

# Leader

## LT 4611

### SYNC GENERATOR



## Overview

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

## Features

### Triple rate SDI compatible

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

### 12G-SDI compatible

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

### Superimposing ID characters

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

### Superimposing logo mark

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

### Safety area marker

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

### Pattern scroll

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

### Superimposing embedded audio

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

### Lip Sync pattern

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

### GENLOCK function

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

### Analog black output

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

### Word clock output

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

### AES/EBU serial digital audio output

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

### Real time clock

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

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

### Ethernet

Standard support of SNMP enables easy integration into network environment.

### Preset function

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

### External memory compatible

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

### Duplex power supply

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

## LT 4610SER01 GPS

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

## LT 4610SER02 12G-SDI

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

## LT 4610SER03 PTP

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

## LT 4611SER21 SYNC 3 OUT ADD

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

## LT 4611SER22 SDI OUTPUT

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

## LT 4611SER23 AUDIO OUTPUT

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

# Standard

### •Compatible standards

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

### •Input/output terminal

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

### Analog black output terminal

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

### Word clock output terminal

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

### •Control terminal

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

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

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

#### •Word clock output

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

#### •Preset function

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

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

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

#### •Log function

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

#### •Internal reference transmitter

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

#### •Internal clock backup battery

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

#### •General specification

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

## LT 4611SER01 GPS

#### •GPS lock

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

#### •10MHz CW lock

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

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

#### •LTC input/output

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

#### •Time code

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

## LT 4611SER02 12G-SDI

#### •Compatible standards

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

#### •Output terminal

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

#### •SDI video output

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

#### •Test pattern

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

## SD

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

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

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

## -Natural image display

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

## -Component ON/OFF

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

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

※Enabled only when test pattern is selected.

## -Moving box

ON / OFF

## -Embedded audio

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

## -ID characters

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

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

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

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

※1 Flashing display and scroll function can be set simultaneously

## -Pattern scroll

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

## •SDI formant and standards (4k)

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

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

### HD(QL) video signal format and standards

Divided transmission system	Color system	Quantization accuracy	Image	Frame frequency/scanning	Compatible standards
Square	YCbCr 4:2:2	10bit	3840 × 2160	30/29.97/25/24/23.98/P	-
				30/29.97/25/24/23.98/PsF	-
			4096 × 2160	30/29.97/25/24/23.98/P	-
				30/29.97/25/24/23.98/PsF	-

### 3G(QL) video signal format and standards

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

### 12G video signal format and standards

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

## LT 4611SER03 PTP (IEEE 1588)

### •Compatible standards

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

### •RJ-45 terminal

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

### •SFP cage

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

### •Master function

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

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

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

#### •Slave function

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

#### •Item sold separately

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

## LT 4611SER21 SYNC 3 OUT ADD

#### •Compatible standards

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

#### •Input/output terminal

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

#### •Analog black output

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

## LT 4611SER22 SDI OUTPUT

#### •Compatible standards

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

#### •Input/output terminal

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

#### Analog black output terminal

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

#### •SDI video output

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

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

※Disabled when check field pattern is selected.

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

※Disabled when check field pattern is selected.

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

※ Disabled when check field pattern is selected.

※1 Flashing display and scroll function can be set simultaneously

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

※ Disabled when check field pattern is selected.

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

※ Disabled when check field pattern is selected.

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

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

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

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

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

#### • SDI format and standards

##### 3G-A format and standards

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

##### 3G-B format and standards

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

##### HD (DL) format and standards

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

##### HD, SD format and standards

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

## LT 4611SER23 AUDIO OUT

### Compatible standards

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

### Input/output terminal

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

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

### AES/EBU digital audio output

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

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

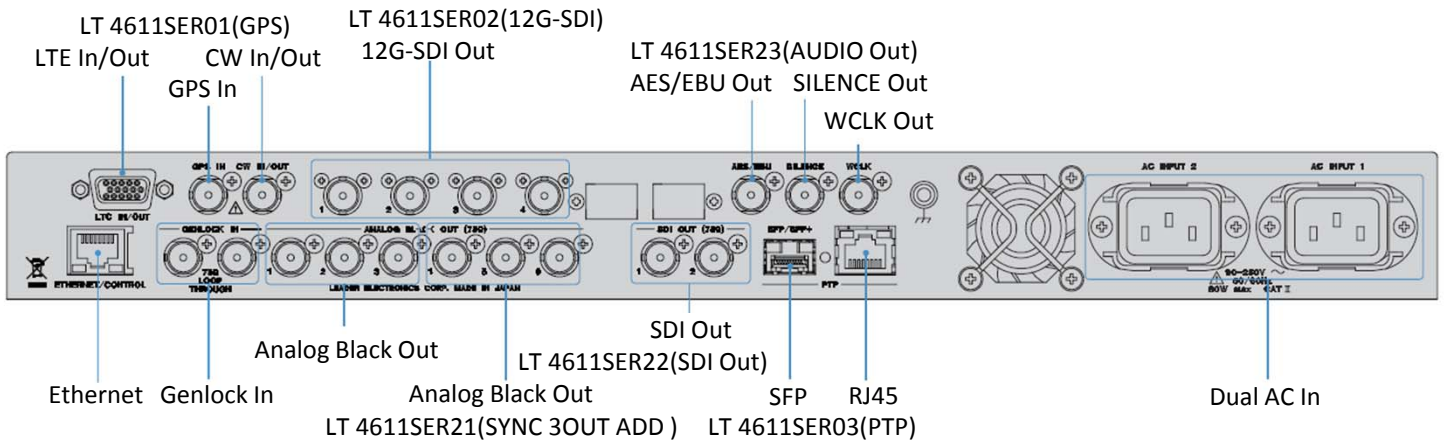
### AES/EBU Silence output

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

### Lip Sync pattern

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

## Rear panel



## Item sold separately

### SFP transceiver RJ-45

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



### SFP + transceiver optical

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



### SFP + transceiver optical

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

