

## LT4448 CHANGEOVER



FRONT PANEL

3G-SDI

HD-SDI

SD-SDI



### 3G/LTC/DUAL AC POWER/SNMP/WEB BROWSER

The LT 4448 is a changeover unit that automatically switches from the primary signal to the backup signal when problems are detected in the primary signal. A single LT4448 provides 11 channels. These channels can receive LTC, SDI, NTSC/PAL black burst, HD tri-level sync, AES/EBU digital audio, and word-clock signals. SDI signals are switched with relays. All other signals are switched with electronic switches. Redundant power supplies are included. Alarms are generated when errors occur. The LT 4448 can be used in combination with the LT4610 TEST / SYNC GENERATOR.

#### FEATURES

##### Input / Output

Provides 11 channels (a single channel consists of a primary input, a backup input, and an output).

##### Input Signal Switching

Relays are used to switch channels 1 to 2. Electronic switches are used to switch channels 3 to 11. In addition to the electronic switches, channels 4 to 11 are also equipped with high-speed, error detection circuits. Provides 3 channels for LTC.

##### Input Signal Selection

Channel 1 and 2 inputs are dedicated inputs for SDI (3G/HD/SD), NTSC/PAL Black burst and Tri-Level Sync signals. Channel 3 to 8 inputs are dedicated inputs for NTSC/PAL Black burst and Tri-Level Sync signals. Channel 9 and 10 inputs are dedicated inputs for AES/EBU digital audio signals. Channel 11 input is a dedicated input for word-clock signals (TTL). For LTC signals, dedicated LTC inputs / outputs (2Vp-p, differential input) are provided.

##### LTC Channels

There are 3 LTC channels. Each has 2 inputs (primary and backup) and 1 output. In addition, they can be connected to the LT4610 TEST / SYNC GENERATOR with a dedicated cable (optional).

##### Fault Detection

When an input signal level error is detected, the panel fault LED on the LT4448 illuminates as well as the panel LED that indicates the channel which is causing the problem. This feature allows for quick notification of the problem. Channels 3 to 11 are equipped with high-speed fault detection circuits. When interruptions occur in the primary signal, these enable the LT4448 to switch to a backup signal with barely any noticeable disturbances showing on a monitor.

##### Power Supply Start Time

A delay for starting the fault detection at power up can be set to approximately 1 minute or approximately 4 minutes, depending on the rise time of the system signal source that the LT4448 is connected to.

##### SNMP Ready

Error monitoring over an Ethernet network is possible. Traps are issued for error detection, panel control, and remote control. In addition, the error details and DIP switch settings (except for the user defined fault detection level) can be read as status information. IP address configuration software is included. The software is compatible with Windows 7 (32bit and 64bit), Windows 8 and Windows 10.

##### Redundant Power Supply

The redundant power supply provides extra reliability. Alarms are generated if a power supply failure occurs.

##### Web Browser

Can be controlled by a web browser



#### SPECIFICATION

##### Compliant Standard

SDI Signal	
3G-SDI	SMPTE ST 372,424,425
HD-SDI (Include Dual Link)	SMPTE ST 274,292,296
SD-SDI	SMPTE ST 125,259
Sync Signal	
NTSC Black Burst Signal	SMPTE ST 170,318,154
PAL Black Burst Signal	ITU-R BT.1700,EBU N14
Tri-Level Sync Signal	SMPTE ST 274,296
AES/EBU Digital Audio Signal	AES3,SMPTE ST 276
LTC Signal	SMPTE 12M-1

##### Input / Output

Primary Input	10 input (75ΩBNC Connectors) 1 input (TTL, 75ΩBNC Connector)
Backup Input	10 input (75ΩBNC Connectors) 1 input (TTL, 75ΩBNC Connector)
Output	10 output (75ΩBNC Connectors) 1 output (+5V CMOS, 75ΩBNC connector)
LTC I/O	
Connector	D-SUB 25 pin ((Input and output)
Input	3 channel 2 input(PRIMARY,BACKUP)
Output	3 Channel 1 output

## SPECIFICATION

### I/O Characteristics

Ch1 and 2	
Return Loss	30dB (0 to 10MHz) 15dB (10 to 1.5GHz) 10dB (1.5 to 3GHz)
Insertion Loss	0.2dB (0 to 10MHz) 0.5dB (10 to 500MHz) 2.0dB (1.5 to 3GHz)
Crosstalk	-60dB (0 to 10MHz) -48dB (10MHz to 1.5GHz) -40dB (1.5 to 3GHz)
Impedance	External termination
Maximum Input Voltage	±5V
Ch3 to 10	
Return Loss	30dB (0 to 10MHz, Internally terminated)
Insertion Loss	0.3dB (0 to 10MHz)
Crosstalk	-55dB (0 to 10MHz) -45dB (10 to 30MHz)
Input Impedance	75Ω
Output Impedance	75Ω
Maximum Input Voltage	±1.5V
Ch11	
Input Impedance	Approx. 4kΩ
Output Impedance	Approx. 60Ω
Maximum Input Voltage	0V/+5V (TTL)
LTC	
Input Impedance	10kΩ (Balance)
Input Signal Level	0.5~4Vp-p
Output Impedance	600Ω (Balance)
Output Signal Level	2Vp-p±10%
Input Channel number	LTC1,LTC2,LTC3 (3CH input)
Output Channel number	LTC1,LTC2,LTC3 (3CH output)
GPI(Shared with LTC Connector )	
LT4610 Alarm output	
Input	PRIMARY,BACKUP each1
Output	PRIMARY,BACKUP each1
Output Method	Thru
Output Signal Level	5V CMOS

### Input Signals

Setting Method	Select the input signal type with DIP switches or Web Browser for each channel.
Ch1 and 2	NTSC black burst signal PAL black burst signal HD tri-level signal SD-SDI signal (270Mb/s) HD-SDI signal (1.485Gb/s) 3G-SDI signal (2.97Gb/s)
Ch3 to 8	NTSC black burst signal PAL black burst signal HD tri-level sync signal
Ch9 and 10	AES/EBU digital audio signal
11ch	Word-clock signal (TTL)
LTC	LTC Signal

### Signal Switching

Switching Method	
Ch1 and 2	Relays
Ch3 to 11, LTC	Electrical switches
Switch time from the Panel	
Ch1 and 2	2ms or less
Ch3 to 11,LTC	100ns or less
Switch Time due to Fault Detection	
Ch1 and 2, LTC	70ms or less
Ch3 to 8	
High-Speed Detection	1.5H or less
Low-Speed Detection	60ms or less
Ch9 and 10	
High-Speed Detection	6us or less
Low-Speed Detection	60ms or less
Ch11	
High-Speed Detection	60us or less
Low-Speed Detection	60ms or less



Combination of LT 4610 and LT 4448



### Fault Detection

Fault Indication	LEDs indicate which signal is a problem (PRIMARY or BACKUP), if a fault is detected.
Fault Channel Indication	LEDs indicate channel(s) that have a problem, when a fault is detected
DC Offset	±30mV (sync signal only)
High-Speed Detection	Detects a fault when a signal drops out.
Low-Speed Detection	Detects a fault when a signal level falls below the detection level.
Detection Level	2 to 5 dB below the specified level.
Detection Reference Select	LOW or HIGH set with DIP switches for each input signal type.
	Less than 300mV for LTC
LOW Level (※1)	
NTSC Black Burst Signal	-180 to -227mV (-286mV)
PAL Black Burst Signal	-190 to -238mV (-300mV)
HD Tri-Level Signal	337 to 476mV (600mV)
SD-SDI Signal (270Mb/s)	450 to 635mV (800mV)
HD-SDI Signal (1.485Gb/s)	450 to 635mV (800mV)
3G-SDI Signal (2.97Gb/s)	450 to 635mV (800mV)
AES/EBU Digital Audio Signal	631 to 794mV (1000mV)
Word-clock Signal	1515 to 1907mV (2400mV)
HIGH Level (※1)	
NTSC Black Burst Signal	-210~-264mV (-286mV)
AL Black Burst Signal	-220~-277mV (-300mV)
HD Tri-Level Signal	379~535mV (600mV)
SD-SDI Signal (270Mb/s)	505~713mV (800mV)
HD-SDI Signal (1.485Gb/s)	505~713mV (800mV)
3G-SDI Signal (2.97Gb/s)	505~713mV (800mV)
AES/EBU Digital Audio Signal	734~924mV (1000mV)
Word-clock Signal	1759~2215mV (2400mV)
User-defied level (※2)	
Ch1 to 8	-100~-700mV (when a signal that is equivalent to a horizontal sync signal is applied)
Ch9 and 10	100~1400mV (p-p value of input signal)
11ch	500~3000mV (high level of input signal)

Time from when the LT 4448 turns on to when error detection starts  
Approx. 1 min. (60 to 80s) / approx. 4 min. (240 to 320s)

※1 Depending on the instrument that you are using, there will be deviations in the detection level within the ranges shown. The parenthetical values are levels during normal operation.

※2 Depending on the shape of the waveform, the detection level that you have set may not be reached.

### Alarm Detection

Alarm Indications	LEDs indicate when errors are detected in the output signals (channels 3 to 11).
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### Key Lock

Lock and Unlock	Hold down the KEY LOCK key
Auto key Lock	Automatically locks the keys after 60 seconds of inactivity (no key operations).

### External Control Connectors

Remote Connector	
Use	Remote control
Input	SYNC SOURCE, AUTO SWITCHING, RESET
Output	SYNC SOURCE, FAULT
Connector	9-pin D-sub (female)
Locking Screws	#4-40 inch screw
Ethernet Port	
Use	Monitoring of error occurrence and remote control by external PC.
Compliant Status	10BASE-T / 100BASE-TX (Auto switching)
Protocol	SNMP(SNMPv2c) Remote monitoring, alarm . HTTP(Control by Browser)
Supported browsers	Fire Fox(Latest edition) Google Chrome(Latest edition) Microsoft Edge(Latest edition) IE9 or more(IE9 , IE10 , IE11)
USB Port	
Use	IP address configuration
Compliant Standards	USB 2.0
Connector	Type B

### General Specifications

Power Supply Unit (Dual )	
Voltage/Power Consumption	AC 90 to 250VAC (50/60Hz) /25Wmax
Dimensions(WHD)/Weight	426 × 44 × 400mm (excluding protrusions)/ 4.0kg

### Option LTC Cable : LC 2183

To connect LTC signals between two LT4610 Test / Sync generators (primary and backup) and the LT4448.