

**LEADER**

**LT 4446 / LT 4447**

CHANGEOVER

INSTRUCTION MANUAL

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# GENERAL SAFETY SUMMARY

## ■ Read This before Using the Instrument

This instrument should only be used by persons with sufficient knowledge of electronics who thoroughly understand the contents of this manual.

This instrument is not designed or manufactured for households or ordinary consumers.

If unqualified personnel are to use the instrument, be sure the instrument is handled under the supervision of qualified personnel (those who have electrical knowledge). This is to prevent the possibility of personal injury or damage to the instrument.

## ■ Note about Reading This Manual

The contents of this manual contain specialized terminology and may be difficult to understand. If you have any questions about the contents of this manual, please contact your local LEADER agent.

## ■ Symbols and Terms

The following symbols and terms are used in this instruction manual and on the instrument to indicate important warnings and notes.

<p>&lt;Symbol&gt;</p> 	<p>This symbol appears in this instruction manual and on the instrument to indicate an area where improper handling could result in personal injury, damage to the instrument, or malfunction of the instrument or devices connected to it.</p> <p>When you encounter this symbol on the instrument, be sure to refer to the information in this instruction manual that corresponds to the area that the symbol marks.</p>
<p>&lt;Term&gt;</p>  WARNING	<p>Ignoring the precautions that this term indicates could lead to death or serious injury.</p>
<p>&lt;Term&gt;</p>  CAUTION	<p>Ignoring the precautions that this term indicates could lead to personal injury or damage to the instrument.</p>

# GENERAL SAFETY SUMMARY

Read the warnings and information below thoroughly to avoid death, personal injury, and damage and deterioration of the instrument.



## ■ Warnings Concerning the Case and Panels

Do not remove the instrument's case or panels (except for the power supply unit, fan unit, and DIP switch cover) for any reason except for setting DIP switches. Touching the internal components of the instrument could lead to fire or electric shock.

Also, do not allow foreign materials, such as liquids, combustible matter, and metal, to enter the instrument. Turning the instrument on when such materials are inside it could lead to fire, electric shock, damage to the instrument, or some other accident.

## ■ Installation Environment

### ● Operating Temperature Range

Use this instrument in a 0 to 40 °C environment. Using the instrument with its vents blocked or in a high temperature environment could lead to fire.

Drastic changes in temperature, such as might be caused by moving the instrument between two rooms with different temperatures, can damage the instrument by causing condensation to form within it. If there is a possibility that the instrument has condensation within it, wait for approximately 30 minutes before turning on the power.

### ● Operating Humidity Range

Use this instrument in an environment whose relative humidity is 90 %RH or less where there is no threat of condensation forming.

Also, do not operate this instrument with wet hands. Doing so could lead to electric shock or fire.

### ● Do Not Operate in an Explosive Atmosphere

Using this instrument in an environment where flammable gasses, explosive gasses, or steam is emitted or stored could lead to an explosion or fire. Do not use the instrument in such an environment.

### ● Do Not Insert Foreign Materials

Do not insert foreign materials, such as metal and flammable objects, through the vents or allow liquid to enter the instrument. Such acts can lead to fire, electric shock, damage to the instrument, or some other accident.

## ■ If You Notice Something Wrong during Operation

If you notice smoke, fire, a strange smell, or something else that is wrong with the instrument while you are operating it, stop operation immediately. Failing to do so could lead to fire. Turn OFF the power switch, and remove the power cord from the outlet. After making sure that fire has not spread anywhere, contact your local LEADER agent.

# GENERAL SAFETY SUMMARY



## ■ Warnings Concerning the Power Source

Do not use a power source with a voltage other than the rated power source voltage for the instrument. Doing so could lead to fire.

Confirm the voltage of the power source before you connect the power cord to it.

Only use a power source whose frequency is 50/60 Hz.

Use a power cord that is appropriate for the voltage of the power source. Also, use a power cord that meets the safety standards of the country that you are using it in.

Using a power cord that does not meet the standards could lead to fire. If the power cord is damaged, stop using it, and contact your local LEADER agent. Using a damaged power cord could lead to electrical shock or fire.

When removing the power cord from the power outlet, do not pull on the cord. Pull from the plug.

## ■ Warnings Concerning Grounding

The instrument has a ground terminal to protect the user and the instrument from electric shock. Ensure that the product is properly grounded for safe operation.

## ■ Warnings Concerning the Panel

Sections of the panel are made out of glass. If the glass breaks, the broken glass may lead to injury. Do not apply a strong shock to the panel, cut it with sharp metal, or damage it in any similar manner.



## ■ Cautions Concerning the Input and Output Connectors

To avoid damaging the instrument, only apply signals to the input connectors that conform to the specifications in this instruction manual. Do not short or apply external voltage to the output connectors. Doing so could damage the instrument.

## ■ If You Will Not Use the Instrument for an Extended Period of Time

If you will not use the instrument for an extended period of time, remove the power plug from the outlet.

## ■ Cautions Concerning the Ethernet Port

When you are connecting the instrument to the communication provider's equipment, connect to the Ethernet port through a hub that is authorized for use in the country that you are using the instrument in.

# GENERAL SAFETY SUMMARY

- **Calibration and Repair**

This instrument has been carefully examined at the factory to ensure that its performance is in accordance with the standards. However, because of factors such as parts wearing out over time, the performance of the instrument may degrade. To ensure stable performance, we recommend that you have the instrument calibrated regularly. Also, if the instrument malfunctions, repairs are necessary. For repairs and calibration, contact your local LEADER agent.

- **Routine Maintenance**

When you clean the instrument, remove the power plug from the outlet.

Do not use thinner or benzene when you clean the instrument's case, panels, or knobs. Doing so could lead to paint chipping and the corrosion of plastic components. To clean the case, panels, and knobs, use a soft cloth with mild detergent, and wipe gently. While cleaning, make sure that foreign materials, such as water and detergent, do not enter the product. If liquid or a metal object enters into the instrument, fire or electric shock may result.

- **About the European WEEE Directive**



This instrument and its accessories are subject to the European WEEE Directive.

Follow the applicable regulations of your country or region when discarding this instrument or its accessories. Follow the EU Battery Directive when discarding the batteries that you removed from this instrument.

(WEEE stands for Waste Electrical and Electronic Equipment.)

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Follow the warnings and precautions that have been listed in this section to use the instrument correctly and safely. Precautions are also contained in various other sections of this instruction manual. To use the instrument correctly, be sure to follow those precautions as well.

If you have any questions or comments about this instruction manual, please contact your local LEADER agent.

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## 1. INTRODUCTION

Thank you for purchasing this LEADER instrument. To use this instrument safely, read this instruction manual thoroughly, and make sure that you know how to use the instrument properly.

If some point about the operation of this instrument is still unclear after you have read this instruction manual, refer to the contact information on the back cover of the manual to contact LEADER, or contact your local LEADER agent.

After you have finished reading this manual, keep it in a convenient place so that you can refer to it when necessary.

### 1.1 Scope of Warranty

This LEADER instrument has been manufactured under the strictest quality control guidelines. LEADER shall not be obligated to furnish the following free services during the warranty period.

1. Repair of malfunction or damages resulting from fire, natural calamity, or improper voltage applied by the user.
2. Repair of a product that has been improperly repaired, adjusted, or modified by personnel other than a factory-trained LEADER representative.
3. Repair of malfunctions or damages resulting from improper use.
4. Repair of malfunctions caused by devices other than this instrument.
5. Repair of malfunctions or damages without the presentation of a proof of purchase or receipt bill for the instrument.

### 1.2 Trademark Acknowledgments

The company and product names in this document are trademarks or registered trademarks of their respective holders.

### 1.3 Operating Precautions

#### 1.3.1 Power Supply Voltage



Confirm the voltage of the power source before you connect the power cord to it. The power requirements of this product are indicated on the rear panel. Only use a power source that supplies a voltage within the operating voltage range and has a frequency of 50/60 Hz.

#### 1.3.2 Maximum Allowable Input Voltage



The maximum signal voltage that can be applied to the input connectors is indicated below. Do not apply excessive voltage to the connectors. Doing so may damage the device or lead to injury.

Table 1-1 Maximum allowable input voltage

Input Connector	Maximum Allowable Input Voltage
CHANNEL 1 to 3 (PRIMARY, BACKUP)	$\pm 5V$
CHANNEL 4 to 10 (PRIMARY, BACKUP)	$\pm 1.5V$
CHANNEL 11 (PRIMARY, BACKUP)	0V/+5V (TTL)

#### 1.3.3 Mechanical Shock

This instrument contains sensitive components, so it may be damaged if it is dropped or otherwise exposed to a strong shock.

#### 1.3.4 Electrostatic Damage

Electronic components can be damaged by static discharge. Static electricity can build up in the core wire of a coaxial cable. Before connecting a coaxial cable to an I/O connector of the instrument, short the core wire of the cable with the external conductor.

#### 1.3.5 Warming Up

To ensure more accurate measurements, turn ON the instrument approximately 30 minutes before you intend to use it to allow its internal temperature to stabilize.

## 2. SPECIFICATIONS

### 2.1 General

The LT 4446/4447 is a changeover unit that automatically switches the signal from the primary signal to the backup signal when problems are detected in the primary signal. Two systems of input signals (primary and backup) are connected to the LT 4446/4447, and the LT 4446/4447 detects errors in the amplitude of the primary input signal.

A single LT 4446/4447 provides 11 channels. These channels can receive 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 can be switched with electronic switches. The power supplies are redundant. Alarms are generated when errors occur.

The LT 4446 and LT 4447 are used in combination with the LT 4600 (MULTIFORMAT VIDEO GENERATOR) and LT 4110 (SYNC GENERATOR), respectively, at close distance.

### 2.2 Features

- **I/O Connectors**

The LT 4446/4447 is equipped with 11 sets of I/O connectors (a single set consists of a primary input connector, a backup input connector, and an output connector).

- **Input Switching**

Relays are used to switch between the primary signals and backup signals of channels 1 to 3.

High-speed electronic switches are used to switch between the primary signals and backup signals of channels 4 to 11.

- **Selecting the Input Signal**

On channels 1 to 3, you can select SDI signals (3G, HD, SD), NTSC/PAL black burst signals, or HD tri-level sync signals.

On channels 4 to 8, you can select NTSC/PAL black burst signals or HD tri-level sync signals.

Channels 9 and 10 are exclusively for AES/EBU digital audio signals.

Channel 11 is exclusively for word-clock signals. It receives TTL signals.

- **Fault Detection**

When an input signal level error is detected, the LT 4446/4447 lights the panel fault LED as well as the panel LED that indicates the channel that is causing the problem. This feature allows quick investigation of the problem.

Channels 4 to 11 are equipped with high-speed fault detection circuits. These enable the LT 4446/4447 to switch to a backup signal with barely any disturbances shown on the screen when problems such as interruptions occur in the primary signal.

- **Alarm Detection**

If an error is detected at an output connector of channels 4 to 11, power supply, or fan (LT 4447 only), a panel LED indicating where the error occurred lights to alert the user.

## 2. SPECIFICATIONS

- **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 LT 4446/4447 is connected to.

- **SNMPv1 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. (Compatible with Windows 7 32 bit and 64 bit)

- **Combining with an LT 4600 or LT 4110**

The depths of the LT 4446 and the LT 4600(MULTIFORMAT VIDEO GENERATOR) are the same. The same holds true for the LT 4447 and the LT 4110(SYNC GENERATOR). This makes it easy to wire and operate the devices when you combine them.

- **Redundant Power Supply**

Redundant power supply provides extra reliability. Alarms are generated when errors occur.

- **Power Supply Unit and Fan Unit (LT 4447 only)**

The power supply unit and fan unit support hot-swapping.

## 2. SPECIFICATIONS

### 2.3 Specifications

#### 2.3.1 Compliant Standards

SDI Signal	
3G-SDI	SMPTE ST 372, SMPTE ST 424, SMPTE ST 425
HD-SDI (including HD dual link)	SMPTE ST 274, SMPTE ST 292, SMPTE ST 296
SD-SDI	ITU-R BT.601, ITU-R BT.656, SMPTE ST 125, SMPTE ST 259
Sync Signal	
NTSC Black Burst Signal	SMPTE ST 170, SMPTE ST 318, SMPTE RP 154
PAL Black Burst Signal	ITU-R BT.470-6, EBU N14
HD Tri-Level Sync Signal	SMPTE ST 274, SMPTE ST 296
AES/EBU Digital Audio Signal	AES3, SMPTE ST 276

#### 2.3.2 I/O Connectors

Primary Input Connectors	
Ch1 to 10	10 input connectors (75 $\Omega$ BNC connectors)
Ch11	1 input connector (TTL, 75 $\Omega$ BNC connector)
Backup Input Connectors	
Ch1 to 10	10 input connectors (75 $\Omega$ BNC connectors)
Ch11	1 input connector (TTL, 75 $\Omega$ BNC connector)
Output Connectors	
Ch1 to 10	10 output connectors (75 $\Omega$ BNC connectors)
Ch11	1 output connector (+5 V CMOS, 75 $\Omega$ BNC connector)

#### 2.3.3 I/O Characteristics

Ch1 to 3	
Return Loss	30 dB (0 to 10 MHz) 15 dB (10 MHz to 1.5 GHz) 10 dB (1.5 to 3 GHz)
Insertion Loss	0.2 dB (0 to 10 MHz) 0.5 dB (10 to 500 MHz) 2.0 dB (1.5 to 3 GHz)
Crosstalk	-60 dB (0 to 10 MHz) -30 dB (10 MHz to 1.5 GHz) -20 dB (1.5 to 3 GHz)
Impedance	External termination
Maximum Input Voltage	$\pm 5V$

## 2. SPECIFICATIONS

Ch4 to 10	
Return Loss	30 dB (0 to 10 MHz, internally terminated)
Insertion Loss	0.3 dB (0 to 10 MHz)
Crosstalk	-55 dB (0 to 10 MHz)
	-45 dB (10 to 30 MHz)
Input Impedance	75Ω
Output Impedance	75Ω
Maximum Input Voltage	±1.5V

Ch11	
Input Impedance	Approx. 4 kΩ
Output Impedance	Approx. 60 Ω
Maximum Input Voltage	0V/+5V (TTL)

### 2.3.4 Input Signals

Setting Method	Select the input signal type with DIP switches for each channel.
Ch1 to 3	NTSC black burst signal PAL black burst signal HD tri-level sync signal SD-SDI signal (270 Mb/s) HD-SDI signal (1.485 Gb/s) 3G-SDI signal (2.97 Gb/s)
Ch4 to 8	NTSC black burst signal PAL black burst signal HD tri-level sync signal
Ch9 and 10	AES/EBU Digital Audio Signal
Ch11	Word-clock Signal (TTL)

### 2.3.5 Signal Switching

Switching Method	
Ch1 to 3	Relays
Ch4 to 11	Electrical switches
Switch Time from the Panel	
Ch1 to 3	10 ms or less
Ch4 to 11	100 ns or less
Switch Time due to Fault Detection	
Ch1 to 3	70 ms or less
Ch4 to 8	
High-Speed Detection	1.5 H or less
Low-Speed Detection	60 ms or less
Ch9 and 10	
High-Speed Detection	6 us or less
Low-Speed Detection	60 ms or less
Ch11	
High-Speed Detection	60 us or less
Low-Speed Detection	60 ms or less

## 2. SPECIFICATIONS

### 2.3.6 Fault Detection

Fault Indication	Indicates with LEDs the problematic signal system (PRIMARY or BACKUP) if a fault is detected
Fault Channel Indication	Indicates with LEDs the problematic channels when a fault is detected
DC Offset	±30 mV (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 with DIP switches for each input signal type.
Low level (*1)	
NTSC Black Burst Signal	-180 to -227 mV (-286 mV)
PAL Black Burst Signal	-190 to -238 mV (-300 mV)
HD Tri-Level Sync Signal	337 to 476 mV (600 mV)
SD-SDI signal (270 Mb/s)	450 to 635 mV (800 mV)
HD-SDI signal (1.485 Gb/s)	450 to 635 mV (800 mV)
3G-SDI signal (2.97 Gb/s)	450 to 635 mV (800 mV)
AES/EBU Digital Audio Signal	631 to 794 mV (1000 mV)
Word-clock signal	1515 to 1907 mV (2400 mV)
High level (*1)	
NTSC Black Burst Signal	-210 to -264 mV (-286 mV)
PAL Black Burst Signal	-220 to -277 mV (-300 mV)
HD Tri-Level Sync Signal	379 to 535 mV (600 mV)
SD-SDI signal (270 Mb/s)	505 to 713 mV (800 mV)
HD-SDI signal (1.485 Gb/s)	505 to 713 mV (800 mV)
3G-SDI signal (2.97 Gb/s)	505 to 713 mV (800 mV)
AES/EBU Digital Audio Signal	734 to 924 mV (1000 mV)
Word-clock signal	1759 to 2215 mV (2400 mV)
User-defined level (*2)	
Ch1 to 8	-100 to -700 mV (when a signal that is equivalent to a horizontal sync signal is applied)
Ch9 and 10	100 to 1400 mV (p-p value of input signal)
Ch11	500 to 3000 mV (high level of input signal)
Time from When the LT 4446/4447 Turns On to When Error Detection Starts	Approx. 1 min. (60 to 80 s) / approx. 4 min. (240 to 320 s)

\*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.

## 2. SPECIFICATIONS

2.3.7	Alarm Detection	
	Alarm Indications	Indicates with LEDs when errors are detected in output signals (channels 4 to 11 only), power supply, or fan unit (LT 4447 only)
2.3.8	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)
2.3.9	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 screws
	Ethernet Port	
	Use	SNMPv1 control (TRAP, STATUS)
	Compliant Standards	10BASE-T/100BASE-TX auto switching
	Connector	RJ-45
	SNMP Read Community	LDRUser
	SNMP Write Community	LDRAdm
	SNMP Trap Community	LDRUser
	SNMP negotiation	AUTO
	USB Port	
	Use	IP address configuration
	Compliant Standards	USB 1.1/2.0 or equivalent
	Connector	Type B
2.3.10	Power Supply Unit (LT 4447 only)	
	Number of Units in Main Unit	2
	Hot Swap	Supported
2.3.11	Fan Unit (LT 4447 only)	
	Number of Units in Main Unit	1
	Hot Swap	Supported

## 2. SPECIFICATIONS

### 2.3.12 General Specifications

#### Environmental Conditions

Operating Temperature	0 to 40 °C
Operating Humidity Range	90 %RH or less (no condensation)
Optimal Temperature	5 to 35 °C
Optimal Humidity	85 %RH or less (no condensation)
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	II
Pollution Degree	2

#### Power Requirements

Redundancy	Supported
Voltage	90 to 250 VAC
Frequency	50/60 Hz
Power Consumption	
LT 4446	25W max.
LT 4447	50W max.

#### Dimensions

LT 4446	426 (W) × 44 (H) × 400 (D) mm (excluding protrusions)
LT 4447	426 (W) × 88 (H) × 450 (D) mm (excluding protrusions)

#### Weight

LT 4446	4.0 kg (excluding rack support)
LT 4447	8.0 kg (excluding rack support)

#### Accessories

Power cord .....	2
Cover/Inlet stopper .....	2
Rack supports.....	2
Rack support mounting screws .....	4
CD-ROM (software and instruction manual)....	1

### 3. PANEL DESCRIPTION

#### 3.1 Front Panel

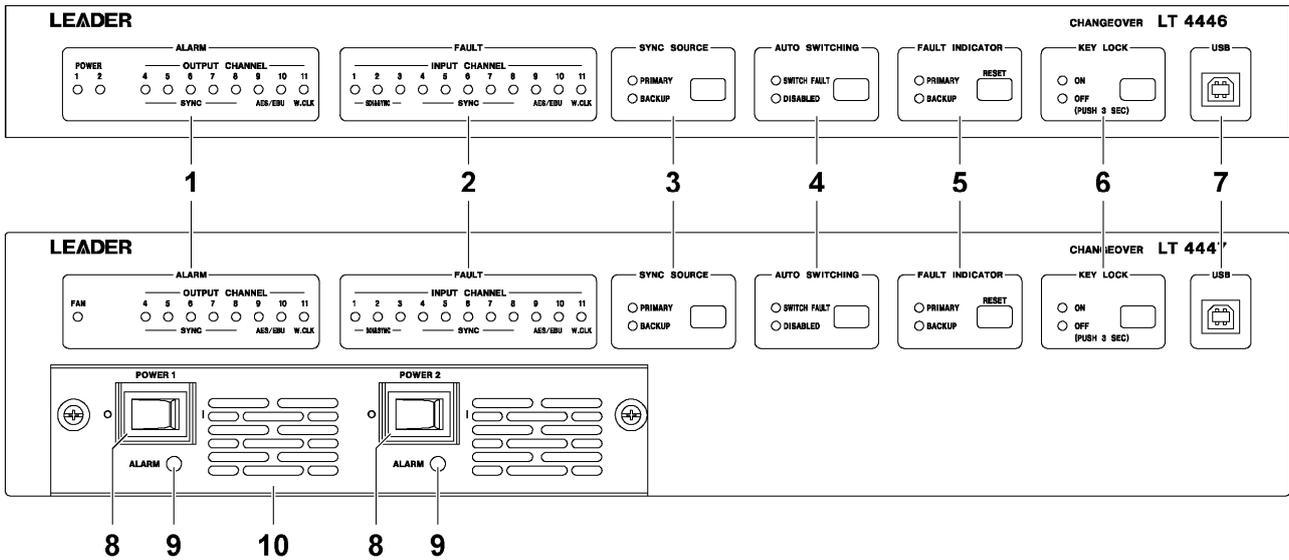


Figure 3-1 Front panel

Table 3-1 Front panel description

No.	Name	Description	Reference
1	ALARM	The LEDs light or blink when errors are detected in the power supply (LT 4446 only), rear-panel fan unit (LT 4447 only), or the output signals of channels 4 to 11.	4.8.2
2	FAULT	The LEDs light when faults are detected in the input signals.	4.8.1
3	SYNC SOURCE	Displays the signal that is being transmitted through the output connector. You can press the key to manually switch the signal that is being transmitted. The setting is shared among channels 1 to 11.	4.7.2
4	AUTO SWITCHING	Selects whether the output signal will be switched automatically when a fault is detected in the input signal. The setting is shared among channels 1 to 11. Select SWITCH FAULT to switch the output signal automatically. Select DISABLED to not switch the output signal automatically.	4.7.3
5	FAULT INDICATOR	The LEDs blink when faults are detected in the input signals. Press RESET to reset alarm indications and fault indications.	4.8.1
6	KEY LOCK	The LEDs indicate the key lock on/off state. You can press the key to turn the key lock on and off. Key lock turns on automatically after 1 minute of inactivity (no key operations).	4.7.1
7	USB	USB port. Connect to a PC to assign an IP address to the LT 4446/4447.	6.1
8	POWER 1 POWER 2 (LT 4447 only)	These are power switches. ○ indicates off, and   indicates on. The switches light when they are turned on. When both POWER 1 and POWER 2 are turned on, operation continues uninterrupted even if one of the power supplies fails.	4.3 4.4
9	ALARM (LT 4447 only)	Lights when an error occurs in the power supply unit.	4.8.2
10	Power Supply Unit (LT 4447 only)	Two exchangeable power supply units (LP 2180s) are installed. Exchange them periodically.	7.4

### 3. PANEL DESCRIPTION

#### 3.2 Rear Panel

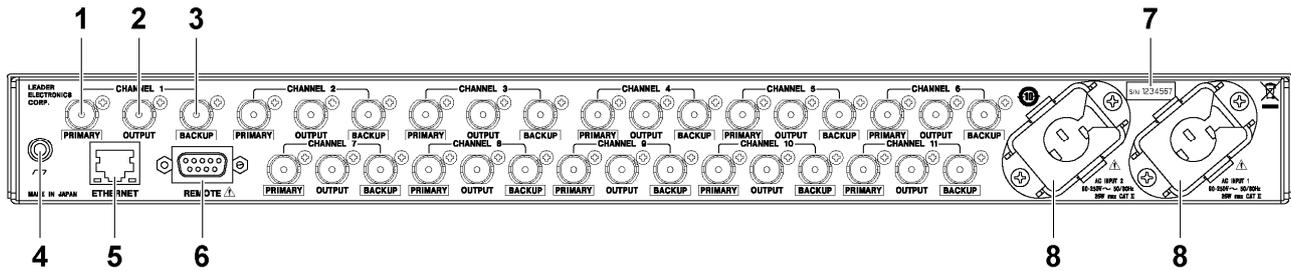


Figure 3-2 LT 4446 rear panel

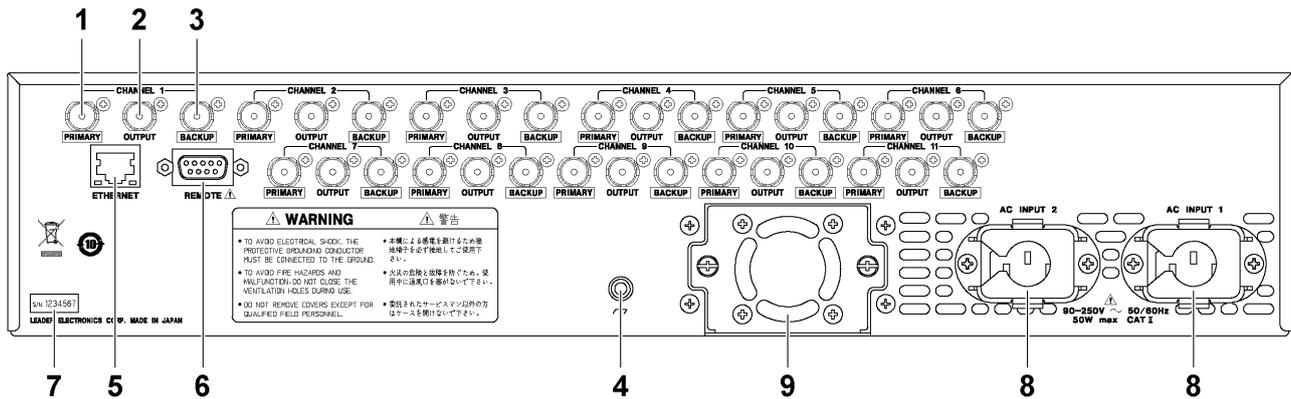


Figure 3-3 LT 4447 rear panel

Table 3-2 Rear panel description

No.	Name	Description	Reference
1	PRIMARY	Primary signal input connector	4.6
2	OUTPUT	Transmits the signal that is received through PRIMARY or BACKUP	4.6
3	BACKUP	Backup signal input connector	4.6
4	Ground terminal	Connect to an external ground.	-
5	ETHERNET	Ethernet port. You can use this port to monitor the LT 4446/4447 using SNMP.	6
6	REMOTE	Remote control connector. You can use this connector to perform functions such as configuring the LT 4446/4447 and transmitting fault information.	5
7	Serial label	The serial number is printed on this label.	-
8	AC INPUT 1 AC INPUT 2	AC inlet. Attach the included cover/inlet stopper to the AC inlet.	4.1
9	Fan Unit (LT 4447 only)	An exchangeable fan unit (LP 2181s) are installed. Exchange them periodically.	7.3

3.3 Top Panel

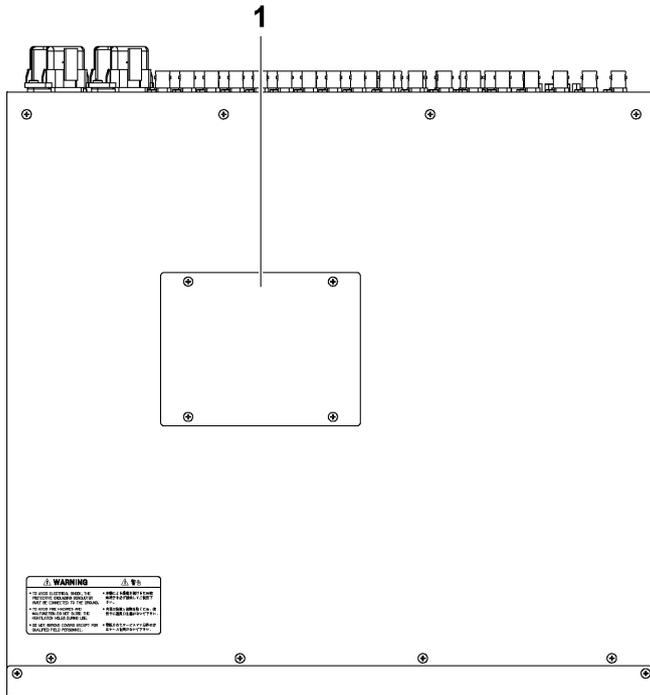


Figure 3-4 Top panel

Table 3-3 Top panel description

No.	Name	Description	Reference
1	DIP switch cover	Remove the four screws to access the DIP switches. You can use the DIP switches to configure the LT 4446/4447. An explanation of the DIP switch settings is printed on the back side of the cover.	4.5

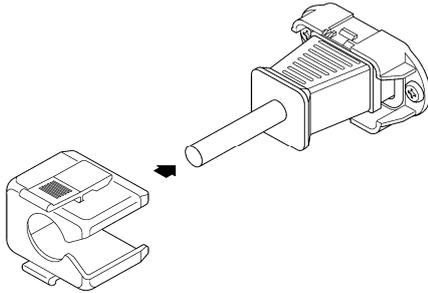
## 4. HOW TO USE

### 4.1 Attaching the Cover Inlet Stopper

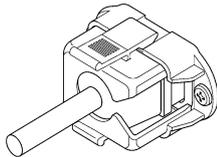
A cover/inlet stopper is included with the LT 4446/4447. Use this device to prevent the power cord from being pulled free of the AC inlet. To attach or remove the cover/inlet stopper, follow the procedure below.

#### • Attaching the Cover/Inlet Stopper

1. Cover the power cord with the cover/inlet stopper.



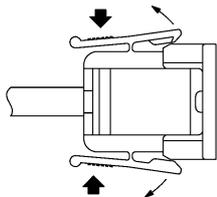
2. Push the cover/inlet stopper, until you hear a click, to attach it to the AC inlet.



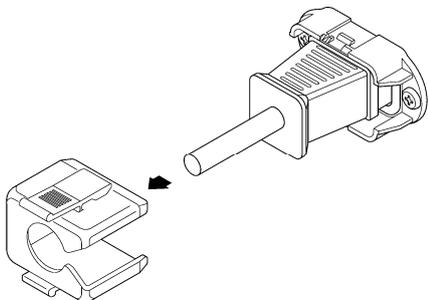
3. Check that the cover/inlet stopper is securely attached to the AC inlet.

#### • Removing the Cover/Inlet Stopper

1. Release the lock by using two fingers to press the cover/inlet stopper levers.



2. Pull the cover/inlet stopper away from the AC inlet.



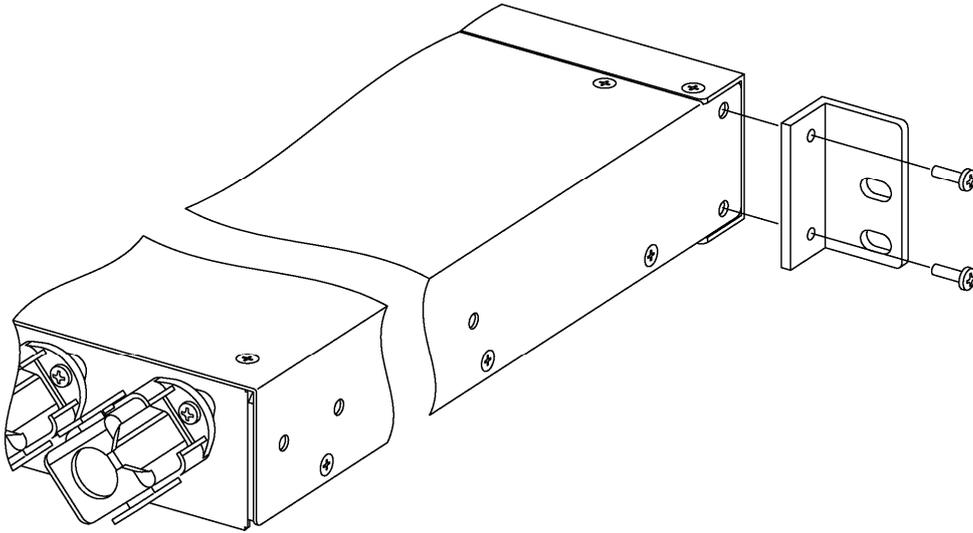
## 4.2 Attaching Rack Supports

To rack mount the LT 4446/4447, attach the supplied rack supports.

Using a Phillips head screwdriver (#2), torque the screws to 63 [cN•m] for the LT 4446 and 147[cN•m] for the LT 4447.

Be sure to provide additional support for the body of the instrument. If you only use the rack supports to mount the instrument, the instrument case may deform or fall.

- **LT 4446**



- **LT 4447**

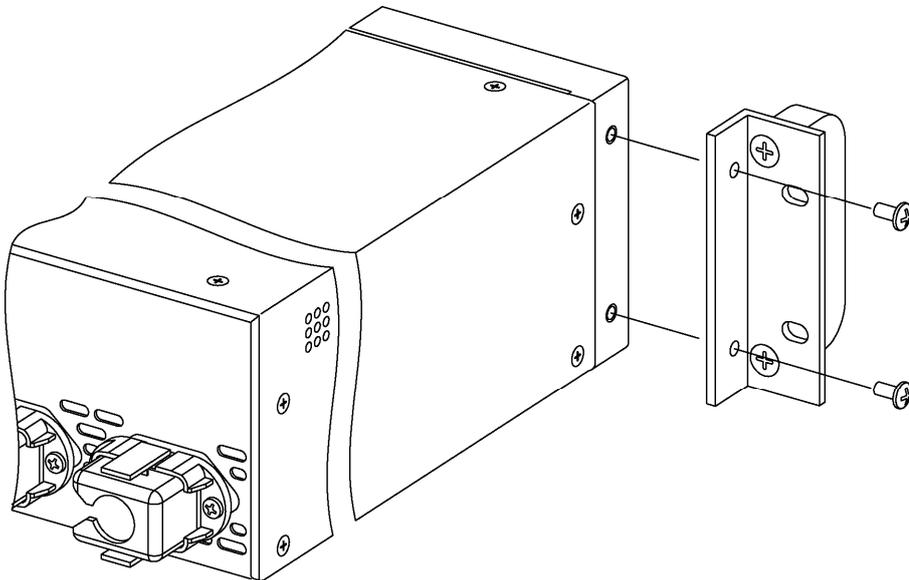


Figure 4-1 Attaching Rack Supports

### 4.3 Turning the Power On

The LT 4446/4447 power supplies are redundant. When both power supplies are turned on, operation continues uninterrupted even if one of the power supplies fails.

With the LT 4446, connect the power cords to AC INPUT 1 and AC INPUT 2. When the power turns on, the POWER 1 and POWER 2 indicators on the front panel light in green.

With the LT 4447, connect the power cords to AC INPUT 1 and AC INPUT 2 and then flip the front-panel POWER 1 and POWER 2 switches on (to the | side). When the power turns on, the power switches light in green.

The LT 4446/4447 uses a relay. A clicking noise can be heard when you turn the power ON or OFF, but this is not a sign that the instrument is malfunctioning.

#### • Standby

When you turn the power ON, the LT 4446/4447 enters Standby mode. When on standby, the SYNC SOURCE PRIMARY, AUTO SWITCHING SWITCH FAULT, and KEY LOCK ON and OFF LEDs light, and the AUTO SWITCHING DISABLED LED blinks. The LT 4446/4447 does not function when it is in this state.

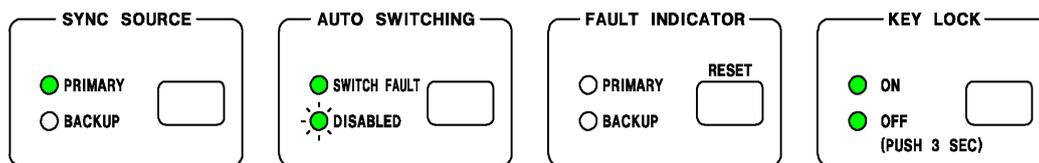


Figure 4-2 Standby mode

#### • Leaving Standby Mode

When the LT 4446/4447 leaves Standby mode, the SYNC SOURCE PRIMARY, AUTO SWITCHING SWITCH FAULT, and KEY LOCK ON LEDs light.

The LT 4446/4447 does not have a last-memory feature. Regardless of the settings that were being used when the LT 4446/4447 was turned OFF, it starts with the following settings when it is turned ON.

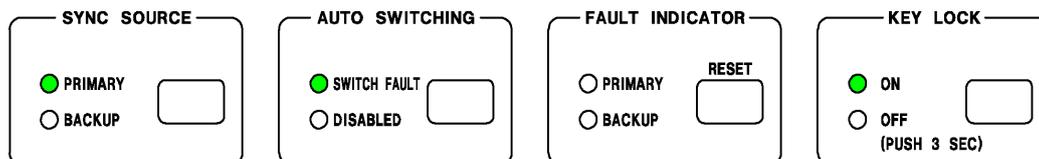


Figure 4-3 Leaving Standby mode

#### • Setting the Standby Time

You can use a DIP switch to set the standby time to approximately 1 minute or approximately 4 minutes. Select a setting that is appropriate for the rise time of the system signal source that you are connected to.

The factory default setting is approximately 1 minute.

Reference 4.5.6, "Setting the Operation Mode and Standby Time"

### 4.4 Turning the Power Off

With the LT 4446, remove the power cords from AC INPUT 1 and AC INPUT 2.  
 With the LT 4447, flip the front-panel POWER 1 and POWER 2 switches off (to the ○ side).  
 When you turn off the power, the output signals of channels 1 to 11 are set to PRIMARY.

### 4.5 DIP Switch Settings

Use the DIP switches on the top panel to configure the LT 4446/4447. To access the DIP switches, first remove the DIP switch cover by unscrewing its four screws. To avoid errors, do not connect the signals until you have completed making all the settings.

The settings specified by DIP switches take effect after you restart the LT 4446/4447. Be sure to restart the LT 4446/4447 after changing the settings.

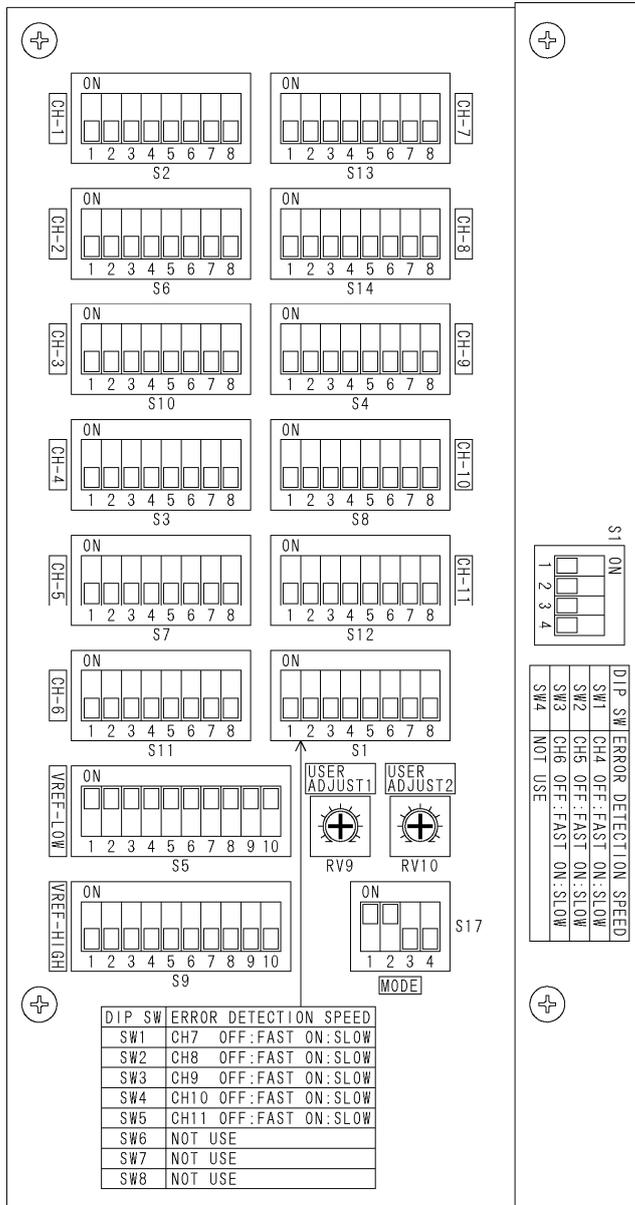


Figure 4-4 DIP switches

The settings are listed below. For details on each item, see the following sections in chapter 4. A simple explanation of the settings is also printed on the back side of the DIP switch cover.

Table 4-1 List of settings

Setting	Name	Remark	Factory Default Value	
Input signal settings	CH-1	S2	All OFF	No input signal
	CH-2	S6	All OFF	No input signal
	CH-3	S10	All OFF	No input signal
	CH-4	S3	All OFF	No input signal
	CH-5	S7	All OFF	No input signal
	CH-6	S11	All OFF	No input signal
	CH-7	S13	All OFF	No input signal
	CH-8	S14	All OFF	No input signal
	CH-9	S4	All OFF	No input signal
	CH-10	S8	All OFF	No input signal
	CH-11	S12	All OFF	No input signal
Fault detection speed settings	ERROR DETECTION SPEED	S1 (Top row)	SW1: OFF	Ch4: High speed
			SW2: OFF	Ch5: High speed
			SW3: OFF	Ch6: High speed
			SW4: OFF	-
	ERROR DETECTION SPEED	S1 (Bottom row)	SW1: OFF	Ch7: High speed
			SW2: OFF	Ch8: High speed
			SW3: OFF	Ch9: High speed
			SW4: OFF	Ch10: High speed
Fault detection reference settings	VREF-LOW	S5	All ON	VREF-LOW
	VREF-HIGH	S9	All OFF	
Fault detection level settings (user-defined)	USER ADJUST1	RV9	-	-
	USER ADJUST2	RV10	-	-
Operation mode and standby time settings	MODE	S17	SW1: ON	NORMAL
			SW2: ON	Approx. 1 minutes
			SW3, 4: OFF	-

#### 4.5.1 Setting Method

When one of the slide switches on the DIP switch is in the ON position, that switch is ON. When a slide switch is in the opposite position, it is OFF. Use an item that has a fine tip, such as a pen or a pair of tweezers, to move switches between the ON and OFF positions. When making settings, be careful to not touch any components other than the DIP switches.

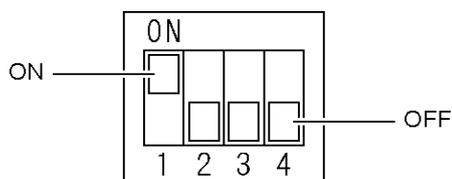


Figure 4-5 DIP switch ON and OFF positions

### 4.5.2 Setting the Input Signals

Set the input signal for each channel.

The factory default setting is “no input signal” for all channels.

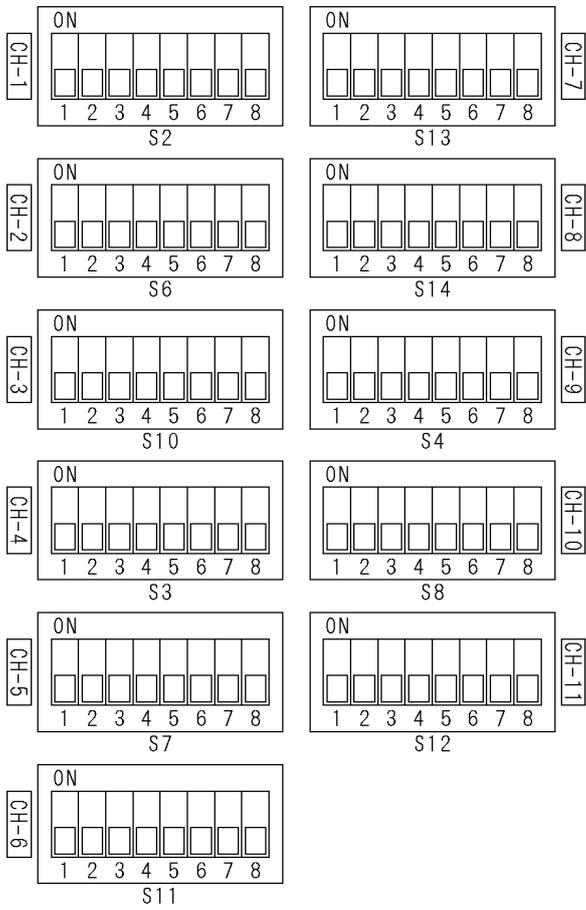


Figure 4-6 Input signal settings

#### 4. HOW TO USE

The channels that you can apply signals to differ depending on the type of input signal as shown below.

The signal switching method is relay for channels 1 to 3 and electronic switch for channels 4 to 11.

If the specified signal is not received, it will be detected as a fault. For channels that will not receive signals, set SW1 to SW3 to OFF.

If you specify user-defined setting 1 or 2, you can set the fault detection level to a value that you want to use.

Reference 4.5.5, "Setting the Fault Detection Level (User-defined)"

"X" in the table indicates that the switch can be set to ON or OFF.

Table 4-2 Input signal settings

Input Signal	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	Input Channel	
NTSC black burst signal	ON	OFF	OFF	X	X	X	X	X	Ch1 to 8	
PAL black burst signal	OFF	ON	OFF	X	X	X	X	X	Ch1 to 8	
HD tri-level sync signal	720P/60	ON	ON	OFF	OFF	OFF	OFF	X	X	Ch1 to 8
	720P/59.94	ON	ON	OFF	ON	OFF	OFF	X	X	
	720P/50	ON	ON	OFF	OFF	ON	OFF	X	X	
	720P/30	ON	ON	OFF	ON	ON	OFF	X	X	
	720P/29.97	ON	ON	OFF	OFF	OFF	ON	X	X	
	720P/25	ON	ON	OFF	ON	OFF	ON	X	X	
	720P/24	ON	ON	OFF	OFF	ON	ON	X	X	
	720P/23.98	ON	ON	OFF	ON	ON	ON	X	X	
	1080i/60	OFF	OFF	ON	OFF	OFF	OFF	X	X	
	1080i/59.94	OFF	OFF	ON	ON	OFF	OFF	X	X	
	1080i/50	OFF	OFF	ON	OFF	ON	OFF	X	X	
	1080P/30	OFF	OFF	ON	ON	ON	OFF	X	X	
	1080P/29.97	OFF	OFF	ON	OFF	OFF	ON	X	X	
	1080P/25	OFF	OFF	ON	ON	OFF	ON	X	X	
1080P/24	OFF	OFF	ON	OFF	ON	ON	X	X		
1080P/23.98	OFF	OFF	ON	ON	ON	ON	X	X		
SD-SDI signal (270 Mb/s)	ON	ON	ON	X	X	X	OFF	OFF	Ch1 to 3	
HD-SDI signal (1.485 Gb/s)	ON	ON	ON	X	X	X	ON	OFF	Ch1 to 3	
3G-SDI signal (2.97 Gb/s)	ON	ON	ON	X	X	X	OFF	ON	Ch1 to 3	
AES/EBU Digital Audio Signal	ON	ON	ON	X	X	X	X	X	Ch9 and 10	
Word-clock signal	ON	ON	ON	X	X	X	X	X	Ch11	
User setting 1	ON	OFF	ON	X	X	X	X	X	Ch1 to 11	
User setting 2	OFF	ON	ON	X	X	X	X	X	Ch1 to 11	
No input signal	OFF	OFF	OFF	X	X	X	X	X	Ch1 to 11	

### 4.5.3 Setting the Fault Detection Speed

For each channel, select the length of time that must elapse before the LT 4446/4447 automatically switches to the backup signal when a fault is detected in the primary signal. You can select this setting for channels 4 to 11. For channels 1 to 3, it is fixed to 70 ms or less. Fault detection on channels 1 to 3 is performed on the signal level.

If you select low speed, fault detection is performed on the signal level. If you set the input signal type to user-defined, select low speed.

If you select high speed, fault detection is performed on whether the signal is present. If you select high speed, you do not need to set the fault detection reference.

The factory default setting is high speed for all channels.

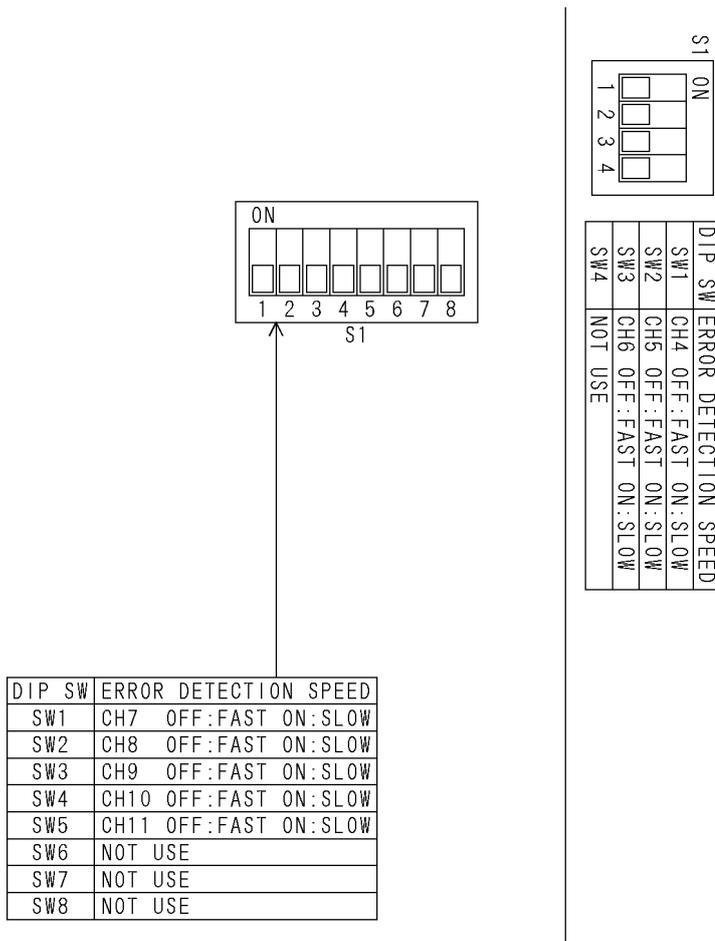


Figure 4-7 Setting the fault detection speed

#### 4. HOW TO USE

Table 4-3 Setting the fault detection speed

DIP Switch Position	Number	Input channel	Fault Detection Speed	
			OFF (high speed)	ON (low speed)
Top row	SW1	Ch4	1.5 H or less	60 ms or less
	SW2	Ch5	1.5 H or less	60 ms or less
	SW3	Ch6	1.5 H or less	60 ms or less
	SW4	Not used (*1)	-	-
Bottom row	SW1	Ch7	1.5 H or less	60 ms or less
	SW2	Ch8	1.5 H or less	60 ms or less
	SW3	Ch9	6 us or less	60 ms or less
	SW4	Ch10	6 us or less	60 ms or less
	SW5	Ch11	60 us or less	60 ms or less
	SW6	Not used (*1)	-	-
	SW7	Not used (*1)	-	-
	SW8	Not used (*1)	-	-

\*1 \*1 Leave unused switches in the OFF position.

#### 4.5.4 Setting the Fault Detection Reference

If the fault detection speed is set to low speed or for channels 1 to 3, select the level at which a fault is to be detected for each input signal. Set either VREF-LOW or VREF-HIGH to ON.

Normally, set VREF-LOW to ON. If you set VREF-HIGH to ON, faults may be detected due to signal level fluctuations or due to noise.

Do not set both VREF-LOW and VREF-HIGH to ON for the same signal. Doing so could cause errors.

By factory default, all input signals are set to VREF-LOW.

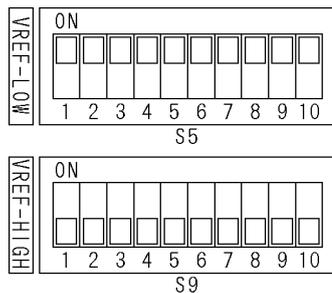


Figure 4-8 Fault detection reference settings

Table 4-4 Fault detection reference settings

Number	Input Signal	Fault Detection Level (*1)		Normal Level
		VREF-LOW	VREF-HIGH	
SW1	NTSC black burst signal	-180 to -227 mV	-210 to -264 mV	-286mV
SW2	PAL black burst signal	-190 to -238 mV	-220 to -277 mV	-300mV
SW3	HD tri-level sync signal	337 to 476 mV	379 to 535 mV	600mV
SW4	AES/EBU Digital Audio Signal	631 to 794 mV	734 to 924 mV	1000mV
SW5	Not used	-	-	-
SW6	Not used	-	-	-
SW7	SD-SDI signal (270 Mb/s)	450 to 635 mV	505 to 713 mV	800mV
SW8	HD-SDI signal (1.485 Gb/s)	450 to 635 mV	505 to 713 mV	800mV
SW9	3G-SDI signal (2.97 Gb/s)	450 to 635 mV	505 to 713 mV	800mV
SW10	Word-clock signal	1515 to 1907 mV	1759 to 2215 mV	2400mV

\*1 Depending on the instrument that you are using, there will be deviations in the fault detection level within the ranges given in this table.

#### 4.5.5 Setting the Fault Detection Level (User-defined)

Set up to two input signal levels at which a fault is to be detected.

In section 4.5.2, "Setting the Input Signals," specify user setting 1 or user setting 2 before adjusting the trimmer.

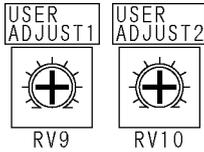


Table 4-9 Fault detection level settings

The trimmer adjustment range varies depending on the input channel as follows.

Table 4-5 Fault detection reference settings

Input Channel	Adjustment Range
Ch1 to 8	-100 to -700 mV
Ch9 and 10	100 to 1400 mV
Ch11	500 to 3000 mV

#### • User Setting Example

Below is an example of a procedure to apply signals to channel 1 using user setting 1.

1. Set DIP switches SW1 and SW3 of CH-1 (S2) to ON.
2. Restart the LT 4446/4447 to apply the new settings.
3. Connect between the input signal and PRIMARY an attenuator with an appropriate attenuation (3 to 6 dB) for detecting faults.
4. While turning USER ADJUST1 (RV9), press RESET repeatedly, and stop when the PRIMARY FAULT INDICATOR LED turns off.
5. Slowly turn the USER ADJUST1 trimmer backwards, and stop when the PRIMARY FAULT INDICATOR LED starts blinking.
6. Remove the attenuator, and connect the input signal to PRIMARY and BACKUP.
7. Check that the PRIMARY and BACKUP FAULT INDICATOR LEDs are turned off, and you are finished.

## 4.5.6 Setting the Operation Mode and Standby Time

- **Setting the Operation Mode**

Normally, you can use the front-panel SYNC SOURCE key to switch the output signal, but when faults are detected in either of the input signals (primary or backup), you cannot switch to the fault signal.

If you set the operation mode to OVERRIDE, regardless of the state of the input signals, you can use the SYNC SOURCE key to switch the output signal. However, this setting is valid when AUTO SWITCHING is set to DISABLED. If AUTO SWITCHING is set to SWITCH FAULT, even if you set the operation mode to OVERRIDE, you cannot switch to the fault signal.

The factory default setting is NORMAL. Leave this set to NORMAL under standard operating circumstances.

Reference For details on the SYNC SOURCE key, see section 4.7.2, "Switching the Output Signal."  
For details on the AUTO SWITCHING key, see section 4.7.3, "Setting Automatic Signal Switching."

- **Setting the Standby Time**

You can select the length of time that the LT 4446/4447 waits from the time that it turns ON to the time that it begins operating. Select a setting that is appropriate for the rise time of the system signal source that you are connected to.

The factory default setting is approximately 1 minute.

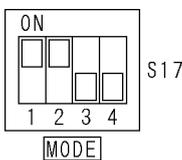


Figure 4-10 Operation mode and standby time settings

Table 4-6 Operation mode and standby time settings

Number	Setting	ON	OFF
SW1	Operation mode	NORMAL	OVERRIDE
SW2	Standby time	Approx. 1 minutes	Approx. 4 minutes
SW3	Not used (*1)	-	-
SW4	Not used (*1)	-	-

\*1 \*1 Leave unused switches in the OFF position.

## 4.6 Signal I/O

Apply the primary signal to PRIMARY and the backup signal to BACKUP.

The input signal impedance is 75 Ω. Terminate the output connectors at 75 Ω. (The signal that is not selected with the front-panel SYNC SOURCE setting is terminated internally at 75 Ω.)

Depending on the front-panel SYNC SOURCE setting, the primary or backup signal is transmitted from the OUTPUT connector.

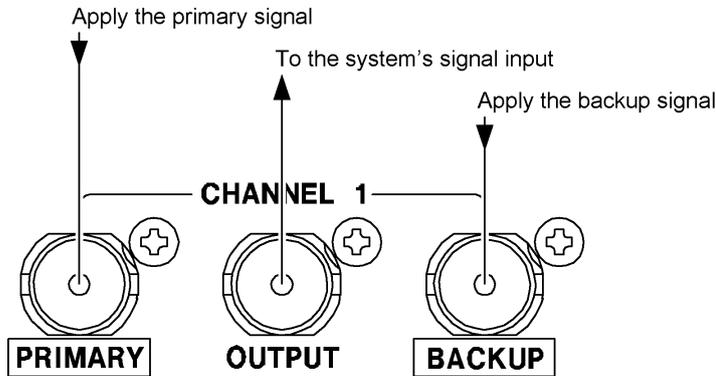


Figure 4-11 Signal I/O

The types of signals that you can apply differ depending on the channel as shown below.

Table 4-7 Operation mode and standby time settings

Input Channel	Input Signal	Signal Switching Method
Ch1 to 3	NTSC black burst signal PAL black burst signal HD tri-level sync signal SD-SDI signal (270 Mb/s) HD-SDI signal (1.485 Gb/s) 3G-SDI signal (2.97 Gb/s)	Relays
Ch4 to 8	NTSC black burst signal PAL black burst signal HD tri-level sync signal	Electrical switches
Ch9 and 10	AES/EBU Digital Audio Signal	Electrical switches
Ch11	Word-clock signal	Electrical switches

## 4.7 LT 4446/4447 Configuration

### 4.7.1 Setting the Key Lock

The LT 4446/4447 locks its keys after 1 minute of inactivity (no key operations). When the key lock is on, front-panel key operations are not accepted.

To perform front-panel key operations, turn the key lock off. Hold down the KEY LOCK key for 3 seconds to turn the key lock on and off.

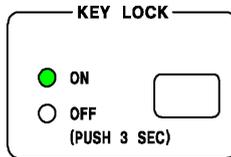


Figure 4-12 Key lock

### 4.7.2 Switching the Output Signal

The SYNC SOURCE area shows the signal that is being transmitted through the output connector (PRIMARY or BACKUP). The setting is shared among channels 1 to 11.

You can press the key to manually switch the output signal. However, you may not be able to switch the signal depending on the LT 4446/4447 state. For details, see section 4.7.3, "Setting Automatic Signal Switching."

SYNC SOURCE is set to PRIMARY immediately after the LT 4446/4447 turns ON.

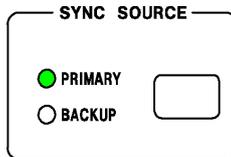


Figure 4-13 SYNC SOURCE

### 4.7.3 Setting Automatic Signal Switching

In the AUTO SWITCHING area, select whether the output signal will be switched automatically when a fault is detected in the input signal. The setting is shared among channels 1 to 11.

If you select SWITCH FAULT, the LT 4446/4447 will automatically switch to the other signal (PRIMARY or BACKUP) when a fault is detected in the output signal. Normally use this setting.

Select DISABLED to not switch the output signal automatically even when a fault is detected. Use this setting when you want to just detect faults.

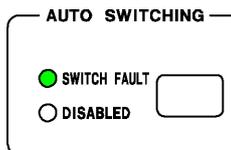


Figure 4-14 AUTO SWITCHING

#### 4. HOW TO USE

Depending on the AUTO SWITCHING setting and the MODE DIP switch setting, the operation of the LT 4446/4447 differs as shown below.

Reference For details on MODE, see 4.5.6, "Setting the Operation Mode and Standby Time"

Table 4-8 LT 4446/4447 operations

LT 4446/4447 Setting		Input Signal Status	When SYNC SOURCE is PRIMARY		When SYNC SOURCE is BACKUP	
AUTO SWITCHING	MODE		Output Signal	SYNC SOURCE Key Operation	Output Signal	SYNC SOURCE Key Operation
SWITCH FAULT	NORMAL OVERRIDE	Normal	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
		Fault on BACKUP	Remains at PRIMARY	Remains at PRIMARY	Switches to PRIMARY	Remains at PRIMARY
		Fault on PRIMARY	Switches to BACKUP	Remains at BACKUP	Remains at BACKUP	Remains at BACKUP
		Fault on both	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
DISABLED	NORMAL	Normal	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
		Fault on BACKUP	Remains at PRIMARY	Remains at PRIMARY	Remains at BACKUP	Switches to PRIMARY
		Fault on PRIMARY	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Remains at BACKUP
		Fault on both	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
	OVERRIDE	Normal	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
		Fault on BACKUP	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
		Fault on PRIMARY	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY
		Fault on both	Remains at PRIMARY	Switches to BACKUP	Remains at BACKUP	Switches to PRIMARY

## 4.8 LT 4446/4447 Indications

### 4.8.1 Fault Indication

#### • Fault Indication

There are two areas for indicating faults: FAULT and FAULT INDICATOR. Both areas indicate the fault detection of input signals.

In the FAULT area, the LED of a fault-detected channel lights in red.

In the FAULT INDICATOR area, the relevant LED blinks in red when a fault is detected in any of the PRIMARY or BACKUP channels.

For example, if a fault is detected in PRIMARY channel 1, the LEDs light or blink as follows.

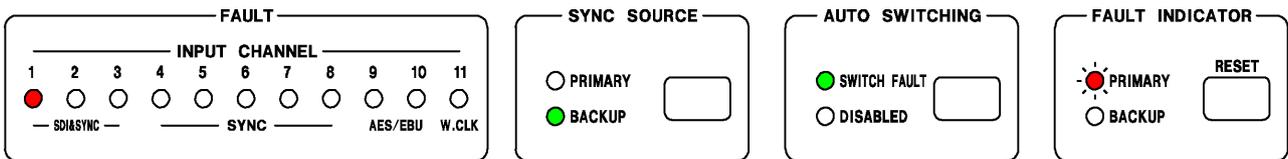


Figure 4-15 Fault indication 1

If a fault is detected in BACKUP channel 3, the LEDs light or blink as follows.

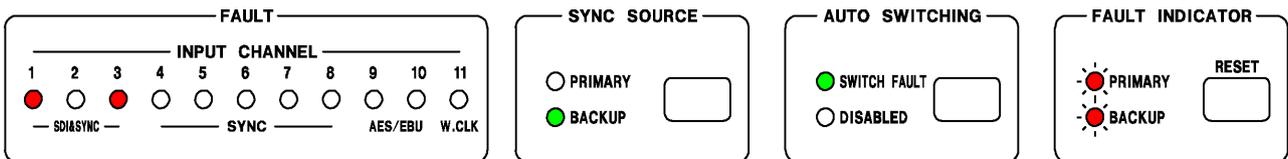


Figure 4-16 Fault indication 2

#### • Resetting Fault Indications

Once a fault is detected, even if the input signals return to normal, the FAULT and FAULT INDICATOR LEDs will continue to light and blink. To reset these fault indications, apply proper signals, and then press RESET. The fault indications will turn off.

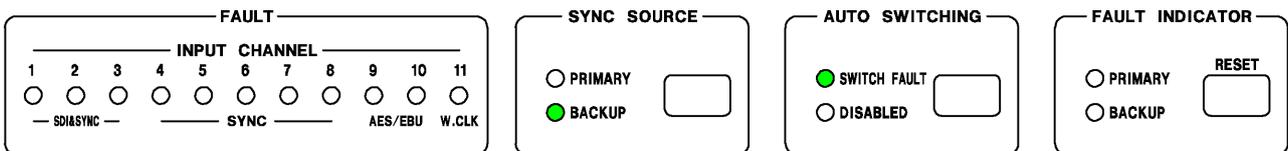


Figure 4-17 Resetting fault indications

4.8.2 Alarm Indications

• **Output Alarm Indications (Channels 4 to 11 only)**

Signals received through PRIMARY or BACKUP are usually output through amplifiers, but if an error is detected in the amplifier or output signal, the relevant ALARM LED lights in red. In such a case, the output connector transmits the input signal as-is without passing through the amplifier.

If an ALARM LED lights, check that the output signal is connected properly, and then press RESET. If the LED does not turn off even after you press RESET, contact your local LEADER agent.

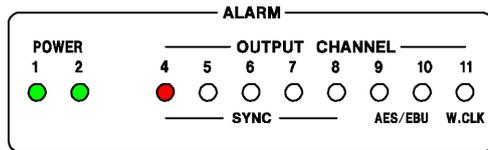


Figure 4-18 Output alarm indications

• **Power Supply Alarm Indications**

The ALARM POWER LED or the ALARM on the power supply unit lights in red in the following situations. If the LED lights in red even when you turn on both power supplies, contact your local LEADER agent.

- When an error occurs in the power supply output
- When one of the power supplies is not turned on (the LED of the power supply that is off lights)
- When the fan in a power supply unit stops (LT 4447 only)

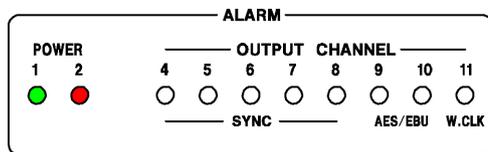


Figure 4-19 LT 4446 power supply alarm indications

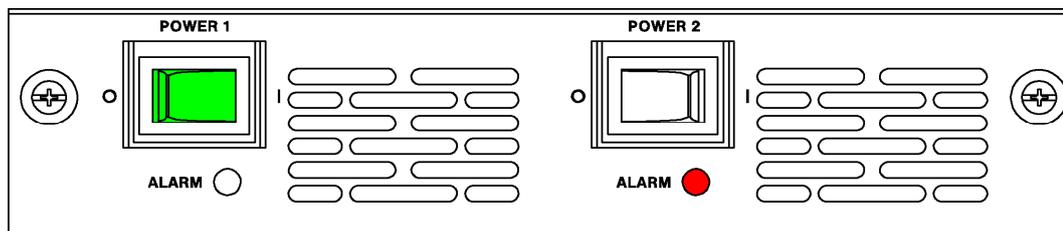


Figure 4-20 LT 4447 power supply alarm indications

• **Fan Alarm Indication (LT 4447 only)**

The FAN LED lights in red when an error occurs in the fan unit on the rear panel. If the LED lights even when the fan is installed properly, contact your local LEADER agent.

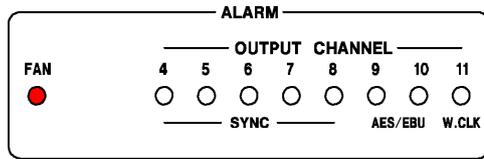


Figure 4-21 Fan alarm indication

## 5. REMOTE CONTROL

You can use the rear-panel remote-control connector to perform functions such as configuring the LT 4446/4447 and transmitting fault information.

The remote control connector and its pin assignments are shown below.

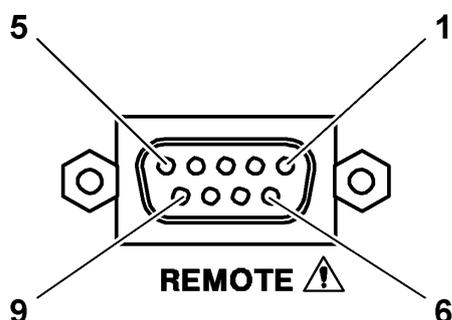


Figure 5-1 Remote-control connector (9-pin D-sub, female, #4-40 inch screws)

Table 5-1 Remote connector functions

Pin No.	Name	I/O	Description
1	AUTO SWITCHING	I	When the front-panel AUTO SWITCHING is set to SWITCH FAULT, applying a low-level signal sets AUTO SWITCHING to DISABLED, and applying a high-level signal (or opening the circuit) sets AUTO SWITCHING to SWITCH FAULT. When the front-panel AUTO SWITCHING is set to DISABLED, remote control is not possible. Set AUTO SWITCHING to SWITCH FAULT using keys to enable remote control.
2	SYNC SOURCE	I	Each time a low-level signal is applied, SYNC SOURCE switches between PRIMARY and BACKUP.
3	SYNC SOURCE (PRIMARY)	O	Transmits a high-level signal when SYNC SOURCE is set to PRIMARY.
4	SYNC SOURCE (BACKUP)	O	Transmits a high-level signal when SYNC SOURCE is set to BACKUP.
5	FAULT INDICATOR	O	Transmits a high-level signal when a fault is detected in PRIMARY or BACKUP. Even when the input signal returns to normal, the LT 4446/4447 retains the high-level signal until the error is reset.
6	RESET	I	Apply a low-level signal to reset fault detection.
7	FAULT INDICATOR+	O	Open during normal operation. Conducts current when the power is not on or when a fault is detected. Use these pair of pins when you want to electrically isolate the connected device from the LT 4446/4447. (There is a photocoupler inside the LT 4446/4447 that is used for isolation.)
8	FAULT INDICATOR-		
9	GND	-	Ground

## 5. REMOTE CONTROL

Table 5-2 Remote connector I/O specifications

Pin No.	I/O	I/O Specifications	Connection Example
1	I		<p>Connect a switch to apply a low-level signal.</p> <p>Connect one side of the switch to the remote connector and the other side to ground.</p>
2			
6			
3	O		<p>Connect an LED so that it will light when a high-level signal is transmitted.</p> <p>Connect the anode to the remote connector and the cathode to ground.</p>
4			
5	O		
7	O	<p>24VDC 20mA Max. Normal : OPEN Power OFF or NG : CLOSE</p>	-

## 6. ETHERNET CONTROL

By using SNMP (Simple Network Management Protocol), you can check the LT 4446/4447 status from an SNMP manager. Additionally, you can notify the SNMP managers of errors that the LT 4446/4447 generates.

- \* The Ethernet features of the LT 4446/4447 have only been confirmed to work in a local network environment. LEADER does not guarantee that they will work in any network environment.
- \* DHCP client and DNS resolver features are not supported.

### 6.1 SNMP Configuration Software

Before using SNMP, you must assign an IP address to the LT 4446/4447. To do so, you need to first install the SNMP configuration software (hereafter referred to as the software) in your PC and connect the LT 4446/4447 to your PC. Have a PC, USB cable (A/B), and the supplied CD-ROM ready.

The supported Windows versions are as follows.

- Windows 7 32 bit
- Windows 7 64 bit

#### 6.1.1 Installation

Follow the procedure below to install the software in your PC.

To update the software, uninstall the old version, and then install the new version.

The software displays “LT 4446” in some of the areas in the user interface, but the software can also be used with the LT 4447 without problems.

##### 1. Load the supplied CD-ROM in your PC, and run Setup.msi.

- ⊙ CD-ROM
  - └─ LT4446\_4447\_SETUP\_SOFTWARE\_Ver\_\*.\*\*
    - └─ Setup.msi
    - └─ Instruction\_Manual\_for\_LT\_4446\_4447

##### 2. When the following window appears, click Next.



Figure 6-1 Installation 1

3. When the following window appears, select the installation folder, and click Next.

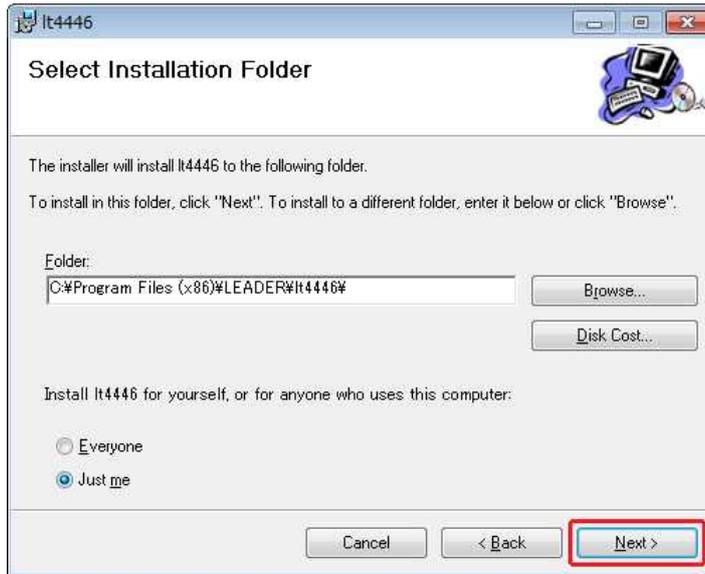


Figure 6-2 Installation 2

4. When the following window appears, click Next.



Figure 6-3 Installation 3

**5. When the following window appears, the installation is complete. Click Close.**

When the installation is complete, two MIB files LT4446-MIB.txt and LT4447-MIB.txt are created on the desktop.

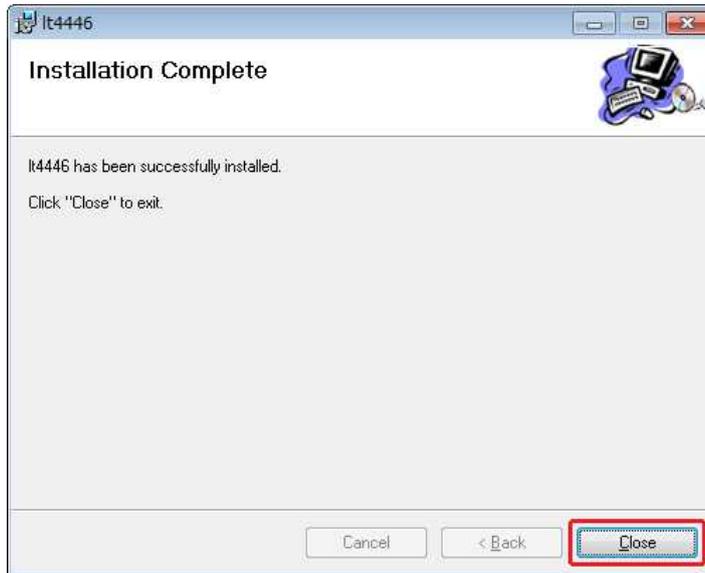


Figure 6-4 Installation 4

### 6.1.2 Uninstallation

To uninstall the software, select "It4446" in Programs and Features of Control Panel, and click Uninstall.

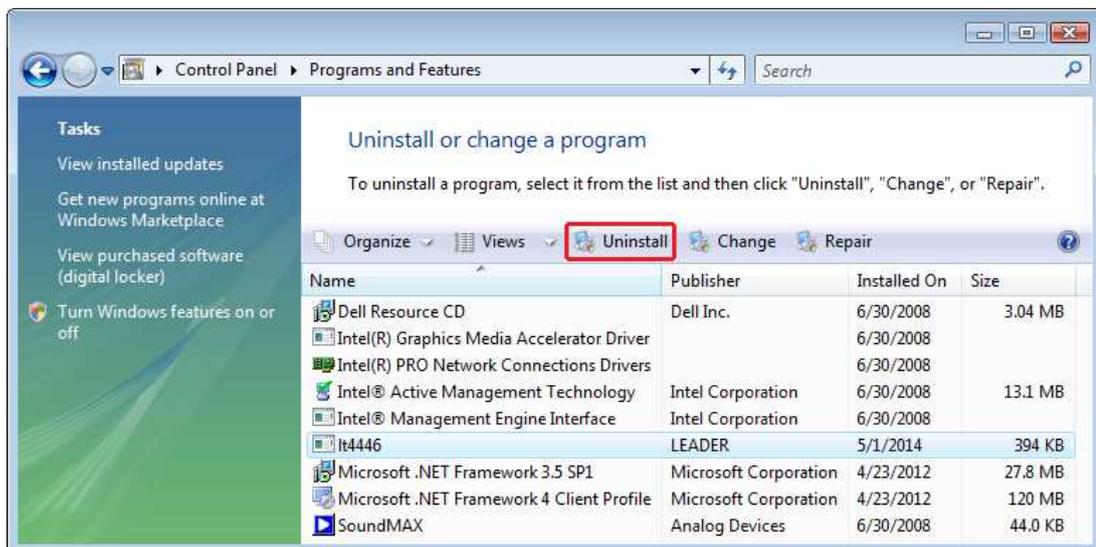


Figure 6-5 Uninstallation

## 6.1.3 Connection

To connect the LT 4446/4447 to a PC, you must install a USB driver.  
Install the VCP driver provided by FTDI in advance.

The latest USB driver can be downloaded from  
<http://www.ftdichip.com/Drivers/VCP.htm>

This section describes the procedure to connect the LT 4446/4447 to a PC and configure the LT 4446/4447 network and SNMP settings.

**1. Connect the USB port on the LT 4446/4447 front panel to the PC's USB port.**

Use a USB cable (A/B).

**2. Start "LT4446 Setup" on the PC desktop.**



LT4446 Setup

**3. Set Device and COM Port, and click Connect.**

When the connection is established, the Connect button becomes unavailable, and GET and SUBMIT become available.

If you turn off the LT 4446/4447 while a connection is established, the communication will be disconnected. If you do, restart the software and reconnect.

LEADER LT4446/4447 Network/SNMP Configuration

Machine

Serial Number:

FPGA Version:

MAC Address:

PASSWORD:

Date/Time

YYYY/MM/DD: 2014/03/27

HH:MM:SS: 11:06:18

Set

Software Version

Network

IP Address: 192 . 168 . 0 . 1

Subnet Mask: 255 . 255 . 255 . 0

Default Gateway: 0 . 0 . 0 . 0

SNMP

SNMP Manager IP: 0 . 0 . 0 . 0

Configuration

GET SUBMIT

Update File

Ref. UPDATE

Device: LT4446

COM Port: COM5 USB Serial Port (COM5)

Connect

CLOSE

Figure 6-6 Connection

4. Enter the proper values in the Network and SNMP areas, and click SUBMIT.
5. When the following window appears, click OK.



Figure 6-7 Configuration complete

6. Restart the LT 4446/4447.

The network settings are applied after you restart the LT 4446/4447.

### 6.1.4 Window Explanations

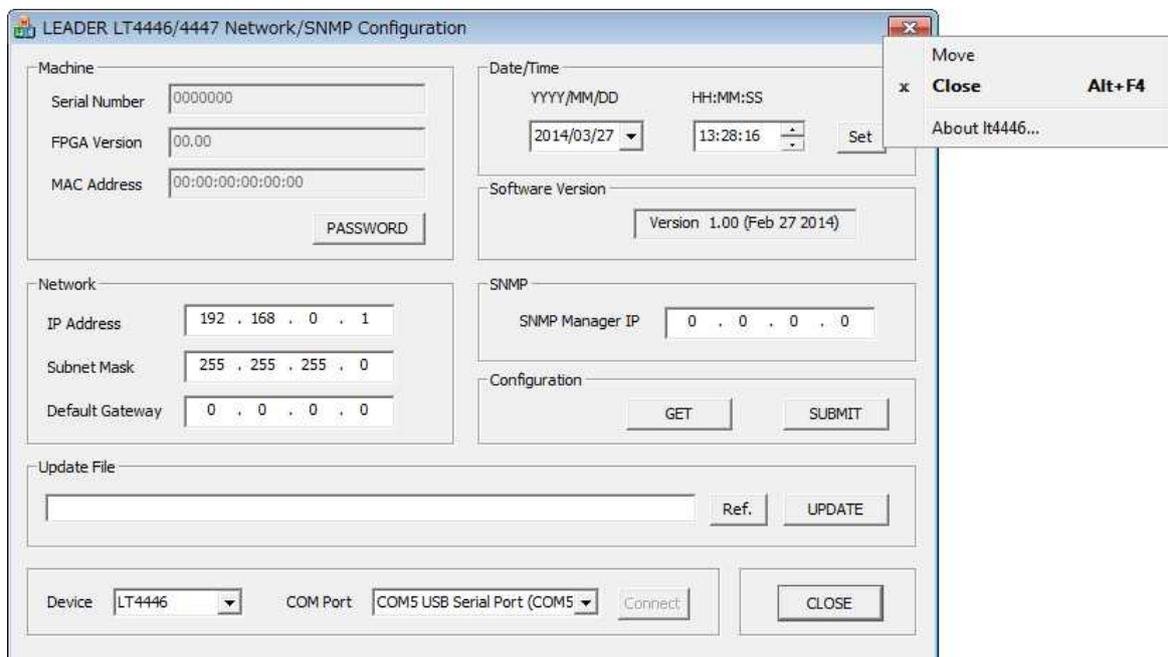


Figure 6-8 Window explanation

- **About It4446**

Right-click the title bar to use this command.  
It displays the software version.



Figure 6-9 Software version

- **Machine**

Click GET to display the LT 4446/4447 serial number, FPGA version, and MAC address. "PASSWORD" is not used.

- **Network**

Set the LT 4446/4447's IP address, subnet mask, and default gateway. Enter these values, and then click SUBMIT. Pressing GET shows the values currently assigned to the LT 4446/4447.

These settings are applied after you restart the LT 4446/4447.

By factory default, the following values are assigned to the LT 4446/4447.

IP Address:	192.168.0.1
Subnet Mask:	255.255.255.0
Default Gateway:	0.0.0.0

- **Date/Time**

Set the date and time on the LT 4446/4447. Enter the values, and then click Set.

- **Software Version**

Pressing GET shows the LT 4446/4447 firmware version.

- **SNMP**

Set the IP address of the TRAP transmission destination. If you set this to 0.0.0.0, TRAPs will not be transmitted.

The factory default setting is 0.0.0.0.

- **Configuration**

Pressing GET retrieves the current Machine, Network, Software Version, and SNMP values.

Click SUBMIT to confirm the NETWORK and SNMP values. The network settings are applied after you restart the LT 4446/4447.

- **Update File**

Not used.

- **Device**

Set the device that the PC will connect to, LT4446 or LT4447.

- **COM Port**

Select the COM port that you want to connect the LT 4446/4447 to.

- **Connect**

After setting Device and COM Port, click this to connect the PC to the LT 4446/4447.

- **CLOSE**

Click CLOSE to close the software.

## 6.2 SNMP

### 6.2.1 SNMP Version

The LT 4446/4447 supports SNMPv1.

### 6.2.2 SMI Definitions

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE, enterprises  
FROM SNMPv2-SMI

DisplayString

FROM SNMPv2-TC

OBJECT-GROUP, MODULE-COMPLIANCE

FROM SNMPv2-CONF;

### 6.2.3 HOW TO USE

To notify the SNMP managers of errors that the LT 4446/4447 generates, follow the procedure below.

#### 1. **Configure the LT 4446/4447.**

From the software installed in your PC, set the IP address, subnet mask, default gateway, and SNMP manager IP.

The IP address of the TRAP transmission destination can also be set from an SNMP manager.

Reference 6.1, "SNMP Configuration Software"

#### 2. **Restart the LT 4446/4447.**

The IP address, subnet mask, and default gateway values take effect.

If you did not change these values in step 1, you do not need to restart the LT 4446/4447.

#### 3. **Connect the LT 4446/4447's Ethernet port to the network.**

#### 4. **Start an SNMP manager.**

You must provide the SNMP manager yourself.

The community names are shown below. (You cannot change them.)

Read Community: LDRUser

Write Community: LDRAdm

Trap Community: LDRUser

#### 5. **On the SNMP manager, set the TRAP function to Enable(1).**

1.3.6.1.4.1.leader(20111).LT4446(31).trap(100).target(1).trapAction(2).0

1.3.6.1.4.1.leader(20111).LT4447(32).trap(100).target(1).trapAction(2).0

#### 6. **Restart the LT 4446/4447. Check that the standard TRAP "coldStart(0)" is received by the SNMP manager.**

## 6.2.4 Enterprise MIB

- **MIB Files**

The MIB files are created on the desktop when the software is installed in the PC. If you are using the LT 4446, use LT4446-MIB.txt. If you are using the LT 4447, use LT4447-MIB.txt.

Reference 6.1.1, "Installation"

- **MIB Structure**

The LT 4447 MIB structure is shown below. The structure is similar for the LT 4446 (31).

lt4447	OBJECT IDENTIFIER ::= { leader 32 }
standard	OBJECT IDENTIFIER ::= { lt4447 1 }
status	OBJECT IDENTIFIER ::= { standard 1 }
fanUnit	OBJECT IDENTIFIER ::= { status 1 } (LT 4447 only)
powerUnit1	OBJECT IDENTIFIER ::= { status 2 }
powerUnit2	OBJECT IDENTIFIER ::= { status 3 }
ch1	OBJECT IDENTIFIER ::= { status 4 }
ch2	OBJECT IDENTIFIER ::= { status 5 }
ch3	OBJECT IDENTIFIER ::= { status 6 }
ch4	OBJECT IDENTIFIER ::= { status 7 }
ch5	OBJECT IDENTIFIER ::= { status 8 }
ch6	OBJECT IDENTIFIER ::= { status 9 }
ch7	OBJECT IDENTIFIER ::= { status 10 }
ch8	OBJECT IDENTIFIER ::= { status 11 }
ch9	OBJECT IDENTIFIER ::= { status 12 }
ch10	OBJECT IDENTIFIER ::= { status 13 }
ch11	OBJECT IDENTIFIER ::= { status 14 }
panel	OBJECT IDENTIFIER ::= { standard 2 }
remote	OBJECT IDENTIFIER ::= { standard 3 }
format	OBJECT IDENTIFIER ::= { standard 4 }
ch1format	OBJECT IDENTIFIER ::= { format 1 }
ch2format	OBJECT IDENTIFIER ::= { format 2 }
ch3format	OBJECT IDENTIFIER ::= { format 3 }
ch4format	OBJECT IDENTIFIER ::= { format 4 }
ch5format	OBJECT IDENTIFIER ::= { format 5 }
ch6format	OBJECT IDENTIFIER ::= { format 6 }
ch7format	OBJECT IDENTIFIER ::= { format 7 }
ch8format	OBJECT IDENTIFIER ::= { format 8 }
ch9format	OBJECT IDENTIFIER ::= { format 9 }
ch10format	OBJECT IDENTIFIER ::= { format 10 }
ch11format	OBJECT IDENTIFIER ::= { format 11 }
trap	OBJECT IDENTIFIER ::= { lt4447 100 }
target	OBJECT IDENTIFIER ::= { trap 1 }

● **ACCESS**

In the tables, "ACCESS" indicates the following:

RO: Information that can be read from the SNMP managers

R/W: Information that can be read and written from the SNMP managers

Table 6-1 fanUnit(1) group (LT 4447 only)

MIB	OID	SYNTAX	ACCESS	VALUE	Description
fanUnitStatus	fanUnit.1	INTEGER	RO	1	Ejected
				2	Stop
				3	Operation

Table 6-2 powerUnit1(2) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
powerUnit1Status	powerUnit1.1	INTEGER	RO	1	Ejected (LT 4447 only)
				2	Error
				3	OK
powerUnit1FanStatus (LT 4447 only)	powerUnit1.2	INTEGER	RO	1	Stop
				2	Operation

Table 6-3 powerUnit2(3) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
powerUnit2Status	powerUnit2.1	INTEGER	RO	1	Ejected (LT 4447 only)
				2	Error
				3	OK
powerUnit2FanStatus (LT 4447 only)	powerUnit2.2	INTEGER	RO	1	Stop
				2	Operation

Table 6-4 ch1(4) group to ch3(6) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch1InputStatus	ch1.1	INTEGER	RO	1	Normal
				2	Error-primary
				3	Error-backup
				4	Error-primary-backup
ch2InputStatus	ch2.1	INTEGER	RO	Same as ch1(4) group	
ch3InputStatus	ch3.1	INTEGER	RO	Same as ch1(4) group	

## 6. ETHERNET CONTROL

Table 6-5 ch4(7) group to ch11(14) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch4InputStatus	ch4.1	INTEGER	RO	1	Normal
				2	Error-primary
				3	Error-backup
				4	Error-primary-backup
ch4OutputStatus	ch4.2	INTEGER	RO	1	Normal
				2	Error-output
ch5InputStatus	ch5.1	INTEGER	RO	Same as ch4(7) group	
ch5OutputStatus	ch5.2	INTEGER	RO	Same as ch4(7) group	
ch6InputStatus	ch6.1	INTEGER	RO	Same as ch4(7) group	
ch6OutputStatus	ch6.2	INTEGER	RO	Same as ch4(7) group	
ch7InputStatus	ch7.1	INTEGER	RO	Same as ch4(7) group	
ch7OutputStatus	ch7.2	INTEGER	RO	Same as ch4(7) group	
ch8InputStatus	ch8.1	INTEGER	RO	Same as ch4(7) group	
ch8OutputStatus	ch8.2	INTEGER	RO	Same as ch4(7) group	
ch9InputStatus	ch9.1	INTEGER	RO	Same as ch4(7) group	
ch9OutputStatus	ch9.2	INTEGER	RO	Same as ch4(7) group	
ch10InputStatus	ch10.1	INTEGER	RO	Same as ch4(7) group	
ch10OutputStatus	ch10.2	INTEGER	RO	Same as ch4(7) group	
ch11InputStatus	ch11.1	INTEGER	RO	Same as ch4(7) group	
ch11OutputStatus	ch11.2	INTEGER	RO	Same as ch4(7) group	

Table 6-6 panel(2) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
keyLock	panel.1	INTEGER	RO	1	ON
				2	OFF
faultIndicator	panel.2	INTEGER	RO	1	Normal
				2	Primary
				3	Backup
				4	Primary-backup
autoSwitching	panel.3	INTEGER	RO	1	Auto-switching
				2	Disable
syncSource	panel.4	INTEGER	RO	1	Primary
				2	Backup
faultReset	panel.5	INTEGER	RO	1	ON
				2	OFF

## 6. ETHERNET CONTROL

Table 6-7 remote(3) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
remoteAutoSwitching	remote.1	INTEGER	RO	1	ON
				2	OFF
remoteToggleSyncSource	remote.2	INTEGER	RO	1	ON
				2	OFF
remoteFaultReset	remote.3	INTEGER	RO	1	ON
				2	OFF

Table 6-8 ch1format(1) group to ch3format(3) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch1FormatStatus1	ch1format.1	INTEGER	RO	1	Disable
				2	NTSC
				3	PAL
				4	720P
				5	1080i/P
				6	User define 1
				7	User define 2
				8	SD-SDI
				9	HD-SDI/3G-SDI
ch1FormatStatus2	ch1format.2	INTEGER	RO	1	Disable
				2	60Hz (1080i/720P)
				3	59.94Hz (1080i/720P)
				4	50Hz (1080i/720P)
				5	30Hz (1080P/720P)
				6	29.97Hz (1080P/720P)
				7	25Hz (1080P/720P)
				8	24Hz (1080P/720P)
				9	23.98Hz (1080P/720P)
ch1FormatStatus3	ch1format.3	INTEGER	RO	1	Disable
				2	HD-SDI
				3	3G-SDI
ch2FormatStatus1	ch2format.1	INTEGER	RO	Same as ch1format(1) group	
ch2FormatStatus2	ch2format.2	INTEGER	RO	Same as ch1format(1) group	
ch2FormatStatus3	ch2format.3	INTEGER	RO	Same as ch1format(1) group	
ch3FormatStatus1	ch3format.1	INTEGER	RO	Same as ch1format(1) group	
ch3FormatStatus2	ch3format.2	INTEGER	RO	Same as ch1format(1) group	
ch3FormatStatus3	ch3format.3	INTEGER	RO	Same as ch1format(1) group	

## 6. ETHERNET CONTROL

Table 6-9 ch4format(4) group to ch8format(8) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch4FormatStatus1	ch4format.1	INTEGER	RO	1	Disable
				2	NTSC
				3	PAL
				4	720P
				5	1080i/P
				6	User Define 1
				7	User Define 2
ch4FormatStatus2	ch4format.2	INTEGER	RO	1	Disable
				2	60Hz (1080i/720P)
				3	59.94Hz (1080i/720P)
				4	50Hz (1080i/720P)
				5	30Hz (1080P/720P)
				6	29.97Hz (1080P/720P)
				7	25Hz (1080P/720P)
				8	24Hz (1080P/720P)
				9	23.98Hz (1080P/720P)
ch4FormatStatus3	ch4format.3	INTEGER	RO	1	Disable
ch5FormatStatus1	ch5format.1	INTEGER	RO	Same as ch4format(4) group	
ch5FormatStatus2	ch5format.2	INTEGER	RO	Same as ch4format(4) group	
ch5FormatStatus3	ch5format.3	INTEGER	RO	Same as ch4format(4) group	
ch6FormatStatus1	ch6format.1	INTEGER	RO	Same as ch4format(4) group	
ch6FormatStatus2	ch6format.2	INTEGER	RO	Same as ch4format(4) group	
ch6FormatStatus3	ch6format.3	INTEGER	RO	Same as ch4format(4) group	
ch7FormatStatus1	ch7format.1	INTEGER	RO	Same as ch4format(4) group	
ch7FormatStatus2	ch7format.2	INTEGER	RO	Same as ch4format(4) group	
ch7FormatStatus3	ch7format.3	INTEGER	RO	Same as ch4format(4) group	
ch8FormatStatus1	ch8format.1	INTEGER	RO	Same as ch4format(4) group	
ch8FormatStatus2	ch8format.2	INTEGER	RO	Same as ch4format(4) group	
ch8FormatStatus3	ch8format.3	INTEGER	RO	Same as ch4format(4) group	

Table 6-10 ch9format(9) group and ch10format(10) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch9FormatStatus1	ch9format.1	INTEGER	RO	1	Disable
				6	User define 1
				7	User define 2
				8	AES/EBU digital audio
ch9FormatStatus2	ch9format.2	INTEGER	RO	1	Disable
ch9FormatStatus3	ch9format.3	INTEGER	RO	1	Disable
ch10FormatStatus1	ch10format.1	INTEGER	RO	Same as ch9format(9) group	
ch10FormatStatus2	ch10format.2	INTEGER	RO	Same as ch9format(9) group	
ch10FormatStatus3	ch10format.3	INTEGER	RO	Same as ch9format(9) group	

6. ETHERNET CONTROL

Table 6-11 ch11format(11) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
ch11FormatStatus1	ch11format.1	INTEGER	RO	1	Disable
				6	User define 1
				7	User define 2
				8	Word clock
ch11FormatStatus2	ch11format.2	INTEGER	RO	1	Disable
ch11FormatStatus3	ch11format.3	INTEGER	RO	1	Disable

Table 6-12 target(1) group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
managerIp	target.1	IP ADDRESS	R/W	*.*.*.*	Trap transmission destination
trapAction	target.2	INTEGER	R/W	1	Enable
				2	Disable

## 6.2.5 Specific Trap Type

Table 6-13 Specific trap type IDs

Specific Trap Type ID	Event Name	Description	Object Data
1	fanUnitStatus	Fan unit status change detection	fanUnit.status
5	powerUnit1Status	Power supply unit 1 status change detection	powerUnit1.status powerUnit1.fanStatus
6	powerUnit2Status	Power supply unit 2 status change detection	powerUnit2.status powerUnit2.fanStatus
7	ch1Status	Channel 1 status change detection	ch1.inputStatus
8	ch2Status	Channel 2 status change detection	ch2.inputStatus
9	ch3Status	Channel 3 status change detection	ch3.inputStatus
10	ch4Status	Channel 4 status change detection	ch4.inputStatus ch4.outputStatus
11	ch5Status	Channel 5 status change detection	ch5.inputStatus ch5.outputStatus
12	ch6Status	Channel 6 status change detection	ch6.inputStatus ch6.outputStatus
13	ch7Status	Channel 7 status change detection	ch7.inputStatus ch7.outputStatus
14	ch8Status	Channel 8 status change detection	ch8.inputStatus ch8.outputStatus
15	ch9Status	Channel 9 status change detection	ch9.inputStatus ch9.outputStatus
16	ch10Status	Channel 10 status change detection	ch10.inputStatus ch10.outputStatus
17	ch11Status	Channel 11 status change detection	ch11.inputStatus ch11.outputStatus
18	panelStatus	Panel key status change detection	panel.keyLock panel.faultIndicator panel.autoSwitching panel.syncSource panel.faultReset
19	remoteStatus	Remote status change detection	remote.autoSwitching remote.syncSource remote.faultReset

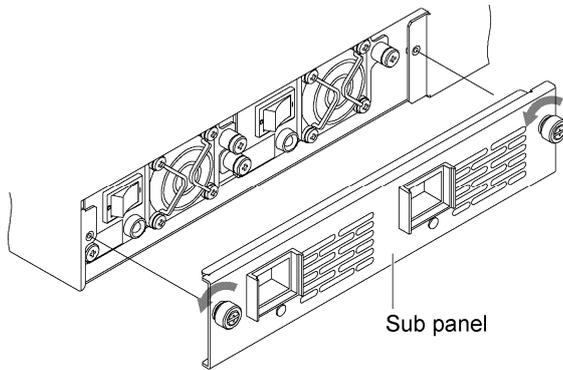
## 7. MAINTENANCE (LT 4447 ONLY)

### 7.1 Cleaning the Air Filters (When they are dirty)

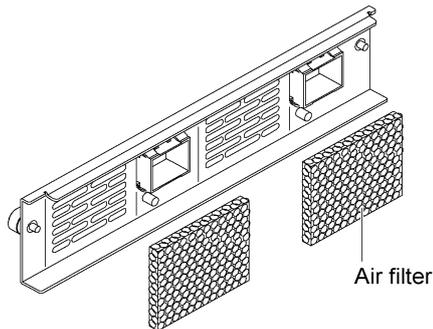
The power units on the front panel have air filters. When the air filters become dirty, clean them by following the procedure below. You can clean them while the power is turned on.

**1. Turn the sub-panel screws counterclockwise, and remove the sub panel.**

You can turn the screws by hand.



**2. Remove the two air filters from the sub panel.**

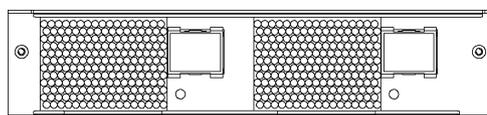


**3. Wash the air filter with mild detergent and water, or remove the dust with a vacuum cleaner.**

If you wash the filters with water, dry them.

**4. Attach the air filters to the sub panel.**

Attach them to the positions shown below. There is no front or back side to the filters.



**5. Attach the sub panel to the main body.**

## 7.2 Replacing the Air Filters (Once every two years)

Air filters are consumables. If they tear or if two years have passed since the previous replacement, replace them by following the procedure below. You can replace them while the power is turned on.

### ● Replacement Parts

To obtain parts, contact your local LEADER agent.

Part No.	Name	Specifications	Quantity Used
6600758001	Air filter	G-758	2

### ● Replacement Procedure

Replace the air filters by referring to section 7.1, "Cleaning the Air Filters (When They Are Dirty)."

## 7.3 Replacing the Fan Unit (Once every three years)

The fan unit on the rear panel is a consumable component. If an error occurs or if three years have passed since the previous replacement, replace it by following the procedure below. You can replace them while the power is turned on.

### ● Replacement Parts

For details, contact your nearest LEADER agent.

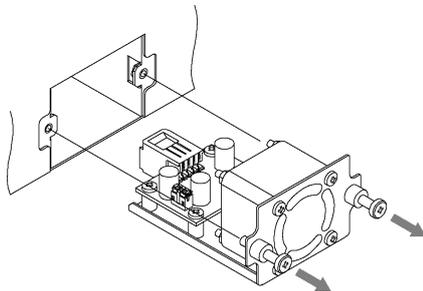
Part No.	Name	Specifications	Quantity Used
0218100005	LP 2181	FAN UNIT	1

### ● Replacement Procedure

#### 1. Turn the fan unit screws counterclockwise, and pull out the unit.

Use a Phillips screwdriver (#2). When you turn the screws, you will be able to pull them out.

When you pull out the fan unit, the FAN LED on the front panel lights.



#### 2. Insert the new fan unit, and tighten the screws.

Torque to 147 [cN•m].

#### 3. Check that the FAN LED on the front panel turns off.

## 7.4 Replacing the Power Supply Unit (Once every three years)

The power supply unit on the front panel is a consumable component. If an error occurs or if three years have passed since the previous replacement, replace it by following the procedure below. You can replace them while the power is turned on. (The power supply unit that you are replacing must be turned off.)

### ● Replacement Unit

To obtain a replacement unit, contact your local LEADER agent.

Part No.	Name	Specifications	Quantity Used
021800001	LP 2180	POWER UNIT	2

### ● Replacement Procedure

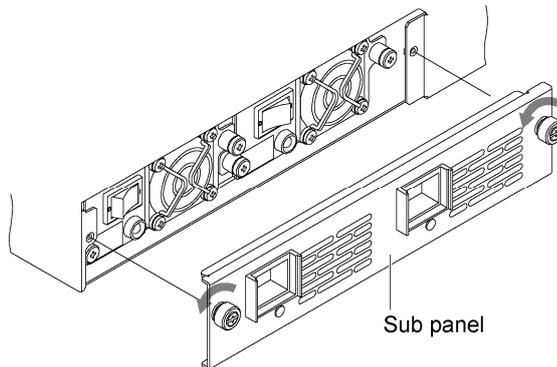
This section provides an example on how to replace power supply unit POWER 2 while leaving power supply unit POWER 1 turned on.

**1. Flip the power switch of POWER 2 to the off (○) side.**

POWER 2 ALARM lights.

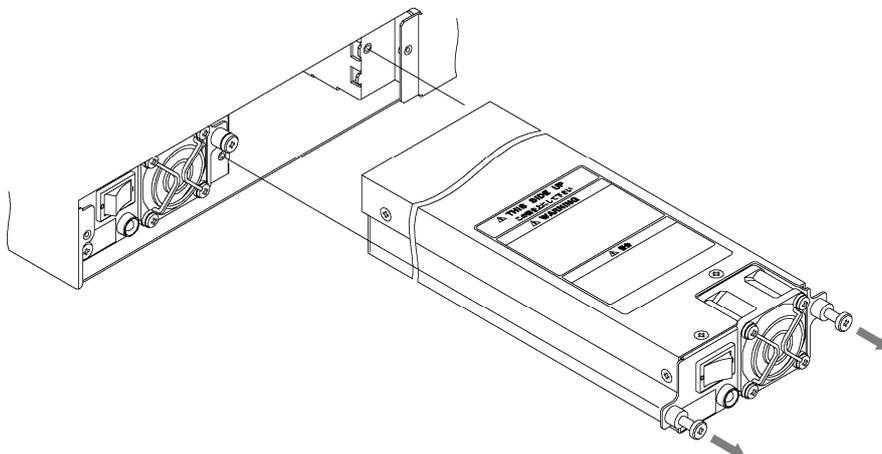
**2. Turn the sub-panel screws counterclockwise, and remove the sub panel.**

You can turn the screws by hand.



**3. Turn the power supply unit screws counterclockwise, and pull out the unit.**

Use a Phillips screwdriver (#2). When you turn the screws, you will be able to pull them out.



- 4. Check that the power switch of the new power supply unit is off (○), and insert the unit.**

Check that vertical orientation. The label should be on top.  
When it is inserted properly, the ALARM LED turns on.

- 5. Tighten the power supply unit screws, and attach the sub panel.**

Torque the screws to 147 [cN•m].

- 6. Flip the power switch of POWER 2 to the on (|) side, and check that the ALARM LED turns off.**

Following information is for Chinese RoHS only

# 所含有毒有害物质信息

部件号码: LT 4446 / LT 4447



此标志适用于在中国销售的电子信息产品, 依据2006年2月28日公布的《电子信息产品污染控制管理办法》以及SJ/T11364-2006《电子信息产品污染控制标识要求》, 表示该产品在使用完结后可再利用。数字表示的是环境保护使用期限, 只要遵守与本产品有关的安全和使用上的注意事项, 从制造日算起在数字所表示的年限内, 产品不会产生环境污染和对人体、财产的影响。产品适当使用后报废的方法请遵从电子信息产品的回收、再利用相关法令。详细请咨询各级政府主管部门。

产品中有毒有害物质或元素的名称及含量

部件名称 Parts	有毒有害物质或元素 Hazardous Substances in each Part					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
实装基板	×	○	○	○	○	○
主体部	×	○	○	○	○	○
开关电源	×	○	○	○	○	○
风扇	×	○	○	○	○	○
外筐	○	○	○	○	○	○
线材料一套	×	○	○	○	○	○
附件	○	○	○	○	○	○
包装材	○	○	○	○	○	○

**备注)**  
○: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 规定的限量要求以下。  
×: 表示该有毒有害物质或元素至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

**LEADER**

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