LTC	
Number of Inputs	1
Input Impedance	600 Ω balanced
Input Signal Level	0.5 to 4 Vp-p
Number of Outputs	3
Output Impedance	600 Ω balanced
Output Signal Level	2 Vp-p±10%
Alarm	
Number of Outputs	2
Output Signal	Level 5 V CMOS

Time Code

Reference Time	Internal / GPS / LTC / VITC / PTP(when the LT4611 is equipped with the hardware option LT4610SER03)
Frame Rate	Synchronizes to ANALOG BLACK 1 (LTC OUT)
Dropped Frame Mode	On / Off
ATC Setting	
LTC Insertion Setting	On / Off
LTC Setting	
Output Setting	On / Off
AES/EBU Time Code Insertion Setting	On / Off
Leap Second	
Application Setting	Set the application date/time with a timer
Daylight Savings Time	
Application Setting	Set the application date/time with a timer

LT4610SER02 12G-SDI

Compliant Standards

SDI Embedded Audio

12G, 3G, HD, HD (DL)	SMPTE ST 299
SD	SMPTE ST 272
SDI Payload ID	SMPTE ST 352

SDI Formats and Standards

The SDI format is the same for all four outputs.

SD Video Signal Formats and Standards

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

HD Video Signal Formats and Standards

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	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 SMPTE ST 292-1
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	

3G-A Video Signal Formats and Standards

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

3G-B-DL, HD (DL) Video Signal Formats and Standards (1/2)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 372 SMPTE ST 425-1
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 372 SMPTE ST 425-1 SMPTE ST 2048-2
	12bit	1920×1080	60/59.94/50/I	SMPTE ST 274 SMPTE ST 372 SMPTE ST 425-1
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
		2048×1080	30/29.97/25/24/23.98/P	SMPTE ST 372 SMPTE ST 425-1 SMPTE ST 2048-2
			30/29.97/25/24/23.98/PsF	

3G-B-DL, HD (DL) Video Signal Formats and Standards (2/2)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:4:4	10bit	1920×1080	60/59.94/50/I	SMPTE ST 274
			30/29.97/25/24/23.98/P	SMPTE ST 372
			30/29.97/25/24/23.98/PsF	SMPTE ST 425-1
		2048×1080	30/29.97/25/24/23.98/P	SMPTE ST 372
			30/29.97/25/24/23.98/PsF	SMPTE ST 425-1 SMPTE ST 2048-2
	12bit	1920×1080	60/59.94/50/I	SMPTE ST 274
			30/29.97/25/24/23.98/P	SMPTE ST 372
			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	10bit	1920×1080	60/59.94/50/I	SMPTE ST 274
			30/29.97/25/24/23.98/P	SMPTE ST 372
			30/29.97/25/24/23.98/PsF	SMPTE ST 425
		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
	12bit	1920×1080	60/59.94/50/I	SMPTE ST 274
			30/29.97/25/24/23.98/P	SMPTE ST 372
			30/29.97/25/24/23.98/PsF	SMPTE ST 425
		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

3G-B-DS Video Signal Formats and Standards

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

* Only SDI1 and SDI3 are supported.

3G(DL)-2K Video Signal Formats and Standards

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
RGB 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:2:2	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
YC_BC_R 4:4:4	10bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3
	12bit	1920×1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425-3
		2048×1080	60/59.94/50/48/47.95/P	SMPTE ST 2048-2 SMPTE ST 425-3

3G(DL)-4K Video Signal Formats and Standards (Square)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 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

3G(DL)-4K Video Signal Formats and Standards (2 sample Interleave)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 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

HD (QL) Video Signal Formats and Standards (Square)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98/P	-
			30/29.97/25/24/23.98/PsF	-
		4096 × 2160	30/29.97/25/24/23.98/P	-
			30/29.97/25/24/23.98/PsF	-

3G (QL) Video Signal Formats and Standards (Square)

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

3G (QL) Video Signal Formats and Standards (2 sample interleave)

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

12G Video Signal Formats and Standards (2 sample Interleave)

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

SDI Output Connector

Connector	4 BNC connectors
12G, 3G-A, HD, SD	4 outputs
3G-B, HD (DL)	2 outputs
Output Impedance	75 Ω
Output Amplitude	800 mVp-p ± 10%
Output Return Loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97 GHz	10 dB or more
2.97 to 6 GHz	7 dB or more
6 to 12 GHz	4 dB or more
Rise and Fall Times	
12G	≤ 45 ps (20 to 80%)
3G	≤ 135 ps (20 to 80%)
HD, HD (DL)	≤ 270 ps (20 to 80%)
SD	0.4 ns to 1.5 ns (20 to 80%)
DC Offset	0±0.5 V

SDI Pattern Generation

The SDI pattern generation settings can be set separately for each output. But the fixed pattern and user pattern cannot be generated simultaneously.
*You cannot format them separately.

SDI Signal	
Bit Rate	
12G	11.880 Gbps, 11.880/1.001 Gbps
3G	2.970 Gbps, 2.970/1.001 Gbps
HD, HD (DL)	1.485Gbps, 1.485/1.001Gbps
SD	270Mbps
Timing Adjustment	
Adjustment Range	Entire frame
Adjustment Unit	
V	Lines
H	Clocks (148.5 MHz, 148.5/1.001 MHz, 74.25 MHz, 74.25/1.001 MHz, 27 MHz)
Test Patterns	
12G, 3G, HD	100% color bar, 75% color bar, multiformat color bar (ARIB STD-B28, pattern 2 area can be set to 100% white, 75% white, or +I), ARIB STD-B66-2 color bar (3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only), check field (3G, HD), flat field white 100%, black 0%, red 100%, green 100%, blue 100%
SD	
525/59.94I	100% color bar, 75% color bar, SMPTE color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
625/50I	100% color bar, EBU color bar, BBC color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
Automatic Switching	Automatically switches between selectable color bar patterns
Switch Time	1 to 255 sec

* The selectable patterns depend on the SDI format.
* In ARIB STD-B66-2 color bar display, the color system is 422(YCbCr) 10 bit.

User Pattern Display	Select one from INT-1 to 8.
Storage Memory	SD, HD (2K), 4K, up to 25 patterns each
Display Memory (INT_1 to 8)	Transfer the SD, HD (2K), 4K (2SI), 4K (SQD) pattern data (up to 8 patterns each) from the storage memory to the display memory
File Format	24-bit full color bitmap format (.bmp) TIFF format (.tif), IMG format (.img)
Archiver Pattern	IMG format (.img)
UHDColorBar	ARIB STD-B66 UHDTV MULTIFORMAT COLOR BAR (3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only)
HLGCB	ARIB STD-B72 Colour Bar Test Pattern for HLG HDR-TV System Recommendation ITU-R BT.2111 HLG (3G(QL) and 12G 422 (YCbCr) 10bit only)
SLog3_LiveHDR_narrow_V11	S-Log3(Live HDR) Ver1.11 narrow range scale (HD and 3G(QL) 2 sample interleave, and 12G 422 (YCbCr) 10bit only)

* After turning on the power, transfer the data from the storage memory to the display memory. It takes about 5 minutes to transfer the data of a 4K user pattern. If the power is cut off after a memory transfer, the data in the display memory will be cleared. The data in the storage memory will be retained even when the power is turned off, so after turning on the power, perform a memory transfer operation again. You can also set the power on load function that automatically transfers data after the power is turned on.
* In the user pattern display, the color system is 422(YCbCr) 10 bit.

Component On/Off	
Function	Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.

* Not available when the check field pattern is selected.

Safety Area Markers	
12G, 3G, HD	Action safe area (90%) Title safe area (80%) 4:3 aspect ratio (can be turned on and off separately)
SD	Action safe area (90%) Title safe area (80%) (can be turned on and off separately)

* Not available when the check field pattern or user pattern is selected.

Moving Box	
Box Color	Select from white, yellow, cyan, green, blue, red, magenta, black
Speed Setting V/H	LOW / MIDDLE / HIGH
Size Setting V/H	SIZE 1 to 5

* Not available when the check field pattern is selected.

Pattern Scrolling	
Direction	Eight directions (up, down, left, right, and their combinations)
Speed Range and Unit	
Interlace	In unit of fields
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps
Progressive	In unit of frames
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.

ID Characters	
Number of Characters	Up to 20 characters
Size [Dots]	32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
Intensity	100%, 75% (black only for the background color)
Display Position	Anywhere on the display
Display Position	Adjustment Resolution
V	1 line
H	1 dot
Blinking Display (*1)	ON / OFF
ON TIME	1 to 9 sec, in 1 sec step
OFF TIME	1 to 9 sec, in 1 sec step
Scrolling (*1)	
Function	Scroll including the ID character background
Direction	Two directions (left and right)
Speed Range and Unit	
Interlace	In unit of fields 0 to 256 dots, in 2 dot steps
Progressive	In unit of frames 0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.
*1 The blinking display and scrolling can be used simultaneously

Logo Mark	
Logo Mark Data	4-level monochrome data from level 0 to 3
Maximum Size	320 (dots) × 240 (lines) (QVGA size)
Number of Logo Marks	That Can Be Saved in the LT4611 Up to 4
Display Position	Anywhere on the display
Display Position Adjustment Resolution	
V	1 line
H	1 dot
Display Level	Any level from 0 to 3
File Format	
Before Conversion	24-bit full color bitmap format (.bmp)
After Conversion	Original format (.lg)
Conversion Color Matrix	Y = (0.212 × R) + (0.701 × G) + (0.087 × B) Converts 256-level monochrome data (Y) to 4 levels (levels 0 to 3) using specified thresholds
Conversion Method	Using the logo application
Logo Mark Data Transfer	Save the data to a USB memory device and transfer to the LT4611.

* Not available when the check field pattern is selected.

Image Overlay	
Display Precedence	ID characters > safety area markers > logo mark > test pattern (The display order cannot be changed.)
Simultaneous Display	ID characters, logo mark, safety area markers, and test pattern can be displayed simultaneously.

Embedded Audio	
Embedded Channels	Can be turned on and off at the group level
3G-A, HD, SD	16 channels (4 channels × 4 groups)
3G-B	32 channels (stream 1, stream 2, 4 channels each × 4 groups)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits
Pre-emphasis	OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec

* Audio (including packets) cannot be embedded when the check field pattern is selected.
* The frequency, level, and audio click can be set for each channel.
* The following limitations apply for SD (525/59.94I).
  • For 16 channel output, the resolution is set to 20 bits.
  • Up to three groups (12 channels) can be output at 24-bit resolution.

Lip Sync Patterns

Setting	SDI1, SDI2, SDI3, and SDI4 can be set separately.

* Not available when the check field pattern is selected.
* The audio click setting of embedded audio is disabled, and audio synchronized to the lip sync pattern is output.

User Payload ID

Setting	ON / OFF

* You can edit the user payload ID only in a web browser.

LT4610SER03 （PTP）

Compliant Standards

Internet Protocol Version	IPv4
PTP Standard	IEEE 1588-2008
Supported Profile	SMPTE ST 2059 / AES67 / General

RJ-45 Port

Number of Ports	1
Port Type	RJ-45
Compliant Standards	IEEE 802.3
Type	10Base-T / 100Base-TX / 1000Base-T

SFP / SFP+ Port

Number of Ports	1
Port Type	SFP cage
Compliant Standards	MSA
Supported Modules and Types	
SFP transceiver RJ-45	1000BASE-T
SFP+ optical transceiver	10GBASE-SR and 10GBASE-SW

* The SFP/SFP+ module is optional.

Master Function

Number of Controllable Master Devices	2
Communication Mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain Number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Announce Message Rate	0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz
Sync Message Rate	0.0078s 128Hz / 0.015s 64Hz / 0.0312s 32Hz / 0.625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz

* The message rate setting range varies depending on the profile.

Priority 1	0 to 255
Priority 2	0 to 255
Number of Connectable Slaves	1000

* When the sync message rate is 8Hz in theoretical value.

Slave Function

Communication Mode	Multicast / Unicast / MIXED SMPTE / MIXED SMPTE without negotiation
Domain Number	0 to 127 (SMPTE ST 2059) 0 to 255 (AES67 / General)
Delay Message Rate	0.0078s 128Hz / 0.015s 64Hz / 0.0312s 32Hz / 0.0625s 16Hz / 0.125s 8Hz / 0.25s 4Hz / 0.5s 2Hz / 1s 1Hz / 2s 0.5Hz / 4s 0.25Hz / 8s 0.125Hz / 16s 0.0625Hz
Announce Timeout Count	2 to 10

LT4610SER04 GPS/BDS

GNSS Lock

Compliant Phase Control Standard	SMPTE ST 2059-1
GNSS Input Connector	
Connector	1 BNC connector
Input Impedance	50 Ω
Antenna, Pre-amp Power Supply	
Voltage	5 V / 3.3 V / OFF
Current	50 mA max. (built-in overcurrent protection circuit)
GNSS Receiver	
Receive Frequency	
GPS	1575.42MHz (L1)
BDS	1561.098MHz (B1)
Receive Sensitivity	GPS：-130dBm or more (input level to the antenna) BDS：-120dBm or more (input level to the antenna)
Status	NO SIGNAL, TRACKING, LOCKED, STAY IN SYNC
Holdover Function	Retains the previous frequency and phase when the GPS signal or GPS signal is interrupted

CW I/O

CW I/O Connector	
Connector	1 BNC connector (shared input and output)
Input Impedance	50 Ω
Input Signal Level	0.5 to 2 Vp-p
Input Signal Frequency	10 MHz
Locking Frequency Range	±5 ppm
Output Signal Level	3.3 V LVCMOS
Output Signal Frequency	10 MHz / 1 PPS
Holdover Function	Retains the previous frequency when the 10 MHz CW signal is interrupted.

LTC I/O

I/O Connectors	
Connector	D-SUB 15 pin (shared input and output)
LTC	
Number of Inputs	1
Input Impedance	600 Ω balanced
Input Signal Level	0.5 to 4 Vp-p
Number of Outputs	3
Output Impedance	600 Ω balanced
Output Signal Level	2 Vp-p±10%
Alarm	
Number of Outputs	2
Output Signal Level	5 V CMOS

Time Code

Reference Time	Internal / GNSS / LTC / VITC / PTP(when the LT4611 is equipped with the hardware option LT4610SER03)
Frame Rate	Synchronizes to ANALOG BLACK 1 (LTC OUT)
Dropped Frame Mode	On / Off
ATC Setting	
LTC Insertion Setting	On / Off
LTC Setting	
Output Setting	On / Off
AES/EBU Time Code Insertion Setting	On / Off
Leap Second	
Application Setting	Set the application date/time with a timer
Daylight Savings Time	
Application Setting	Set the application date/time with a timer

LT4611SER21　SYNC 3 OUT ADD

Compliant Standard

Analog Video Sync Signal

NTSC Black Burst Signal	SMPTE ST 170, SMPTE ST 318, SMPTE RP 154
PAL Black Burst Signal	ITU-R BT 1700, EBU N14
HD Tri-Level Sync Signal	SMPTE ST 240, SMPTE ST 274, SMPTE ST 296

Output Connectors

Analog Video Sync Signal Output Connector

Connector	3 BNC connectors, 3 outputs
Output Signal	NTSC black burst signal, PAL black burst signal, HD tri-level sync signal
Output Impedance	75Ω
Sync Level	
NTSC	40±1 IRE
PAL	-300±6mV
HD	±300±6mV
Blanking	0±15mV

Analog Video Sync Signal Output

Signal Formats: Each of the 3 outputs can be set separately.
NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, NTSC BB+SETUP, NTSC BB+S+REF, NTSC BB+S+ID, NTSC BB+S+R+ID, PAL BB, PAL BB+REF, 525/59.94I, 525/59.94P, 625/50I, 625/50P, 1125/60I, 1125/59.94I, 1125/50I, 1125/30P, 1125/29.97P, 1125/25P, 1125/24P, 1125/23.98P, 1125/24PsF, 1125/23.98PsF, 750/60P, 750/59.94P, 750/50P, 750/30P, 750/29.97P, 750/25P, 750/24P, 750/23.98P

Timing Adjustment: Can be set separately for each of the 3 outputs

Adjustment Range

NTSC Black Burst Signal	±5 frames
PAL Black Burst Signal	±2 frames
HD Tri-Level Sync Signal	1 frame (entire frame)

Adjustment Unit

NTSC/PAL Black Burst Signal	In units of 0.0185 µs (54 MHz clock unit)
HD Tri-Level Sync Signal	In units of 0.0135 µs (74.25/1.001 MHz clock unit or 74.25 MHz clock unit)

LT4611SER22　SDI OUTPUT

Compliant Standards

SDI Embedded Audio

3G、HD、HD (DL)	SMPTE ST 299
SD	SMPTE ST 272
SDI Payload ID	SMPTE ST 352

SDI Formats and Standards

HD, SD Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1280 × 720	60/59.94/50/ 30/29.97/25/24/23.98/P	SMPTE ST 292 SMPTE ST 296
		1920 × 1080	60/59.94/50/I	SMPTE ST 292
			30/29.97/25/24/23.98/P	SMPTE ST 274
			24/23.98/PsF	SMPTE ST 292 SMPTE RP 211
		720 × 487	59.94/I	SMPTE ST 259
		720 × 576	50/I	SMPTE ST 125

HD(DL) Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920 × 1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 372
	12bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
YC_BC_R 4:4:4	10bit 12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
RGB 4:4:4	10bit 12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	

3G-A Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920 × 1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 425
	12bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
YC_BC_R 4:4:4	10bit	1280 × 720	60/59.94/50/ 30/29.97/25/24/23.98/P	SMPTE ST 296 SMPTE ST 425
		1920 × 1080	60/59.94/50/I	SMPTE ST 274 SMPTE ST 425
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	
RGB 4:4:4	10bit	1280 × 720	60/59.94/50/ 30/29.97/25/24/23.98/P	SMPTE ST 296 SMPTE ST 425
		1920 × 1080	60/59.94/50/I	SMPTE ST 274 SMPTE ST 425
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit	1920 × 1080	60/59.94/50/I	
			30/29.97/25/24/23.98/P	

3G-B Video Signal Formats and Standards

Color System	Quantization	Image	Frame (Field) Frequency /Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	1920 × 1080	60/59.94/50/P	SMPTE ST 274 SMPTE ST 372 SMPTE ST 425
	12bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
YC_BC_R 4:4:4	10bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
RGB 4:4:4	10bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	
			30/29.97/25/24/23.98/PsF	
	12bit		60/59.94/50/I	
			30/29.97/25/24/23.98/P	

Output Connectors

SDI Output Connector

Connector	2 BNC connectors
3G-A, HD, SD	2
3G-B, HD(DL)	1
Output Impedance	75 Ω
Output Amplitude	800 mVp-p±10%
Output Return Loss	
5 MHz to 1.485 GHz	15 dB or more
1.485 to 2.97 GHz	10 dB or more
Overshoot	Less than 10%
Rise and Fall Times	
3G	≤ 135 ps (20 to 80%)
HD, HD(DL)	≤ 270 ps (20 to 80%)
SD	0.4 ns to 1.5 ns (20 to 80%)
DC Offset	0±0.5 V

SDI Video Output

SDI Signal

Bit Rate	
3G	2.970Gbps, 2.970/1.001Gbps
HD, HD(DL)	1.485Gbps, 1.485/1.001Gbps
SD	270 Mbps

Timing Adjustment

Adjustment Range	Entire frame
Adjustment Unit	
V	Lines
H	Clocks (148.5 MHz, 148.5/1.001 MHz, 74.25 MHz, 74.25/1.001 MHz, 27 MHz)

Test Patterns

3G, HD	100% color bar, 75% color bar, multiformat color bar (ARIB STD-B28, pattern 2 area can be set to 100% white, 75% white, or +I), check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
SD	
525/59.94I	100% color bar, 75% color bar, SMPTE color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
625/50I	100% color bar, EBU color bar, BBC color bar, check field, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
Automatic Switching	Automatically switches between selectable color bar patterns
Switch Time	1 to 255 sec

Pattern Scrolling

Direction	Eight directions (up, down, left, right, and their combinations)
Speed Range and Unit	
Interlace	In unit of fields
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps
Progressive	In unit of frames
V	0 to 256 lines, in 1 line steps
H	0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.

Safety Area Markers

3G, HD	Action safe area (90%) Title safe area (80%) 4:3 aspect ratio (can be turned on and off separately)
SD	Action safe area (90%) Title safe area (80%) (can be turned on and off separately)

* Not available when the check field pattern is selected.

ID Characters

Number of Characters	Up to 20 characters
Size [Dots]	32 × 32 / 64 × 64 / 128 × 128 / 256 × 256
Intensity	100%, 75% (black only for the background color)
Display Position	Anywhere on the display
Display Position	Adjustment Resolution
V	1 line
H	1 dot
Blinking Display (*1)	ON / OFF
ON TIME	1 to 9 sec, in 1 sec step
OFF TIME	1 to 9 sec, in 1 sec step
Scrolling (*1)	
Function	Scroll including the ID character background
Direction	Two directions (left and right)
Speed Range and Unit	
Interlace	In unit of fields 0 to 256 dots, in 2 dot steps
Progressive	In unit of frames 0 to 256 dots, in 2 dot steps

* Not available when the check field pattern is selected.
*1 The blinking display and scrolling can be used simultaneously.

Logo Mark

Logo Mark Data	4-level monochrome data from level 0 to 3
Maximum Size	320 (dots) × 240 (lines) (QVGA size)
Number of Logo Marks	That Can Be Saved in the LT4611 Up to 4
Display Position	Anywhere on the display
Display Position Adjustment Resolution	
V	1 line
H	1 dot
Display Level	Any level from 0 to 3
File Format	
Before Conversion	24-bit full color bitmap format (.bmp)
After Conversion	Original format (.lg)
Conversion Color Matrix	Y = (0.212 × R) + (0.701 × G) + (0.087 × B) Converts 256-level monochrome data (Y) to 4 levels (levels 0 to 3) using specified thresholds
Conversion Method	Using the logo application
Logo Mark Data Transfer	Save the data to a USB memory device and transfer to the LT4611.

* Not available when the check field pattern is selected.

Component On/Off

Function	Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.

* Not available when the check field pattern is selected.

Image Overlay

Display Precedence	ID characters > logo mark > safety area markers > test pattern (The display order cannot be changed.)
Simultaneous Display	ID characters, logo mark, safety area markers, and test pattern can be displayed simultaneously.

Embedded Audio

Embedded Channels	Can be turned on and off at the group level
3G-A, HD, SD	16 channels (4 channels × 4 groups)
3G-B	32 channels (stream 1, stream 2, 4 channels each × 4 groups)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits Pre-emphasis OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec

* Audio (including packets) cannot be embedded when the check field pattern is selected.
* The frequency, level, and audio click can be set for each channel.
* The following limitations apply for SD (525/59.94I).
  - For 16 channel output, the resolution is set to 20 bits.
  - Up to three groups (12 channels) can be output at 24-bit resolution.

Lip Sync Patterns

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

LT4611SER23 AUDIO OUT

Compliant Standards

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

Output Connectors

AES/EBU Digital Audio Output Connector

Connector	1 BNC connector
Output Amplitude	1 Vp-p±0.1 V
Output Impedance	75 Ω unbalanced

AES/EBU Silence Output Connector

Connector	1 BNC connector
Output Amplitude	1 Vp-p±0.1 V
Output Impedance	75 Ω unbalanced

AES/EBU Digital Audio Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits
Pre-emphasis	OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec
Lip Sync	Synchronization with SDI1
Sampling Clock Accuracy	Grade 2 (±10 ppm)

AES/EBU Silence Output

Timing Adjustment	
Adjustment Range	±1 AES/EBU frame
Adjustment Unit	512 fs (24.576 MHz)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits / 24 bits
Pre-emphasis	OFF
Frequency	SILENCE
Level	MUTE
Sampling Clock Accuracy	Grade 2 (±10 ppm)

LT4611SER24 8K

Compliant Standard

SDI Embedded Audio	SMPTE ST 299
SDI Payload ID	SMPTE ST 352

SDI Formats and Standards

12G(QL) 8K Video Signal Formats and Standards(2 sample Interleave)

Color System	Quantization	Image	Field Frequency/Scanning	Compliant Standards
YC_BC_R 4:2:2	10bit	7680×4320	60/59.94/50/48/47.95/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
YC_BC_R 4:4:4	10bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
RGB 4:4:4	10bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1
	12bit	7680×4320	30/29.97/25/24/23.98/P	SMPTE ST 2082-12 SMPTE ST 2036-1

8K SDI Pattern Generation

SDI Signal	11.880 Gbps, 11.880/1.001 Gbps
Test Patterns	100% color bar, 75% color bar, flat field white 100%, black 0%, red 100%, green 100%, blue 100%
Automatic Switching	Automatically switches between selectable color bar patterns
Switch Time	1 to 255 sec
User Pattern Display	Select one from INT-1 to 8.
Storage Memory	Up to 25 patterns
Display Memory (INT_1 to 8)	Transfer the pattern data (up to 8 patterns) from the storage memory to the display memory
File Format	24-bit full color bitmap format (.bmp) TIFF format (.tif), IMG format (.img)

* After turning on the power, transfer the data from the storage memory to the display memory.It takes about 2 minutes to transfer the data of an 8K user pattern. If the power is cut off after a memory transfer, the data in the display memory will be cleared. The data in the storage memory will be retained even when the power is turned off, so after turning on the power, perform a memory transfer operation again.
* If the power is cut off while data is being accessed, the data may become corrupted. Do not turn off the power while data is being accessed.
* In the user pattern display, the color system is 422(YCbCr) 10 bit.

Component On/Off	
Function	Each of the Y/G, Cb/B, and Cr/R components can be turned on and off independently.
Safety Area Markers	Action safe area (90%) Title safe area (80%) 4:3 aspect ratio (can be turned on and off separately)
Moving Box	
Box Color	Select from white, yellow, cyan, green, blue, red, magenta, black
Speed Setting V/H	LOW / MIDDLE / HIGH
Size Setting V/H	SIZE 1 to 5

* Not available when the user pattern is selected.

Pattern Scrolling	
Direction	Eight directions (up, down, left, right, and their combinations)
Speed Range and Unit	
Progressive	In unit of fields
V	0 to 256 lines, in 4 line steps
H	0 to 256 dots, in 8 dot steps
Embedded Audio	
Embedded Channels	Can be turned on and off at the group level 16 channels (4 channels × 4 groups)
Sampling Frequency	48 kHz sampling (synced with the video signal)
Resolution	20 bits, 24 bits
Pre-emphasis	OFF, 50/15, CCITT (only the CS bit is switched)
Frequency	SILENCE / 400Hz / 800Hz / 1kHz
Level	-60 to 0 dBFS (1 dBFS steps)
Audio Click	OFF, 1 / 2 / 4 sec

* The frequency, level, and audio click can be set for each channel.

Lip Sync Patterns

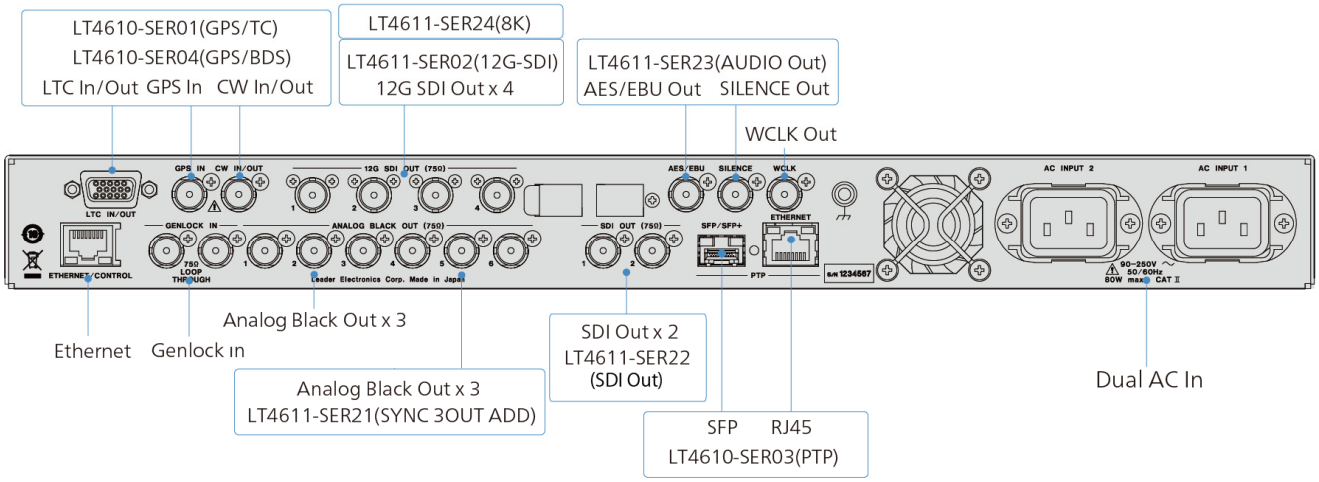
Setting	Set by SDI1

User Payload ID

Setting	ON / OFF

* You can edit the user payload ID only in a web browser.

Rear Panel



Related accessories

LC2141 (SFP RJ-45)
Speed : 1000Mbps
Connector : RJ-45

LC2148 (SFP+ MULTI-MODE)
Transmission Distance : 300m
Wave ength : 850nm
Supported standards : 10GBASE-SR/SW
Connector : LC

LC2145 (SFP+ SINGLE-MODE)
Transmission Distance : Max 10,000m
Wave ength : 1310nm
Supported standards : 10GBASE-LR/LW

LT4610 / LT4611 Comparison table

	LT4610	LT4611
Genlock	Standard	Standard
SYNC 3 Outputs (BB/tri-level) 1～3	Standard	Standard
SYNC 3 Outputs (BB/tri-level) 4～6	Standard	LT4611SER21
SDI 2 Outputs 3G/HD/SD SDI	Standard	LT4611SER22
Word-Clock Signal Output	Standard	Standard
AES/EBU Signal Output AES/EBU Silence Output	Standard	LT4611SER23
GPS/TC	LT4610SER01	LT4610SER01
GPS/BDS/TC	LT4610SER04	LT4610SER04
12G-SDI 4K Outputs	LT4610SER02	LT4610SER02
PTP	LT4610SER03	LT4610SER03
12G-SDI 8K Output	LT4610SER24	LT4611SER24

*If you add the LT4611SER21, LT4611SER22, and LT4611SER23 to the LT4611 to make them equivalent to the LT4610, the LT4611 will be more expensive than the LT4610.

www.leader.co.jp/en

List of Locations

Leader Electronics Corporation
2-6-33 Tsunashima-higashi, Kohoku-ku, Yokohama 223-8505 Japan
Tel: +81-45-541-2123
URL：www.leader.co.jp/en　Email: sales@leader.co.jp
Area: All World

Leader Instruments Corporation
2125 Center Avenue, Suite 406, Fort Lee, NJ 07024 USA
Tel: +1-201-355-4850
Email: sales@leaderamerica.com
Area: USA and Canada

Leader Europe limited (UK)
6th Floor, First Central 200, 2 Lakeside Drive Park Royal, London, NW10 7FQ UK
UK Tel: +44-7867-450205　Germany Tel: +49-174-3977799
Email: sales@leadereurope.com
Area: Europe and Africa

JiaLong Leader (Beijing) Trading Co., Ltd.
Unit 08,20F Jialong International Tower, No.19 Chaoyang Park Road, Chaoyang District, Beijing, P.R.China Zip Code 100125
Beijing　Tel:+86-10-8511-8606 Email:beijing@leadercorp.com.cn
Shanghai Tel:+86-21-6275-6905 Email:shanghai@leadercorp.com.cn
Area: China

Leader Korea Co., Ltd.
#R1110, 11F, Gangdong Green Tower Bldg., 1139, Cheonho-daero, Gangdong-gu, Seoul, 05355
Tel: +82-10-6245-7311
Email: jhlee@leaderkorea.kr
Area: South Korea

Leader Singapore Branch
50 Bukit Batok Street 23, #05-20 Midview Building, Singapore 659578
Area: South East Asia and Oceania
Tel:+65-9429-0237 Email: ishihara.m@leader.co.jp
Area: India and Middle East
Tel:+91-98111-06956 Email: Umesh@leaderindia.in

Leader Taiwan Representative Office
14F, No. 51, Sec. 2, Keelung Rd., Xinyi Dist., Taipei City,112,Taiwan
Tel:+886-933-800-188 Email: chen.p@leader.co.jp
Area: Taiwan, Hong Kong and Macau

Latin America Branches
Area: Mexico, Central America, Colombia, Ecuador and Venezuela
Tel:+1-305-213-4827 Email: salvadordelaserna@leaderamerica.com
Area: Argentina, Bolivia, Brazil, Chile, Peru and Uruguay
Tel:+55-11-2863-3822 Email: ishimaru@leaderamerica.com

⚠ Safety Precautions

In order to use the product correctly and safely, carefully read the instruction manual prior to first use.

April 15th 2022