MULTIFORMAT VIDEO GENERATOR

LT 4600A

LEADER Technology Innovator

Compact Sync Generator with 3G Capabilities

The compact, 1U half-rack sized, LT4600A Multiformat Video Generator is applicable to 3G-SDI, HD-SDI and SD-SDI systems. Various output capabilities, such as color bar, SDI check field test pattern, ID characters, logo mark in QVGA size, safety area marker, embedded audio, genlock function for external reference synchronization, and three independent analog black signal systems. Lip Sync is one of the key features included in the product.

■MAIN FEATURES

●Triple-Rate SDI outpou

Accepts 3G-SDI (Level A,B) ,HD-SDI (include Dual Link) and SD-SDI systems. Two(2) SDI output can be used independently from each other.

●Superimposing ID characters

The ID characters can be superimposed at any arbitrary position on the screen. The character blinks to indicate the freeze status.

●Superimposing Logo mark

A logo mark, up to 320(pixels) by 240(lines) in QVGA size can be superimposed at any arbitrary position on the screen. The logo mark is converted from bitmap to four grade monochrome data.

●Safety-area marker

A 90% and 80% safety-area markers can be superimposed on the screen. A 4:3 aspect ratio marker can also be superimposed in 3G-SDI or HD-SDI formats.

●Pattern scroll

Simple motion picture mode is provided to scroll the pattern.

●Superimposing embedded audio

The 32 channel of embedded audio signals (link A and link B – each 4ch x 4 groups) for 3G-SDI (level B), and the 16 channels of embedded audio signals (4ch x 4 groups) can be superimposed. The frequency and level can be respectively set for each channel.

●Lip Sync test pattern

The LT4600A can output lip sync test pattern in which the video and audio are synchronized.
By using Leader's LV5770A., you can accurately measure the lip sync of the video and audio on SDI signal.
(3G-SDI Level A/HD-SDI/SD-SDI only)

●Genlock mode

The LT4600A can synchronize with NTSC/PAL black burst signals and HD 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. Furthermore, s Sty-in-Sync function is available in case errors occur at the genlock input.

●Analog black signal output

Three independent analog black signals output systems are provided. The black burst signal with the same format as the SDI output, or HDTV tri-level sync signal with the same format of clock frequency can be selected for variable timing.
The NTCS/PAL black burst signal with field reference pulse signal, and NTSC black burst signal with 10-field ID are also applicable.

●Word clock output

The 48 kHz word clock output is provided to synchronize the audio signal.

●AES/EBU digital audio output

AES/EBU digital audio output is provided to synchronize the video signal.

●Ethernet

Standard support for SNMP via Ethernet makes it easy to integrate the LT4600A in a network environment.

●USB memory

USB slot in available on the front panel to save and update user data setting.

●Preset function

Up to 10 presets can be saved. You can recall a preset to start the LT4600A with the same settings every time.

●AC Power

AC 90～250V, Power consumption 25W max.

■SPECIFICATIONS

●SDI Format and Standards

3G-A Format and Standard

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

3G-B Format and Standards

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

HD(DL) Format and Standards

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

HD,SD Format and Standards

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

●Test pattern

3G,HD

100% color bar / 75% color bar / Multi-format color bar（ARIB STD-B28, pattern2 area can be set to 100% white, 75% white or +I ）/ Check field / Flat field blue 100% / Green 100% / red 100% / white 100% / Black 0%

SD

525i/59.94: 100% color bar / 75% color bar/ SMPTE color bar / Check field / Flat field blue 100% / Green 100% / red 100% / white 100% / Black 0%

625i/50: 100% color bar / EBU color bar / BBC color bar / Check field / Flat field blue 100% / Green 100% / red 100% / white 100% / Black 0%

Automatic Switching: Automatically switches between available patterns (except for check field)

Switching Time: 1～255sec

●Pattern Scrolling

Direction: Eight directions(Up, Down, left, right, and their combinations)

Speed range and Unit

- Interlace: In unit of fields
  - V: 0～256 lines, 1 line steps
  - H: 0～256 dots, in 2 dot steps
- Progressive: In unit of frames
  - V: 0 to 256 lines, 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 turn on and off separately)

SD: Action safe area(90%), Title safe area(80%)
(can be turn 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 back ground color)
Display position: Anywhere on the display
Blinking Display (※1): OFF / 1 to 9sec
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(dot)×240(line)(QVGA size)
Number of Logo Marks: Up to 4
Display Position: Anywhere on the display
Display Level: Any level from 0 to3
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)
Conversion 256-level monochrome data (Y) to 4 levels (level 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.

●Embedded Audio

Embedded channels: Can be turn on and of at the group level

- 3G-A, HD, SD: 16ch (4ch×4 group)
- 3G-B: 32ch (Link A, Link B, 4ch each×4 group)

Sampling Frequency: 48kHz sampling (synced with the video signal)
Resolution: 20bits / 24bits
Pre-emphasis: OFF / 50/15 / CCITT (only the CS bit is switched)
Frequency: SILENCE / 400Hz / 800Hz / 1kHz
Level: －60 to 0dBFS (1dBFS steps)
Audio Click: OFF / 1 to 4 sec

※ Audio (include 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 limitation apply for SD (525i/59.94)
・For 16channel output, the resolution is set to 20 bits.
・Up to three groups (12 channels) can be output at 24-bit resolution.

●Lip Sync Pattern

Format: 3G, HD, HD(DL), SD
Setting: On / Off

※ Not available when the check field pattern is selected.
※ Safety marker, ID character and logo mark cannot be embedded.
※ When lip sync is embedded, the audio click setting is disabled, and audio synchronized to the lip sync pattern is output.

Genlock Function

Reference input signal	
Input Configuration	BNC 75Ω loop through
Input Signal	
NTSC black bust signal	SMPTE RP 154, SMPTE ST 170, SMPTE ST 318
PAL black bust signal	EBU N14, ITU-R BT 1700
HD try-level sync signal	SMPTE ST 240, SMPTE ST 274, SMPTE ST 296
Sync Level	
NTSC black burst signal	−286mV
PAL black burst signal	−300mV
HD try-level sync signal	±300mV
Operation Method	
Internal	Internal reference signal is used for operation (INT mode)
Stay-in-Sync	Maintains the phase when errors occur in the input signal

Analog black output

Format	
NTSC black burst signal	SMPTE RP 154, SMPTE ST 170, SMPTE ST 318
PAL black burst signal	EBU N14, ITU-R BT 1700
HD try-level sync signal	SMPTE ST 240, SMPTE ST 274, SMPTE ST 296
Output signal	
Number of output	6 (3 output systems which equip with 2 connectors each)
Setting	Three systems can be set individually
Impedance	75Ω
Connector	BNC
Output Timing	
Setting	Three systems can be set individually
Variable Range	
NTSC black burst signal	±5 frames
PAL black burst signal	±2 frames
HD try-level sync signal	1frame (entire frame range)
Setting Resolution	
NTSC/PAL BB signal	0.0185µs steps (54MHz in clock steps)
HD try-level sync signal	0.0135µs steps (74.25/1.001MHz in clock steps, or 74.25MHz in clock steps)

※ HD tri-level sync signal of 3G format (1080p) cannot be output.

※ The output settings can be specified separately for the three signals, but for HD tri-level sync signal, different frame frequencies (60 Hz, 59.94 Hz, and 50 Hz) cannot be specified at the same time.

AES/EBU Digital Audio Output

Compliant Standards	ANSI S4.40, AES3-2009, AES11-2009, SMPTE ST 276
Output Impedance	75Ωunbakanced
Output Amplitude	1Vp-p±0.1V
Output Connector	BNC
Outputs	2 (2 channel pair)
Timing Adjustment	
Adjustment Range	±1AES/EBU frame
Adjustment Unit	512fs(24.576MHz)
Sampling frequency	48kHz 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 0dBFS (1dBFS steps)
Audio Click	OFF / 1 to 4sec
Lip Sync	ENABLE / DISABLE
Sampling Clock Accuracy	Grade2 (±10ppm)

※ The frequency, level, and audio click can be set for each channel. (When lip sync is enabled, the audio click setting is disabled, and audio synchronized to the lip sync pattern is output.)

※ Turn off all channels to output a digital audio reference signal (DARS).

Word-Clock Output

Output Frequency	48kHz
Output Amplitude	5V CMOS Compatible (when not terminated)
Output Connector	BNC
Outputs	1
Timing Adjustment	
Adjustment Range	±1AES/EBU frame
Adjustment Unit	512fs(24.576MHz)

External Interface

Ethernet	
Specification	10BASE-T / 100BASE-TX (auto switching)
function	Transmission operation status(e.g., genlock synchronization status) SNMP v1compliant
USB	
Connector	USB Type A
Specification	USB 2.0
Supported Media	USB memory device (up to 8GB)
Function	Saving and loading of preset data Saving and loading of logo data updating of firmware

Presets

Presets	Save the panel setting(※1)
Presets	10
Recall Method	Front panel
Copy Method	Copy all presets from the LT4600A to a USB memory device or copy all presets from the USB memory device to the LT4600A

※ Last memory is not supported. By setting POWER ON RECALL, you can start the LT 4600 with preset settings.

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

LCD

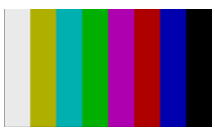
Number of Characters	20 characters × 2 lines
Backlight	On, Off

General Specifications

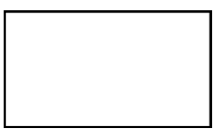
Environmental Conditions	
Operating Temperature	0〜40℃
Operating Humidity	
Range	85%RH or less (no condensation)
Optional Temperature	10 to 35℃
Operating Environment	Indoors
Elevation	up to 2,000m
Overvoltage Category	I
Pollution Degree	2
Power Requirements	
Voltage	AC 90〜250V
Power Consumption	25W max.
Dimensions	213(W) × 44(H) × 400(D)mm (excluding protrusions)
Weight	3.0kg
Accessories	Power code X 1 Cover/ Inlet stoppers X 1 CD-ROM (Logo App, Instruction Manual) X 1
Sold Separately	LR 2478 (rack mount adapter for two units) LR 2481 (rack mount adapter for one unit)

Test Pattern

Multi-Format Color Bar (ARIB STD-B28)



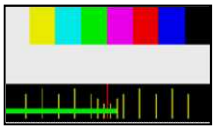
75 % Color bar



Flat Field White 100 %

Flat field Black 100 %

Check Field



Lip Sync Pattern

■Rack Mount Adapter

LR 2478 （Rack mount adapter for two units）

For：LT 4600A (Mount example)

■Rack Mount Adapter

LR 2481 （Rack mount adapter for one unit）

For：LT 4600A (Mount example)