LEADER

LT 4110

SYNC GENERATOR

INSTRUCTION MANUAL

LEADER
ELECTRONIC MEASURING INSTRUMENTS

TABLE OF CONTENTS

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.

<Symbol> 	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. 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.
<Term> 	Ignoring the precautions that this term indicates could lead to death or serious injury.
<Term> 	Ignoring the precautions that this term indicates could lead to personal injury or damage to the instrument.

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 and fan unit) 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 % 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

WARNING

■ 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.

CAUTION

■ 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 power 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

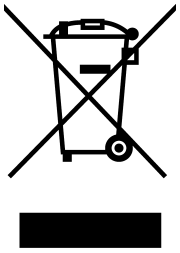
■ Calibration and Repairs

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, knobs, and other parts, 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.
(WEEE stands for Waste Electrical and Electronic Equipment.)

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 Disclaimer

LEADER will not be held liable for any direct, indirect, contingent, consequential, or other damages resulting from using this product.

1.3 Trademarks Acknowledgments

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

1.4 Operating Precautions

1.4.1 Mechanical Shock

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

1.4.2 Electrostatic Damage

Electronic components can be damaged by static discharge.

1.4.3 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.
If you require the frequency accuracy to be 1×10^{-7}/h or higher, leave the instrument turned on for at least 48 hours, and use it without any power interruptions.

1.4.4 Input Signals

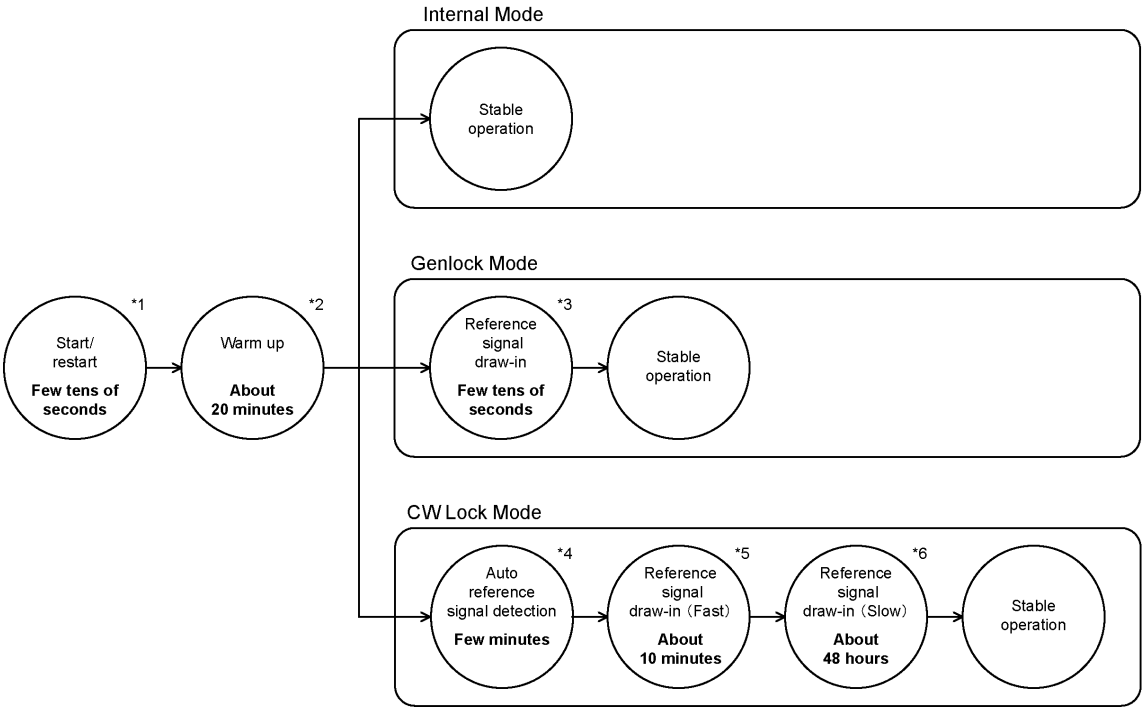
The LT 4110 is a signal generator designed for mastering and is different from ordinary signal generators.
For signals applied to GENLOCK IN and CW IN, use a signal generator with a built-in OCXO or the like and with a frequency stability of at least 1×10^{-7}. The LT 4110 may not be able to lock if a poor quality signal is used.

- **Examples of poor quality signals**

- Signals with level, timing, slope, or the like not complying with the appropriate standard
- Signals with hum noise, pulse noise, white noise, or other external noise
- Signals with degraded level or frequency characteristics as a result of transmission path extension or the like
- Signals with a frequency stability less than 1×10^{-7} (e.g., TCXO)
- Signals running through degraded BNC cables

1.4.5 Starting and Restarting

The following figure shows the time it takes for the LT 4110 to stabilize after the power is started or restarted.



*1 The output signal is unstable.
*2 The signal is output, but the signal is unstable.
*3 The signal is output, but the signal is discontinuous. Even when the LT 4110 is started in genlock mode, panel operation (RE-ADJUST) is necessary to draw in the reference signal.
*4 A continuous signal is output, but the phase may vary.
*5 A continuous signal is output, but the phase varies at a fast timing.
*6 A continuous signal is output, but the phase varies at a slow timing.

Operations that require starting or restarting the LT 4110 are listed below. Be sure to reserve enough time when performing these operations.

- Turning the power on
- Restarting the power
- NETWORK SETTING under UTILITY SETTING
- FACTORY DEFAULT under UTILITY SETTING
- Firmware updating
  (Contact your nearest LEADER agent.)

2. SPECIFICATIONS

2.1 General

The LT 4110 is an analog black signal generator with CW lock and genlock functions.

2.2 Features

- **Analog Black**

  Equipped with four independent pairs (eight channels) of analog black outputs.
  The output timings of the four pairs can be adjusted separately.
  Each output signal can be set to HDTV tri-level sync signal, NTSC/PAL black burst signal with field reference pulse, or NTSC black burst signal with 10 field IDs.

- **CW Lock**

  Equipped with a CW 10 MHz input that can be used for CW locking.
  A holdover function, which holds the frequency that is in use immediately before an error occurs, is available to handle errors that may occur at the CW input.

- **Genlock**

  Synchronizes to HDTV tri-level sync signals and NTSC/PAL black burst signals.
  NTSC/PAL black burst signal with field reference pulse and NTSC black burst signal with 10 field IDs are also supported.
  A Stay-in-Sync function, which holds the frequency (video phase) that is in use immediately before an error occurs, is available to handle errors that may occur at the genlock input.

- **Ethernet**

  Provides SNMP support for remotely monitoring genlock and other status signals.

- **Redundant Power Supply (Option)**

  Supports hot-swap capable power supplies.

2.3 Specifications

2.3.1 Analog Black Output

Compliant Standard

NTSC Black Burst Signal:	SMPTE ST 170, ST 318, RP154
PAL Black Burst Signal	EBU N14, ITU-R BT.470-6
HDTV Tri-Level Sync Signal	SMPTE ST 274, ST 296

Output Signals

Outputs	8 (1 pair 2 outputs × 4)
Output Format Setting	Each of the 4 pairs can be configured independently.(*1)
Output Connector	
Output Impedance	75 Ω
Output Connector	BNC

Output Timing

Value	Each of the 4 pairs can be configured independently.(*1)
Adjustment Range	
NTSC Black Burst Signal:	±5 frames
PAL Black Burst Signal	±2 frames
HDTV Tri-Level Sync Signal	1 frame (entire frame)
Adjustment Unit	
NTSC Black Burst Signal:	In units of 0.0185 μs (54 MHz clock unit)
HDTV Tri-Level Sync Signal	In units of 0.0135 μs (74.25/1.001 MHz clock unit or 74.25 MHz clock unit)

*1 The four pairs can be set separately, but the HDTV tri-level sync signal clocks 74.25/1.001 MHz and 74.25MHz cannot be used together.

2.3.2 Genlock

Reference Input Signal Level

HDTV	Positive polarity: 300 mV; negative polarity: -300 mV
NTSC	-286 mV
PAL	-300 mV

Input Connector

Input Impedance	75 Ω
Input Connector	BNC

Stay in Sync

Function	Holds the frequency (video phase) immediately before an error occurrence when an error occurs in the external reference signal
Hold Accuracy	1×10^{-7}/h (at 25°C fixed)

2.3.3 CW Lock

Input Frequency	10 MHz
Maximum Input Level	1 Vrms
Input Connector	
Input Impedance	50 Ω
Input Connector	BNC
Holdover	
Function	Holds the frequency that is in use immediately before an error occurs when an error occurs in the external reference signal
Hold Accuracy	1×10^{-7}/h (at 25°C fixed)

2.3.4 External Interface

Ethernet	
Function	Transmission of operating status (GENLOCK sync status, etc.)
Transmission Rate	10Base-T/100Base-TX
SNMP Version	SNMP v1
USB	
Specifications	USB 1.1
Function	Saving and loading of presets and retrieving of MIB files

2.3.5 Fan Unit (LP 2181)

Number of Units in Main Unit	1
Fan Unit Replacement	Hot-swap capable
Number of Fans	1

2.3.6 Power Supply Unit (LP 2180)

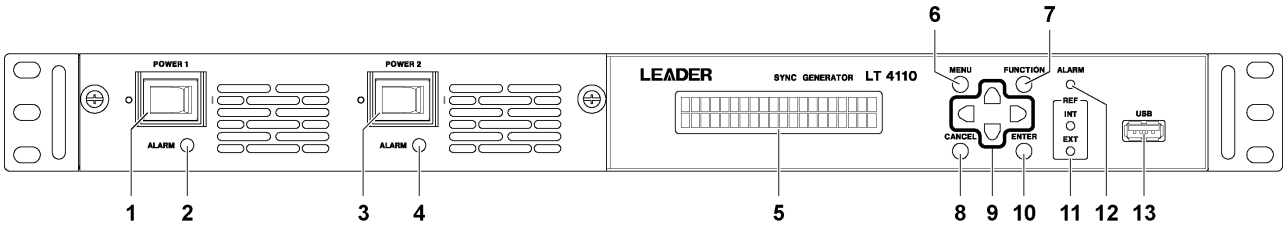
Redundancy	Supported (when the option is installed)
Power Switch	Illuminated
Number of Units in Main Unit	
Standard	1
With Option	2
Power Supply Unit Replacement	Hot-swap capable (the power switch of the unit to be replaced is off)

2.3.7 General Specifications

Environmental Conditions	
Operating Temperature	0 to 40°C
Operating Humidity Range	90 %RH or less (no condensation)
Optimal Temperature	10 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	
Voltage	90 to 250 VAC
Frequency	50/60 Hz
Power Consumption	75W max.
Dimensions	426 (W) × 44 (H) × 450 (D) mm (excluding protrusions)
Weight	8.3 kg (including the power supply unit option)
Accessories	Power cord 2
	Cover/Inlet stopper 2
	Rack supports.....2
	Flat head screws M3×8 6
	Instruction manual 1

3. PANEL DESCRIPTION

3.1 Front Panel

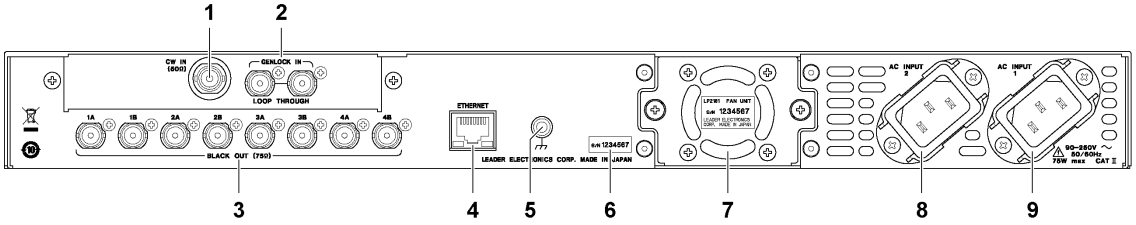


* The figure is for when the optional power supply unit is installed.

No.	Name	Description	Reference
1	POWER 1	Power switch. The ○ side is off; the | side is on.	* MERGEFORMAT
2	ALARM	Turns on when the power unit is in one of the following states. • When an error occurs in the POWER 1 output • When the POWER 1 fan has stopped • When POWER 2 is installed and the POWER 1 switch is off	* MERGEFORMAT
3	POWER 2 (option)	Power switch. The ○ side is off; the | side is on. When both POWER 1 and POWER 2 are turned on, operation continues uninterrupted even if one of the power supplies fails.	* MERGEFORMAT
4	ALARM (option)	Turns on when the power unit is in one of the following states. • When an error occurs in the POWER 2 output • When the POWER 2 fan has stopped • When POWER 1 is installed and the POWER 2 switch is off	* MERGEFORMAT
5	LCD	Shows various information.	-
6	MENU	Switches the menu.	* MERGEFORMAT
7	FUNCTION	Enables and disables the key lock.	* MERGEFORMAT
8	CANCEL	Cancels settings.	* MERGEFORMAT
9	Arrow keys	Used to move the cursor and to set values.	-
10	ENTER	Confirms settings.	* MERGEFORMAT
11	REF	INT lights when the internal reference signal is in use. EXT lights when an external reference signal is in use.	5 6.1
12	ALARM	Blinks when the rear-panel fan unit is in one of the following states. • When the fan has stopped • When the fan unit is not installed	* MERGEFORMAT
13	USB	USB port. Used to save and load presets and retrieve of MIB files.	6.2.6 6.2.7

			6.2.10

3.2 Rear Panel



No.	Name	Description
1	CW IN	CW input connector. It receives 10 MHz CW signals.
2	GENLOCK IN	Genlock input connectors. They are loop-through connectors. They receive HD tri-level sync or NTSC/PAL black burst signals.
3	BLACK OUT	Black output connector. They output HD tri-level sync or NTSC/PAL black burst signals.
4	ETHERNET	Ethernet port. Used to remotely monitor the LT 4110 status.
5	Ground terminal.	Connect to an external ground.
6	Serial label	The serial number is printed on this label.
7	Fan Unit	Cooling fan for the instrument. Replace it periodically.
8	AC INPUT 2	AC inlet. Used when the optional power supply unit is installed. Attach the included cover/inlet stopper to the AC inlet.
9	AC INPUT 1	AC inlet. Attach the included cover/inlet stopper to the AC inlet.

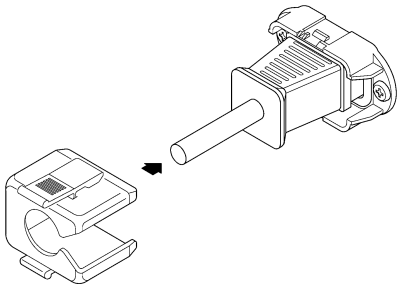
4. BEFORE USE

4.1 Attaching the Cover Inlet Stopper

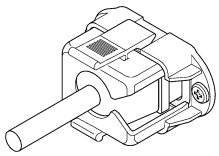
A cover/inlet stopper is included with the LT 4110. Use this device to prevent the power cord from being pulled free of the AC inlet. To attach the cover/inlet stopper, follow the procedure below.

- **Attaching the Cover/Inlet Stopper**

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



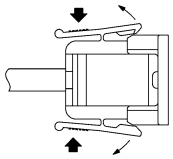
2. **Push the cover/inlet stopper, until you hear a click, to attach it to the AC inlet.**



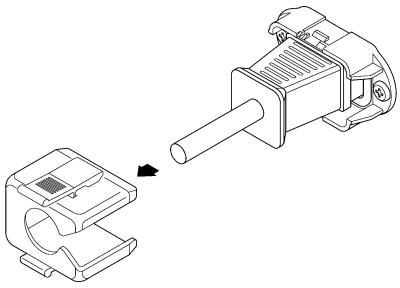
3. **Check that the cover/inlet stopper is securely attached to the AC inlet.**

- **Removing the Cover/Inlet Stopper**

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



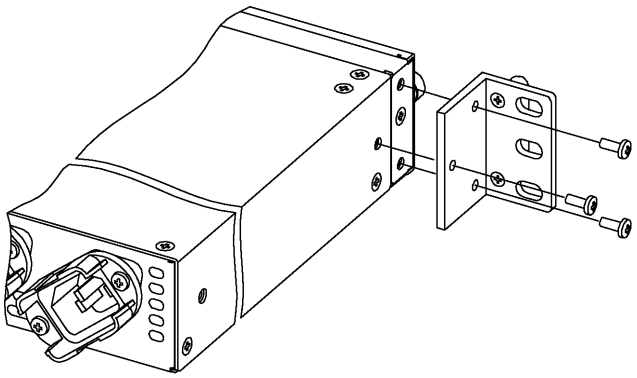
2. **Pull the cover/inlet stopper away from the AC inlet.**



4.2 Attaching Rack Supports

To rack mount the LT 4110, attach the supplied rack supports.
Using a Phillips head screwdriver (#2), torque the included screws (M3×8) to 59.8 [cN·m].

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.



4.3 Turning the Power On

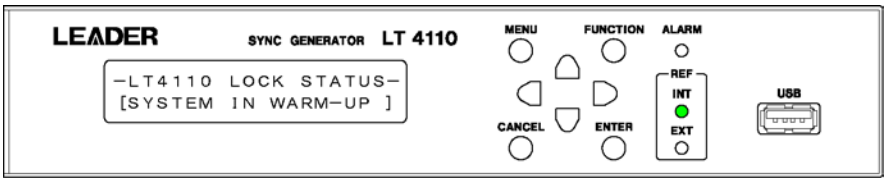
- **Turning the Power On**

  Connect a power cord to AC INPUT 1 on the rear panel, and flip the POWER 1 switch on the front panel to the on (|) side. The power switch lights, and the instrument turns on.
  If the optional power supply unit is installed, turn on the POWER 2 switch in the same manner. By using two power supplies, you can continue operation even if one of the power supplies fails. (The LT 4110 can run off of either power supply.)

- **Warming Up**

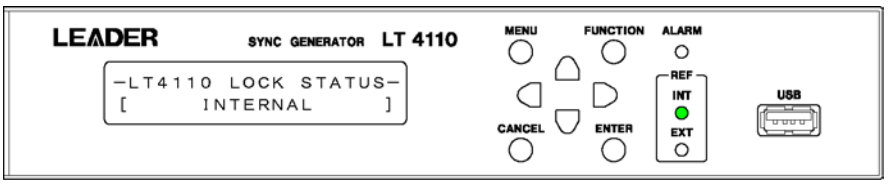
  When the LT 4110 is turned on, warm-up begins. “SYSTEM IN WARM-UP” is displayed under “LT4110 LOCK STATUS.” The warm-up time is about 20 minutes. A warm-up is necessary every time the LT 4110 is turned on or restarted.
  [Reference] Section 1.4.5, “Starting and Restarting”

> ■ Notes on Warm-Up ■
>
> You can operate the LT 4110 while it is warming up, but the output signals will be unstable. In addition, even if the LT 4110 locks during warm-up, it may transit to stay-in-sync or holdover mode. Set the lock mode and reference signal after warm-up is completed.



- **Warming-Up Completion**

  When “SYSTEM IN WARM-UP” disappears, warm-up is complete. You can begin using the instrument.



- **Power-on Settings**

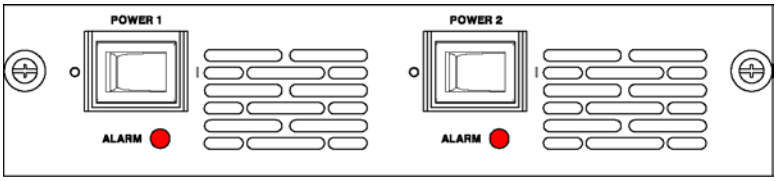
  The settings vary depending on the POWER ON RECALL setting as follows:
  [Reference] POWER ON RECALL → section 6.2.5, “Power-on Settings”

	POWER ON RECALL	
	OFF	NUMBER 0 to NUMBER 9
UTILITY SETTING	Settings that were in use the last time the power was turned off	Settings that were in use the last time the power was turned off
REFERENCE SETTING	Factory default settings	Preset settings
BLACK SETTING	Factory default settings	Preset settings

4.4 Alarm Indications

If an error occurs in the power supply or fan, the ALARM LED on the front panel lights or blinks in red.
If an alarm occurs due to an output error or the fan stopping, contact your nearest LEADER agent.

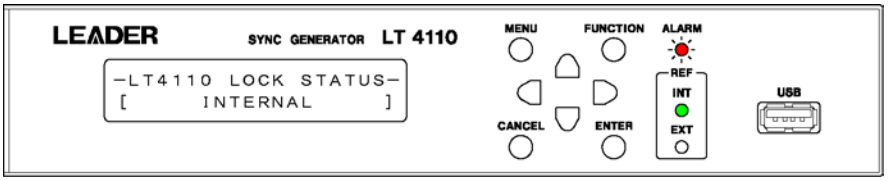
- **Power Supply Alarm**



POWER 1 ALARM lights in the following situations.
• When an error occurs in the POWER 1 output
• When the POWER 1 fan has stopped
• When POWER 2 is installed and the POWER 1 switch is off

POWER 2 ALARM lights in the following situations.
• When an error occurs in the POWER 2 output
• When the POWER 2 fan has stopped
• When POWER 1 is installed and the POWER 2 switch is off

- **Fan Alarm**



The ALARM LED at the upper right of the front panel blinks in the following situations.
• When the fan of the rear panel stops
• When the fan unit of the rear panel is not installed

5. HOW TO USE

■ Before Operation ■

By factory default, the LT 4110 is configured so that keys are locked after 30 seconds of inactivity (no key operations).
If "* KEY LOCK *" appears when you press a key, the keys are locked. If this happens, hold down the FUNCTION key for 3 seconds to disable the key lock temporarily, and then operate the LT 4110.
[Reference] Section 6.2.2, "Turning Key Lock On and Off"

This chapter will explain how to use the LT 4110 for the following three lock modes.
Turn on the LT 4110 according to the procedure in section 4.2, "Turning the Power On." Wait for the LT 4110 to warm up, and then begin operation.

Lock Mode	Reference Signal	Description
Internal mode	Internal	The internal reference signal is used. The factory default setting is this mode.
Genlock mode	External (HD tri-level sync signal, NTSC/PAL black burst signal)	An external reference signal received through GENLOCK IN on the rear panel is used. If the external reference signal is lost during operation, the frequency that is in use immediately before the signal is lost is maintained. (Stay-in-sync function) During stay-in-sync operation, even if the external reference signal returns, the LT 4110 will not lock back on to the external reference signal until the LT 4110 is instructed to do so from the front panel.
CW lock mode	External (10 MHz CW signal)	An external reference signal received through CW IN on the rear panel is used. If the external reference signal is lost during operation, the frequency that is in use immediately before the signal is lost is maintained. (Holdover function) If the external reference signal returns during holdover operation, the LT 4110 will automatically lock back on to the external reference signal.

5.1 Internal Mode

1. **Under REFERENCE SETTING, set INPUT SELECT to GENLOCK.**

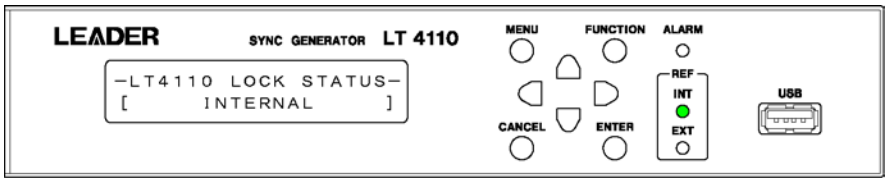
   [Reference] Section 6.3.1, “Lock Mode Selection 1”

2. **Under REFERENCE SETTING, select GENLOCK SETTING, and set GENLOCK MODE to INTERNAL.**

   [Reference] Section 6.3.2, “Lock Mode Selection 2”

- **Panel Display**

  Under LT4110 LOCK STATUS, INTERNAL appears, and INT under REF lights in green.



5.2 Genlock Mode

1. Under REFERENCE SETTING, set INPUT SELECT to GENLOCK.

[Reference] Section 6.3.1, “Lock Mode Selection 1”

2. Under REFERENCE SETTING, select GENLOCK SETTING, and set GENLOCK MODE to STAY-IN-SYNC.

[Reference] Section 6.3.2, “Lock Mode Selection 2”

3. Under REFERENCE SETTING, select GENLOCK SETTING, and set LOCK FORMAT.

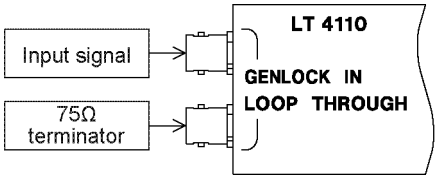
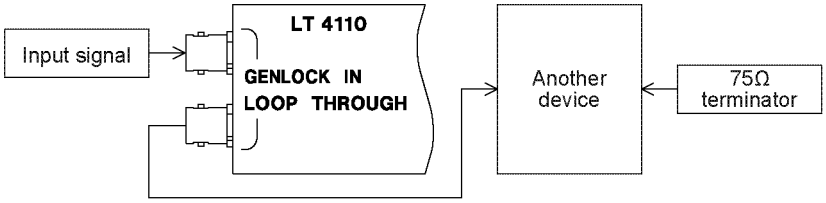
Select the reference signal format.

[Reference] Section 6.3.3, “Selecting the Genlock Format.”

4. Apply a reference signal to GENLOCK IN on the rear panel.

The LT 4110 supports HD tri-level sync or NTSC/PAL black burst signals.
Connect cables with a characteristic impedance of 75 Ω in one of the following ways.

[Reference] Section 1.4.4, “Input Signals”

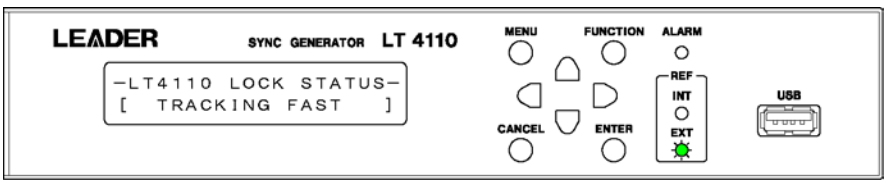
[Input Method 1] Apply to one input and terminate the other at 75 Ω.	
[Input Method 2] Apply to one input and connect the other to another device. Terminate the device at the end of the chain at 75 Ω.	

- **Panel Display**

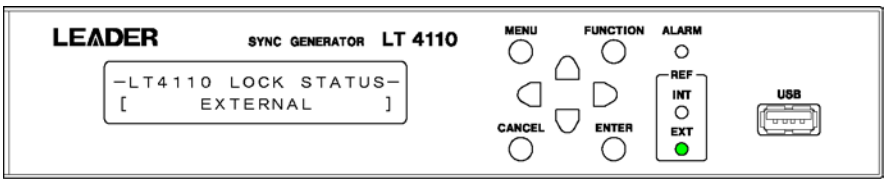
When the LT 4110 determines that the input reference signal can be drawn in, TRACKING FAST appears under LT4110 LOCK STATUS, and EXT under REF blinks in green.

<u>This condition indicates that the reference signal is being drawn in. This continues for a few tens of seconds. Please wait.</u>

Note that depending on the frequency stability of the input signal, the LT4110 may not be able to lock, or even if it locks, it may disengage.

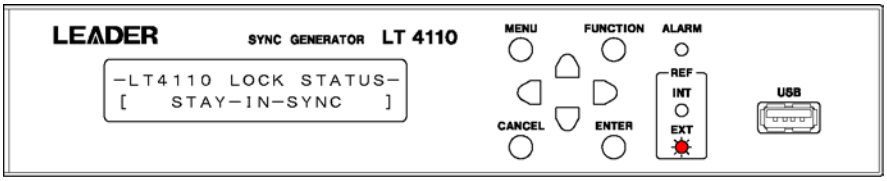


When genlock is complete, EXTERNAL appears under LT4110 LOCK STATUS, and EXT under REF lights in green.
In genlock mode, use the LT 4110 in this condition.

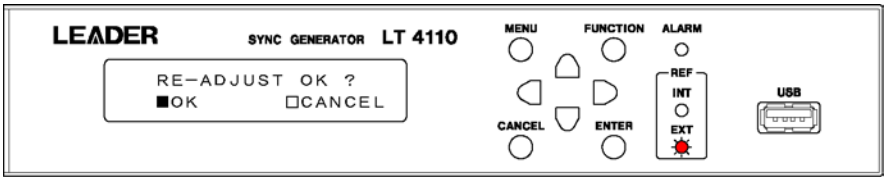


If an error occurs in the external reference signal in the EXTERNAL state, the frequency (video phase) that was in use immediately before the error occurred is maintained (stay-in-sync function).
Under LT4110 LOCK STATUS, STAY-IN-SYNC appears, and EXT under REF blinks in red.

* The stay-in-sync function works when an abnormal condition lasts over 10 seconds.
(“STAY-IN-SYNC” appears 20 seconds after an abnormality occurs.)
If the abnormal condition lasts less than 10 seconds, the “EXTERNAL” state is maintained.



In the STAY-IN-SYNC status, even if the reference signal returns, the LT 4110 will not automatically lock on to the reference signal. To lock on to the reference signal, set GENLOCK MODE Under REFERENCE SETTING, select GENLOCK SETTING, and set GENLOCK MODE to STAY-IN-SYNC, and then specify RE-ADJUST.
[Reference] Section 6.3.2, “Lock Mode Selection 2”



Relocking takes a few seconds, and the output signal becomes discontinuous.

5.3 CW Lock Mode

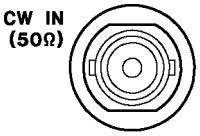
1. Under REFERENCE SETTING, set INPUT SELECT to CW-LOCK.

[Reference] Section 6.3.1, “Lock Mode Selection 1”

2. Apply a reference signal to CW IN on the rear panel.

The LT 4110 supports 10MHz CW signals.
Connect cables with a characteristic impedance of 50 Ω to the external reference input connectors.

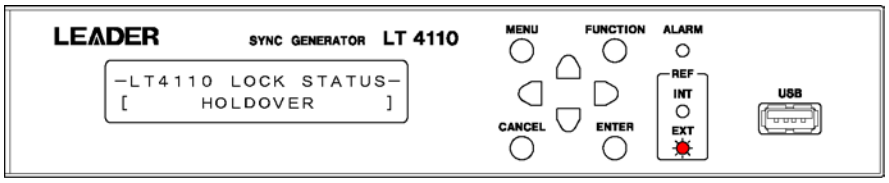
[Reference] Section 1.4.4, “Input Signals”



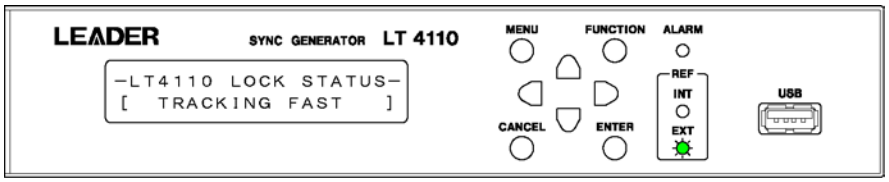
- **Panel Display**

Even when you apply a reference signal, HOLDOVER will continue to be displayed under LT4110 LOCK STATUS, and EXT under REF will remain blinking in red.
This condition indicates that an auto reference signal detection is taking place. This continues for a few seconds. Please wait.

Note that depending on the frequency stability of the input signal, it may take time for auto detection to complete, or the LT 4110 may fail to lock.

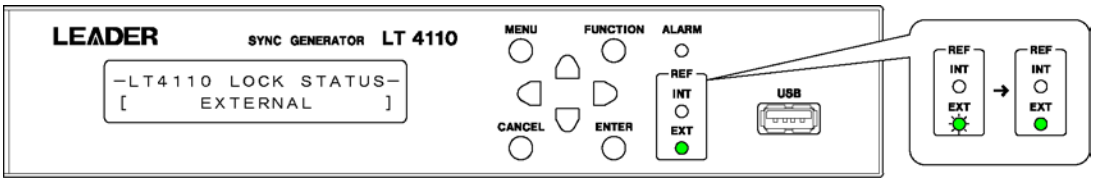


When the LT 4110 determines that the input reference signal can be drawn in, TRACKING FAST appears under LT4110 LOCK STATUS, and EXT under REF blinks in green.
This condition indicates that the reference signal is being drawn in. This continues for about 10 minutes. Please wait.

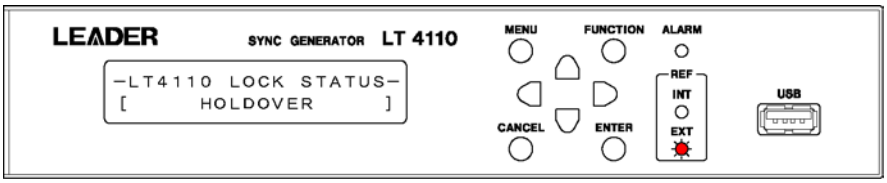


When CW lock is complete, EXTERNAL appears under LT4110 LOCK STATUS. EXT under REF blinks in green for about 48 hours and then turns to solid green.

In CW lock mode, use the LT 4110 when EXT is lit green.
If it is blinking, the phase of the output signal may vary slowly.



If an error occurs in the external reference signal in the EXTERNAL state, the frequency that was in use immediately before the error occurred is maintained (holdover function). Under LT4110 LOCK STATUS, HOLDOVER appears, and EXT under REF blinks in red.

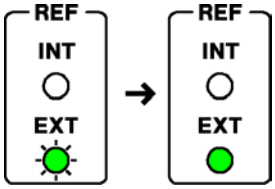
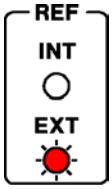
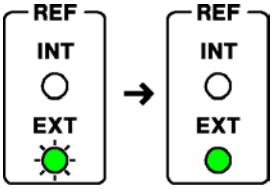


In the HOLDOVER state, if the reference signal returns, the LT 4110 will automatically detect the reference signal and start to relock after a few minutes. While relocking, the phase of the output signal may vary.

- **Time required for CW relock**

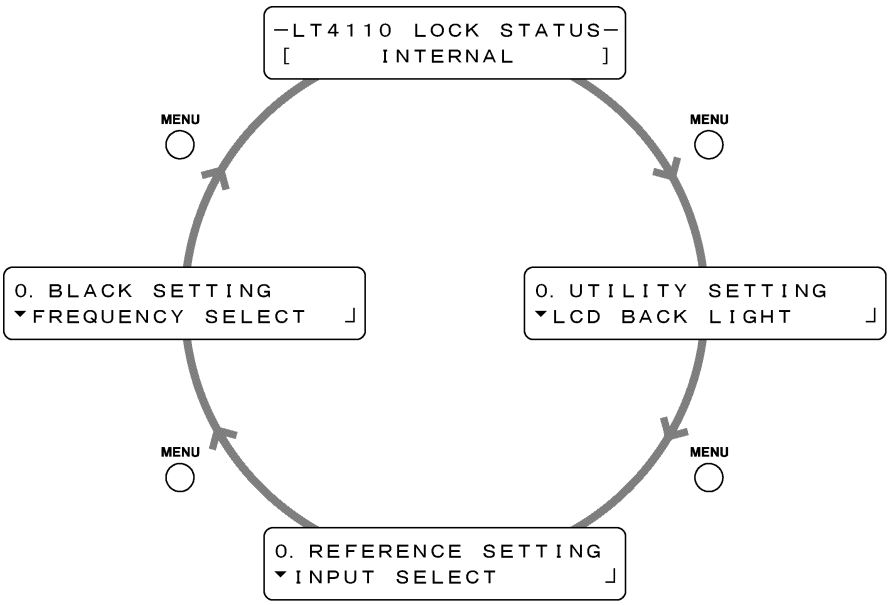
  After CW lock is complete (EXT lit), the LT 4110 switches to the holdover function, and the external reference signal returns, the LT 4110 starts drawing in the reference signal once again. The time it takes for EXT to change from blinking to solid varies as follows depending on how long the LT 4110 was in holdover mode.

  For example, if it takes about 48 hours for CW lock to complete and the LT 4110 is in holdover mode for 2 hours, CW reclock takes about 6 hours.

	Time needed for CW lock	Length of time in holdover	Time needed for CW relock
Panel	 Blinking green Solid green	 Blinking red	 Blinking green Solid green
Estimated time	About 48 hours	Up to 1 hour	About 4 hours
		1 to 3 hours	About 6 hours
		3 to 12 hours	About 12 hours
		12 hours or more	About 24 hours

6. MENU DESCRIPTION

There are four main menu items that appear on the LCD (when the setting menu level is 0). The menu switches each time you press the MENU key.



Type	Item	Description	Reference
Display menu	LT4110 LOCK STATUS	Displays the LT 4110 lock status.	6.1
Settings Menu	UTILITY SETTING	Configure basic LT 4110 settings.	6.2
	REFERENCE SETTING	Set the reference signal.	6.3
	BLACK SETTING	Select the black signal.	6.4

- **Menu Levels**

  With the exception of a portion of the screens, the settings menus show a number to the upper left of the screen. This number indicates the menu level. The larger the number, the deeper the level.

  To enter a lower level menu, press ENTER. (In some screens, you can also use the ▶ key.)
  To return to a higher level menu, press CANCEL or MENU. (In some screens, you can also use the ◀ key.)

- **Confirming and Canceling Settings**

  Press ENTER on a setting screen in a settings menu to confirm the setting. Press CANCEL to cancel the setting.
  For BLK* TIMING under FINE PHASE ADJUST and BLACK SETTING under REFERENCE SETTING, the setting is immediately confirmed. Pressing CANCEL will not revert the setting to the previous value.

■ Notes on UTILITY SETTING ■

Do not turn the power off after confirming the settings until the next screen appears. If you do, the settings may not be saved properly.

6.1 LT4110 LOCK STATUS

LT4110 LOCK STATUS displays the LT 4110 lock status.
This section will explain the details in conjunction with the REF display. For details on the REF display, see chapter 5, “HOW TO USE.”

- **SYSTEM IN WARM-UP**

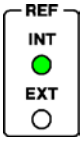
  Appears when the LT 4110 is warming up.
  The warm-up time is about 20 minutes and varies depending on the surrounding conditions. The LT 4110 does not operate properly in this condition.

```
-LT4110 LOCK STATUS-
[SYSTEM IN WARM-UP ]
```

- **INTERNAL**

  Appears in internal mode.
  Under REF, INT lights in green.

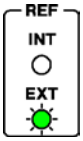
```
-LT4110 LOCK STATUS-
[      INTERNAL      ]
```



- **TRACKING FAST**

  Appears when genlock operation is in preparation or when CW lock operation is in preparation.
  Under REF, EXT blinks in green.

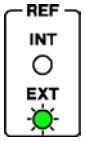
```
-LT4110 LOCK STATUS-
[  TRACKING FAST   ]
```



- **EXTERNAL**

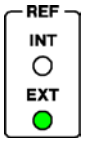
  Appears when CW lock is in preparation, when genlock operation is in use, or when CW lock operation is in use.
  Under REF, INT lights or blinks in green.

```
-LT4110 LOCK STATUS-
[      EXTERNAL      ]
```



CW lock in preparation

```
-LT4110 LOCK STATUS-
[      EXTERNAL      ]
```



Genlock operation is in use, CW lock operation is in use

- **STAY-IN-SYNC**

  Appears in genlock mode when an error occurs in the external reference signal. Under REF, INT blinks in red.

- **HOLDOVER**

  Appears in CW lock mode when an error occurs in the external reference signal. Under REF, INT blinks in red.

6.2 UTILITY SETTING

UTILITY SETTING is used to configure the basic LT 4110 settings.
These settings are not stored to presets.

6.2.1 Turning the Backlight On and Off

To turn the LCD backlight on or off, follow the procedure below.

1. **Press MENU several times to display LCD BACK LIGHT.**

2. **Press ENTER.**

3. **Press ◀ ▶ to select ON or OFF, and press ENTER.**

   [ON]: On (factory default value)
   (When AUTO BACK LIGHT (next section) is set to ON, the backlight turns off when the keys are locked.)

   [OFF]: Off

6.2.2 Turning Key Lock On and Off

To turn key lock on and off, follow the procedure below.
When the backlight and key lock are turned on, the backlight can also be turned on and off automatically on the basis of the key lock state.

* The key lock on/off function has been available from version 1.0. The auto backlight on/off function has been available from version 1.3.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select KEY LOCK.

3. Press ENTER and then ◀ ▶ to select key lock on or off. Then press ENTER again.

[ON]: Enabled or disabled depending on key operation (factory default value)
[OFF]: Always disabled

4. If LCD BACK LIGHT (previous section) and KEY LOCK are set to ON, press ◀ ▶ to select auto backlight on or off. Then, press ENTER.

[ON]: Turns on when keys are not locked; turns off when keys are locked (factory default value)
[OFF]: Always on

- **Behavior when KEY LOCK and AUTO BACK LIGHT are set to ON**

  The LT 4110 locks its keys after 30 seconds of inactivity (no key operations) and turns off the backlight.
  When the keys are locked, all keys are disabled. If you press a key in this condition, the following message is displayed for about 3 seconds. (The backlight turns on while the message is being displayed.)

```
*       KEY LOCK        *
PUSH <FUNCTION> 3SEC
```

  When the keys are locked, holding down FUNCTION for 3 seconds unlocks the keys temporarily and turns on the backlight. The LT 4110 locks its keys again after 30 seconds of inactivity (no key operations).
  Release the key when the following message appears.

```
*       KEY LOCK        *
*   UNLOCK SUCCESS      *
```

  When the keys are not locked, holding down FUNCTION for 1 second locks the keys and turns off the backlight.
  Release the key when the following message appears.

```
*       KEY LOCK        *
*      LOCK START       *
```

- **Summary of the backlight and key lock settings**

LT 4110 setting			Backlight state
LCD BACK LIGHT	KEY LOCK	AUTO BACK LIGHT	
ON	ON	ON	Turns on when keys are not locked, turns off when keys are locked
		OFF	Always on
	OFF	- (Cannot be selected)	Always on
OFF	ON	- (Cannot be selected)	Always on
	OFF	- (Cannot be selected)	Always on

6.2.3 Saving Presets

A preset is a collection of LT 4110 settings that are registered. Presets can be imported and exported through a USB memory device. A preset can be recalled automatically at startup.

A preset contains the items that have been set in the REFERENCE SETTING and BLACK SETTING menus. Settings in the UTILITY SETTING menu are not saved.

You can save up to 10 presets by following the procedure below. By factory default, NUMBER 0 to NUMBER 9 contain factory default values.

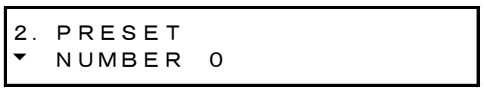
1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select PRESET/RECALL.

3. Press ▶ or ENTER and then ▲ ▼ to select PRESET.

4. Press ENTER and then ▲ ▼ to select a preset number.

Select a number from NUMBER 0 to NUMBER 9.



5. Press ENTER and then ◀ to select OK. Then, press ENTER again.

If there is already a preset stored at the selected number, it will be overwritten.

6.2.4 Recalling Presets

To recall a preset that you saved according to the procedure in section 6.2.3, “Saving Presets,” follow the procedure below.

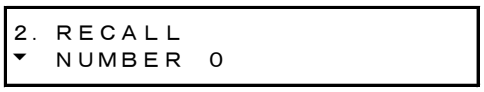
1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select PRESET/RECALL.

3. Press ▶ or ENTER and then ▲ to select RECALL.

4. Press ENTER and then ▲ ▼ to select a preset number.

Select a number from NUMBER 0 to NUMBER 9.



5. Press ENTER and then ◀ to select OK. Then, press ENTER again.

6.2.5 Power-on Settings

To select whether to set the settings in the REFERENCE SETTING and BLACK SETTING menu to factory default values or values in a preset that have been saved according to the procedures in section 6.2.3, “Saving Presets,” follow the procedure below.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select PRESET/RECALL.

3. Press ▶ or ENTER and then ▲ ▼ to select POWER ON RECALL.

4. Press ENTER and then ▲ ▼ to select OFF or a preset number.

[OFF]: Factory default values (factory default value)
[NUMBER 0 to NUMBER 9]: Values in the selected preset

5. Press ENTER.

An asterisk appears in front of the selected item.

6.2.6 Exporting the Presets

To export the presets from the LT 4110 to a USB memory device, follow the procedure below. This feature is useful when you want to use multiple LT 4110s with the same settings.

All 10 presets are exported to a single file. You cannot export presets one at a time.

1. **Connect a USB memory device to the USB port on the front panel.**

   When the LT 4110 detects the device correctly, the following message will appear for about 2 seconds.

2. **Press MENU several times to display 0.UTILITY SETTING.**

3. **Press ▲ ▼ to select PRESET/RECALL.**

4. **Press ▶ or ENTER and then ▼ to select IMPORT/EXPORT.**

5. **Press ▶ or ENTER and then ▼ to select EXPORT TO USB.**

6. **Press ENTER and then ◀ to select OK. Then, press ENTER again.**

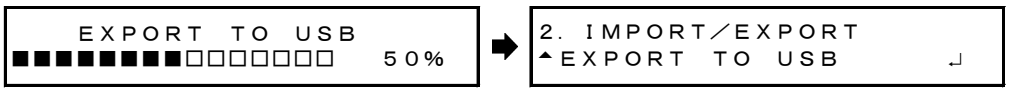
   

7. **When an overwrite confirmation message appears, press ◀ to select OK, and then press ENTER.**

   The overwrite confirmation message appears when there are presets already stored in the USB memory device.

While the presets are being exported, an indicator appears to show the progress. When the original screen returns, exporting is finished. Do not turn the power off or remove the USB memory device until the original screen returns.



- **Where the Presets Are Exported To**

  The presets are exported to the “preset” folder in the USB memory device. If you change the folder structure of the USB memory device, the LT 4110 will not be able to load them.
  The date and time of the exported file will be the date and time specified according to the procedure in section 6.2.13, “Setting the Date and Time.”

  USB memory device
  └ preset
  　└ LT4110_PRESET_DATA.DAT

6.2.7 Importing Presets

To import the presets that have been exported according to the procedure in section 6.2.6, “Exporting the Presets” from the USB memory device to the LT 4110, follow the procedure below. This feature is useful when you want to use multiple LT 4110s with the same settings.

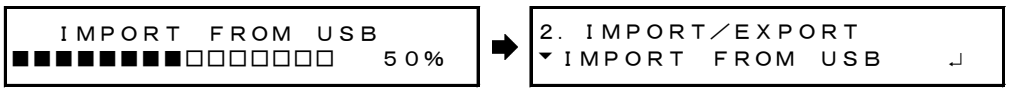
All 10 presets are imported at once. You cannot load presets one at a time.

1. Carry out steps 1 to 4 in section 6.2.6, “Exporting the Presets.”

2. Press ▶ or ENTER and then ▲ to select IMPORT FROM USB.

3. Press ENTER and then ◀ to select OK. Then, press ENTER again.

While the presets are being imported, an indicator appears to show the progress. When the original screen returns, exporting is finished. Do not turn the power off or remove the USB memory device until the original screen returns.



6.2.8 Setting the IP Address

To set the IP address, follow the procedure below.
For the new IP address to take effect, you need to restart the LT 4110.

■ Notes on restarting ■

- When you restart the LT 4110, the settings in the REFERENCE SETTING and BLACK SETTING menus return to their factory default values. If necessary, save the current settings to a preset.
- While restarting, the output signal is unstable.
- It takes a certain length of time for the LT 4110 to stabilize after it restarts. See section 1.4.5, “Starting and Restarting.”

1. Press MENU several times to display 0.UTILITY SETTING.

```
0. UTILITY SETTING
▼LCD BACK LIGHT    ↵
```

2. Press ▲ ▼ to select ETHERNET.

```
0. UTILITY SETTING
▲▼ETHERNET          ▶
```

3. Press ▶ or ENTER and then ▲ to select NETWORK SETTING.

```
1. ETHERNET
▼NETWORK SETTING    ↵
```

4. Press ENTER and then ▲ ▼ ◀ ▶ to set the IP address.

Press ◀ ▶ to move the cursor and ▲ ▼ to change the number.
Hold down ▲ ▼ to change the number continuously.

```
2. IP ADDRESS
 192. 168. 000. 000
```

5. Press ENTER and then ▲ ▼ ◀ ▶ to set the subnet mask.

```
2. SUBNET MASK
 255. 255. 255. 000
```

6. Press ENTER and then ▲ ▼ ◀ ▶ to set the default gateway.

```
2. DEFAULT GATEWAY
 000. 000. 000. 000
```

7. Press ENTER and then ◀ to select OK. Then, press ENTER again.

The LT 4110 restarts, and the settings take effect.

```
      REBOOT ?
   ■OK        □CANCEL
```

6.2.9 Viewing the MAC Address

To view the MAC address of the LT 4110, follow the procedure below.
The MAC address is a unique number assigned to the device and cannot be changed.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select ETHERNET.

3. Press ▶ or ENTER and then ▲ ▼ to select MAC ADDRESS.

4. Press ENTER.

The MAC address is displayed.

6.2.10 Setting Trap Transmission

To select whether to transmit SNMP traps when SNMP trap transmission conditions are met, follow the procedure below.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select ETHERNET.

3. Press ▶ or ENTER and then ▲ ▼ to select SNMP TRAP SETTING.

4. Press ▶ or ENTER and then ▲ to select SNMP TRAP.

5. Press ENTER and then ◀ ▶ to select trap transmission enable or disable. Then press ENTER again.

[ENABLE]: Trap transmission enabled
[DISABLE]: Trap transmission disabled (factory default value)

6.2.11 Setting the Trap Transmission Destination

To set the IP address of the SNMP manager to send SNMP traps to, follow the procedure below.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select ETHERNET.

3. Press ▶ or ENTER and then ▲ ▼ to select SNMP TRAP SETTING.

4. Press ▶ or ENTER and then ▼ to select MANAGER IP.

5. Press ENTER and then ▲ ▼ ◀ ▶ to set the IP address. Then, press ENTER again.

Press ◀ ▶ to move the cursor and ▲ ▼ to change the number.
Hold down ▲ ▼ to change the number continuously.

6.2.12 Retrieving the MIB File

To copy the MIB file, which is used for SNMP, from the LT 4110 to a USB memory device, follow the procedure below.

1. Connect a USB memory device to the USB port on the front panel.

When the LT 4110 detects the device correctly, the following message will appear for about 2 seconds.

```
*USB STORAGE DEVICE*
*        INSERT      *
```

2. Press MENU several times to display 0.UTILITY SETTING.

```
0. UTILITY SETTING
▼LCD BACK LIGHT    ↵
```

3. Press ▲ ▼ to select ETHERNET.

```
0. UTILITY SETTING
◆ETHERNET          ▸
```

4. Press ▶ or ENTER and then ▼ to select GET MIB FILE.

```
1. ETHERNET
▲GET MIB FILE      ↵
```

5. Press ENTER and then ◀ to select OK. Then, press ENTER again.

When the original screen returns, the operation is finished. If there is already a MIB file stored in the USB memory device, it will be overwritten.

```
2. GET MIB FILE
   ■OK      □CANCEL
```

➡

```
1. ETHERNET
▲GET MIB FILE      ↵
```

- **Where the MIB File Is Saved To**

The MIB file is saved in the root folder of the USB memory device.
The date and time of the exported file will be the date and time specified according to the procedure in section 6.2.13, “Setting the Date and Time.”

USB memory device
└ LT4110-MIB.mib

6.2.13 Setting the Date and Time

To set the date and time, follow the procedure below.
The date and time set here are used when presets are exported and when the MIB file is retrieved.
The date and time are reset to their factory default values (2012/01/01 00:00:00) each time the LT 4110 is started.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select DATE & TIME ADJUST.

3. Press ENTER and then ▲ ▼ ◀ ▶ to select the date and time. Then, press ENTER again.

Press ◀ ▶ to move the cursor and ▲ ▼ to change the number.
Hold down ▲ ▼ to change the number continuously.

6.2.14 Factory Default Settings

To reset all settings to their factory default values, follow the procedure below.
For the factory default values, see section 9.2, “List of Settings.”
For the factory default values to take effect, you need to restart the LT 4110.

■Notes on restarting ■

- While restarting, the output signal is unstable.
- It takes a certain length of time for the LT 4110 to stabilize after it restarts. See section 1.4.5, “Starting and Restarting.”

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▲ ▼ to select FACTORY DEFAULT.

3. Press ENTER and then ◀ to select OK.

4. Press ENTER and then ◀ to select OK. Then, press ENTER again.

The LT 4110 restarts with the factory default settings.

6.2.15 Viewing the Version Information

The following version information is available on the LT 4110.

1. MAIN ROM version (SYS)
2. MAIN ROM version (BOOT)
3. GL ROM version (SYS)
4. GL ROM version (BOOT)
5. GL FPGA version
6. PLL FPGA version
7. BLK FPGA version
8. CONFIG version
9. MIB version

“MAIN ROM version (SYS)” (the first number above) is the main version. The other version numbers are for maintenance. If you contact your local LEADER agent, tell them the “MAIN ROM version (SYS)” number.
To view the “MAIN ROM version (SYS),” follow the procedure below.

1. Press MENU several times to display 0.UTILITY SETTING.

2. Press ▼ to select VERSION DISPLAY.

3. Press ▶ or ENTER and then ▲ to select ROM VERSION.

4. Press ENTER and then ▲ to select SYS (MAIN).

The version is displayed.

6.3 REFERENCE SETTING

REFERENCE SETTING is used to set the reference signal.
These settings are reset to their factory default values when the LT 4110 is restarted. (If POWER ON RECALL is enabled, the settings are set to the preset values.)
[Reference] POWER ON RECALL → section 6.2.5, “Power-on Settings”

6.3.1 Lock Mode Selection 1

To select the lock mode, follow the procedure below.

1. Press MENU several times to display INPUT SELECT.

```
0. REFERENCE SETTING
▼INPUT SELECT          ↵
```

2. Press ENTER and then ▲ to select the lock mode. Then, press ENTER again.

[GENLOCK]: Internal mode or genlock mode (factory default value)
[CW-LOCK]: CW lock mode

```
1. INPUT SELECT
▲ CW-LOCK
```

3. When a change confirmation message appears, press ◀ to select OK, and then press ENTER.

The change confirmation message appears when you change the setting.

```
   CHANGE INPUT ?
   ■OK        □CANCEL
```

4. Press ENTER.

An asterisk appears in front of the selected item.

```
1. INPUT SELECT
▲*CW-LOCK
```

6.3.2 Lock Mode Selection 2

To select the lock mode, follow the procedure below.
This menu item appears when INPUT SELECT is set to GENLOCK.

1. Press MENU several times to display 0.REFERENCE SETTING.

```
0. REFERENCE SETTING
▼INPUT SELECT          ↵
```

2. Press ▲ ▼ to select GENLOCK SETTING.

```
0. REFERENCE SETTING
▲▼GENLOCK SETTING      ▶
```

3. Press ▶ or ENTER and then ▲ to select GENLOCK MODE.

```
1. GENLOCK SETTING
▼GENLOCK MODE          ↵
```

4. Press ENTER and then ▲ to select the lock mode. Then, press ENTER again.

[INTERNAL]: Internal mode (factory default value)
[STAY-IN-SYNC]: Genlock mode

```
2. GENLOCK MODE
▲  STAY-IN-SYNC
```

5. Press ◀ to select OK.

When you change the setting, a change confirmation message appears.

```
  CHANGE GL MODE ?
   ■OK          □CANCEL
```

When you don't change the setting, a re-adjust confirmation message appears. During stay-in-lock operation, use this to re-lock to the genlock signal.

```
    RE-ADJUST OK ?
    ■OK          □CANCEL
```

6. Press ENTER.

An asterisk appears in front of the selected item.

```
2. GENLOCK MODE
▲ *STAY-IN-SYNC
```

6.3.3 Selecting the Genlock Format

To select the genlock format, follow the procedure below. When GENLOCK MODE is set to STAY-IN-SYNC, set the reference signal format.
This menu item appears when INPUT SELECT is set to GENLOCK.

1. Press MENU several times to display 0.REFERENCE SETTING.

```
0. REFERENCE SETTING
▼INPUT SELECT          ↵
```

2. Press ▲ ▼ to select GENLOCK SETTING.

```
0. REFERENCE SETTING
◆GENLOCK SETTING       ▶
```

3. Press ▶ or ENTER and then ▼ to select LOCK FORMAT.

```
1. GENLOCK SETTING
▲LOCK FORMAT           ↵
```

4. Press ENTER and then ▲ ▼ to select the genlock format. Then, press ENTER again.

```
2. LOCK FORMAT
◆ NTSC BB
```

5. When a change confirmation message appears, press ◀ to select OK, and then press ENTER.

The change confirmation message appears when you change the setting.

```
 CHANGE GL FORMAT ?
   ■OK          □CANCEL
```

6. Press ENTER.

An asterisk appears in front of the selected item.

```
2. LOCK FORMAT
◆*NTSC BB
```

- **Genlock Formats**

  1125i/60, 1125i/59.94 (factory default value), 1125i/50,
  1125p/30, 1125p/29.97, 1125p/25, 1125p/24, 1125p/23.98,
  750p/60, 750p/59.94, 750p/50,
  750p/30, 750p/29.97, 750p/25, 750p/24, 750p/23.98,
  NTSC BB, NTSC BB+REF, NTSC BB+ID, NTSC BB+REF+ID, 525i/59.94,
  PAL BB, PAL BB+REF, 625i/50

  * The genlock formats are expressed in terms of the total number of lines, not the number of effective lines.
  * REF represents the field reference pulse, and ID represents the field ID.

6.3.4 Adjusting the Timing (Fine Adjustment)

To adjust the black signals 1 to 4 in reference to the reference signal, follow the procedure below. Adjustments can be made in more detail than BLK* H-PHASE(dot) and BLK* H-PHASE(µsec) under BLACK SETTING.

The procedure here cannot adjust the timing of black signals 1 to 4 separately. To do so, use BLK* TIMING under BLACK SETTING.

1. Press MENU several times to display 0.REFERENCE SETTING.

```
0. REFERENCE SETTING
▼INPUT SELECT          ↵
```

2. Press ▼ to select FINE PHASE ADJUST.

```
0. REFERENCE SETTING
▲FINE PHASE ADJUST     ↵
```

3. Press ENTER and then ▲ ▼ to adjust the timing.

Adjustments can be made in the range of ±20. (One step is approximately 0.5 ns.) The value takes effect immediately. Pressing CANCEL does not revert the setting to the previous value.

```
1. FINE PHASE ADJUST
                       +5
```

6.4 BLACK SETTING

BLACK SETTING is used to set the black signal.
These settings are reset to their factory default values when the LT 4110 is restarted. (If POWER ON RECALL is enabled, the settings are set to the preset values.)
[Reference] POWER ON RECALL → section 6.2.5, “Power-on Settings”

6.4.1 Selecting the Sampling frequency

To select the black signal frequency group, follow the procedure below.
Depending on the value selected here, the selectable formats will vary as shown below.

BLK* FORMAT	FREQUENCY SELECT		
	74.176MHz (factory default value)	74.25MHz(/60GROUP)	74.25MHz(/50GROUP)
1080i/60	No	Yes (default value)	No
1080i/59.94	Yes (default value)	No	No
1080i/50	No	No	Yes (default value)
1080p/30	No	Yes	No
1080p/29.97	Yes	No	No
1080p/25	No	No	Yes
1080p/24	No	Yes	No
1080p/23.98	Yes	No	No
720p/60	No	Yes	No
720p/59.94	Yes	No	No
720p/50	No	No	Yes
720p/30	No	Yes	No
720p/29.97	Yes	No	No
720p/25	No	No	Yes
720p/24	No	Yes	No
720p/23.98	Yes	No	No
NTSC BB	Yes	Yes	Yes
NTSC BB+REF	Yes	Yes	Yes
NTSC BB+ID	Yes	Yes	Yes
NTSC BB+REF+ID	Yes	Yes	Yes
NTSC BB+SETUP	Yes	Yes	Yes
NTSC BB+S+REF	Yes	Yes	Yes
NTSC BB+S+ID	Yes	Yes	Yes
NTSC BB+S+R+ID	Yes	Yes	Yes
525i/59.94	Yes	Yes	Yes
PAL BB	Yes	Yes	Yes
PAL BB+REF	Yes	Yes	Yes
625i/50	Yes	Yes	Yes

(Yes: Can be selected No: Cannot be selected)

* REF, R (Field REF): The following signal is included as a field ID signal.
  • For NTSC, a 714 mV reference signal at line 10 (every two frames)
  • For PAL, a 700 mV reference signal at line 7 (every four frames)
* ID (10 field ID): An ID signal complying with SMPTE ST 318 is included.
* SETUP, S (Setup): A 7.5IRE (7.5%) setup signal is included.

■ Notes on changing the sampling frequency ■

If you change the sampling frequency when in genlock or CW lock mode, the stay-in-sync function and holdover function are activated. Afterwards, in CW lock mode, the LT 4110 automatically relocks to the reference signal, but in genlock mode, you must perform “RE-ADJUST” to relock.
[Reference] Section 5.2, “Genlock Mode”, section 5.3, “CW Lock Mode”

1. Press MENU several times to display FREQUENCY SELECT.

```
0. BLACK SETTING
▼FREQUENCY SELECT  ↵
```

2. Press ENTER and then ▲ ▼ to select the frequency group. Then, press ENTER again.

```
1. FREQUENCY SELECT
▲▼ 74.25MHz (/60GROUP)
```

3. When a change confirmation message appears, press ◀ to select OK, and then press ENTER.

The change confirmation message appears when you change the setting.

```
CHANGE FREQUENCY ?
  ■OK        □CANCEL
```

4. Press ENTER.

An asterisk appears in front of the selected item.

```
1. FREQUENCY SELECT
▲▼*74.25MHz (/60GROUP)
```

6.4.2 Selecting the Black Format

To set the four black signal formats separately, follow the procedure below.
The selectable formats vary depending on FREQUENCY SELECT. If you change FREQUENCY SELECT, the format is reset to its default value.
The procedure below is for black 1, but the same procedure can be applied to black 2 to 4.

1. Press MENU several times to display 0.BLACK SETTING.

```
0. BLACK SETTING
▼FREQUENCY SELECT   ↵
```

2. Press ▲ ▼ to select BLACK1 SIGNAL.

```
0. BLACK SETTING
◆BLACK1 SIGNAL      ▶
```

3. Press ▶ or ENTER and then ▲ to select BLK1 FORMAT.

```
1. BLACK1 SIGNAL
▼BLK1 FORMAT        ↵
```

4. Press ENTER and then ▲ ▼ to select the black format. Then, press ENTER again.

```
2. BLK1 FORMAT
◆ NTSC BB
```

For the selectable formats, see section 6.4.1, “Selecting the Sampling frequency.”
For formats that cannot be selected, an exclamation point appears before the item.

```
2. BLK1 FORMAT
◆!1080i/60
```

Note that to use a normal composite black signal, select NTSC BB or PAL BB.

5. When a change confirmation message appears, press ◀ to select OK, and then press ENTER.

The change confirmation message appears when you change the setting.

```
CHANGE BLK1 FORMAT ?
   ■OK        □CANCEL
```

6. Press ENTER.

An asterisk appears in front of the selected item.

```
2. LOCK FORMAT
◆*NTSC BB
```

6.4.3 Adjusting the Timing (Frame)

To adjust the black signal in reference to the reference signal at the frame level for the four black signals separately, follow the procedure below.
This menu appears when BLK* FORMAT is set to NTSC *, 525i/59.94, PAL *, or 625i/50.
These settings are reset to their factory default values when FREQUENCY SELECT or BLK* FORMAT is changed.
The procedure below is for black 1, but the same procedure can be applied to black 2 to 4.

1. Press MENU several times to display 0.BLACK SETTING.

```
0. BLACK SETTING
▼FREQUENCY SELECT   ↵
```

2. Press ▲ ▼ to select BLACK1 SIGNAL.

```
0. BLACK SETTING
▲▼BLACK1 SIGNAL      ▶
```

3. Press ▶ or ENTER and then ▼ to select BLK1 TIMING.

```
1. BLACK1 SIGNAL
▲BLK1 TIMING         ▶
```

4. Press ▶ or ENTER and then ▲ to select BLK1 F-PHASE.

```
2. BLK1 TIMING
▼BLK1 F−PHASE        ↵
```

5. Press ENTER and then ▲ ▼ to adjust the timing.

Adjustments can be made in the range of ±5 when BLK* FORMAT is set to NTSC * or 525i/59.94 and in the range of ±2 when BLK* FORMAT is set to PAL * or 625i/50.
Hold down ▲ ▼ to change the number continuously.
The value takes effect immediately. Pressing CANCEL does not revert the setting to the previous value.

```
3. BLK1 F−PHASE
              +2 frame
```

6.4.4 Adjusting the Timing (Line)

To adjust the black signal in reference to the reference signal at the line level for the four black signals separately, follow the procedure below.
These settings are reset to their factory default values when FREQUENCY SELECT or BLK* FORMAT is changed.
The procedure below is for black 1, but the same procedure can be applied to black 2 to 4.

1. Press MENU several times to display 0.BLACK SETTING.

```
0. BLACK SETTING
▼FREQUENCY SELECT  ↵
```

2. Press ▲ ▼ to select BLACK1 SIGNAL.

```
0. BLACK SETTING
◆BLACK1 SIGNAL     ▶
```

3. Press ▶ or ENTER and then ▼ to select BLK1 TIMING.

```
1. BLACK1 SIGNAL
▲BLK1 TIMING       ▶
```

4. Press ▶ or ENTER and then ▼ to select BLK1 V-PHASE.

```
2. BLK1 TIMING
◆BLK1 V-PHASE      ↵
```

5. Press ENTER and then ▲ ▼ to adjust the timing.

Adjustment range varies depending on BLK* FORMAT. The maximum range is ±1124.
Hold down ▲ ▼ to change the number continuously.
The value takes effect immediately. Pressing CANCEL does not revert the setting to the previous value.

```
3. BLK1 V-PHASE
                +5 line
```

6.4.5 Adjusting the Timing (Dot)

To adjust the black signal in reference to the reference signal at the dot level for the four black signals separately, follow the procedure below. You can also adjust at the time level. For this, see 6.4.6, “Adjusting the Timing (Time). Dot and time are mutually linked.
These settings are reset to their factory default values when FREQUENCY SELECT or BLK* FORMAT is changed.
The procedure below is for black 1, but the same procedure can be applied to black 2 to 4.

1. Press MENU several times to display 0.BLACK SETTING.

```
0. BLACK SETTING
▼FREQUENCY SELECT  ↵
```

2. Press ▲ ▼ to select BLACK1 SIGNAL.

```
0. BLACK SETTING
▲▼BLACK1 SIGNAL      ▶
```

3. Press ▶ or ENTER and then ▼ to select BLK1 TIMING.

```
1. BLACK1 SIGNAL
▲BLK1 TIMING         ▶
```

4. Press ▶ or ENTER and then ▲ ▼ to select BLK1 H-PHASE(dot).

```
2. BLK1 TIMING
▲▼BLK1 H−PHASE(dot)  ↵
```

5. Press ENTER and then ▲ ▼ to adjust the timing.

Adjustment range varies depending on BLK* FORMAT. The maximum range is ±4124.
Hold down ▲ ▼ to change the number continuously.
The value takes effect immediately. Pressing CANCEL does not revert the setting to the previous value.

```
3. BLK1 H−PHASE(dot)
                +5 dot
```

6.4.6 Adjusting the Timing (Time)

To adjust the black signal in reference to the reference signal at the time level for the four black signals separately, follow the procedure below. You can also adjust at the dot level. For this, see 6.4.5, “Adjusting the Timing (Dot). Dot and time are mutually linked.
These settings are reset to their factory default values when FREQUENCY SELECT or BLK* FORMAT is changed.
The procedure below is for black 1, but the same procedure can be applied to black 2 to 4.

1. Press MENU several times to display 0.BLACK SETTING.

```
0. BLACK SETTING
▼FREQUENCY SELECT  ↵
```

2. Press ▲ ▼ to select BLACK1 SIGNAL.

```
0. BLACK SETTING
▲▼BLACK1 SIGNAL      ▶
```

3. Press ▶ or ENTER and then ▼ to select BLK1 TIMING.

```
1. BLACK1 SIGNAL
▲BLK1 TIMING         ▶
```

4. Press ▶ or ENTER and then ▼ to select BLK1 H-PHASE(µsec).

```
2. BLK1 TIMING
▲BLK1 H−PHASE(µsec)↵
```

5. Press ENTER and then ▲ ▼ to adjust the timing.

Adjustment range varies depending on BLK* FORMAT. The maximum range is ±63.9814.
Hold down ▲ ▼ to change the number continuously.
The value takes effect immediately. Pressing CANCEL does not revert the setting to the previous value.

```
3. BLK1 H−PHASE(µsec)
          +0.0925 µsec
```

7. SNMP

By using SNMP (Simple Network Management Protocol), you can check the LT 4110 status from an SNMP manager. In addition, when the fan stops or other errors occur, traps can be sent from the LT 4110 to an SNMP manager.

* The Ethernet features of the LT 4110 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.

7.1 SNMP Version

SNMPv1

7.2 SMI Definitions

```
IMPORTS
MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE, enterprises
FROM SNMPv2-SMI
DisplayString
FROM SNMPv2-TC
OBJECT-GROUP, MODULE-COMPLIANCE
FROM SNMPv2-CONF;
```

7.3 Procedure

1. **On the LT 4110, set the IP address.**

   Use UTILITY SETTING > ETHERNET > NETWORK SETTING.
   Then, restart the LT 4110 according to the displayed instructions. The specified value takes effect after you restart the LT 4110.

2. **Connect the LT 4110's Ethernet port to the network.**

   You can use either a straight cable or a cross-over cable.

3. **On the PC, start an SNMP manager.**

   An SNMP manager is not supplied with the LT 4110. Please obtain it separately.
   For details on how to use the SNMP manager, see its instruction manual.

   The community name is shown below. (You cannot change them.)(*1)
   Read Community: LDRUser
   Write Community: LDRAdm

4. **On the SNMP manager, set the IP address of the trap transmission destination.(*2)**

   OID: 1.3.6.1.4.1.leader(20111).lt4110(23).trap(100).target(1).managerIp(1).0

5. **On the SNMP manager, set trap transmission to enable(1).(*2)**

   OID: 1.3.6.1.4.1.leader(20111).lt4110(23).trap(100).target(1).trapAction(2).0

6. **Restart the LT 4110.**
7. **When the LT 4110 restarts, check that the standard TRAP "ColdStart" is received by the SNMP manager.**

*1 The community field of SNMP messages sent as traps from the LT 4110 is set to "LDRUser."
*2 You can also set it from the LT 4110 menu.

7.4 Standard MIBs

The LT 4110 uses the following standard MIBs:
• RFC1213 (MIB-II)
• RFC1573 (Evolution of the Interfaces Group of MIB-II)

- **ACCESS**

  In the tables, "ACCESS" indicates the following:

-:	Not accessible.
RO:	Read only.
RO *:	Read only. (R/W in the RFCs.)
R/W:	Read and write. (Initialized when the LT 4110 is restarted.)

- **Initial Values**

  The symbols that follow the initial values in the table below indicate the following:

*:	The value is not updated.
**:	Changing the value with the SNMP manager will not produce any effect.

- **system Group**

MIB	OID	SYNTAX	ACCESS	Initial value
sysDescr	1.3.6.1.2.1.1.1	DisplayString	RO	Leader Electronics Corp. LT4110/SNMPv1 Agent
sysObjectID	1.3.6.1.2.1.1.2	OBJECT IDENTIFIER	RO	1.3.6.1.4.1.20111.23
sysUpTime	1.3.6.1.2.1.1.3	TimeTicks	RO	0
sysContact	1.3.6.1.2.1.1.4	DisplayString	R/W	Unknown
sysName	1.3.6.1.2.1.1.5	DisplayString	R/W	LT4110
sysLocation	1.3.6.1.2.1.1.6	DisplayString	R/W	Unknown
sysServices	1.3.6.1.2.1.1.7	INTEGER	RO	72

- **interfaces Group**

MIB	OID	SYNTAX	ACCESS	Initial value
ifNumber	1.3.6.1.2.1.2.1	INTEGER	RO	1
ifTable	1.3.6.1.2.1.2.2	SEQUENCE	-	-
ifEntry	1.3.6.1.2.1.2.2.1	SEQUENCE	-	-
ifIndex	1.3.6.1.2.1.2.2.1.1	INTEGER	RO	1
ifDescr	1.3.6.1.2.1.2.2.1.2	DisplayString	RO	eth0
ifType	1.3.6.1.2.1.2.2.1.3	INTEGER	RO	ethernet(6)
ifMtu	1.3.6.1.2.1.2.2.1.4	INTEGER	RO	1500
ifSpeed	1.3.6.1.2.1.2.2.1.5	Gauge	RO	100000000
ifPhysAddress	1.3.6.1.2.1.2.2.1.6	PhysAddress	RO	(Device specific information)
ifAdminStatus	1.3.6.1.2.1.2.2.1.7	INTEGER	RO *	up(1) *
ifOperStatus	1.3.6.1.2.1.2.2.1.8	INTEGER	RO	up(1) *
ifLastChange	1.3.6.1.2.1.2.2.1.9	TimeTicks	RO	0 *
ifInOctets	1.3.6.1.2.1.2.2.1.10	Counter	RO	0
ifInUcastPkts	1.3.6.1.2.1.2.2.1.11	Counter	RO	0
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12	Counter	RO	0
ifInDiscards	1.3.6.1.2.1.2.2.1.13	Counter	RO	0
ifInErrors	1.3.6.1.2.1.2.2.1.14	Counter	RO	0
ifInUnknownProtos	1.3.6.1.2.1.2.2.1.15	Counter	RO	0
ifOutOctets	1.3.6.1.2.1.2.2.1.16	Counter	RO	0
ifOutUcastPkts	1.3.6.1.2.1.2.2.1.17	Counter	RO	0
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18	Counter	RO	0
ifOutDiscards	1.3.6.1.2.1.2.2.1.19	Counter	RO	0 *
ifOutErrors	1.3.6.1.2.1.2.2.1.20	Counter	RO	0 *
ifOutQLen	1.3.6.1.2.1.2.2.1.21	Gauge	RO	16
ifSpecific	1.3.6.1.2.1.2.2.1.22	OBJECT IDENTIFIER	RO	0.0

- **ip Group**

MIB	OID	SYNTAX	ACCESS	Initial value
ipForwarding	1.3.6.1.2.1.4.1	INTEGER	R/W	not-worwarding(2) **
ipDefaultTTL	1.3.6.1.2.1.4.2	INTEGER	R/W	32 **
ipInReceives	1.3.6.1.2.1.4.3	Counter	RO	0
ipInHdrErrors	1.3.6.1.2.1.4.4	Counter	RO	0

MIB	OID	SYNTAX	ACCESS	Initial value
ipInAddrErrors	1.3.6.1.2.1.4.5	Counter	RO	0
ipForwDatagrams	1.3.6.1.2.1.4.6	Counter	RO	0 *
ipInUnknownProtos	1.3.6.1.2.1.4.7	Counter	RO	0
ipInDiscards	1.3.6.1.2.1.4.8	Counter	RO	0
ipInDelivers	1.3.6.1.2.1.4.9	Counter	RO	0
ipOutRequests	1.3.6.1.2.1.4.10	Counter	RO	0
ipOutDiscards	1.3.6.1.2.1.4.11	Counter	RO	0 *
ipOutNoRoutes	1.3.6.1.2.1.4.12	Counter	RO	0 *
ipReasmTimeout	1.3.6.1.2.1.4.13	INTEGER	RO	2
ipReasmReqds	1.3.6.1.2.1.4.14	Counter	RO	0
ipReasmOKs	1.3.6.1.2.1.4.15	Counter	RO	0
ipReasmFails	1.3.6.1.2.1.4.16	Counter	RO	0
ipFragOKs	1.3.6.1.2.1.4.17	Counter	RO	0
ipFragFails	1.3.6.1.2.1.4.18	Counter	RO	0
ipFragCreates	1.3.6.1.2.1.4.19	Counter	RO	0
ipAddrTable	1.3.6.1.2.1.4.20	SEQUENCE	-	-
ipAdrEntry	1.3.6.1.2.1.4.20.1	SEQUENCE	-	-
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1	IpAddress	RO	(IP address)
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2	INTEGER	RO	(I/F channel number)
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3	IpAddress	RO	(Subnet mask)
ipAdEntBcastAddr	1.3.6.1.2.1.4.20.1.4	INTEGER	RO	1
ipAdEntReasmMaxSize	1.3.6.1.2.1.4.20.1.5	INTEGER	RO	1500
ipNetToMediaTable	1.3.6.1.2.1.4.22	SEQUENCE	-	-
ipNetToMediaEntry	1.3.6.1.2.1.4.22.1	SEQUENCE	-	-
ipNetToMediaIfIndex	1.3.6.1.2.1.4.22.1.1	INTEGER	RO	(I/F channel number)
ipNetToMediaPhysAddress	1.3.6.1.2.1.4.22.1.2	PhysAddress	RO	(MAC address)
ipNetToMediaNetAddress	1.3.6.1.2.1.4.22.1.3	IpAddress	RO	(IP address)
ipNetToMediaType	1.3.6.1.2.1.4.22.1.4	INTEGER	RO *	other(1) invalid(2) dynamic(3) static(4)
ipRoutingDiscards	1.3.6.1.2.1.4.23	Counter	RO	0 *

- icmp Group

MIB	OID	SYNTAX	ACCESS	Initial value
icmpInMsgs	1.3.6.1.2.1.5.1	Counter	RO	0
icmpInErrors	1.3.6.1.2.1.5.2	Counter	RO	0
icmpInDestUnreachs	1.3.6.1.2.1.5.3	Counter	RO	0 *
icmpInTimeExcds	1.3.6.1.2.1.5.4	Counter	RO	0 *
icmpInParmProbs	1.3.6.1.2.1.5.5	Counter	RO	0 *
icmpInSrcQuenchs	1.3.6.1.2.1.5.6	Counter	RO	0 *
icmpInRedirects	1.3.6.1.2.1.5.7	Counter	RO	0 *
icmpInEchos	1.3.6.1.2.1.5.8	Counter	RO	0
icmpInEchoReps	1.3.6.1.2.1.5.9	Counter	RO	0
icmpInTimestamps	1.3.6.1.2.1.5.10	Counter	RO	0 *

MIB	OID	SYNTAX	ACCESS	Initial value
icmpInTimestampReps	1.3.6.1.2.1.5.11	Counter	RO	0 *
icmpInAddrMasks	1.3.6.1.2.1.5.12	Counter	RO	0 *
icmpInAddrMaskReps	1.3.6.1.2.1.5.13	Counter	RO	0 *
icmpOutMsgs	1.3.6.1.2.1.5.14	Counter	RO	0
icmpOutErrors	1.3.6.1.2.1.5.15	Counter	RO	0
icmpOutDestUnreachs	1.3.6.1.2.1.5.16	Counter	RO	0 *
icmpOutTimeExcds	1.3.6.1.2.1.5.17	Counter	RO	0 *
icmpOutParmProbs	1.3.6.1.2.1.5.18	Counter	RO	0 *
icmpOutSrcQuenchs	1.3.6.1.2.1.5.19	Counter	RO	0 *
icmpOutRedirects	1.3.6.1.2.1.5.20	Counter	RO	0 *
icmpOutEchos	1.3.6.1.2.1.5.21	Counter	RO	0
icmpOutEchoReps	1.3.6.1.2.1.5.22	Counter	RO	0
icmpOutTimestamps	1.3.6.1.2.1.5.23	Counter	RO	0 *
icmpOutTimestampReps	1.3.6.1.2.1.5.24	Counter	RO	0 *
icmpOutAddrMasks	1.3.6.1.2.1.5.25	Counter	RO	0 *
icmpOutAddrMaskReps	1.3.6.1.2.1.5.26	Counter	RO	0 *

- **tcp Group**

MIB	OID	SYNTAX	ACCESS	Initial value
tcpRtoAlgorithm	1.3.6.1.2.1.6.1	INTEGER	RO	vanj(4)
tcpRtoMin	1.3.6.1.2.1.6.2	INTEGER	RO	300
tcpRtoMax	1.3.6.1.2.1.6.3	INTEGER	RO	64000
tcpMaxConn	1.3.6.1.2.1.6.4	INTEGER	RO	8
tcpActiveOpens	1.3.6.1.2.1.6.5	Counter	RO	0
tcpPassiveOpens	1.3.6.1.2.1.6.6	Counter	RO	0
tcpAttemptFails	1.3.6.1.2.1.6.7	Counter	RO	0
tcpEstabResets	1.3.6.1.2.1.6.8	Counter	RO	0
tcpCurrEstab	1.3.6.1.2.1.6.9	Gauge	RO	0 *
tcpInSegs	1.3.6.1.2.1.6.10	Counter	RO	0
tcpOutSegs	1.3.6.1.2.1.6.11	Counter	RO	0
tcpRetransSegs	1.3.6.1.2.1.6.12	Counter	RO	0
tcpConnTable	1.3.6.1.2.1.6.13	SEQUENCE	-	-
tcpConnEnttry	1.3.6.1.2.1.6.13.1	SEQUENCE	-	-
tcpConnState	1.3.6.1.2.1.6.13.1.1	INTEGER	RO *	closed(1) listen(2) sysSent(3) synReceive(4) established(5) finWait1(6) finWait2(7) closeWait(8) lastAck(9) closing(10) timeWait(11) closed(12)

MIB	OID	SYNTAX	ACCESS	Initial value
tcpConnLocalAddress	1.3.6.1.2.1.6.13.1.2	IpAddress	RO	(IP address)
tcpConnLocalPort	1.3.6.1.2.1.6.13.1.3	INTEGER	RO	(Port number)
tcpConnRemAddress	1.3.6.1.2.1.6.13.1.4	IpAddress	RO	(IP address)
tcpConnRemPort	1.3.6.1.2.1.6.13.1.5	INTEGER	RO	(Port number)
tcpInErrs	1.3.6.1.2.1.6.14	Counter	RO	0
tcpOutRsts	1.3.6.1.2.1.6.15	Counter	RO	0

- **udp Group**

MIB	OID	SYNTAX	ACCESS	Initial value
udpInDatagrams	1.3.6.1.2.1.7.1	Counter	RO	0
udpNoPorts	1.3.6.1.2.1.7.2	Counter	RO	0
udpInErrors	1.3.6.1.2.1.7.3	Counter	RO	0
udpOutDatagrams	1.3.6.1.2.1.7.4	Counter	RO	0
udpTable	1.3.6.1.2.1.7.5	SEQUENCE	-	-
udpEntry	1.3.6.1.2.1.7.5.1	SEQUENCE	-	-
udpLocalAddress	1.3.6.1.2.1.7.5.1.1	IpAddress	RO	(IP address)
udpLocalPort	1.3.6.1.2.1.7.5.1.2	INTEGER	RO	(Port number)

- snmp Group

MIB	OID	SYNTAX	ACCESS	Initial value
snmpInPkts	1.3.6.1.2.1.11.1	Counter	RO	0
snmpOutPkts	1.3.6.1.2.1.11.2	Counter	RO	0
snmpInBadVersions	1.3.6.1.2.1.11.3	Counter	RO	0
snmpInBadCommunityNames	1.3.6.1.2.1.11.4	Counter	RO	0
snmpInBadCommunityUses	1.3.6.1.2.1.11.5	Counter	RO	0
snmpInASNParseErrs	1.3.6.1.2.1.11.6	Counter	RO	0
snmpInTooBigs	1.3.6.1.2.1.11.8	Counter	RO	0
snmpInNoSuchNames	1.3.6.1.2.1.11.9	Counter	RO	0 *
snmpInBadValues	1.3.6.1.2.1.11.10	Counter	RO	0 *
snmpInReadOnlys	1.3.6.1.2.1.11.11	Counter	RO	0 *
snmpInGenErrs	1.3.6.1.2.1.11.12	Counter	RO	0 *
snmpInTotalReqVars	1.3.6.1.2.1.11.13	Counter	RO	0
snmpInTotalSetVars	1.3.6.1.2.1.11.14	Counter	RO	0
snmpInGetRequests	1.3.6.1.2.1.11.15	Counter	RO	0
snmpInGetNexts	1.3.6.1.2.1.11.16	Counter	RO	0
snmpInSetRequests	1.3.6.1.2.1.11.17	Counter	RO	0
snmpInGetResponses	1.3.6.1.2.1.11.18	Counter	RO	0
snmpInTraps	1.3.6.1.2.1.11.19	Counter	RO	0 *
snmpOutTooBigs	1.3.6.1.2.1.11.20	Counter	RO	0
snmpOutNoSuchNames	1.3.6.1.2.1.11.21	Counter	RO	0
snmpOutBadValues	1.3.6.1.2.1.11.22	Counter	RO	0
snmpOutGenErrs	1.3.6.1.2.1.11.24	Counter	RO	0
snmpOutGetRequests	1.3.6.1.2.1.11.25	Counter	RO	0
snmpOutGetNexts	1.3.6.1.2.1.11.26	Counter	RO	0 *

MIB	OID	SYNTAX	ACCESS	Initial value
snmpOutSetRequests	1.3.6.1.2.1.11.27	Counter	RO	0 *
snmpOutGetResponses	1.3.6.1.2.1.11.28	Counter	RO	0
snmpOutTraps	1.3.6.1.2.1.11.29	Counter	RO	0
snmpEnableAuthenTraps	1.3.6.1.2.1.11.30	Counter	R/W	disable(2)

- **ifMIB Group**

MIB	OID	SYNTAX	ACCESS	Initial value
ifMIBObjects	1.3.6.1.2.1.31.1	SEQUENCE	-	-
ifXTable	1.3.6.1.2.1.31.1.1	SEQUENCE	-	-
ifXEntry	1.3.6.1.2.1.31.1.1.1	SEQUENCE	-	-
ifName	1.3.6.1.2.1.31.1.1.1.1	DisplayString	RO	eth0
ifInMulticastPkts	1.3.6.1.2.1.31.1.1.1.2	Counter	RO	0
ifInBroadcastPkts	1.3.6.1.2.1.31.1.1.1.3	Counter	RO	0
ifOutMulticastPkts	1.3.6.1.2.1.31.1.1.1.4	Counter	RO	0
ifOutBroadcastPkts	1.3.6.1.2.1.31.1.1.1.5	Counter	RO	0
ifHCInOctets	1.3.6.1.2.1.31.1.1.1.6	Counter	RO	0
ifHCInUcastPkts	1.3.6.1.2.1.31.1.1.1.7	Counter	RO	0
ifHCInMulticastPkts	1.3.6.1.2.1.31.1.1.1.8	Counter	RO	0
ifHCInBroadcastPkts	1.3.6.1.2.1.31.1.1.1.9	Counter	RO	0
ifHCOutOctets	1.3.6.1.2.1.31.1.1.1.10	Counter	RO	0
ifHCOutUcastPkts	1.3.6.1.2.1.31.1.1.1.11	Counter	RO	0
ifHCOutMulticastPkts	1.3.6.1.2.1.31.1.1.1.12	Counter	RO	0
ifHCOutBroadcastPkts	1.3.6.1.2.1.31.1.1.1.13	Counter	RO	0

7.5 Enterprise MIB

- **Retrieving the MIB File**

  Copy the file from the LT 4110 to a USB memory device.
  Connect a USB memory device to the LT 4110, and from the menu, select UTILITY SETTING > ETHERNET > GET MIB FILE > OK. The file LT4110-MIB.mib will be copied to the USB memory device.
  For details on how to use the MIB file, see the instruction manual for the SNMP manager.

- **Enterprise Number**

  The enterprise number of LEADER ELECTRONICS CORPORATION is 20111.
  iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).leader(20111)

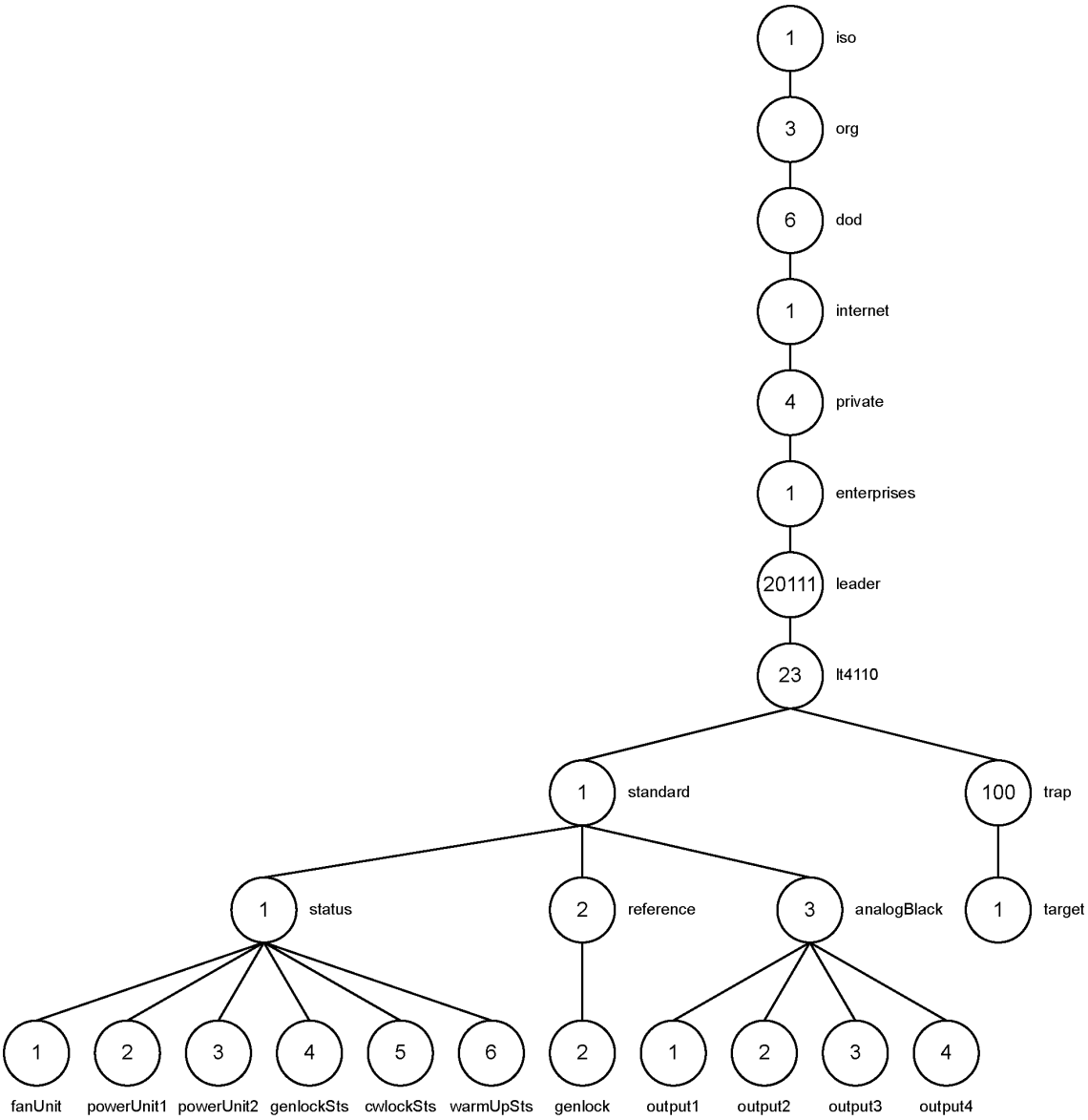
- **MIB Structure**

```
lt4110              OBJECT IDENTIFIER ::= { leader 23 }

standard            OBJECT IDENTIFIER ::= { lt4110 1 }
  status            OBJECT IDENTIFIER ::= { standard 1 }
    fanUnit         OBJECT IDENTIFIER ::= { status 1 }
    powerUnit1      OBJECT IDENTIFIER ::= { status 2 }
    powerUnit2      OBJECT IDENTIFIER ::= { status 3 }
    genlockSts      OBJECT IDENTIFIER ::= { status 4 }
    cwlockSts       OBJECT IDENTIFIER ::= { status 5 }
    warmUpSts       OBJECT IDENTIFIER ::= { status 6 }
  reference         OBJECT IDENTIFIER ::= { standard 2 }
    genlock         OBJECT IDENTIFIER ::= { reference 2 }
  analogBlack       OBJECT IDENTIFIER ::= { standard 3 }
    output1         OBJECT IDENTIFIER ::= { analogBlack 1 }
    output2         OBJECT IDENTIFIER ::= { analogBlack 2 }
    output3         OBJECT IDENTIFIER ::= { analogBlack 3 }
    output4         OBJECT IDENTIFIER ::= { analogBlack 4 }

trap                OBJECT IDENTIFIER ::= { lt4110 100 }
  target            OBJECT IDENTIFIER ::= { trap 1 }
```

- **MIB Tree**



- **ACCESS**

  In the tables, “ACCESS” indicates the following:

  RO: Read only.
  R/W: Read and write.

7.5.1 status Group

● fanUnit Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	fanUnit.1	INTEGER	RO	1	ejected
				2	stop
				3	operation

● powerUnit1 Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	powerUnit1.1	INTEGER	RO	1	ejected
				2	error
				3	ok
fanStatus	powerUnit1.2	INTEGER	RO	1	stop
				2	operation

● powerUnit2 Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	powerUnit2.1	INTEGER	RO	1	ejected
				2	error
				3	ok
fanStatus	powerUnit2.2	INTEGER	RO	1	stop
				2	operation

● genlockSts Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	genlockSts.1	INTEGER	RO	1	disable
				2	internal
				3	tracking-fast
				4	locked
				5	stay-in-sync

● cwlockSts Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	cwlockSts.1	INTEGER	RO	1	disable
				2	tracking-fast
				3	locked-warmup
				4	locked
				5	holdover

● warmUpSts Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
status	warmUpSts.1	INTEGER	RO	1	system-in-warm-up
				2	completion-of-warm-up

7.5.2 reference Group

● reference Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
inputSelect	reference.1	INTEGER	RO	1	genlock
				2	cw-lock

● genlock Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
mode	genlock.1	INTEGER	RO	1	internal
				2	stay-in-sync
format	genlock.2	INTEGER	RO	1	1125i/60
				2	1125i/59.94
				3	1125i/50
				4	1125p/30
				5	1125p/29.97
				6	1125p/25
				7	1125p/24
				8	1125p/23.98
				21	750p/60
				22	750p/59.94
				23	750p/50
				24	750p/30
				25	750p/29.97
				26	750p/25
				27	750p/24
				28	750p/23.98
				41	NTSC BB
				42	NTSC BB+REF
				43	NTSC BB+ID
				44	NTSC BB+REF+ID
				49	525i/59.94
				61	PAL BB
				62	PAL BB+REF
				63	625i/50

7.5.3 analogBlack Group

● output1 Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
format	output1.1	INTEGER	RO	1	1080i/60
				2	1080i/59.94
				3	1080i/50
				4	1080p/30
				5	1080p/29.97
				6	1080p/25
				7	1080p/24
				8	1080p/23.98
				21	720p/60
				22	720p/59.94
				23	720p/50
				24	720p/30
				25	720p/29.97
				26	720p/25
				27	720p/24
				28	720p/23.98
				41	NTSC BB
				42	NTSC BB+REF
				43	NTSC BB+ID
				44	NTSC BB+REF+ID
				45	NTSC BB+SETUP
				46	NTSC BB+S+REF
				47	NTSC BB+S+ID
				48	NTSC BB+S+R+ID
				49	525i/59.94
				61	PAL BB
				62	PAL BB+REF
				63	625i/50

● **output2 Group**

MIB	OID	SYNTAX	ACCESS	VALUE	Description
format	output2.1	INTEGER	RO	1	1080i/60
				2	1080i/59.94
				3	1080i/50
				4	1080p/30
				5	1080p/29.97
				6	1080p/25
				7	1080p/24
				8	1080p/23.98
				21	720p/60
				22	720p/59.94
				23	720p/50
				24	720p/30
				25	720p/29.97
				26	720p/25
				27	720p/24
				28	720p/23.98
				41	NTSC BB
				42	NTSC BB+REF
				43	NTSC BB+ID
				44	NTSC BB+REF+ID
				45	NTSC BB+SETUP
				46	NTSC BB+S+REF
				47	NTSC BB+S+ID
				48	NTSC BB+S+R+ID
				49	525i/59.94
				61	PAL BB
				62	PAL BB+REF
				63	625i/50

● **output3 Group**

MIB	OID	SYNTAX	ACCESS	VALUE	Description
format	output3.1	INTEGER	RO	1	1080i/60
				2	1080i/59.94
				3	1080i/50
				4	1080p/30
				5	1080p/29.97
				6	1080p/25
				7	1080p/24
				8	1080p/23.98
				21	720p/60
				22	720p/59.94
				23	720p/50
				24	720p/30
				25	720p/29.97
				26	720p/25
				27	720p/24
				28	720p/23.98
				41	NTSC BB
				42	NTSC BB+REF
				43	NTSC BB+ID
				44	NTSC BB+REF+ID
				45	NTSC BB+SETUP
				46	NTSC BB+S+REF
				47	NTSC BB+S+ID
				48	NTSC BB+S+R+ID
				49	525i/59.94
				61	PAL BB
				62	PAL BB+REF
				63	625i/50

● output4 Group

MIB	OID	SYNTAX	ACCESS	VALUE	Description
format	output4.1	INTEGER	RO	1	1080i/60
				2	1080i/59.94
				3	1080i/50
				4	1080p/30
				5	1080p/29.97
				6	1080p/25
				7	1080p/24
				8	1080p/23.98
				21	720p/60
				22	720p/59.94
				23	720p/50
				24	720p/30
				25	720p/29.97
				26	720p/25
				27	720p/24
				28	720p/23.98
				41	NTSC BB
				42	NTSC BB+REF
				43	NTSC BB+ID
				44	NTSC BB+REF+ID
				45	NTSC BB+SETUP
				46	NTSC BB+S+REF
				47	NTSC BB+S+ID
				48	NTSC BB+S+R+ID
				49	525i/59.94
				61	PAL BB
				62	PAL BB+REF
				63	625i/50

7.5.4 trap Group

● target 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

7.6 Extended TRAP

ID	Event Name	Description	Variable Bindings (*1)
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
10	genlockSignalStatus	Genlock status change detection	genlockSts.status
11	cwlockSignalStatus	CW lock status change detection	cwlockSts.status
12	warmUpStatus	Warm-up status change detection	warmUpSts.status

*1 The OIDs registered in Variable Bindings are the those arranged under the following OID.
1.3.6.1.4.1.leader(20111).lt4110(23).standard(1).status(1)

8. MAINTENANCE

8.1 Calibration and Repair

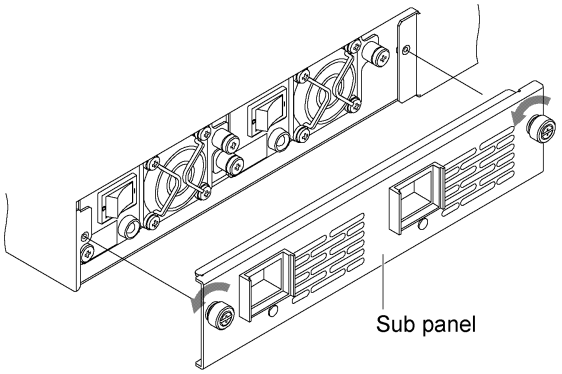
This instrument has been carefully examined at the factory to ensure that its performance is in accordance with the standards. However, because of factors such as parts wearing out over time, the performance of the instrument may degrade. To ensure stable performance, we recommend that you have the instrument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

8.2 Cleaning the Air Filters (When They Are Dirty)

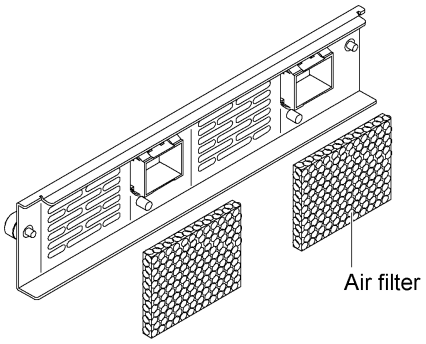
The power units on the front panel have air filters. When the air filters become dirty, clean them by following the procedure below. You can clean them while the power is turned on.

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

   You can turn the screws by hand. (The screws do not come off the sub panel.)



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

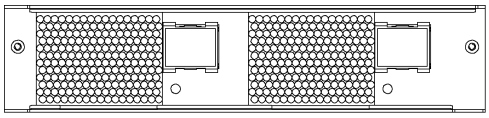


3. **Wash the air filter with mild detergent and water, or remove the dust with a vacuum cleaner.**

   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.

8.3 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.
There are two air filters. Replace both filters, even if the optional power supply unit is not installed.

- **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 8.2, “Cleaning the Air Filters (When They Are Dirty).”

8.4 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**

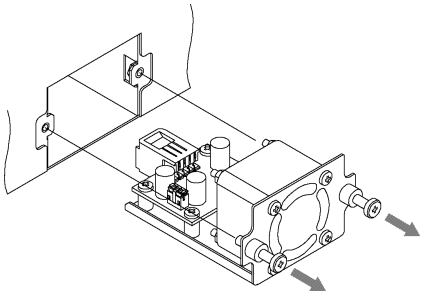
  Contact your nearest LEADER agent.

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 Philips screwdriver (#2). When you turn the screws, you will be able to pull them out. (The screws do not come off the unit.)
   When you pull out the fan unit, the ALARM LED in the upper right of the front panel will blink.



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

   Torque to 147 [cN•m].

3. **Check that the ALARM LED on the front panel has turned off.**

8.5 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.
If the optional power supply unit is installed, you can replace it with the power 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
0218000001	LP 2180	POWER UNIT	1 or 2

- **Replacement Procedure**

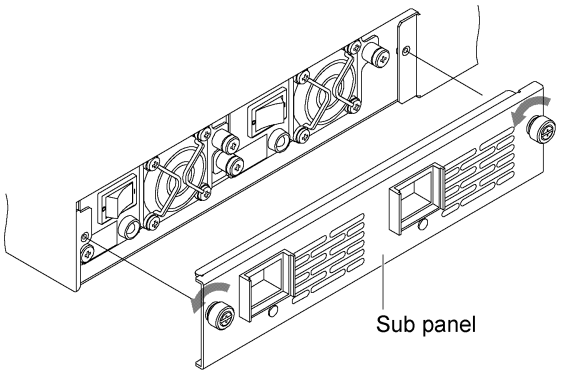
  The following procedure is for when the optional power supply unit is installed. Power supply unit POWER 2 will be replaced with power supply unit POWER 1 turned on.

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

     POWER 2 ALARM lights.

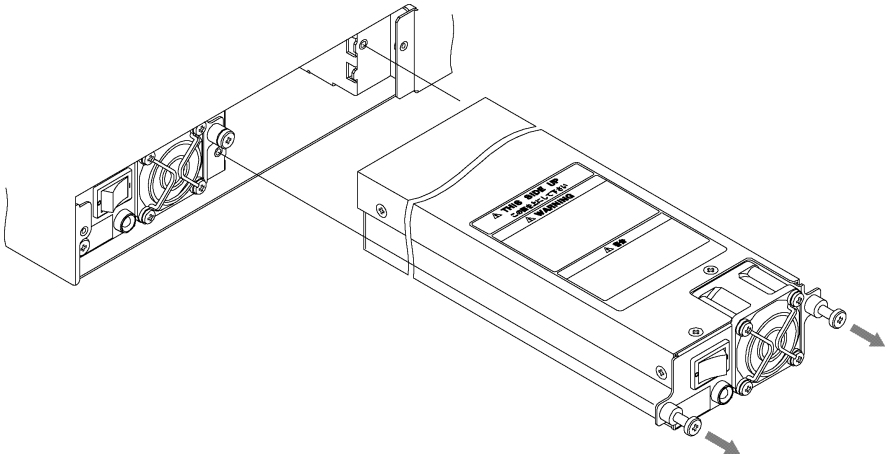
  2. **Turn the sub-panel screws counterclockwise, and remove the sub panel.**

     You can turn the screws by hand. (The screws do not come off the sub panel.)



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

   Use a Philips screwdriver (#2). When you turn the screws, you will be able to pull them out. (The screws do not come off the unit.)



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.**

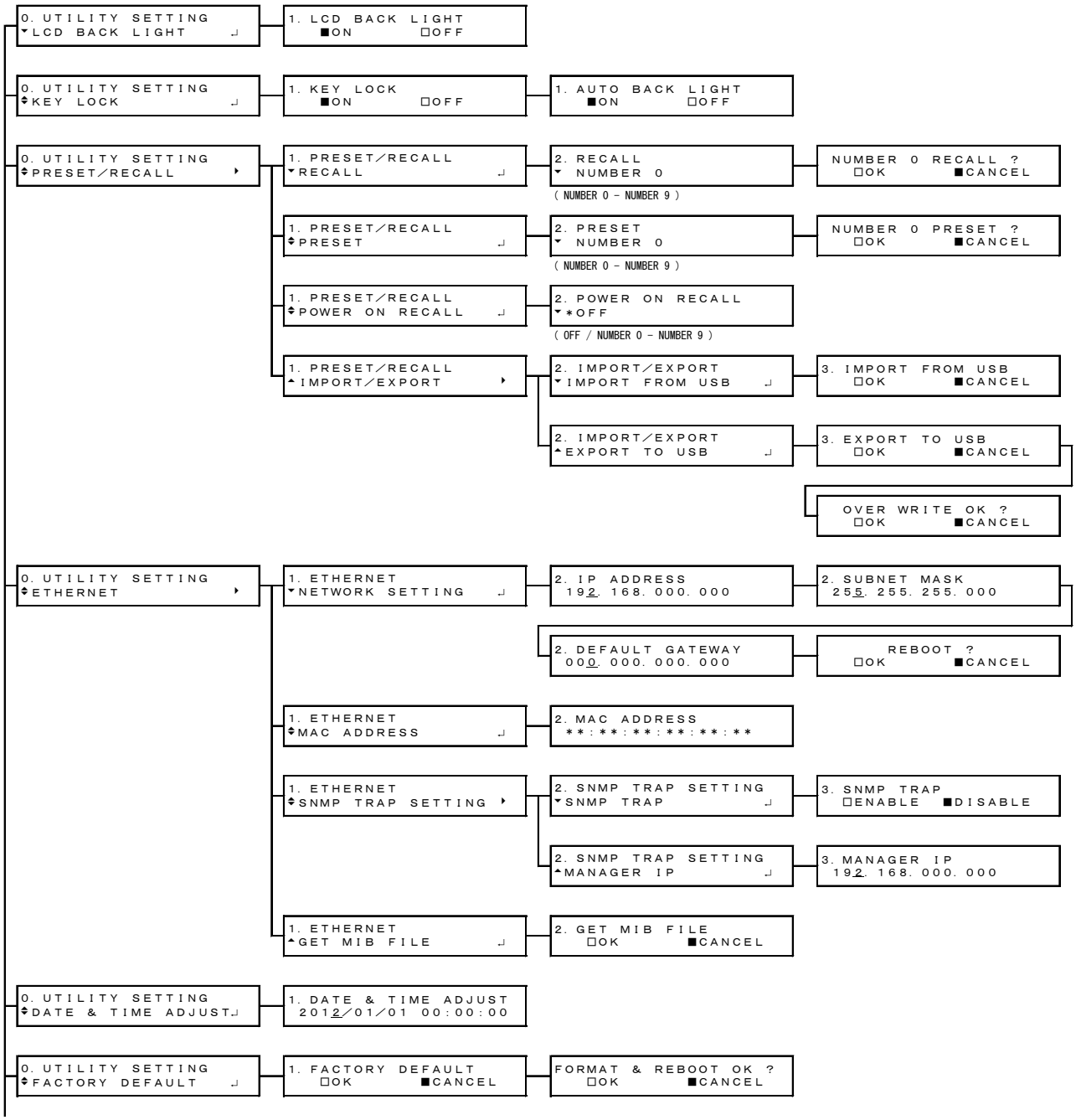
   Torque the screws to 147 [cN•m].

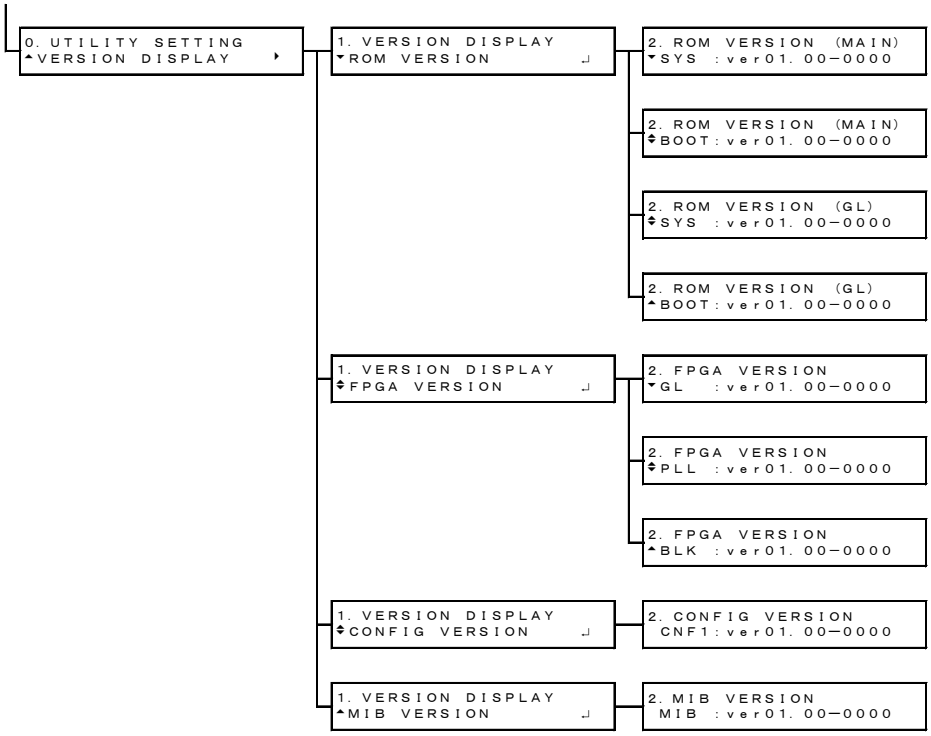
6. **Flip the power switch of POWER 2 to the on (|) side, and check that the ALARM LED turns off.**

9. APPENDIX

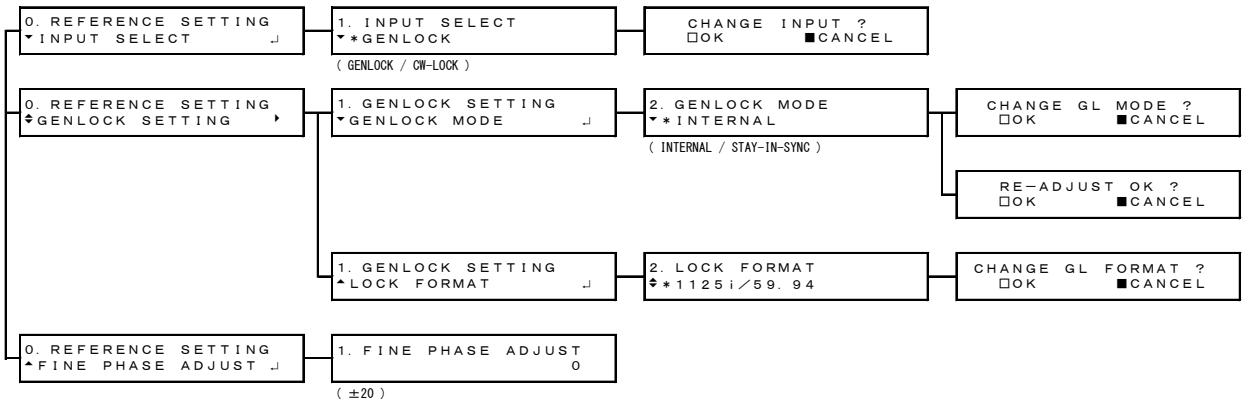
9.1 Menu Tree

9.1.1 UTILITY SETTING

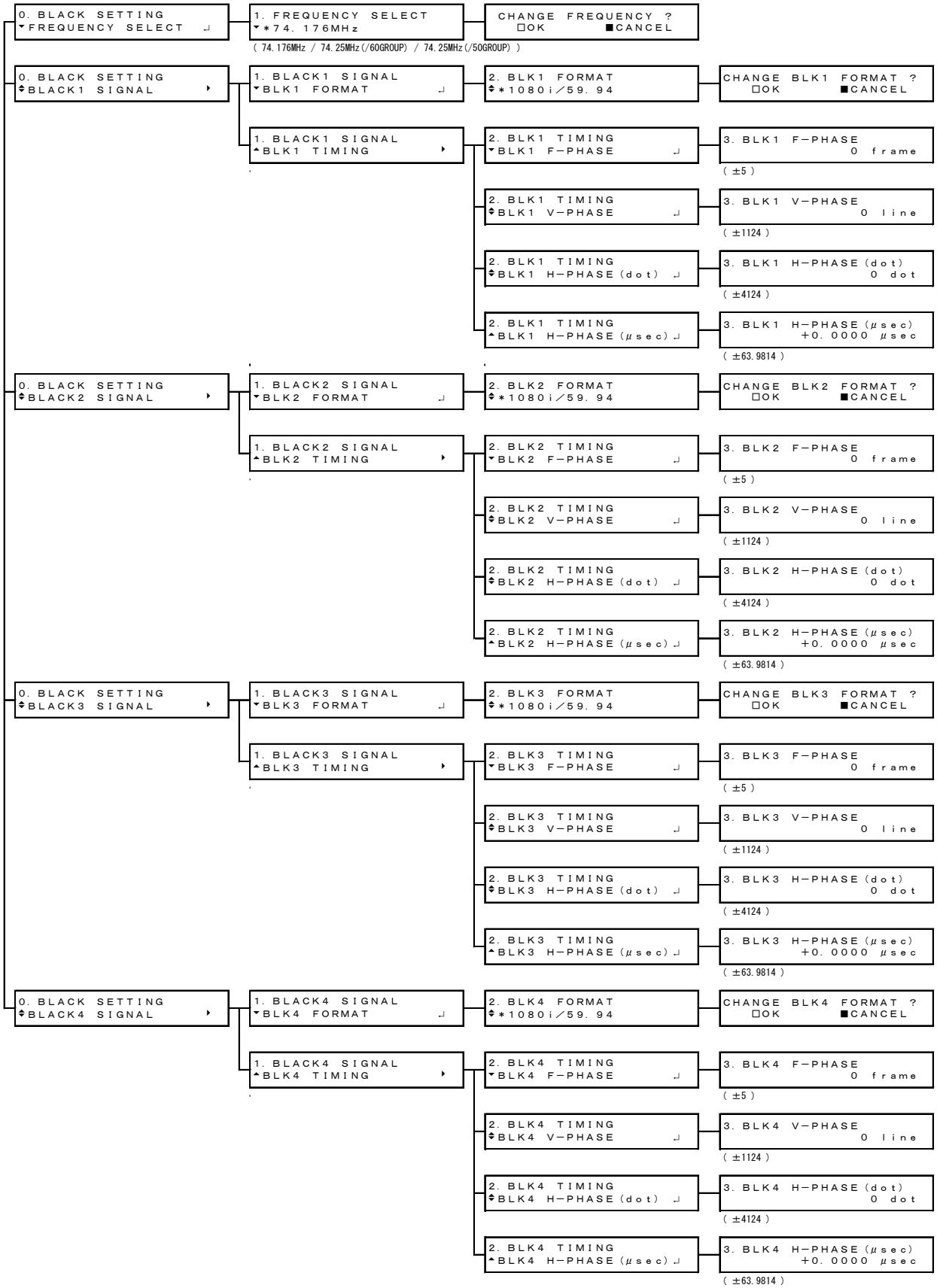




9.1.2 REFERENCE SETTING



9.1.3 BLACK SETTING



* The timing adjustment range is the maximum value. It varies depending on the format.

9.2 List of Settings

A list of settings that you can specify on the LT 4110 is provided below. The description of each item is as follows:

Preset: Items that are saved to presets are indicated as Yes; otherwise they are indicated as No.

Restart: Items that are set to their factory default values when the LT 4110 is restarted are indicated as Yes; otherwise they are indicated as No. Items that take on POWER ON RECALL values are indicated as POR. (Settings indicated as No retain their values when the power is turned off.)

Setting	Value (Maximum)	Factory Default Value	Preset	Restart
LCD BACK LIGHT	ON / OFF	ON	No	No
KEY LOCK	ON / OFF	ON	No	No
AUTO BACK LIGHT	ON / OFF	ON	No	No
POWER ON RECALL	OFF / NUMBER 0 - NUMBER 9	OFF	No	No
IP ADDRESS	000.000.000.000 - 255.255.255.255	192.168.000.000	No	No
SUBNET MASK	000.000.000.000 - 255.255.255.255	255.255.255.000	No	No
DEFAULT GATEWAY	000.000.000.000 - 255.255.255.255	000.000.000.000	No	No
SNMP TRAP	ENABLE / DISABLE	DISABLE	No	No
MANAGER IP	000.000.000.000 - 255.255.255.255	192.168.000.000	No	No
DATE & TIME ADJUST	2000/01/01 00:00:00 - 2099/12/31 23:59:59	2012/01/01 00:00:00	No	Yes
INPUT SELECT	GENLOCK / CW-LOCK	GENLOCK	Yes	POR
GENLOCK MODE	INTERNAL / STAY-IN-SYNC	INTERNAL	Yes	POR
LOCK FORMAT	1125i/60 / 1125i/59.94 / 1125i/50 / 1125p/30 / 1125p/29.97 / 1125p/25 / 1125p/24 / 1125p/23.98 / 750p/60 / 750p/59.94 / 750p/50 / 750p/30 / 750p/29.97 / 750p/25 / 750p/24 / 750p/23.98 / NTSC BB / NTSC BB+REF / NTSC BB+ID / NTSC BB+REF+ID / 525i/59.94 / PAL BB / PAL BB+REF / 625i/50	1125i/59.94	Yes	POR
FINE PHASE ADJUST	±20	0	Yes	POR
FREQUENCY SELECT	74.176MHz / 74.25MHz(/60GROUP) / 74.25MHz(/50GROUP)	74.176MHz	Yes	POR
BLK1 FORMAT (*1)	1080i/60 / 1080i/59.94 / 1080i/50 / 1080p/30 / 1080p/29.97 / 1080p/25 / 1080p/24 / 1080p/23.98 / 720p/60 / 720p/59.94 / 720p/50 / 720p/30 / 720p/29.97 / 720p/25 / 720p/24 / 720p/23.98 / NTSC BB / NTSC BB+REF / NTSC BB+ID / NTSC BB+REF+ID / NTSC BB+SETUP / NTSC BB+S+REF / NTSC BB+S+ID / NTSC BB+S+R+ID / 525i/59.94 / PAL BB / PAL BB+REF / 625i/50	1080i/59.94	Yes	POR
BLK1 F-PHASE (*1)	±5	0	Yes	POR

Setting	Value (Maximum)	Factory Default Value	Preset	Restart
BLK1 V-PHASE (*1)	±1124	0	Yes	POR
BLK1 H-PHASE(dot)(*1)	±4124	0	Yes	POR
BLK1 H-PHASE(μsec)(*1)	±63.9814	+0.0000	Yes	POR

*1 BLK2, BLK3, and BLK4 settings are the same as BLK1 settings.

Following information is for Chinese RoHS only

所含有毒有害物质信息

部件号码：LT 4110

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	×	○	○	○	○	○
液晶显示模组	○	○	○	○	○	○
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。

Ver. 1

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Sep. 30, 2016 Ver. 2 (FW Ver. 1.6)