LT 443D

MULTIFORMAT
VIDEO GENERATOR

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

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GENERAL SAFETY SUMMARY

■ To Avoid Personal Injury

It is recommended that only qualified personnel with technical knowledge use this instrument only after reading and fully understanding all functions of the instrument described this instruction manual.
This instrument is not designed and manufactured for consumers.
If you do not have enough knowledge on electricity, to avoid personal injury and prevent damage to this product, please be sure to use this product only under the supervision of an engineer who has sufficient knowledge about electronics.

■ Precautions on Contents

Should you find the contents in this manual and any of its technical terms confusing, please feel free to contact your local LEADER agent.

■ Symbols and Terms

Following terms and symbols indicate necessary warnings and cautions used in this manual and on the product are there for safe operation.

<Symbol> 	The sections where this symbol is marked in this manual or instrument, if not correctly performed or practiced, could result in personal injury or cause serious danger to the instrument. Misuse could also produce unintentional movement to create an operational impediment on the instrument or other products that might be connected to it. Be sure to refer to the safety precautions in this manual to safely use the part of the instrument where the symbol is marked.
<Term> ⚠ **WARNING**	Warning statements identify warning conditions that if disregarded or not correctly performed or adhered to, could result in serious personal injury or even loss of life.
<Term> ⚠ **CAUTION**	Caution statements identify caution conditions that if disregarded or not correctly performed or adhered to, could result in personal injury or damage to the instrument.

GENERAL SAFETY SUMMARY

Review the following safety precautions to avoid operator's injury and loss of life and prevent damage and deterioration to this instrument. To avoid potential hazards, use this product as specified.

WARNING

■ **Warnings on the Cases and Panels of the Instrument**

Operator should not remove any cases or panel for any reasons. If you touch inside the instrument it could result personal shock or fire hazard. Refrain from spilling any liquid on or inserting anything flammables or piece of metal into the ventilation of the instrument. Such actions could cause fire, shock, malfunction and be an accident hazard while the power is on.

■ **Warnings on Power Line**

- **Make sure to connect only to the rated power line voltage. Excess voltage may cause fire.**
  Confirm the voltage of the commercial power line before connecting the AC power cord. The power frequency of the power line should be 50/60 Hz.

- **Warning on the Power Cord**
  Use only the optional power cord that is attached to this instrument. The use of the power cord other than that attached could cause fire hazard.
  If the attached cord is damaged stop using it and contact your local LEADER agent. Should you use a damaged cord, it could cause a shock or create a fire hazard. When you pull out the cord be sure to hold it by plug and pull from the socket not by holding the cord wire.

- **Cover/Inlet stopper**
  Use the Cover/Inlet stopper that comes with the package only after establishing a means to immediately shut down the power supply when a malfunction occurs on the LT 443D.

GENERAL SAFETY SUMMARY

WARNING

■ Warning on Installation Environments

- **About the Operating Temperature Range**
  Operate the instrument between the temperature range of 0 to 40 °C. Operating the instrument at higher temperatures could cause a fire hazard.
  Rapid changes of temperatures from cold to warm can create internal moisture or condensation and could damage the instrument. If there is a possibility of moisture condensation allow the instrument to sit for 30 minutes without the power on.

- **About the Operating Humidity Range**
  Operating humidity range is ≤ 90 % RH.
  Do not operate the instrument with wet hands. This could cause a shock and fire hazard.

- **About the Operation in the Presence of Gasses**
  Operating the instrument in and near the presence or storage locations of flammable, explosive gasses or fumes could create an explosion and fire hazard. Do not operate the instrument anywhere near such environments.

- **Avoid Insertions**
  Do not insert metals or flammable objects or drop liquid on or into the instrument. To do so could cause fire, shock, malfunction and create a dangerous accident hazard.

■ Abnormal symptom

Incase of smoke, fire, or abnormal smell while operating this instrument, immediately disconnect the power cord from the mains. Otherwise, you run the risk of fire or electrical shock. If the trouble cannot be solved, contact your local LEADER agent.

■ Warning about Ground

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

GENERAL SAFETY SUMMARY

CAUTION

■ **Caution on Input/Output Terminals**

Input Terminals are rated with a maximum input. Do not supply an input over the specified rating in the standard section of the instruction manual. Also, do not supply external power to Output terminal, this could cause the instrument to malfunction.

■ **Caution when Not Using the Instrument for a Long Time**

Make sure to disconnect the power cord from the socket when you do not use the instrument for a long time.

Please conform to the above warnings and cautions for safe operation. There are cautions in each area of this instruction manual, so please conform to each caution. If you have any questions about this manual, please feel free to contact your local LEADER agent.

1. INTRODUCTION

Thank you for purchasing LEADER's measuring instruments.
Please read this instruction manual carefully to ensure correct and safe operation.
If you have any difficulties or questions on how to use the instrument after you have read this manual, please feel free to contact your local LEADER agent.

1.1 Scope of Warranty

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

1. Repair of malfunction or damages resulting from fire, natural calamity, or improper voltage applied by the user.
2. Repair of an instrument 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 Operating Precautions

⚠ WARNING

1.2.1 Line Voltage and Fuse

Confirm that the power line voltage is correct before connecting the power cord.
The voltage range and fuse rating are indicated on the rear panel.
The instrument must be connected to the rated line voltage and line frequency of 50 Hz to 60 Hz.

⚠ **CAUTION**

1.2.2 Maximum Allowable Input Voltage

The maximum allowable input voltage to the input connector is shown below.
Do not apply excessive voltage to prevent damage to the instrument.

Input Connector	Maximum Allowable Input Voltage
GENLOCK IN	± 4.5V (DC + peak AC)

1.2.3 Shorting the Output Connectors, Reverse Voltage

- Shorting the output connectors
  Do not short any output connectors to prevent damage the instrument.
- Applying external voltage
  Do not apply external voltage to the output connectors, it can cause trouble.

1.2.4 Installation

Do not use the instrument in the following environments.

- High temperature environments
  Do not place the instrument under direct sunlight or near a heater (e.g., stove).
  Do not move the instrument from cold to warm environment abruptly, it may cause condensation.
  Operating temperature range: 0 to 40 ˚C
- High humidity environments
  Do not place the instrument in the high humidity environment (e.g., bathroom, near a humidor).
  Operating humidity range: ≤ 90 % RH
- Dusty environments

1.2.5 Mechanical Shock

Please be careful not to expose the instrument to other forms of severe mechanical shock as this product contains shock sensitive precise parts.

1.2.6 Calibration

When calibration or service is required, contact your local LEADER agent.

1.2.7 Routine Maintenance

When cleaning the instrument, do not use such solvents as thinner or benzol which will remove paint or damage the plastic surface. Use a soft cloth dampened with neutral detergent.
Do not drop water or detergent, or insert metal object into the instrument while cleaning. Otherwise, you run the risk of electrical shock or fire.

2. SPECIFICATIONS

2.1 Description

The LT 443D Signal Generator can be flexibly used for the multiformat digital broadcast systems. Various plug-in units enable the output of SDI signals (i.e., HDTV, SDTV), sync signals, and analog signals. By using these signals and genlock functions, users can customize this signal generator as desired.

2.2 Features

- **Plug-in units provide various functions**

  Since up to four plug-in units can be installed in the mainframe (consisting of a power supply, main signal generator, and controller), users can customize this signal generator as desired.

- **Applicable to multiformat HDTV**

  For the SDI signals, HDTV 14 format unit and 525 line/625 line SDTV unit are provided. The NTSC/PAL analog video signal unit is also available.
  Since each unit can output the signal simultaneously, a multiformat system can be constructed to satisfy user's requirements.

- **Various sync outputs**

  Two units can simultaneously output HD signals with 74.25 MHz clock and 74.25/1.001 MHz clock.

- **Easy-to-use sync signals**

  For today's modern age of digital TV systems, BB signal (for NTSC, PAL) and HDTV tri-level sync signals can be generated from the Analog BB Unit.

- **Ethernet provided**

  Since the ethernet capability is provided as standard. This feature can remotely control various functions and monitor he genlock status.

- **User-friendly operability**

  LEADER's traditional design and operability concepts are also reflected in this instrument. User-friendly operation includes significantly reduced power-on initialization time is advantageous to a high-performance instrument.

2.3 Specifications

2.3.1 Compartment

Number of compartments	4
ID Function	Automatically identifies the unit installed.

∗2 Refer to Section 2.5 and specifications of each unit.

2.3.2 LCD Panel

Number of Characters	20 characters x 2 lines can be displayed (w/backlight).

2.3.3 Internal Clock

Internal Reference Frequency	27 MHz

2.3.4 Memory Card Slot

Function	Storing/reading preset data Reading logo mark data Reading NATURAL PICTURE data ∗3
Applicable Card	Compact flash memory card (CFA TYPE-1) ∗4

∗3 The NATURAL picture function is only usable when the LT 443D-70 Option is installed in the mainframe.

∗4 No compact flash memory card is supplied as standard accessory.
Memory cards produced by following manufacturers should be procured (as of August 2002):SanDisk

∗5 A microdrive can't be used.

2.3.5 External Interface

Ethernet	10/100 Base T (Automatic selection)
Function	Transferring operation status (e.g., genlock status) Remote control (e.g., pattern switching)
USB (Universal Serial Bus)	Applicable to USB 1.1
Function	This function will be supported. (Hardware is installed as standard.)

2.3.6 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90% RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85% RH (without condensation)
Operating Environment	Indoor use
Operating Altitude	Up to 2000 m
Overvoltage Category	Ⅱ
Pollution Degree	2
Power Requirements	90 to 250 VAC, 50/60 Hz
Power Consumption	Approx. 150 W max. (Approx. 75 W max. ∗5)
Dimensions and Weight	426 (W) x 44 (H) x 560 (D) mm, Approx. 7 kg ∗5

Accessories	Power cord	1
	Cover/Inlet Stopper	1
	Rack Support (Right and left)	1
	Screw (for rack support)	4
	About Rubber Feet	5
	Instruction Manual	1
	LOGO MARK SOFTWARE CD-R	1

∗5 When four plug-in units (i.e., LT 443D-HD, LT 443D-SD, LT 443D-BL, LT 443D-GL) are installed.

2.4 Options

2.4.1 LT 443D-70 (NATURAL Picture Memory: Option 70)

2.4.1.1 Description

This option adds the NATURAL picture pattern output capability to the LT 443D mainframe.

A compact flash memory card is used as an additional memory to store the NATURAL picture pattern.

2.4.1.2 Specifications

(1) NATURAL PICTURE Memory

Additional memory	≥16 M byte (Compact flash memory card)

(2) Number of Storable Screens

In case of 32 M byte memory is used: ∗6

1920 (H) x 1080 (V) format	Up to 3 screens
720 (H) x 574 (V) format	Up to 19 screens

∗6 The number of storable screens to the memory is described above. When the power is turned on or the screen size is changed, data contained in this memory is transferred to the RAM in the plug-in unit.
Refer to the unit specifications for the number of storable screens to the RAM.
Any combination of the screen sizes can be stored.
The same size of NATURAL picture data can only be stored; difference size of screens cannot be stored.

(3) Number of Video Data Quantitative Bits

Y, C_b, C_r	10 bits

(4) File Format

Before Conversion	Bit map format (.bmp)
	8 bits for each R, G, B component
After Conversion	Dedicated format for LT 443D (.img) ∗7
	10 bits for each Y, C_b, C_r component

∗7 Converted by using Windows (R) application software supplied.

(5) Conversion of Color Matrix

Colorimetry parameter used to convert data from R, G, B (eight bits data) to Y, C_b, C_r (10 bits data) by using the Windows (R) application software.

1080/720 System	Rec. ITU-R BT. 709-3 Part II
1035 System	SMPTE 240M
SD 525/SD 625 System	SMPTE 125M
NTSC System	SMPTE 170M
PAL System	Rec. ITU-R BT. 470-6

(6) Transferring NATURAL Picture Pattern

Memory	Picture data should be stored in a compact flash memory card. (Procure a compact flash memory card on your side. At least 16 M bytes required)

2.5 Plug-In Units

2.5.1 Plug-In Units for LT 443D

Up to four units can be installed.

Table 2-1 lists installable combination of the unit and UNIT compartment. ∗8

Compartment / Model	UNIT 1	UNIT 2	UNIT 3	UNIT 4
LT 443D-GLA	Yes ∗8	No	No	No
LT 443D-GL	Yes ∗8	No	No	No
LT 443D-HD/HDB	Yes	Yes	Yes	Yes
LT 443D-BL	Yes	Yes	Yes	Yes
LT 443D-SD/SDB	Yes	Yes	Yes	Yes
LT 443D-DA	Yes	Yes	Yes	Yes
LT 443D-AA	Yes	Yes	Yes	Yes
LT 443D-CS	Yes	Yes	Yes	Yes

Table 2-1 Installable unit and compartment

∗8 The LT 443D-GLA and the LT 443D-GL can only be installed in the UNIT 1 compartment.

∗Note: The firmware version 3.0 and later is used for the LT 443D-GLA.
The firmware version can be confirmed on the VERSION DISPLAY in MAINFRAME menu.

2.5.2 LT 443D-GLA

2.5.2.1 Description

This unit provides genlock capability to lock the LT 443D mainframe with the external reference signal, and three independent black signal generators.

The NTSC/PAL black burst signals, principal 20 types of HDTV analog tri-level sync signal formats, and 525p/625p analog sync signals can be used as an external reference signal.

The following black burst signal formats can be selected.

For NTSC/PAL system, black burst signal with field reference pulse is provided. For NTSC system, black burst with 10-field sequence identification conforming to the SMPTE 318M standards is provided.

The instrument continues operation since the flywheel mode is provided even if the external reference signal is accidentally removed in genlock mode. By logging the genlock status, the time can be obtained when the external reference signal is removed. The log information can be stored on the CF CARD.

The genlock timing can be adjusted for the entire color frame range when the NTSC/PAL black burst signal is applied; entire frame range when the HDTV analog tri-level sync signal is applied.

Three black burst signal output systems with selectable formats are available as follows:

For NTSC/PAL system, standard black burst signal and black burst signal with field reference pulse are provided. For NTSC system, black burst with 10-field sequence identification conforming to the SMPTE 318M standards, 525p/625p analog sync signal, and HDTV analog tri-level sync signal are provided.

The format and output signal timing of each output can be respectively set.

The black signal timing can be adjusted for the entire color frame range when the NTSC/PAL black burst signal is applied; entire frame range when the HDTV analog tri-level sync signal is applied.

2.5.2.2 Specifications

(1) Genlock Function

Reference Input Signal Level

• HDTV	Positive polarity: 300 mV
	Negative polarity: -300 mV
• 525p/625p	-300 mV
• NTSC	-286 mV
• PAL	-300 mV
Input Connector	BNC (75 Ω, loop through)

(2) Analog Sync Signal Output

Sync Level (into 75 Ω)

• HDTV	Positive polarity: 300 mV ±6 mV
	Negative polarity: -300 mV ±6 mV
• 525p	-300 mV ±6 mV
• 625p	-300 mV ±6 mV
• NTSC	40 IRE ±1 IRE
• PAL	-300 mV ±6 mV
Output Connector	BNC (BLACK 1/BLACK 2/BLACK 3)
Number of Outputs	1 each

2.5.3 LT 443D-HD/HDB

2.5.3.1 Description

The LT 443D-HD (HD-SDI Unit) and LT 443D-HDB (HD-SDI & BLACK Unit) add the capability to output 14 types of HD-SDI signal formats to the LT 443D mainframe. Various functions (e.g., ID character display, simple motion pictures, embedded audio, NATURAL picture pattern ∗1) are provided.

The LT 443D-HDB (HD-SDI & BLACK Unit) can output HD-SDI black signal independently of the HD-SDI test signals.

∗1: The option should be installed.

2.5.3.2 Specifications

(1) Applicable Format

1035i/60,	1035i/59.94,	
1080i/60,	1080i/59.94,	1080i/50,
1080p/30,	1080p/29.97,	1080p/25,
1080p/24,	1080p/23.98,	
1080PsF/24,	1080PsF/23.98,	
720p/60,	720p/59.94,	

The verification has not completed though the following formats were built in since the firmware version 3.3 of the LT 443D.

720p/24,	720p/23.98,	720p/29.97,
720p/50,	720p/30,	720p/25

(2) HD-SDI Video Output 1 system, 2 outputs (75 Ω, BNC)

HD-SDI Black Output 1 system, 2 outputs (75 Ω, BNC)

(The HD-SDI black signal is only output when the LT 443D-HDB is installed.)

2.5.4 LT 443D-BL

2.5.4.1 Description

This unit outputs the 20 format HDTV analog tri-level sync signal, 525p/625p analog sync signals, and NTSC/PAL black burst signals.

Three independent output systems (six outputs, two outputs per system) are provided to output multiformat black sync signal.

The format and output signal timing can be respectively set each output.

2.5.4.2 Specifications

(1) Sync Level (into 75 Ω)

• HDTV	Positive polarity: 300 mV ±6 mV Negative polarity: -300 mV ±6 mV
• 525p	-300 mV ±6 mV
• 625p	-300 mV ±6 mV
• NTSC	40 IRE ±1 IRE
• PAL	-300 mV ±6 mV

(2) Output Connector BNC (BLACK 1, 2/BLACK 3, 4/BLACK 5, 6)

(3) Number of Outputs 2 each

2.5.5 LT 443D-SD/SDB

2.5.5.1 Description

The LT 443D-SD (SD-SDI Unit) and LT 443D-SDB (SD-SDI & BLACK Unit) add the capability to output 525/625 line format SD-SDI signal (4:2:2 component signal) to the LT 443D mainframe.

Various functions (e.g., ID character display, simple motion pictures, embedded audio, NATURAL picture pattern ∗1) are provided.

The LT 443D-SDB (SD-SDI & BLACK Unit) can output SD-SDI black signal independently of the SD-SDI test signals.

∗1:The option should be installed.

2.5.5.2 Specifications

(1) Applicable Format 525i/59.94-270 MHz, 625i/50-270 MHz

(2) SD-SDI Video Output 1 system, 2 outputs (75 Ω, BNC)

SD-SDI Black Output 1 system, 2 outputs (75 Ω, BNC)

(The SD-SDI black signal is only output when the LT 443D-SDB is installed.)

2.5.6 LT 443D-DA

2.5.6.1 Description

Installing the LT 443D-DA Digital Audio Unit in the LT 443D mainframe can output AES/EBU digital audio signals (four systems), silence signals (one system), and 48 kHz word clock signals.

The AES/EBU signal characteristics (e.g., output level, frequency) can be independently set for each output system.

The sampling frequency is synchronized with the video signal of plug-in unit installed in the mainframe.

2.5.6.2 Specifications

AES/EBU Digital Audio Output

- Number of Outputs 4 (2-channel output)
- Output Impedance 75 Ω unbalanced
- Output Amplitude 1 Vp-p (into 75 Ω)
- Output Connector BNC

Silence Signal (DARS grade 2) Output

- Number of Outputs 1 (2-channel output)
- Output Impedance 75 Ω unbalanced
- Output Amplitude 1 Vp-p (into 75 Ω)
- Output Connector BNC

48 kHz Word Clock

- Number of Outputs 1
- Output Impedance 75 Ω unbalanced (“1 Vp-p” output)
- Output Amplitude 1 Vp-p (into 75 Ω), 5 V CMOS, selectable
- Output Connector BNC

2.5.7 LT 443D-AA

2.5.7.1 Description

Installing the LT 443D-AA Analog Audio Unit in the LT 443D mainframe can output analog audio signal (two systems). Output characteristics (e.g., output level, frequency) can be independently set for each output system. The sound sampling frequency is synchronized with the video signal of plug-in unit installed in the mainframe.

2.5.7.2 Specifications

- Number of Outputs 2
- Output Impedance 600 Ω, balanced
- Output Amplitude 0.775 Vrms (into 600 Ω at 0 dBm)
- Output Connector XLR-3P x 2

2.5.8 LT 443D-CS

2.5.8.1 Description

The LT 443D-CS Analog Composite Unit adds the NTSC/PAL analog composite signal output capability to the LT 443D mainframe. Various functions (e.g., ID character, simple motion pictures, NATURAL picture pattern ∗1) are provided.

∗1: The NATURAL picture function is only usable when the Option LT 443D-70 is installed in the mainframe.

2.5.8.2 Specifications

Test Signal Output

- Number of Outputs 2
- Signal Level 1 Vp-p (into 75 Ω)

Black Signal Output

- Number of Outputs 2 systems (one each)
- Signal Level 1 Vp-p (into 75 Ω)

Horizontal Drive Pulse Output

- Number of Outputs 1
- Signal Level 2 Vp-p (into 75 Ω)

Vertical Drive Pulse Output

- Number of Outputs 1
- Signal Level 2 Vp-p (into 75 Ω)

3. PANEL DESCRIPTION

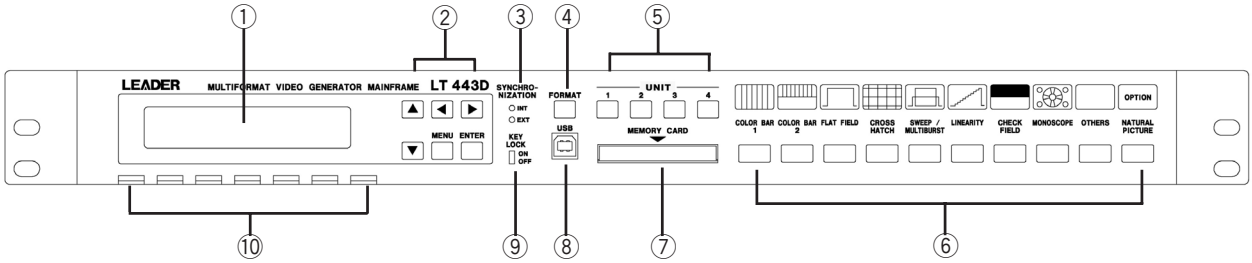


Figure 3-1

3.1 Front Panel

Figure 3-1 shows the LT 443D front panel.

① LCD panel

Displays the information in 20 characters x 2 lines.
Generally displays the status (e.g., output format of the selected unit).
In the setting mode, the setting item of the selected unit is displayed.

② Menu keys

Sets the menu in the setting mode.
(These keys are also used in status display mode.)

③ SYNCHRONIZATION indicators

The [EXT] lights when the instrument is synchronized to the external sync signal (e.g., black burst, tri-level sync).
The [INT] lights when the internal sync is used.

④ FORMAT key

Selects the signal format of the selected unit.

⑤ UNIT keys

Select the unit when changing or confirming the setting item.

⑥ Pattern keys

Select the pattern output from the selected unit.
These keys are common to all units.
When the unit without a pattern output capability (e.g., genlock unit) is selected, all pattern LEDs go off. And pattern key could not use.

⑦ MEMORY CARD slot

To insert memory card to store the optional NATURAL PICTURE pattern.

Procure a compact flash memory card recommended by Leader Electronics Corp. Refer to Section 2.3.4, “Memory Card Slot” for detail.

∗ Note: When formatting a CF card, use the FAT system; the LT 443D cannot recognize the CF card formatted in FAT32 system.

To format the CF card of 32 MB or larger capacity on Windows XP, select FAT from the default (FAT32 file system selected) for formatting.

Notes on using CF memory card:

- A “Vcc = 5 V” type memory card cannot be used.
- Insert the memory card until it in place. If the card cannot be inserted properly, check the card for up side down. Do not insert the card forcibly. It may cause trouble.
- Do not remove the card while writing or recalling data.
- Do not turn power off while writing or recalling data.

⑧ USB connector

Used for maintenance in the factory. This connector will be installed.

⑨ KEY LOCK switch

Turns on and off the key lock mode.

⑩ Ventilation hole

To prevent instrument damage due to overheating, do not block airflow through the ventilation vents (i.e., air-intake vents on the rear panel and exhaust holes on the front panel).

3.2 Rear Panel

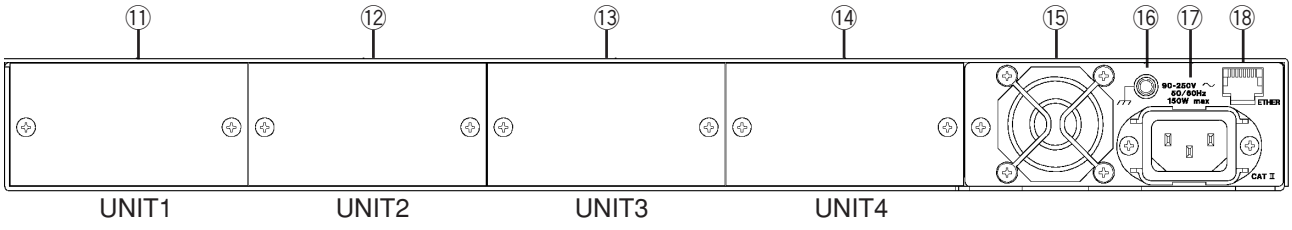


Figure 3-2

Figure 3-2 shows the LT 443D rear panel.

⑪ UNIT 1 compartment

⑫ UNIT 2 compartment

⑬ UNIT 3 compartment

⑭ UNIT 4 compartment

⑮ Cooling fan

Do not block air flow and ventilation holes.

⑯ Grounding terminal

Connected to the chassis of this instrument.

⑰ AC inlet

AC power inlet. Usable AC voltage range is 90 to 250 V, universal.

⑱ ETHER connector

Used for 10 BASE-T/100 BASE-TX ethernet.

4. USING THE MAINFRAME

4.1 Turning Power On

∗Note: There is no power switch on the LT 443D; connecting the power cord immediately supplies the power.

(1) Supplying the power initializes this instrument.
The following message is displayed until initialization is completed.
During initialization, incorrect signal is output and key operation is disabled.

LEADER LT443D INITIALIZING •••

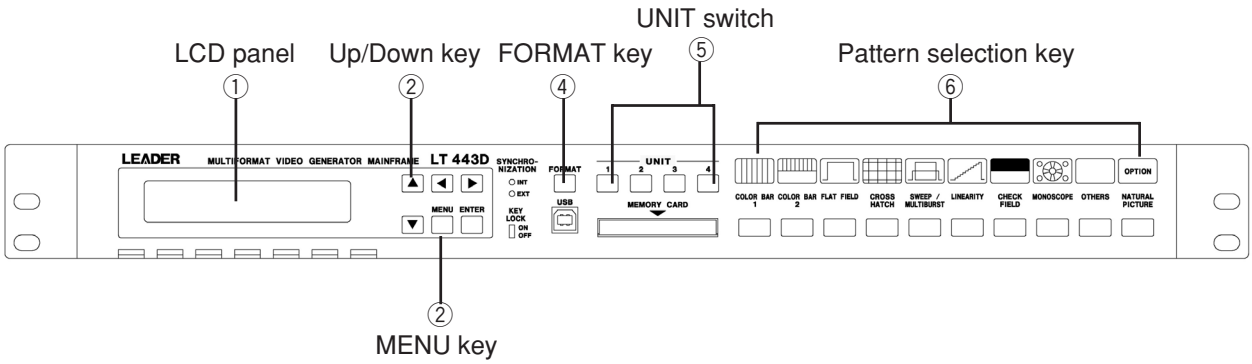
(Example: When the power is supplied.)

(2) After initialization is completed, the setting status (e.g., video format being output) is displayed as shown below.

[STATUS] FORMAT TYPE ◆ 1080/59.94

(Example of status display)

Refer to Sections 4.2, 4.3, and 4.4 for front panel operations.



4.2 Selecting Unit

Pressing one of UNIT keys displays the UNIT number and its information on the LCD panel.
This section describes the operating procedure in case of the HD-SDI unit is installed in the UNIT 2 compartment.

Hierarchy level 1 —

1. HD SETTING	#2
▼ FORMAT SELECT	

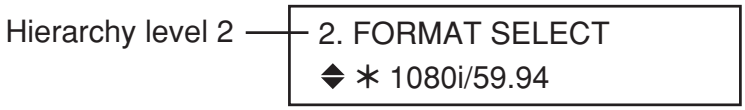
— In case of the LT 443D-HD unit is installed in the UNIT 2 compartment.

If [STATUS] is displayed, pressing the [MENU] key can display the [SETTING].

4.3 Selecting Format

Press the FORMAT switch to select the signal format.

Pressing the [Up] or [Down] key in the LCD panel group can also select the signal format.



4.4 Selecting Pattern

Press the Pattern key to select the pattern.

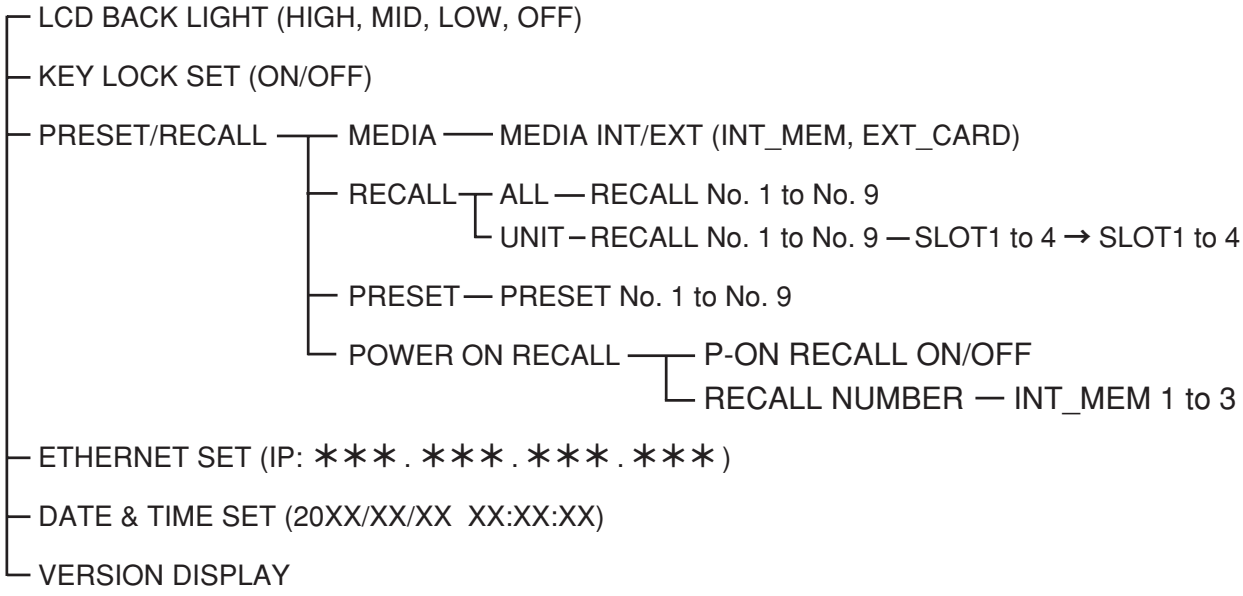
Pressing the key lights the key LED and outputs the pattern.

4.5 UTILITY Menu Structure

The UTILITY menu can be commonly used for each unit.

To enable this menu, turn four UNIT LEDs off, then press the [MENU] key.

4.5.1 UTILITY Menu Screen



4.5.2 LCD BACK LIGHT

The backlight brightness can be selected: HIGH, MIDDLE, LOW, or OFF.

4.5.3 KEY LOCK SET

The key lock function prevents a trouble from accidental key operation.

There are two key lock modes as follows:

All front panel keys are locked by using the [KEY LOCK SET] in setting mode. The [FORMAT] key is only locked by pressing the KEY LOCK switch in the SYSTEM block ④ on the front panel.

4.5.3.1 Key Lock Mode Set With Menu

When the [KEY LOCK SET] is ON, keys related to the SYSTEM (including [FORMAT] and [INT/EXT] keys) are disabled.

4.5.3.2 Setting KEY LOCK ON

(1) Select the [KEY LOCK SET] by pressing the [Up] or [Down] key, then press the [ENTER] key.

Hierarchy level 1 —

```
1. UTILITY MENU
◆ KEY LOCK SET
```

(2) The key lock mode is enabled. [KEY LOCK ON] is displayed for about one second, then status mode is enabled.

```
KEY LOCK ON
```

When the key is pressed in key lock mode, the following message is displayed for about one second.

```
KEY LOCK !!
PUSH MENU KEY 2 sec
```

4.5.3.3 Setting KEY LOCK OFF

(1) To cancel key lock mode, hold down the MENU key for at least two seconds. [KEY LOCK OFF] is displayed for about one second.

```
KEY LOCK OFF
```

∗ The [FORMAT] in the SYSTEM block are disabled during the KEY LOCK switch ⑨ is set ON even when the key lock mode is canceled with the menu.

4.5.4 Using Front Panel KEY LOCK Switch

Setting the [KEY LOCK] slide switch on locks the [FORMAT] key operation.
If the [FORMAT] key is pressed when the [KEY LOCK] slide switch is set on, the LCD displays the following messages:

```
KEY LOCK ON
TURN OFF KEY_LOCK_SW
```

When setting the KEY LOCK slide switch, use an insulated wedge-shaped screwdriver, for example.

4.5.5 PRESET / RECALL

You can store up to three presets of the panel key settings to in the internal memory (INT_MEM) and up to nine presets to a Compact Flash card (EXT_CARD) ∗1, ∗2.
There are two methods to recall presets: One method in which the settings of all slots are recalled at once (ALL mode) and another method in which the settings are recalled on each slot individually (UNIT mode). ∗3

∗1 The compact flash card is not included in the package. The memory card can be shared with Option 70 (color still picture memory).
∗2 The INT_MEM preset function is supported on firmware version 1.8 or later.
∗3 The recall function per slot is supported on firmware version 2.1 or later.
∗4 The POWER ON RECALL mode has been applied for firmware version 3.0 and later.

4.5.5.1 Selecting the Preset Storage Media

Set the medium for storing presets. You can select INT_MEM (internal memory) or EXT_CARD (Compact Flash card).
Data stored in the INT_MEM (internal memory) can only be recalled in the POWER ON RECALL mode.

Hierarchy level 1 —
1. UTILITY MENU
◆ PRESET/RECALL

Hierarchy level 2 —
2. PRESET/RECALL
▼ MEDIA

▼ MEDIA
◆ RECALL
◆ PRESET
▲ POWER ON RECALL

Hierarchy level 3 —
3. MEDIA INT/EXT
■ INT_MEM □ EXT_CARD

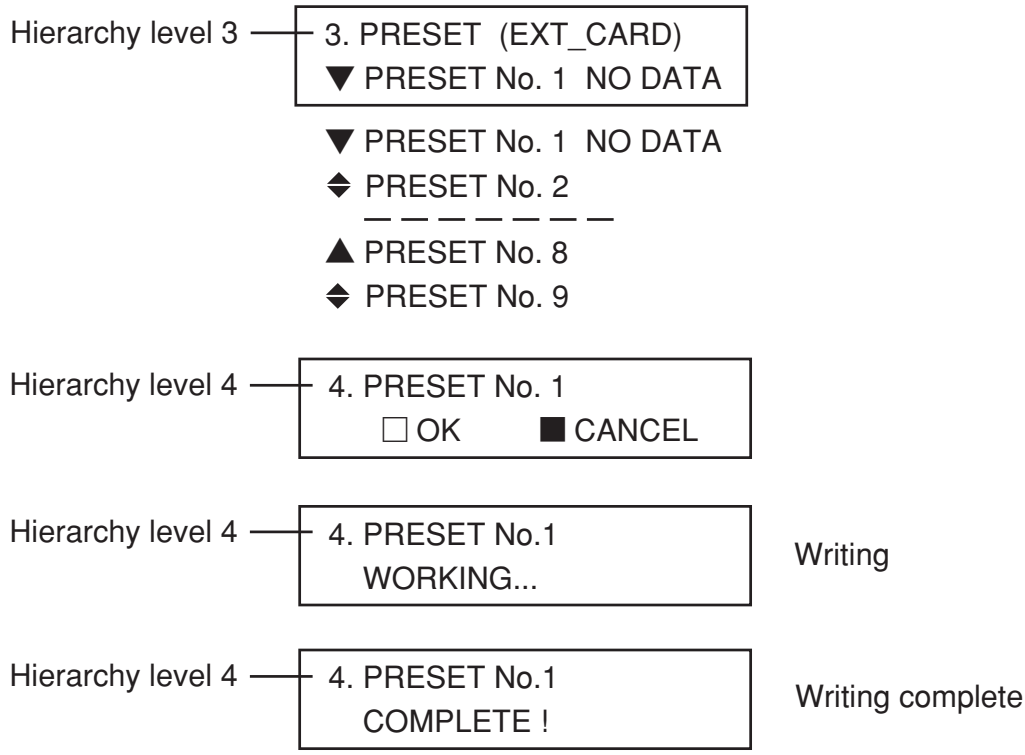
4.5.5.2 Creating Presets

You can create three presets in INT_MEM and nine presets in EXT_MEM.

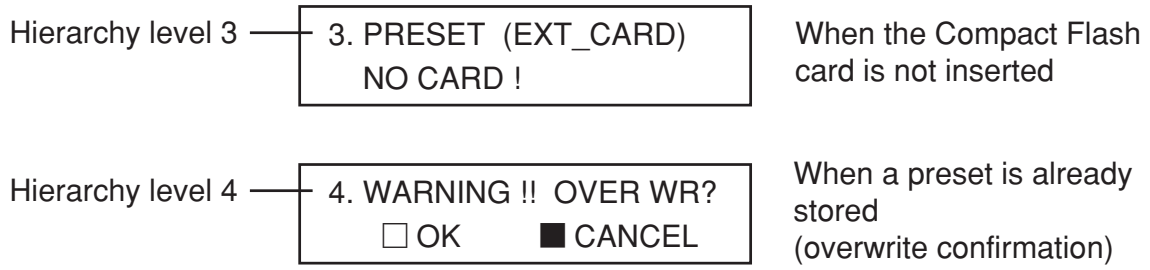
Hierarchy level 3 —
3. PRESET (INT_MEM)
▼ PRESET No. 1 NO DATA

▼ PRESET No. 1 NO DATA
◆ PRESET No. 2
▲ PRESET No. 3

The current information about the preset data is displayed at the right edge of the second line.
NO DATA: No preset data is stored.
No display: Preset data is stored.

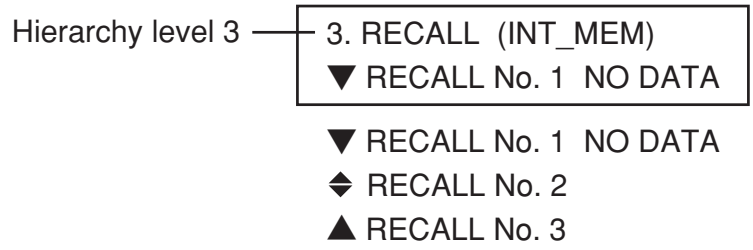


The following messages may appear in addition to the messages above.



4.5.5.3 Recalling Presets (ALL Mode)

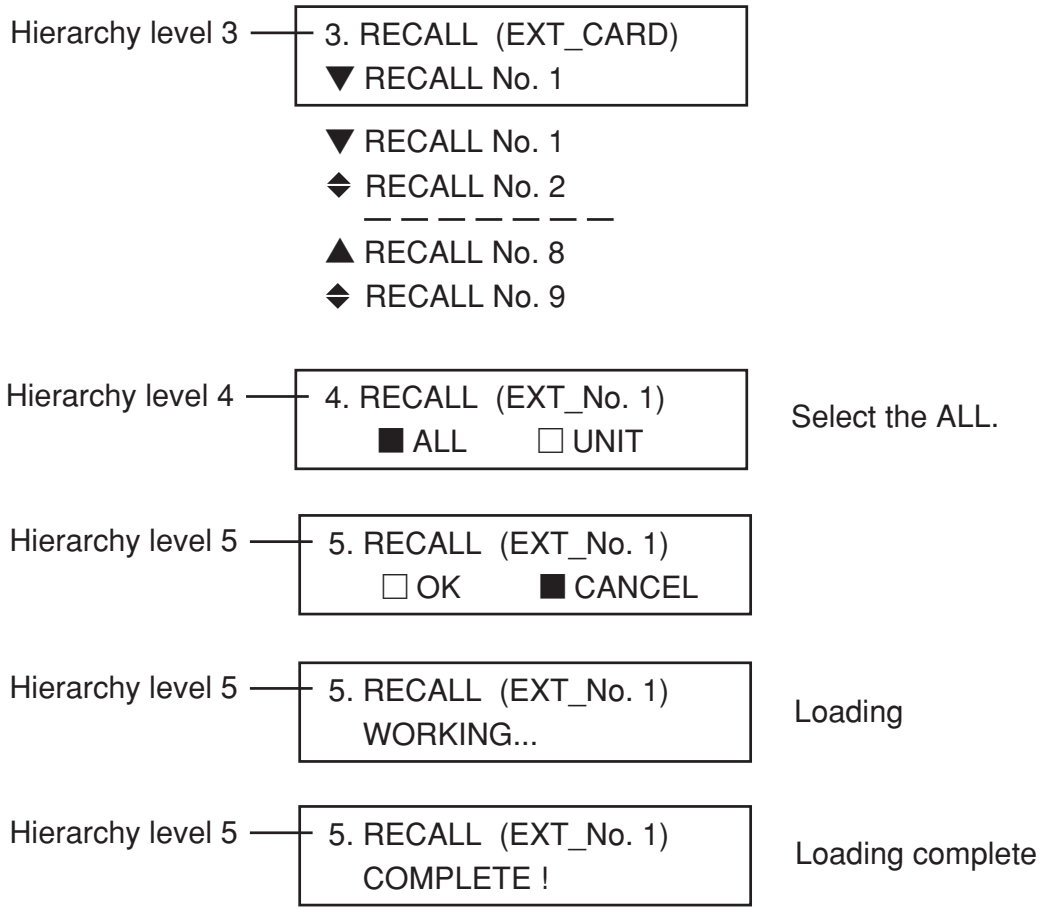
In ALL mode, the settings of the units installed in the four slots can be recalled at once. However, if the configuration of the units installed in slots 1 to 4 differs from that when the preset was created, the settings cannot be recalled. If this happens, you may be able to recall using UNIT mode.



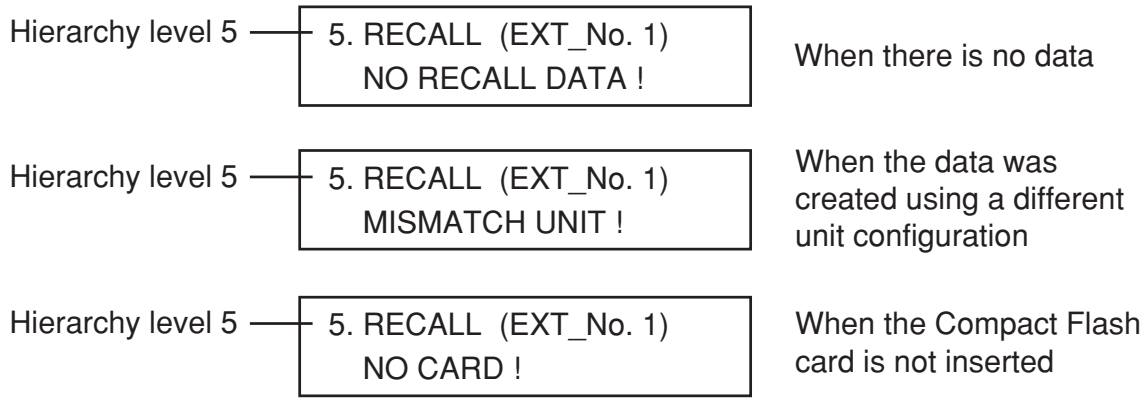
The current information about the preset data is displayed at the right edge of the second line.

NO DATA: No preset data is stored.

No display: Preset data is stored.

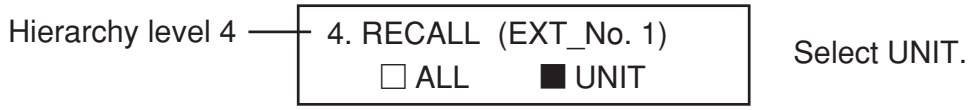


The following messages may appear in addition to the messages above.



4.5.5.4 Recalling Presets (UNIT Mode)

In UNIT mode, the settings of a particular slot can be recalled from the preset data of all the settings of the units installed in the four slots.



Hierarchy level 5 —

```
5. RECALL  (EXT_No. 1)
▼ SLOT1 • GLA → SLOT1  OK
```

```
▼ SLOT1 • GLA → SLOT1  OK
◆ SLOT2 • HD  → SLOT1  NG
◆ SLOT3 • BL  → SLOT3  OK
▲ SLOT4 • SD  → SLOT4  OK
  ①           ②      ③
```

① Preset data information (unit configuration when the preset was created)
② The LT 443D slot number for which the settings are to be recalled
③ Unit type matching

OK: The unit type for ① and ② match or are compatible, and the settings can be recalled.

NG: The unit type for ① and ② do not match or are not compatible, and the settings cannot be recalled.

Select the unit within the preset data corresponding to ① using the [▲] or [▼] key.

Hierarchy level 5 —

```
5. RECALL  (EXT_No. 1)
SLOT1 • GLA → ▼ SLOT1  OK
```

Use the [◀] or [▶] key to move the cursor to the ② position and select the LT 443D unit whose settings are to be recalled. The settings can be recalled using a combination in which OK is displayed in ③.

Hierarchy level 6 —

```
6. EXT_No. 1 • GLA  (1 → 1)
   □ OK      ■ CANCEL
```

Hierarchy level 6 —

```
6. EXT_No. 1 • GLA  (1 → 1)
   WORKING...
```

Loading

Hierarchy level 6 —

```
6. EXT_No. 1 • GLA  (1 → 1)
   COMPLETE !
```

Loading complete

The following messages may appear in addition to the messages above.

Hierarchy level 5 —

```
5. RECALL  (EXT_No. 1)
   NO RECALL DATA !
```

When there is no data

Hierarchy level 6 —

```
6. EXT_No. 1 • GLA  (1 → 2)
   MISMATCH UNIT !
```

When the unit type does not match (a combination consisting of NG displays)

Hierarchy level 5 —

```
5. RECALL  (EXT_ −− )
   NO CARD !
```

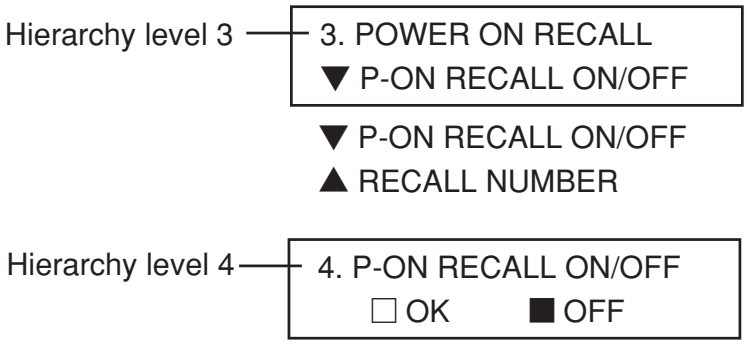
When the Compact Flash card is not inserted

4.5.5.5 POWER ON RECALL

The following functions can be selected in the POWER ON RECALL mode.

To initialize each unit based on the last memory setting information (i.e., information immediately before turning power off) when power is turned on.

To initialize each unit by recalling the setting information from preset data stored in the internal memory (INT_MEM).

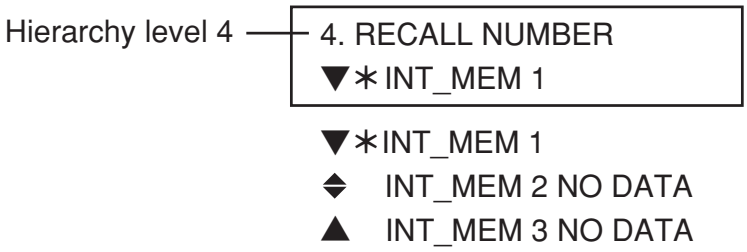


Select POWER ON RECALL ON/OFF by pressing the ◀ or ▶ key, then press the ENTER key.

When OFF is selected, each unit is initialized based on the last memory setting information.

When ON is selected, each unit is initialized by recalling the setting information of the RECALL NUMBER listed below from preset data stored in the INT_MEM (internal memory).

When there is no setting information at the specified number, each unit is initialized based on the last memory setting information.



Select the number by pressing the ▲ (Up) or ▼ (Down) key. The item indicated as NO DATA cannot newly be specified by attaching " ∗ " (asterisk).

4.5.6 ETHERNET SET

The ethernet capability can remotely control and monitor genlock status.

Hierarchy level 2 —

```
2. ETHERNET SET
IP: 192. 168.  20.  63
```

The current setting value is displayed.

The underline cursor can be moved by pressing the [Left] or [Right] key.
The cursored number can be changed by pressing the [Up] or [Down] key.

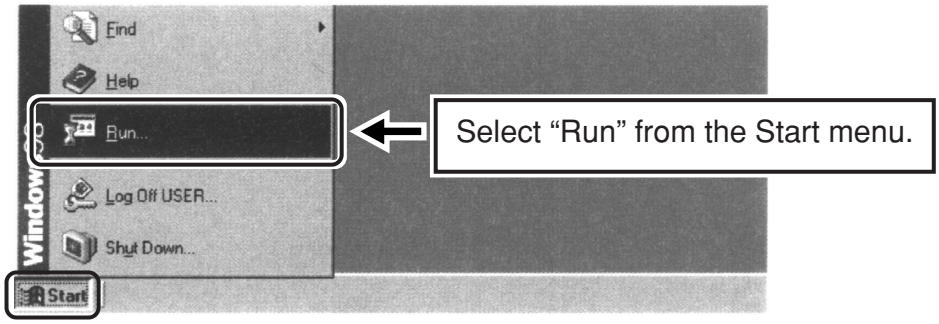
Pressing the [ENTER] key enters data.

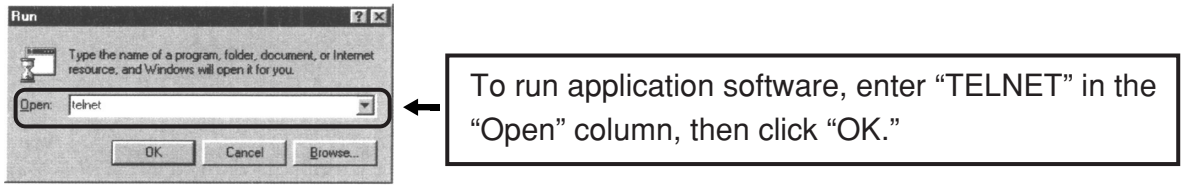
```
IP: 192. 168.  20.  63
  ■ OK   □ CANCEL
```

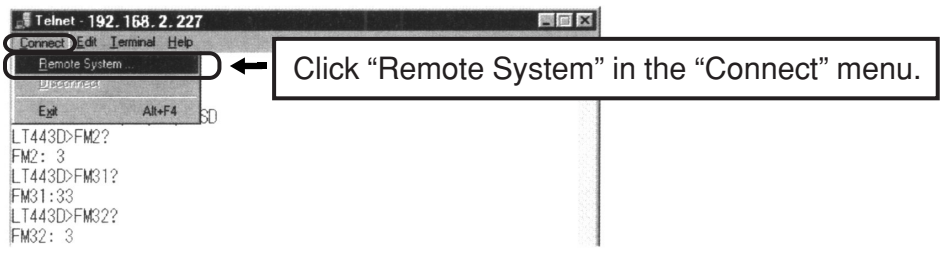
∗ ”ETHER” is set to IP address when power is turned on.

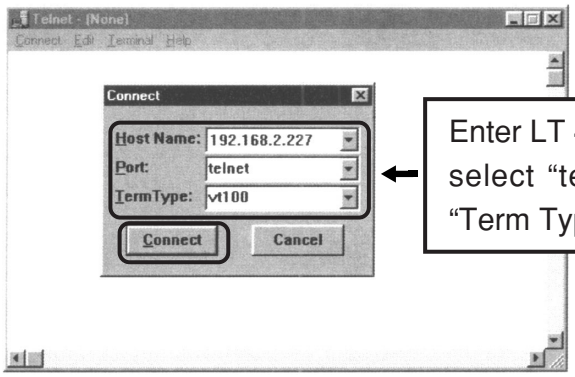
4.5.6.1 Remote Control via ETHER Port

This section describes the remote control procedure using the “TELNET” software.

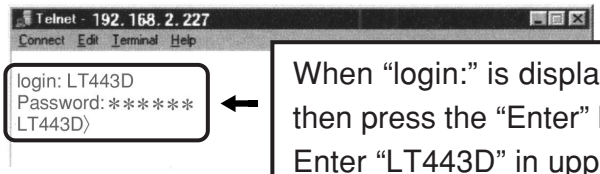




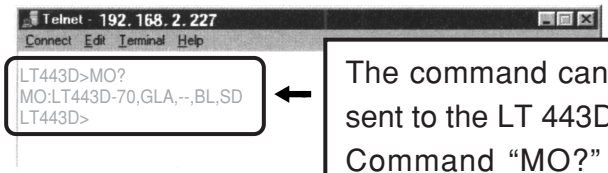




Enter LT 443D IP address in the “Host Name,” select “telnet” for “Port,” select “vt100” for “Term Type,” then click “Connect.”

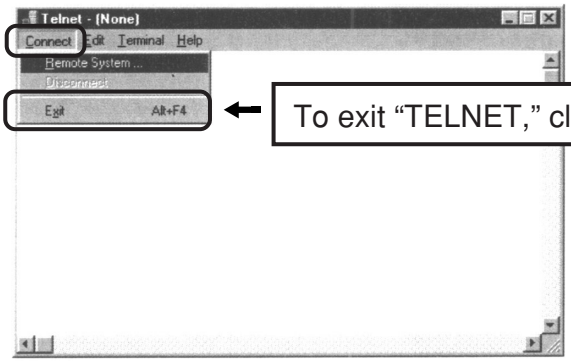


When “login:” is displayed, enter “LT443D” in uppercase letters, then press the “Enter” key. A password can now be entered. Enter “LT443D” in uppercase letters, then press the “Enter” key. The command prompt “LT443D>” is displayed. A command can now be entered.



The command can be entered on this screen; data can be sent to the LT 443D.
Command “MO?” (to query the plug-in unit inserted) is entered, for example, “MO: LT443D-70, GLA, - -, BL, SD” is replied.
When the prompt “LT443D>” is displayed, a new command can be entered.

4.5.6.2 Exiting Remote Control Mode



To exit “TELNET,” click “Exit” in the “Connect” menu.

4.5.6.3 Remote Control Command

Operating precautions for remote controlling via the ETHER port

Do not enter multistatement command.
Enter a space (0X20) between command and data.
Enter a comma (0X2C) between data.
In remote control mode, LED on the main frame is undefined, either on or off. Use the query command to confirm the settings in this case.

(1) MAINFRAME

Query of Model Number MO?

MO: LT443D-70, GLA, HD, BL, SD With Option 70
MO: LT443D, - -, HD, BL, - - Without Option 70
The unit type is sequentially displayed from the UNIT compartment 1.
"- -" indicates "without option."

Confirming firmware version VR? VR: LT443D-70 V1.0

(2) HD Unit (Installed in UNIT 2)

• Getting format FM2? FM2: 11

0 = 1035i/60	7 = 1080p/25	14 = 720p/50
1 = 1035i/59.94	8 = 1080p/24	15 = 720p/30
2 = 1080i/60	9 = 1080p/23.98	16 = 720p/29.97
3 = 1080i/59.94	10 = 1080PsF/24	17 = 720p/25
4 = 1080i/50	11 = 1080PsF/23.98	18 = 720p/24
5 = 1080p/30	12 = 720p/60	19 = 720p/23.98
6 = 1080p/29.97	13 = 720p/59.94	

• Selecting pattern PA2 X

0 = COLOR BAR 75 %	11 = RAMP
1 = COLOR BAR 100 %	12 = SHALLOW RAMP
2 = MULTIFORMAT COLOR BAR 1	13 = 10 STEP
3 = (unused)	14 = CHECK FIELD
4 = (unused)	15 = MONOSCOPE (NORMAL)
5 = FLAT FIELD 100 %	16 = MONOSCOPE (INVERT)
6 = FLAT FIELD 50 %	17 = BOWTIE 100 %
7 = FLAT FIELD 0 %	18 = PULSE & BAR
8 = CROSS & DOT	19 = RED RASTER
9 = LINE SWEEP 100 %	20 = (unused)
10 = MULTIBURST 100 %	21 = (unused)

• Getting pattern PA2? PA2: 0

0 = COLOR BAR 75 %	11 = RAMP
1 = COLOR BAR 100 %	12 = SHALLOW RAMP
2 = MULTIFORMAT COLOR BAR 1	13 = 10 STEP
3 = MULTIFORMAT COLOR BAR 2	14 = CHECK FIELD
4 = MULTIFORMAT COLOR BAR 3	15 = MONOSCOPE (NORMAL)
5 = FLAT FIELD 100 %	16 = MONOSCOPE (INVERT)
6 = FLAT FIELD 50 %	17 = BOWTIE 100 %
7 = FLAT FIELD 0 %	18 = PULSE & BAR
8 = CROSS & DOT	19 = RED RASTER
9 = LINE SWEEP 100 %	20 = NATURAL PICTURE 1 (w/Option 70)
10 = MULTIBURST 100 %	21 = NATURAL PICTURE 2 (w/Option 70)

• Setting ID ON/OFF ID2 X

0 = ID OFF	1 = ID ON

• Getting ID ON/OFF ID2? ID2: 0

0 = ID OFF	1 = ID ON

(3) SD Unit (Installed in UNIT 4)

• Getting format FM4? FM4: 0

0 = 525i/59.94

1 = 625i/50

• Selecting pattern PA4 X

[525i/59.94]

0 = COLOR BAR 100 %
1 = COLOR BAR 75 %
2 = SMPTE
3 = RAMP & COLOR BAR
4 = FLAT FIELD 100 %
5 = FLAT FIELD 50 %
6 = FLAT FIELD 0 %
7 = FIELD ID
8 = CROSSHATCH
9 = LINE SWEEP 100 %
10 = LINE SWEEP 60 %
11 = MULTIBURST 100 %
12 = MULTIBURST 60 %
13 = OVER SIZE RAMP
14 = DIGITAL LIMIT RAMP
15 = SHALLOW RAMP
16 = 10 STEP
17 = CHECK FIELD
18 = MONOSCOPE (NORMAL)
19 = MONOSCOPE (INVERT)
20 = BOWTIE 100 %
21 = PULSE & BAR
22 = RED RASTER
23 = MULTIPULSE
24 = (unused)
25 = (unused)
26 = (unused)
27 = (unused)
28 = (unused)

[625i/50]

0 = COLOR BAR 100 %
1 = EBU COLOR
2 = BBC COLOR
3 = RAMP & COLOR BAR
∗ 4 to 28: Same as the “525i/59.94.”

• Getting pattern PA4? PA4: 0

[525i/59.94]

0 = COLOR BAR 100 %
1 = COLOR BAR 75 %
2 = SMPTE
3 = RAMP & COLOR BAR
4 = FLAT FIELD 100 %
5 = FLAT FIELD 50 %
6 = FLAT FIELD 0 %
7 = FIELD ID
8 = CROSSHATCH
9 = LINE SWEEP 100 %
10 = LINE SWEEP 60 %
11 = MULTIBURST 100 %
12 = MULTIBURST 60 %
13 = OVER SIZE RAMP
14 = DIGITAL LIMIT RAMP
15 = SHALLOW RAMP
16 = 10 STEP
17 = CHECK FIELD
18 = MONOSCOPE (NORMAL)
19 = MONOSCOPE (INVERT)
20 = BOWTIE 100 %
21 = PULSE & BAR
22 = RED RASTER
23 = MULTIPULSE
24 = NATURAL PICTURE 1 (w/Option 70)
25 = NATURAL PICTURE 2 (w/Option 70)
26 = NATURAL PICTURE 3 (w/Option 70)
27 = NATURAL PICTURE 4 (w/Option 70)
28 = NATURAL PICTURE 5 (w/Option 70)

[625i/50]

0 = COLOR BAR 100 %
1 = EBU COLOR
2 = BBC COLOR
3 = RAMP & COLOR BAR
∗ 4 to 28: Same as the “525i/59.94.”

• Setting ID ON/OFF ID4 X

0 = ID OFF
1 = ID ON

• Getting ID ON/OFF ID4? ID4: 0

0 = ID OFF
1 = ID ON

(4) BL Unit (Installed in UNIT 3)

• Getting BLACK 1, 2 format FM31? FM31: 1
Getting BLACK 3, 4 format FM32? FM32: 0
Getting BLACK 5, 6 format FM33? FM33: 3

0 = 1035i/60
1 = 1035i/59.94
2 = 1080i/60
3 = 1080i/59.94
4 = 1080i/50
5 = 1080p/30
6 = 1080p/29.97
7 = 1080p/25
8 = 1080p/24
9 = 1080p/23.98
10 = 1080PsF/24
11 = 1080PsF/23.98
12 = 720p/60
13 = 720p/59.94
14 = 720p/50
15 = 720p/30
16 = 720p/29.97
17 = 720p/25
18 = 720p/24
19 = 720p/23.98
20 = NTSC BB
21 = NTSC BB+Ref
22 = NTSC BB+ID
23 = NTSC BB+Ref+ID
24 = NTSC BB+Setup
25 = NTSC BB+S+Ref
26 = NTSC BB+S+ID
27 = NTSC BB+S+R+ID
28 = 525i/59.94
29 = 525p/59.94
30 = PAL BB
31 = PAL BB+Ref
32 = 625i/50
33 = 625p/50

(5) GLA Unit (Installed in UNIT 1)

• Getting GENLOCK operation status GE1? GE1: 0
0 = INTERNAL or FLYWHEEL 1 = EXTERNAL

• Getting BLACK 1 format FM11? FM11: 1
Getting BLACK 2 format FM12? FM12: 0
Getting BLACK 3 format FM13? FM13: 3

Parameters are same as the “Getting BLACK 1, 2 format” of BL.

(6) List of Query Command

Command	Parameter	Function	Reply Example
• MAINFRAME			
MO?	None	Queries unit inserted	MO: LT443D-70, GL, HD, BL, SD MO: LT443D, - -, HD, BL, - -
VR?	None	Queries version	VR: LT443D-70 V1.0
• HD (Installed in UNIT 2, for example)			
FM2?	UNIT No. (1-4)	Confirming format	FM2: 0 FM2: 13
PA2?	UNIT No. (1-4)	Getting pattern	PA2: 0 PA2: 21
ID2?	UNIT No. (1-4)	Getting ID ON/OFF	ID2: 0 ID2: 1
• SD (Installed in UNIT 4, for example)			
FM4?	UNIT No. (1-4)	Confirming format	FM4: 0 FM4: 1
PA4?	UNIT No. (1-4)	Getting pattern	PA4: 0 PA4: 28
ID4?	UNIT No. (1-4)	Getting ID ON/OFF	ID4: 0 ID4: 1
• BL (Installed in UNIT 3, for example)			
FM31?	UNIT No. (1-4) Output No. (1)	Confirming BLACK 1, 2 format	FM31: 0 FM31: 33
FM32?	UNIT No. (1-4) Output No. (2)	Confirming BLACK 3, 4 format	FM32: 0 FM32: 33
FM33?	UNIT No. (1-4) Output No. (3)	Confirming BLACK 5, 6 format	FM33: 0 FM33: 33
• GLA (Installed in UNIT 1, dedicated)			
GE1?	UNIT No. (1)	Getting GENLOCK operation status	GE1: 0 GE1: 1
FM11?	UNIT No. (1) Output No. (1)	Confirming BLACK 1 format	FM11: 0 FM11: 33
FM12?	UNIT No. (1) Output No. (2)	Confirming BLACK 2 format	FM12: 0 FM12: 33
FM13?	UNIT No. (1) Output No. (3)	Confirming BLACK 3 format	FM13: 0 FM13: 33

(7) List of Setting Command

Command	Parameter	Function	Reply Example
• HD (Installed in UNIT 2, for example)			
PA2 X	UNIT No. (1-4) Pattern No.	Selecting pattern	PA2: 0 PA2: 19
ID2 X	UNIT No. (1-4) Setting ID	Setting ID ON/OFF	ID2: 0 ID2: 1
• SD (Installed in UNIT 4, for example)			
PA4 X	UNIT No. (1-4) Pattern No	Selecting pattern	PA4: 0 PA4: 23
ID4 X	UNIT No. (1-4) Setting ID	Setting ID ON/OFF	ID4: 0 ID4: 1

∗There is no setting item for the MAINFRAME, BL unit, and GLA unit.

4.5.7 VERSION DISPLAY

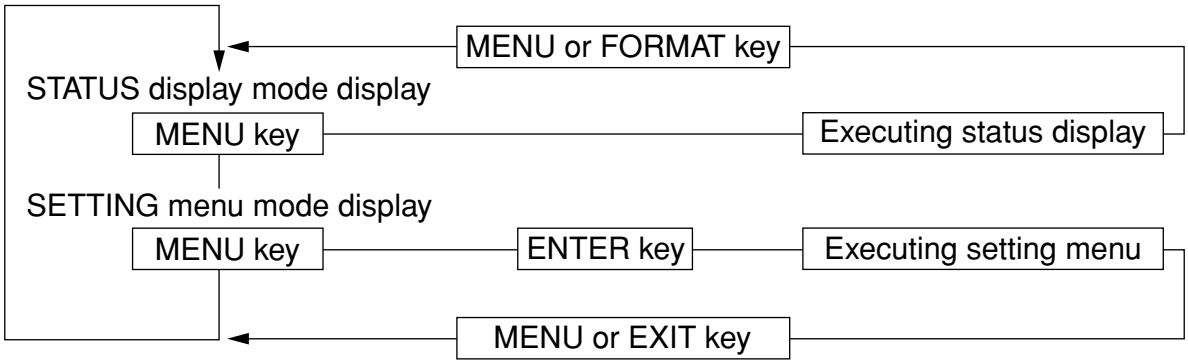
The software version used for this instrument can be confirmed.

2. VERSION DISPLAY
LT 443D Ver 3.3

4.6 Main Menu Structure

4.6.1 Two Modes Selectable With MENU Key

When one of four UNIT LEDs lights, pressing the [MENU] key on the LT 443D front panel can select the STATUS display mode or SETTING menu mode.



4.6.2 STATUS Display Mode

This mode displays the current setting conditions of the LT 443D mainframe.
The principal setting conditions of the selected unit (e.g., UNIT 2) is displayed as follows.
The status display mode is only used for checking the status; cannot be used for settings.

Display example

```
[STATUS] FORMAT TYPE
◆ 1080i/59.94
```

(1) Status Display Structure

The hierarchical structure for each unit is shown below:

① GENLOCK STATUS

- GENLOCK STATUS: INT/EXT xxx ∗ xxx The sign displays the locked format.
- GENLOCK MODE: INTERNAL/AUTO (GO INTERNAL)/MANUAL (GO INT)/ AUTO (FLYWHEEL)/MANUAL (FLYWHEEL)
- FORMAT TYPE BLK 1
- FORMAT TYPE BLK 2
- FORMAT TYPE BLK 3

② ANALOG BLACK STATUS

- FORMAT TYPE BLK 1, 2
- FORMAT TYPE BLK 2, 4
- FORMAT TYPE BLK 3, 6

③ HD-SDI STATUS

- FORMAT TYPE
- V-PHASE (HD)
- H-PHASE (HD)
- V-PHASE (HDB)
- H-PHASE (HDB)
- EMB. AUDIO (HD)
- EMB. AUDIO (HDB)
- Y, Cb, Cr
- ID CHARACTER
- PATTERN SCROLL
- PATTERN CHANGE

∗ Items with “(HDB)” is only applicable to HDB.

④ SD-SDI STATUS

- FORMAT TYPE
- V-PHASE (SD)
- H-PHASE (SD)
- V-PHASE (SDB)
- H-PHASE (SDB)
- EMB. AUDIO (SD)
- EMB. AUDIO (SDB)
- Y, Cb, Cr
- ID CHARACTER
- PATTERN SCROLL
- PATTERN CHANGE

∗ Items with “(SDB)” is only applicable to SDB.

⑤ DA STATUS

- CH1/CH2 ON/OFF
- CH3/CH4 ON/OFF
- CH5/CH6 ON/OFF
- CH7/CH8 ON/OFF

⑥ AA STATUS

CH1 ON/OFF, CH2 ON/OFF

⑦ CS STATUS

- FORMAT TYPE
- CS F-PHASE
- CS V-PHASE
- CS H-PHASE
- Y, C ON/OFF
- APL MODE
- ID CHARACTER
- PATTERN SCROLL
- PATTERN CHANGE
- BLACK1 F-PHASE
- BLACK1 V-PHASE
- BLACK1 H-PHASE
- BLACK2 F-PHASE
- BLACK2 V-PHASE
- BLACK2 H-PHASE
- V. DRIVE V-PHASE
- H. DRIVE H-PHASE

4.6.3 SETTING Menu Mode

This mode is described in the instruction manual of each unit.

5. NOTES ON RACK MOUNTING

A size of this instrument conforms to 1U standards. Use the Rack Support supplied as standard accessory. Also procure L-angles, shelves, and slide rails. Secure them to prevent damaging the instrument.

Contact your local leader agent for more information.

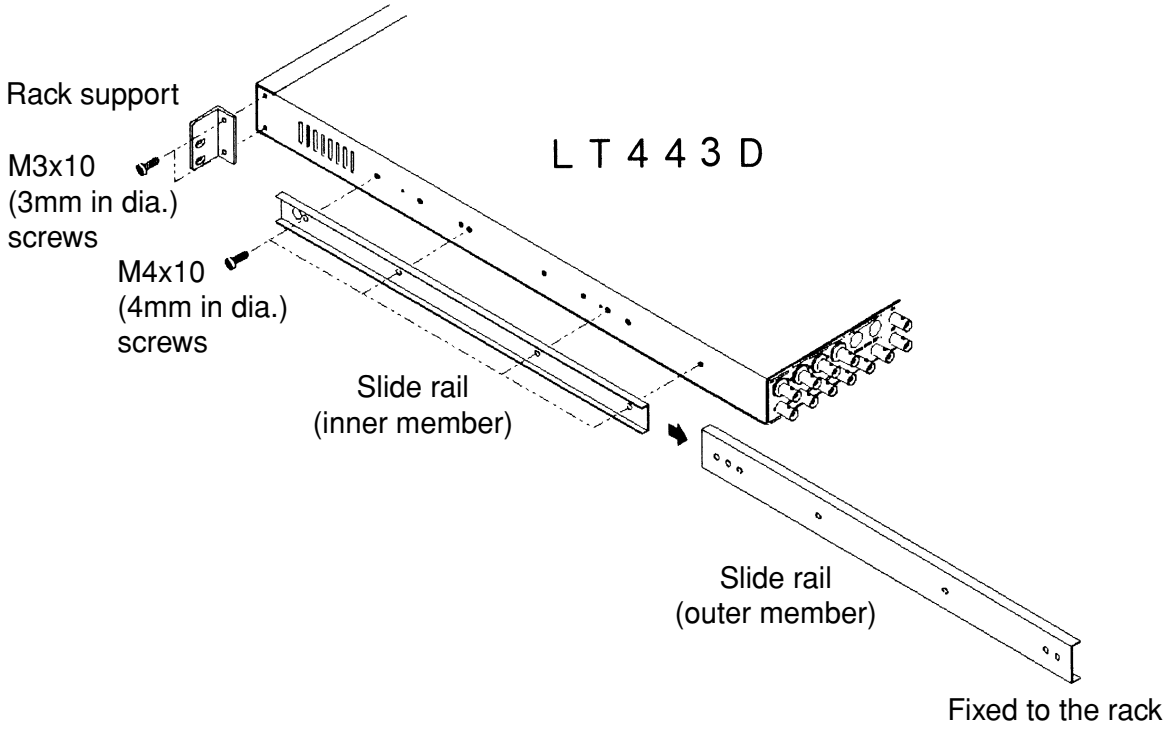


Figure 5-1 Mounting slide rail

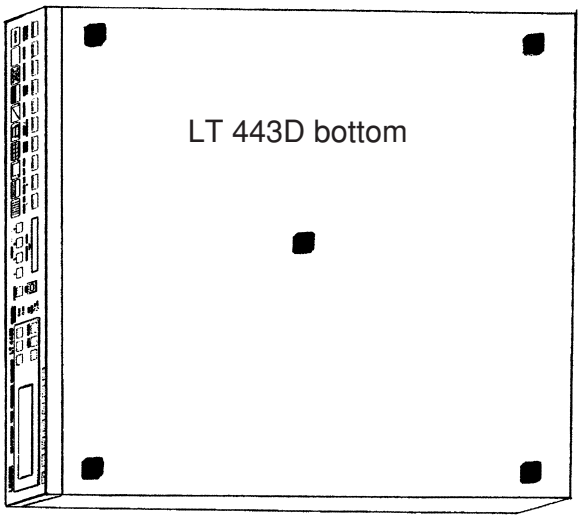
∗Slide rail (outer member) mount method depends on types of racks. Read the rack instruction manual for mounting.

6. ABOUT RUBBER FEET

There are no rubber feet on the bottom of this instrument for rack-mounting purposes.

When using the instrument outside the rack or stack instruments on top of each other, attach five rubber feet (supplied as standard accessory) as shown in Figure below to prevent the instrument from scratching or falling.

Peel the seals before attaching the rubber feet.



7. DATA BACKUP

This instrument retains the menu setting contents and panel settings even when the power is turned off.

• Backup battery
Manganese-Lithium primary battery

• Backup period
Data is backed up for about five years.

* Backup period depends on storage environment, operating conditions, etc.

8. DEFAULT SETTINGS

8.1 Default Settings for All Data [MENU] + [FORMAT]

This section described the setting procedure to default all setting data (except DATE & TIME).

∗Caution: When the default setting is made, such data as backup and preset return to the default value.

Procedure

1 Disconnect the power cord from the main unit for [POWER: OFF] state.

2 Hold down the [MENU] and [FORMAT] keys on the front panel simultaneously, then insert the power cord to the main unit for [POWER: ON] state; do not release the keys, here.

3 When [INITIALIZING...] is displayed on the front panel, release the [MENU] and [FORMAT] keys.

4 When default setting is completed, [ALL DEFAULT SET COMPLETE!] is displayed on the front panel LCD. A display check and ENTER key is pushed.

5 The default setting is now completed.

8.2 Default Settings for Selected Data [MENU] + [ENTER]

This section described the setting procedure to default basic data except the followings:

Preset data [INT_MEM PRESET No. 1 to 3]
[IP address] data
[DATE & TIME] data

∗ This function can be applied from the firmware version 1.8.

Procedure

1 Disconnect the power cord from the main unit for [POWER: OFF] state.

2 Hold down the [MENU] and [ENTER] keys on the front panel simultaneously, then insert the power cord to the main unit for [POWER: ON] state; do not release the keys, here.

3 When [INITIALIZING...] is displayed on the front panel, release the [MENU] and [ENTER] keys.

4 When default setting is completed, [DEFAULT SET COMPLETE!] is displayed on the front panel LCD. A display check and ENTER key is pushed.

5 The default setting is now completed.

9. MAINTENANCE

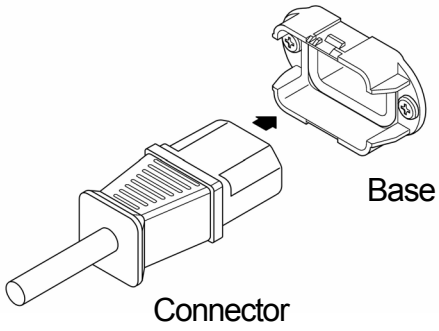
The LT 443D is designed to operate stably under normal handling. If you have questions regarding calibration and service, contact your local Leader agent.

9.1 Preventing Power Cord Disconnection

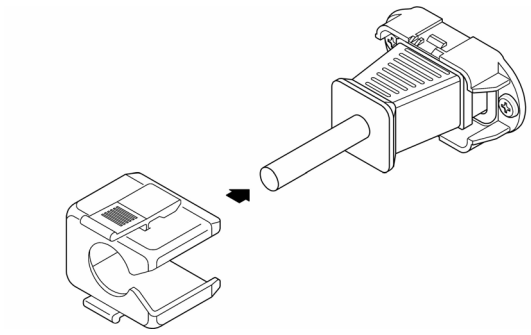
To prevent power cord disconnection from the AC inlet, the Cover/Inlet stopper is supplied with the instrument. Refer to the procedure below.

9.1.1 Connecting the Power Cord

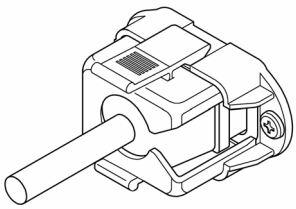
① Insert the power cord connector into the AC inlet.



② Place the Cover/Inlet stopper on top of the connector as shown below.



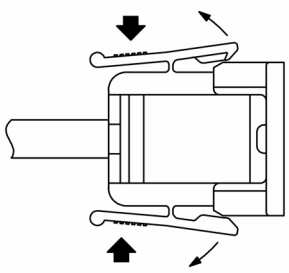
③ Press the cover until it clicks into place.



④ Confirm that the Cover/Inlet stopper is locked to the base.

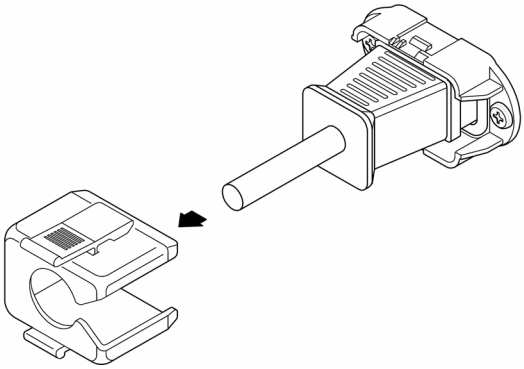
9.1.2 Disconnecting the Power Cord

① Press the levers on the Cover/Inlet stopper with your fingers to release the lock.



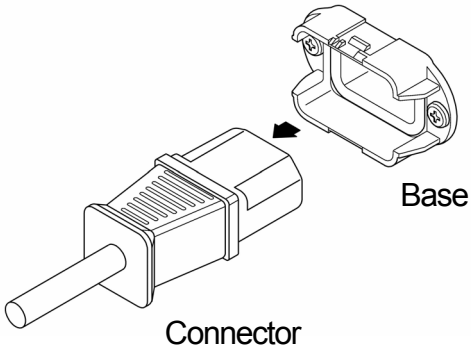
Cover/Inlet stopper (side view)

② Remove the Cover/Inlet stopper from the base.



Cover/Inlet stopper

③ Disconnect the power cord connector from the AC inlet.



Connector

UNIT INSTALLATION / REPLACEMENT

INSTRUCTION MANUAL

NOTE:
This instruction manual describes the procedures necessary for installing/replacing various LT 443D units. Perform the work after checking the information and precautions of the relative items in this manual.

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. Introduction

This instruction manual describes the procedures necessary for installing/replacing various LT 443D units.

Perform the work after checking the information and precautions of the relative items in this manual.

2. Scope of Warranty

Install/Replace units or upgrade the firmware at the user's own responsibility. If the product malfunctions due to the user's inadequate handling or a failure in the upgrading of the firmware, repairs will be provided for a fee even if it is within the warranty period.

3. Equipment and Tools Necessary for Performing the Work

The table below shows the equipment and tools necessary for installing/replacing units and upgrading the firmware. Additional measurement instruments are necessary if you are going to check the operation of each unit. For details, see the operation check procedure of the respective unit in chapter 5, "Operation Check."

List of Equipment and Tools Necessary for Performing the Work

No.	Name	Note
1	Screwdrivers for TORX screws	For M3 x 6 mm binding screws with Hexalobular socket head cap
2	Compact Flash card (CF card)	CF card tested for compatibility by LEADER (made by SanDisk Corporation) For preset backup: 1 card For firmware updating: 1 card
3	Wrist strap	As a measure for countering electrostatic discharge

4. Work Procedure

The work flow is shown below.

4.1	Firmware upgrade
4.2	Slot selection
4.3	Unit installation
4.4	System initialization
4.5	Unit operation check

4.1 Firmware Upgrade

If you are installing/replacing units, you may need to upgrade the main frame firmware. In addition, the main frame settings are initialized during the installation or replacement of units. Therefore, you should back up the main frame settings as necessary.

∗ For information on obtaining the newest version of the firmware, contact your local Leader agent.

1) Checking the Firmware Version

a) Turn off the front panel [UNIT] key LED on the main frame.
b) From “1. UTILITY MENU” that is shown on the front panel LCD, select “VERSION DISPLAY.”
c) Check the firmware version that is shown. If the current main frame firmware version is older (the version number is smaller) than the newest firmware version, you must upgrade the firmware.

Note: Firmware upgrading

- Even if you are installing the same type of unit that is installed, if the firmware version is older (the version number is smaller) than the newest version, upgrade the firmware.
- Please note that if the unit is a special order model, functions specific to the model may no longer work if you upgrade the firmware using the firmware of the standard model.
- If the firmware version is less than 1.6, it may be necessary to upgrade data other than the firmware. Please consult your local Leader agent in this case.

2) Backing Up Various Settings

When you install/replace a unit or upgrade the firmware, settings must be initialized. When initialization is performed, various unit settings (excluding the LT 443D time setting) and internal presets are reset to their factory default. If you need to retain the settings, backup the following items.

- Internal presets (No.1 to 3: 3 items)
- Last memory (main frame settings that exist immediately before the power is turned OFF: 1 item)
- Ethernet (IP Address, Subnet Mask, and Gateway: 3 items)

Note: Backing up the settings

- Internal presets and last memory can be backed up on a Compact Flash card (CF card). Ethernet settings are not included in the preset. Please retain the settings such as by taking a memo.
- For the procedure of storing presets to the CF card, see the item of “MAINFRAME” in this manual.
- For backing up the data, use a CF card that is separate from the card used to upgrade the firmware.

3) Upgrading the Firmware

a) Remove all cables that are connected to the LT 443D units.
b) Turn on the power to the main frame.
c) Insert the CF card for upgrading the firmware into the MEMORY CARD slot on the front panel of the LT 443D main frame.
d) When the front panel LCD shows a screen illustrated in Figure 4-1-1, press the [ENTER] key. The firmware upgrading starts.

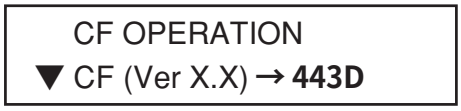


Figure 4-1-1

e) While the firmware is being upgraded, the LCD shows a screen illustrated in Figure 4-1-2, and the INT and EXT SYNCHRONIZATION LEDs illuminate alternately.

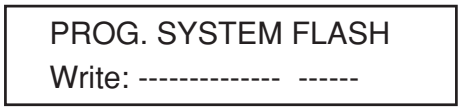


Figure 4-1-2

f) When the firmware upgrading is finished, the main frame automatically restarts. Then, the screen shown in Figure 4-1-1 appears again. Remove the CF card.
g) Check that the firmware has been upgraded by carrying out the procedure described in 1), “Checking the Firmware Version.”

Note: Firmware upgrading

- When upgrading the firmware, remove all cables except the power cord. Be especially certain that nothing is connected to the genlock connector. Upgrading the firmware while the genlock function is in operation may hinder proper firmware upgrading. In addition, the signal condition of the output connectors of each unit may be abnormal while the firmware upgrade is in progress.
- To avoid problems such those related to compatibility, use CF cards (made by SanDisk Corporation) that have been tested by Leader for backing up data.
- Do not operate the keys while the firmware upgrade is in progress.
- If the power is cut off while the firmware upgrade is in progress, the unit may no longer be able to startup. Never cut off the power while the firmware upgrade is in progress.

4.2 Slot Selection

Table 4-2-1 shows the possible combinations of units. Select the slots to be used according to Table 4-2-1.

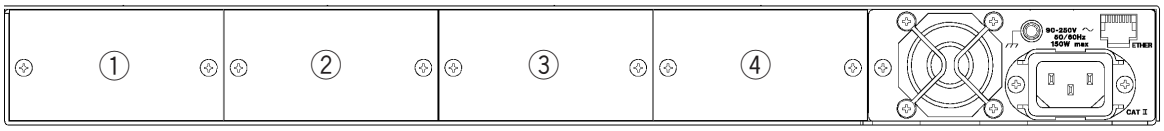


Figure 4-2-1 Main Frame Rear Panel

Table 4-2-1

Slot / Unit Model	① Slot 1	② Slot 2	③ Slot 3	④ Slot 4
LT443D-GLA	Yes	No	No	No
LT443D-GL	Yes	No	No	No
LT443D-HD/HDB	Yes	Yes	Yes	Yes
LT443D-BL	Yes	Yes	Yes	Yes
LT443D-SD/SDB	Yes	Yes	Yes	Yes
LT443D-DA	Yes	Yes	Yes	Yes
LT443D-AA	Yes	Yes	Yes	Yes
LT443D-CS	Yes	Yes	Yes	Yes

Yes: Installable, No: Not installable

∗ Note: The firmware version 3.0 and later is used for the LT 443D-GLA.
The unit cannot be confirmed by an old version.
The firmware version can be confirmed on the VERSION DISPLAY in MAINFRAME menu.

4.3 Unit Installation

Install the unit into the slot.

a) Turn off the power to the main frame.

b) Remove the screws that are fixing the blank panel in place (Figure 4-3-1 (a)). If a unit is already installed, remove the screws that are fixing the unit in place, place 75 Ω terminators on the unit's BNC connectors, and pull the unit out. If the unit has Canon connectors, attach Canon connector plugs, and then pull the unit out.

c) Check that there are no problems in the connector pins inside the slot (Figure 4-3-1 (b)).

d) Insert the unit's board into the rail grooves (Figure 4-3-1 (c)).

e) Slide the unit in until the unit no longer moves inward (Figure 4-3-1 (d)).

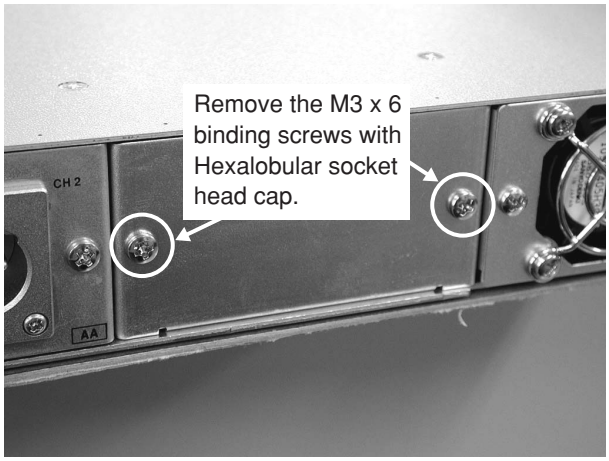
f) Press the unit further into the slot to connect the main frame and unit connectors. Check that the top and bottom steel plates of the main frame are closely aligned with the units panel (Figure 4-3-1 (e)).

g) Fix the unit in place using screws (binding screws with Hexalobular socket head cap M3 x 6 mm). (Figure 4-3-1 (f))

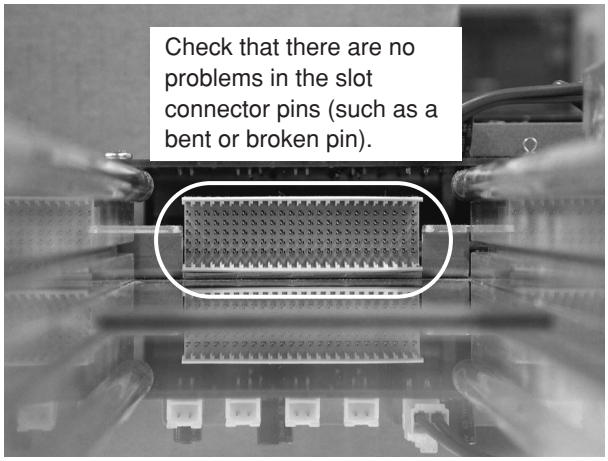
Note: Handling of the unit and main frame

Each unit uses parts that are susceptible to damage from electrostatic discharge. Damage can also result when mechanical stress is applied to the parts on the board. Be sure to observe the following points.

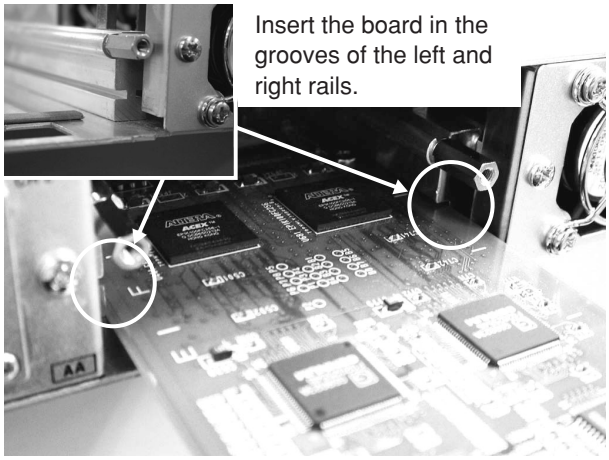
- If you are carrying the unit, use dedicated packing material that has measures taken against static electricity.
- If you are installing the unit, use a wrist wrap to prevent damage caused by static electricity built up in your body. If a wrist wrap is not available, discharge the statistic electricity on your body by using metal parts of a rack or something similar.
- While installing or replacing a unit, do not bring objects that may discharge static electricity.
- When holding the unit in your hand, hold the chassis. Do not touch the parts or connector pins on the board.
- Be sure to turn off the power to the main frame when installing or replacing a unit.
- Insert the unit in the appropriate slot according to Table 4-2-1.
- Before installing the unit, check that there are no problems in the slot connector pins (such as a bent or broken pin).
- Be sure not to lose the unit attachment screws.
- Be sure to attach blank panels that come with the LT 443D main frame to unused slots.
- The number of times that the connector connecting the main frame and the unit can be attached and removed is 500. Avoid using the unit in a way that requires it to be attached and removed frequently as it may cause a malfunction.



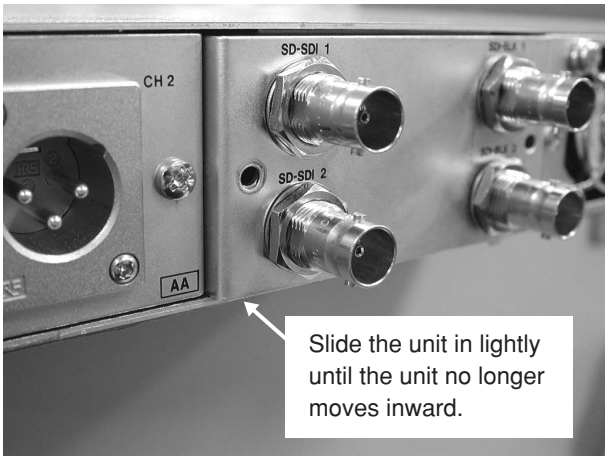
(a)



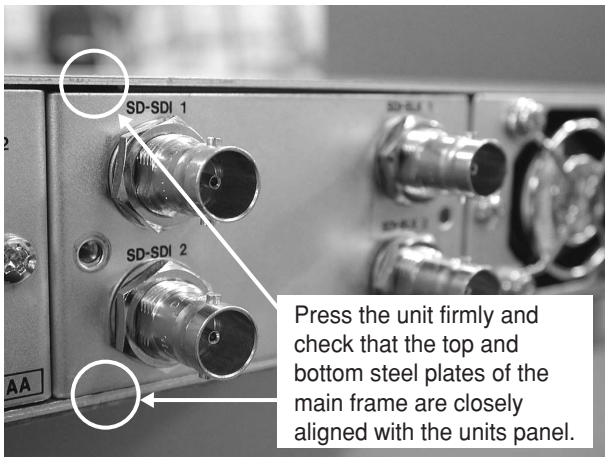
(b)



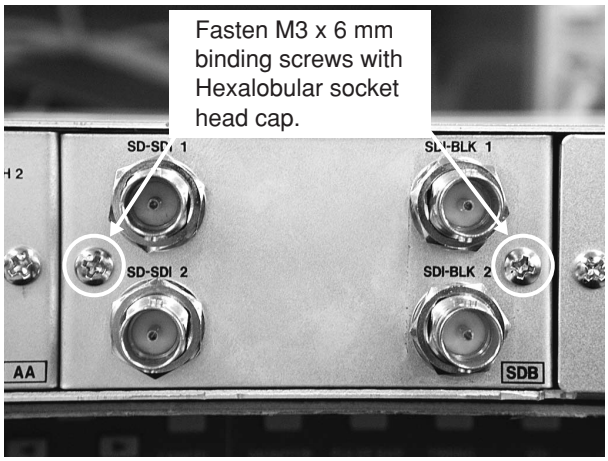
(c)



(d)



(e)



(f)

Figure 4-3-1

4.4 System Initialization

Initialize the main frame settings and check that the system starts up normally. When you initialize the main frame settings, the settings are reset to their factory default.
Then, as necessary, restore the settings that you backed up.

1) Initialization Procedure

a) While holding down the [MENU] key and [FORMAT] key simultaneously, turn on the power.
b) When the LCD shows a screen illustrated in Figure 4-4-1, release the keys.

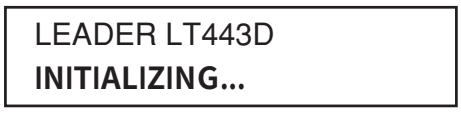


Figure 4-4-1

c) If the initialization is successful and the system starts up normally, a screen illustrated in Figure 4-4-2 appears. Check the screen and press the [ENTER] key to clear the screen.

Figure 4-4-2

d) Select each slot that has a unit installed using the [UNIT] key and check that the setting menu of each unit appears on the LCD.
e) As necessary, restore the settings that you backed up.

Note:

- If an error is detected during startup, the LCD may show a warning. If a warning appears or if the setting menu does not appear even when you press the [UNIT] key, immediately turn off the power and consult your local Leader agent.

4.5 About the Operation Check

Operation checks are performed to verify that the installed units are operating properly. The check procedure varies depending on the unit type. Refer to the operation check procedure appropriate for the respective unit in chapter 5, “Operation Check.” Note that the check procedures assume that each unit is in the factory default condition.

5. Operation Check

5.1 Operation Check of the LT 443D-GLA Genlock Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	TV signal generator	Capable of generating analog tri-level sync signals and black burst signals
2	HDTV waveform monitor	With an analog component input connector
3	NTSC/PAL waveform monitor	
4	75 Ω terminator	
5	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the Genlock Function

a) Turn on the power to the LT 443D.

b) Use the [UNIT] key on the main frame front panel to select the genlock unit.

c) From “GLA SETTING,” select “GENLOCK MODE SET.” Then, press the [ENTER] key.

d) Select “AUTO (GO INTERNAL)” and press the [ENTER] key.

e) Attach a 75 Ω terminator to one of the GENLOCK connectors of the genlock unit.

f) Connect the sync signal output (analog black output) of the TV signal generator to the GENLOCK connector using a 75 Ω coaxial cable.

g) Check that the green SYNCHRONIZATION LED on the main frame front panel switches from INT to EXT. In addition, press the [MENU] key to show the status of the genlock unit and select “GENLOCK ST.” Check that the format shown on the LCD matches the signal that is applied to the GENLOCK connector.

h) Remove the cable from the GENLOCK connector.

i) Check that the LED and the LCD indication switch from EXT to INT.

Checking the Analog Black Signal

a) Connect genlock unit's BLACK 1 to the HDTV waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

b) Use the [UNIT] key on the main frame front panel to select the genlock unit, and press the [FORMAT] key several times until "BLACK1" appears.

c) Use the [▲] and [▼] keys to select "1080i/59.94" or "1080i/50.00" and press the [ENTER] key. (Factory default setting: 1080i/59.94)

d) Display the tri-level sync signal on the waveform monitor and check that it is normal.

e) Connect genlock unit's BLACK 1 to the NTSC/PAL waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

f) With the genlock unit selected using the [UNIT] key on the main frame front panel, press the [FORMAT] key several times until "BLACK1" appears.

g) Use the [▲] and [▼] keys to select "NTSC BB" or "PAL BB" and press the [ENTER] key.

h) Display the black burst signal waveform on the waveform monitor and check that it is normal.

i) Repeat steps a) to h) for BLACK2 and BLACK3.

5.2 Operation Check of the LT 443D-HD -HDB HD-SDI Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	Multi SDI Waveform Monitor	That supports HD-SDI
2	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the HD-SDI Output

a) Turn on the power to the LT 443D.

b) Connect HD-SDI unit's SIGNAL 1 to the SDI waveform monitor using a 75 Ω coaxial cable.

c) Use the [UNIT] key on the main frame front panel to select the HD-SDI unit.

d) Press the [FORMAT] key. Then, use the [▲] and [▼] keys to select "1080i/59.94" or "1080i/50.00" and press the [ENTER] key. (Factory default setting: 1080i/59.94)

e) Press the [COLOR BAR1] key on the main frame front panel several times to select "COLOR BAR 75%."

f) Switch the SDI waveform monitor to waveform display. Display the "COLOR BAR 75%" waveform and check that the waveform is normal.

g) Switch the SDI waveform monitor to status display. Check that the format of the signal output from the HD-SDI unit is detected correctly and that no errors are indicated for FORMAT, TRS, and other items.

h) Repeat steps f) and g) for HD-SDI unit's SIGNAL 2.

Checking the HD-SDI BLACK Output (LT 443D-HDB Only)

a) Connect HD-SDI unit's SDI-BLK 1 to the SDI waveform monitor using a 75 Ω coaxial cable.

b) Use the [UNIT] key on the main frame front panel to select the HD-SDI unit.

c) Press the [FORMAT] key. Then, use the [▲] and [▼] keys to select "1080i/59.94" or "1080i/50.00" and press the [ENTER] key. (Factory default setting: 1080i/59.94)

d) Switch the SDI waveform monitor to status display. Check that the format of the signal output from the HD-SDI unit is detected correctly and that no errors are indicated for FORMAT, TRS, and other items.

e) Repeat step d) for HD-SDI unit's SDI-BLK 2.

5.3 Operation Check of the LT 443D-BL Analog Black Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	HDTV waveform monitor	With an analog input connector
2	NTSC/PAL waveform monitor	
3	75 Ω terminator	
4	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the Analog Black Signal

a) Turn on the power to the LT 443D.

b) Connect analog black unit's BLACK 1 to the HDTV waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

c) Use the [UNIT] key on the main frame front panel to select the analog black unit and press the [FORMAT] key several times until "BLACK1" appears.

d) Use the [▲] and [▼] keys to select "1080i/59.94" or "1080i/50.00" and press the [ENTER] key. (Factory default setting: 1080i/59.94)

e) Display the tri-level sync signal on the HDTV waveform monitor and check that it is normal.

f) Connect analog black unit's BLACK 1 to the NTSC/PAL waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

g) Use the [UNIT] key on the main frame front panel to select the analog black unit and press the [FORMAT] key several times until "BLACK1" appears.

h) Use the [▲] and [▼] keys to select "NTSC BB" or "PAL BB" and press the [ENTER] key.

i) Display the black burst signal waveform on the NTSC/PAL waveform monitor and check that it is normal.

j) Reconnect the coaxial cable that is connected to analog black unit's BLACK 1 to BLACK 2, and check that the black burst signal waveform is normal.

k) Repeat steps a) to h) for BLACK 3 (BLACK 4) and BLACK 5 (BLACK 6).

5.4 Operation Check of the LT 443D-SD -SDB SD-SDI Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	Multi SDI Waveform Monitor	That supports SD-SDI
2	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the SD-SDI Output

a) Turn on the power to the LT 443D.

b) Connect SD-SDI unit's SIGNAL 1 to the SDI waveform monitor using a 75 Ω coaxial cable.

c) Use the [UNIT] key on the main frame front panel to select the SD-SDI unit.

d) Press the [FORMAT] key. Then, use the [▲] and [▼] keys to select "525i/59.94" or "625i/50.00" and press the [ENTER] key. (Factory default setting: 525i/59.94)

e) Press the [COLOR BAR1] key on the main frame front panel several times to select "COLOR BAR 75%."

f) Switch the SDI waveform monitor to waveform display. Display the "COLOR BAR 75%" waveform and check that the waveform is normal.

g) Switch the SDI waveform monitor to status display. Check that the format of the signal output from the SD-SDI unit is detected correctly and that no errors are indicated for FORMAT, TRS, and other items.

h) Repeat steps f) and g) for SD-SDI unit's SIGNAL 2.

Checking the SD-SDI BLACK Output (LT 443D-SDB Only)

a) Connect SD-SDI unit's SDI-BLK 1 to the SDI waveform monitor using a 75 Ω coaxial cable.

b) Use the [UNIT] key on the main frame front panel to select the SD-SDI unit.

c) Press the [FORMAT] key. Then, use the [▲] and [▼] keys to select "525i/59.94" or "625i/50.00" and press the [ENTER] key. (Factory default setting: 525i/59.94)

d) Switch the SDI waveform monitor to status display. Check that the format of the signal output from the SD-SDI unit is detected correctly and that no errors are indicated for FORMAT, TRS, and other items.

e) Repeat step d) for SD-SDI unit's SDI-BLK 2.

5.5 Operation Check of the LT 443D-DA Digital Audio Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	Audio monitor	That supports AES/EBU
2	Oscilloscope	
3	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the AES/EBU and WORD CLOCK Output

a) Turn on the power to the LT 443D.

b) Connect digital audio unit's CH1/2 to the audio monitor using a 75 Ω coaxial cable.

c) Switch the audio monitor to a level meter. Check that the CH1/CH2 (L CH/R CH) level is -20 dB. (Factory default setting: 1 kHz, -20 dB)

d) Reconnect the coaxial cable to digital audio unit's CH3/4, CH5/6, and CH7/8 one by one and check that their levels are also -20 dB.
(Factory default setting: 1 kHz, -20 dB)

e) Connect digital audio unit's SILENCE to the audio monitor using a 75 Ω coaxial cable.

f) Switch the audio monitor to a channel status display. Check that information of items such as FORMAT and SIGNAL LOCK of the CH1/CH2 (L CH/R CH) channel status is displayed.

g) Connect digital audio unit's WCLK (WORD CLOCK) to the oscilloscope using a 75 Ω coaxial cable. Display the clock signal on the oscilloscope and check that the clock signal is normal.
(Factory default WORD CLOCK level: C-MOS level)

5.6 Operation Check of the LT 443D-AA Analog Audio Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	Audio monitor	That supports analog balanced signals
2	Audio cable	For balanced transmission Canon connector (plug) to Canon connector (plug)

2) Operation Check Procedure

Checking the Analog Audio Output

a) Turn on the power to the LT 443D.

b) Connect analog audio unit's CH 1 and CH 2 to the audio monitor using audio cables (impedance: 600 Ω).

c) Switch the audio monitor to a level meter. Check that the CH1/CH2 (L CH/R CH) level indicates 0 dBm. (Factory default setting: 1 kHz, 0 dBm)

5.7 Operation Check of the LT 443D-CS Analog Composite Unit

1) Equipment Necessary for Performing the Work

List of Equipment Necessary for Performing the Work

No.	Name	Note
1	NTSC/PAL waveform monitor	With an analog input connector
2	Oscilloscope	
3	75 Ω terminator	Through type
4	75 Ω coaxial cable	BNC connector (plug) to BNC connector (plug)

2) Operation Check Procedure

Checking the Analog Composite Signal and Black Burst Signal

a) Turn on the power to the LT 443D.

b) Connect analog composite unit's SIGNAL 1 to the NTSC/PAL waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

c) Use the [UNIT] key on the main frame front panel to select the analog composite unit, and press the [FORMAT] key. Use the [▲] and [▼] keys to select "NTSC" or "PAL" and press the [ENTER] key.

d) Press the [COLOR BAR1] key on the main frame front panel several times to select "COLOR BAR 75%."

e) Display the analog composite signal waveform on the waveform monitor and check that it is normal.

f) Likewise, reconnect the 75 Ω coaxial cable that is connected to analog composite unit's SIGNAL 1 to SIGNAL 2, and check that the analog composite signal waveform is normal.

g) Connect analog composite unit's BLACK 1 to the NTSC/PAL waveform monitor using a 75 Ω coaxial cable. Terminate the waveform monitor at 75 Ω.

h) Display the black burst signal waveform on the waveform monitor and check that it is normal.

i) Likewise, reconnect the 75 Ω coaxial cable that is connected to analog composite unit's BLACK 1 to BLACK 2, and check that the black burst signal waveform is normal.

Checking the Horizontal and Vertical Drive Pulse Signals

a) Connect analog composite unit's H.DRIVE to the oscilloscope using a 75 Ω coaxial cable. Terminate the oscilloscope end using a 75 Ω terminator (through type).

b) Use the [UNIT] key on the main frame front panel to select the analog composite unit, and press the [FORMAT] key. Use the [▲] and [▼] keys to select "NTSC" or "PAL" and press the [ENTER] key.

c) Display the horizontal drive signal waveform on the oscilloscope and check that it is normal.

d) Reconnect the 75 Ω coaxial cable that is connected to analog composite unit's H.DRIVE to V.DRIVE, and check that the vertical drive pulse signal waveform is normal on the oscilloscope.

LT 443D-GLA GENLOCK UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. DESCRIPTION

This unit provides genlock capability to lock the LT 443D mainframe with the external reference signal, and three independent black signal generators.

The NTSC/PAL black burst signals, principal 20 types of HDTV analog tri-level sync signal formats, and 525p/625p analog sync signals can be used as an external reference signal.

The following black burst signal formats can be selected.

For NTSC/PAL system, black burst signal with field reference pulse is provided. For NTSC system, black burst with 10-field sequence identification conforming to the SMPTE 318M standards is provided.

The instrument continues operation since the flywheel mode is provided even if the external reference signal is accidentally removed in genlock mode. By logging the genlock status, the time can be obtained when the external reference signal is removed. The log information can be stored on the CF CARD.

The genlock timing can be adjusted for the entire color frame range when the NTSC/PAL black burst signal is applied; entire frame range when the HDTV analog tri-level sync signal is applied.

Three black burst signal output systems with selectable formats are available as follows:

For NTSC/PAL system, standard black burst signal and black burst signal with field reference pulse are provided. For NTSC system, black burst with 10-field sequence identification conforming to the SMPTE 318M standards, 525p/625p analog sync signal, and HDTV analog tri-level sync signal are provided.

The format and output signal timing of each output can be respectively set.

The black signal timing can be adjusted for the entire color frame range when the NTSC/PAL black burst signal is applied; entire frame range when the HDTV analog tri-level sync signal is applied.

2. SPECIFICATIONS

2.1 Genlock Function

2.1.1 Loop-Through Input

Input Configuration	BNC connector, 75 Ω loop-through
Return Loss	≥ 30 dB (0.3 MHz to 30 MHz)
Reference Input Signal	HDTV tri-level sync signal conforming to SMPTE 240M/274M/296M standards 525p/625p analog sync signal conforming to SMPTE 293M/ITU-R BT 1358 standards NTSC black burst signal conforming to EBU N14/SMPTE RP-154/SMPTE 170M/SMPTE 318M standards PAL black burst signal conforming to ITU-R BT. 470-6 standards

Reference Input Signal Level	
• HDTV	Positive polarity: 300 mV Negative polarity: -300 mV
• 525p/625p	-300 mV
• NTSC	-286 mV
• PAL	-300 mV
Maximum Input Level	±4.5 V (DC + peak AC)
Operating Input Level Range	±6 dB
External Lock Range	±10 ppm
Jitter	≤ 0.5˚ in burst lock mode ≤ 1 ns in sync lock mode
Operation Modes	Five modes are selectable. Internal mode: INTERNAL External mode: AUTO (GO INTERNAL), MANUAL (GO INT), AUTO (FLYWHEEL), MANUAL (FLYWHEEL)
• INTERNAL	Internal reference signal is used for operation. (INT mode)
• AUTO (GO INTERNAL)	The EXT mode is automatically selected when the external reference signal is applied to the GENLOCK input. The INT mode is automatically selected when the external reference signal is removed.
• MANUAL (GO INT)	The EXT mode is automatically selected when the external reference signal with the same format specified to the GENLOCK input is applied after power is turned on. The INT mode is automatically selected when no external reference signal is applied to the GENLOCK input, or signal format does not match the specified format.
• AUTO (FLYWHEEL)	The EXT mode is automatically selected when the external reference signal is applied to the GENLOCK input after power is turned on. If the external reference signal is accidentally removed during operation, the instrument continues operation under the conditions immediately before the signal is removed since the flywheel mode is provided. After the external reference signal is recovered, the system is automatically locked.

• MANUAL (FLYWHEEL)	The EXT mode is automatically selected when the external reference signal with the same format specified to the GENLOCK input is applied after power is turned on. If the external reference signal is accidentally removed during operation, the instrument continues operation under the conditions immediately before the signal is removed since the flywheel mode is provided. The flywheel mode will be held until the reset operation is performed via the front panel and the ENTER key is pressed even after the external reference signal is recovered.
Genlock Timing Variable Range	
• H-PHASE (FINE)	Covers between H-PHASE (COARSE) steps.
• H-PHASE (COARSE)	±1/2 line with respect to the input signal
• Resolution	0.0741 μs
• V-PHASE	±1 frame with respect to the input signal
• Resolution	1 line
• F-PHASE	Up to ±5 frames with respect to the input signal. (Variable range depends on the input signal format.)
• Resolution	1 frame (When NTSC black burst is applied, the coincident point of line 4 of the NTSC and line 1 of the HDTV is handled as a reference. When PAL black burst is applied, the coincident point of line 1 of the PAL and line 1 of the HDTV is handled as a reference.)

2.2 Analog Sync Signal Output

2.2.1 BLACK 1/BLACK 2/BLACK 3 Output

Format	HDTV tri-level sync signal conforming to SMPTE 240M/274M/296M standards 525p/625p analog sync signal conforming to SMPTE 293M/ITU-R BT 1358 standards NTSC black burst signal conforming to EBU N14/SMPTE RP-154/SMPTE 170M/SMPTE 318M standards PAL black burst signal conforming to ITU-R BT. 470-6 standards

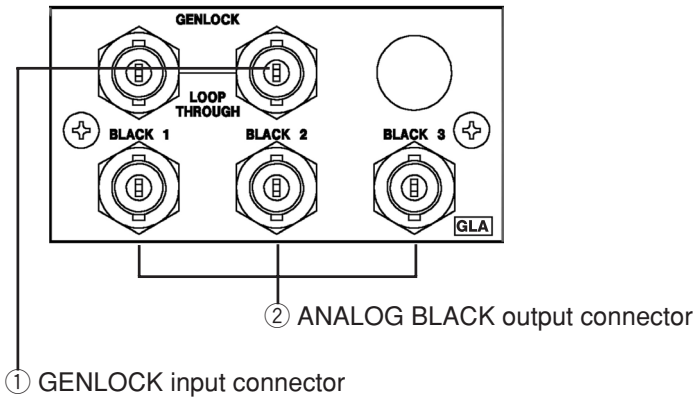
Sync Level (into 75 Ω)	
• HDTV	Positive polarity: 300 mV ±6 mV Negative polarity: -300 mV ±6 mV
• 525p	-300 mV ±6 mV
• 625p	-300 mV ±6 mV
• NTSC	40 IRE ±1 IRE
• PAL	-300 mV ±6 mV
Blanking Level	0 mV ±15 mV
Rise and fall times	
• HDTV	54 ns ±20 ns
• 525p	70 ns ±10 ns
• 625p	100 ns ±10 ns
• NTSC	140 ns ±10 ns
• PAL	200 ns ±10 ns
Horizontal Sync Width	
• 1125-Line Format	Positive polarity: 593 ns ±40 ns Negative polarity: 593 ns ±40 ns
• 750-Line Format	Positive polarity: 539 ns ±40 ns Negative polarity: 539 ns ±40 ns
• 525p	2.35 μs ±0.05 μs
• 625p	2.35 μs ±0.1 μs
• NTSC/PAL	4.7 μs ±0.1 μs
Vertical Sync Width	5H (HDTV) / 6H (525p) / 5H (625p) / 3H (NTSC) / 2.5H (PAL)
Output Impedance	75 Ω
Output Connector	BNC
Number of Outputs	1 each
Timing Variable Range	
• H-PHASE	Up to ±1 line-1 dot
• Resolution	Variable in 1 dot steps (54 MHz, 74.25 MHz, or 74.25/1.001 MHz converted into clock frequency)
• V-PHASE	Up to ±1 frame-1 line
• Resolution	Variable in 1 line steps
• F-PHASE	Up to ±5 frames (depends on the input signal format.)
• Resolution	Variable in 1 frame steps

2.3 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.4 kg
Accessory	Instruction Manual ..... 1 Screw (for Unit) 2

3. PANEL DESCRIPTION

3.1 Rear Panel



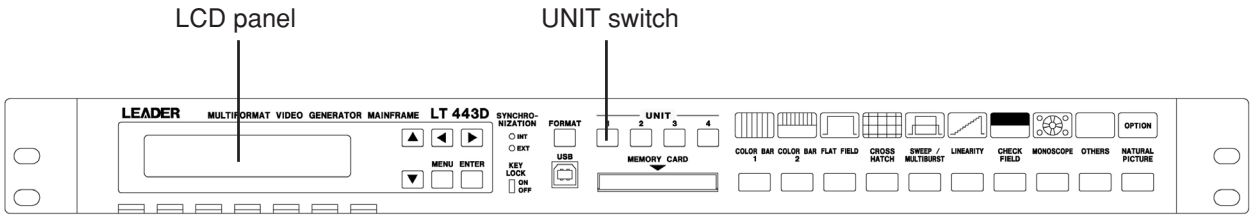
① Genlock signal input connector
Loop-through input accepts the external reference signal.

② Analog black burst signal output connector
Outputs the analog black burst signal and HDTV tri-level sync signal.
Three output systems are provided.

4. OPERATING PROCEDURE

∗ Note: The firmware version 3.0 and later is used for the LT 443D-GLA.
The firmware version can be confirmed on the VERSION DISPLAY in MAINFRAME menu.
To obtain the latest firmware version, contact your local Leader agent.

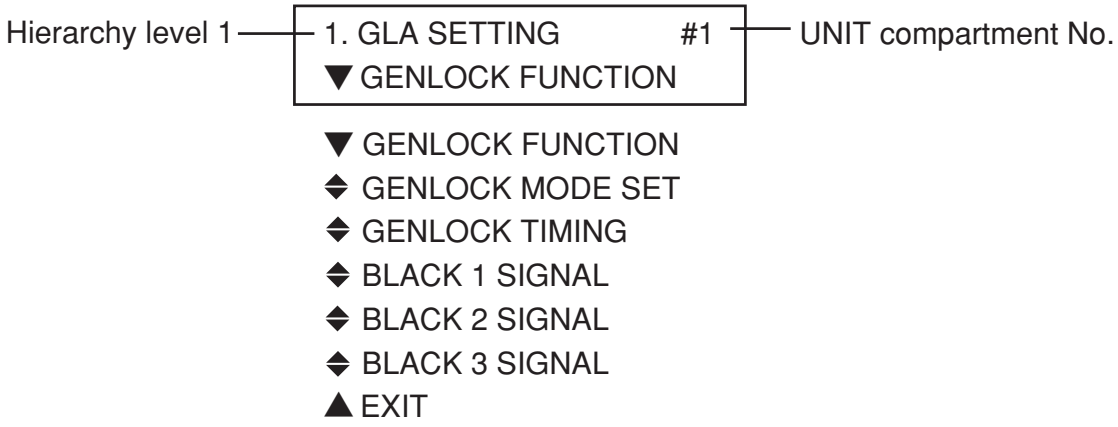
The front panel controls and LCD panel on the mainframe are used to set the LT 443D-GLA. Press the UNIT 1 switch, for example, corresponding to the UNIT compartment where this unit is installed.



4.1 SETTING Menu Mode Structure

[1. GLA SETTING #1] is displayed on the LCD panel by pressing the UNIT 1 switch on the mainframe.

The [GLA SETTING #1] is used to set configuration mode, genlock operation mode and timing, analog black output signal format and timing, etc.

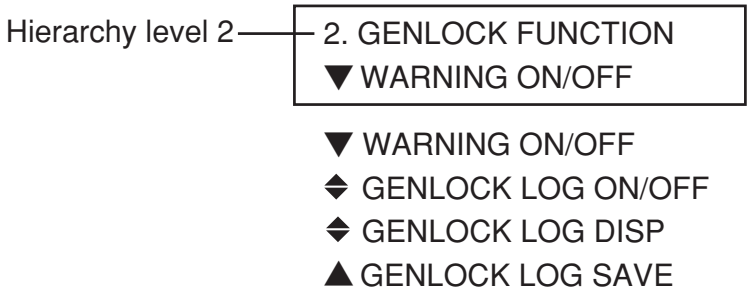


4.2 Setting LT 443D-GLA Genlock Mode

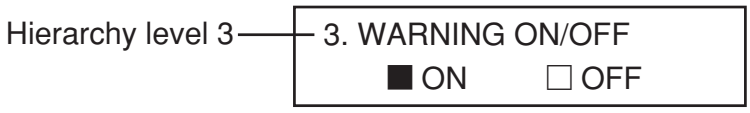
4.2.1 Setting WARNING ON/OFF

(1) Select [GENLOCK FUNCTION] on the [1. GLA SETTING] screen, then press the [ENTER] key.

(2) Select [WARNING ON/OFF] by pressing the ▲ or ▼ key, then press the [ENTER] key.



(3) Select WARNING ON/OFF on the status display by pressing the ◀ or ▶ key.



Pressing the [ENTER] key enters data and returns the display to hierarchy level 2 [2. GENLOCK FUNCTION].

The WARNING STATUS displays an alarm when the difference between the lock frequency in genlock mode and internal reference frequency (reference frequency of INTERNAL) exceeds ±10 ppm. See example below:

```
[STATUS]  GENLOCK ST
WARNING!  OVER +10 ppm
```

When the difference is 10 ppm or less, “UNDER 10 ppm” is displayed.

4.2.2 Setting GENLOCK LOG ON/OFF

(1) Select [GENLOCK LOG ON/OFF] by pressing the ▲ or ▼ key, then press the [ENTER] key.

(2) Select the GENLOCK LOG mode ON or OFF by pressing the ◀ or ▶ key. Selecting ON can log the genlock operation status.

Hierarchy level 3

```
3. GENLOCK  LOG  ON/OFF
   ■ ON      □ OFF
```

Pressing the [ENTER] key enters data and returns the display to hierarchy level 2 [2. GENLOCK FUNCTION].

The log data is retained while the instrument is powered on: turning power off deletes data.

4.2.3 Setting GENLOCK LOG DISP

(1) Select [GENLOCK LOG DISP] by pressing the ▲ or ▼ key, then press the [ENTER] key.

Hierarchy level 3

```
3. GENLOCK  LOG  DISP →
   5:2004/10/15 13:05:
```

This arrow appears when more characters exist on the right side.

```
5: 2004/10/15 13:05:07  LOCKED (EXT), [
4: 2004/10/15 13:01:23  SYNC ABSENT (
3: 2004/10/15 12:48:12  LOCKED (EXT), [
2: 2004/10/15 12:35:43  SYNC ABSENT (
1: 2004/10/15 12:34:56  POWER ON MOD
```

Log numbers (99 lines max.) — Time stamp — Status display

Up to 64 characters x 99 lines can be displayed.

When the number of logs exceeds 99 lines, the oldest log will be deleted.

Pressing the ◀ or ▶ key shifts 16 characters displayed.
The rightmost character is overlapped in display.

Hierarchy level 3

```
3. GENLOCK  LOG  DISP →
   5::07  LOCKED  (EXT). [
```

This arrow appears when more characters exist on the right side.

The next log can be displayed by pressing the ▲ or ▼ key.

Pressing the [ENTER] key returns the display to hierarchy level 2 [2. GENLOCK FUNCTION].

4.2.4 Setting GENLOCK LOG SAVE

(1) Insert the CF card. Select [GENLOCK LOG SAVE] by pressing the ▲ or ▼ key, then press the [ENTER] key.

Hierarchy level 3

```
3. GENLOCK  LOG  SAVE
▼ LOG  NO. 0   NO DATA
```

```
▼ LOG NO. 0  NO DATA
◆ LOG NO. 1  NO DATA
◆ LOG NO. 2  NO DATA
◆ LOG NO. 3                ← Blank is displayed when there is
◆ LOG NO. 4  NO DATA         a file name.
◆          •  •
◆          •  •
◆ LOG NO. 8  NO DATA       ← "NO DATA" is displayed when
▲ LOG NO. 9  NO DATA         there is no file name.
```

Up to ten log data in text format are stored in the "GL_LOG" folder on the CF card.
If there is no "GL_LOG" folder on the CF card, a new folder named "GL_LOG" is automatically created, then data is logged.

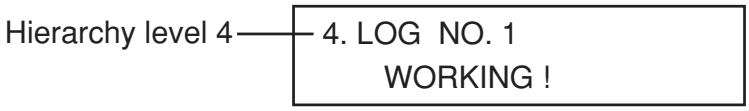
(2) Select the number to be stored by pressing the ▲ or ▼ key, then press the [ENTER] key.

Hierarchy level 4

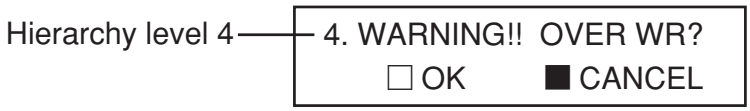
```
4. LOG  NO. 1
     □ OK      ■ CANCEL
```

Select OK or CANCEL by pressing the ◀ or ▶ key.

Press the [ENTER] key.



The following message is displayed to prevent the overwriting of existing data with new data.
Select OK or CANCEL by pressing the ◀ or ▶ key, then press the [ENTER] key.



4.3 Setting Genlock Mode

There are five genlock modes as follows:

[INTERNAL]: The internal reference signal is used.
Use this mode when the LT 443D need not lock to the external reference signal.

AUTO (GO INTERNAL) The EXT mode is automatically selected when the external reference signal is applied to the GENLOCK input. The INT mode is automatically selected when the external reference signal is removed.
The instrument automatically genlocked with the signal listed in Step (3) “GENLOCK FORMAT Selection” (e.g., HDTV tri-level sync signal, NTSC, PAL).
Use this mode to immediately lock the LT 443D to the external reference signal even when ignoring any abnormal picture momentarily displayed due to a transient in lock operation.

MANUAL (GO INT) The system is locked to the signal according to the GENLOCK FORMAT selected.
The EXT mode is automatically selected when the external reference signal with the same format specified to the GENLOCK input is applied after power is turned on.

The INT mode is automatically selected when no external reference signal is applied to the GENLOCK input, or signal format does not match the specified format.
Use this mode to immediately lock the LT 443D to the external reference signal in specified format listed in Step (3) "GENLOCK FORMAT Selection" even when ignoring any abnormal picture momentarily displayed due to a transient in lock operation.

AUTO (FLYWHEEL)

The EXT mode is automatically selected when the external reference signal is applied to the GENLOCK input after power is turned on.
If the external reference signal is accidentally removed during operation, the instrument continues operation under the conditions immediately before the signal is removed since the flywheel mode is provided.
The EXT LED blinks in this case.
After the external reference signal is recovered, the system is automatically locked.
It takes for a moment until the system is relocked. Some shock may occur in this case.

MANUAL (FLYWHEEL)

The system is locked to the signal according to the GENLOCK FORMAT selected.
The EXT mode is automatically selected when the external reference signal with the same format specified to the GENLOCK input is applied after power is turned on.
If the external reference signal is accidentally removed during operation, the instrument continues operation under the conditions immediately before the signal is removed since the flywheel mode is provided.
The EXT LED blinks in this case.
The flywheel mode will be held until the reset operation is performed via the front panel and the ENTER key is pressed even after the external reference signal is recovered.
Use this mode to immediately relock the LT 443D to the external reference signal in specified format, listed in Step (3) "GENLOCK FORMAT Selection," after operation is completed if the system is unlocked and relock operation is not required.

(1) Select [GENLOCK MODE SET] from the [1. GLA SETTING] menu, then press the [ENTER] key.

(2) Position the [∗] to the [INTERNAL], [AUTO (GO INTERNAL)], or [MANUAL (GO INT)], or [AUTO (FLYWHEEL)], or [MANUAL (FLYWHEEL)] by pressing the Up or Down key, then press the [ENTER] key.
[INTERNAL] is selected, here.

Hierarchy level 2 — 2. GENLOCK MODE SET
▼∗ INTERNAL — In case of [INTERNAL] is selected.

▼ ∗ INTERNAL
◆ AUTO (GO INTERNAL)
◆ MANUAL (GO INT)
◆ AUTO (FLYWHEEL)
▲ MANUAL (FLYWHEEL)

(3) Selecting GENLOCK FORMAT
Select [MANUAL (GO INT)] or MANUAL (FLYWHEEL) mode, then press the [ENTER] key to enter [GENLOCK FORMAT] mode.
Select the desired format by pressing the ▲ or ▼ key, then press the [ENTER] key.
Pressing the [MENU] key displays the upper hierarchy level.

Hierarchy level 3 — 3. MANUAL
◆ ∗ 1125i/59.94 — In case of [1125i/59.94] is selected.

◆ 1125i/60
◆∗1125i/59.94
◆ 1125i/50
◆ 1125p/30
◆ 1125p/29.97
◆ 1125p/25
◆ 1125p/24
◆ 1125p/23.98
◆ 1125PsF/24
◆ 1125PsF/23.98
◆ 750p/60
◆ 750p/59.94
◆ 750p/50
◆ 750p/30
◆ 750p/29.97
◆ 750p/25
◆ 750p/24
◆ 750p/23.98
◆ 525i/59.94
◆ NTSC BB
◆ NTSC BB+Ref
◆ NTSC BB+ID
◆ NTSC BB+Ref+ID
∗Note
◆ 525p/59.94
◆ 625i/50
◆ PAL BB
◆ PAL BB+Ref
∗Note
◆ 625p/50

∗Note: Conditions	SYNC	BB	REF	ID
525i/59.94	○	×	×	×
NTSC BB	○	○	×	×
NTSC BB+Ref	○	○	○	×
NTSC BB+ID	○	○	×	○
NTSC BB+Ref+ID	○	○	○	○
625i/50	○	×	×	
PAL BB	○	○	×	
PAL BB+Ref	○	○	○	

∗ Signals marked with " ○ " are detected for synchronization.

The number of all lines of the frame, instead of the active picture, is used for the GENLOCK FORMAT.

Abbreviations Displayed on the LCD Panel

Ref: Field Reference

A signal with the followings to identify the field.

NTSC: 714 mV reference signal on the line 10 (every 2 frame)

PAL: 700 mV reference signal on the line 7 (every 4 frame)

ID: 10 field sequence identification

A signal with the ID conforming to SMPTE 318M standards.

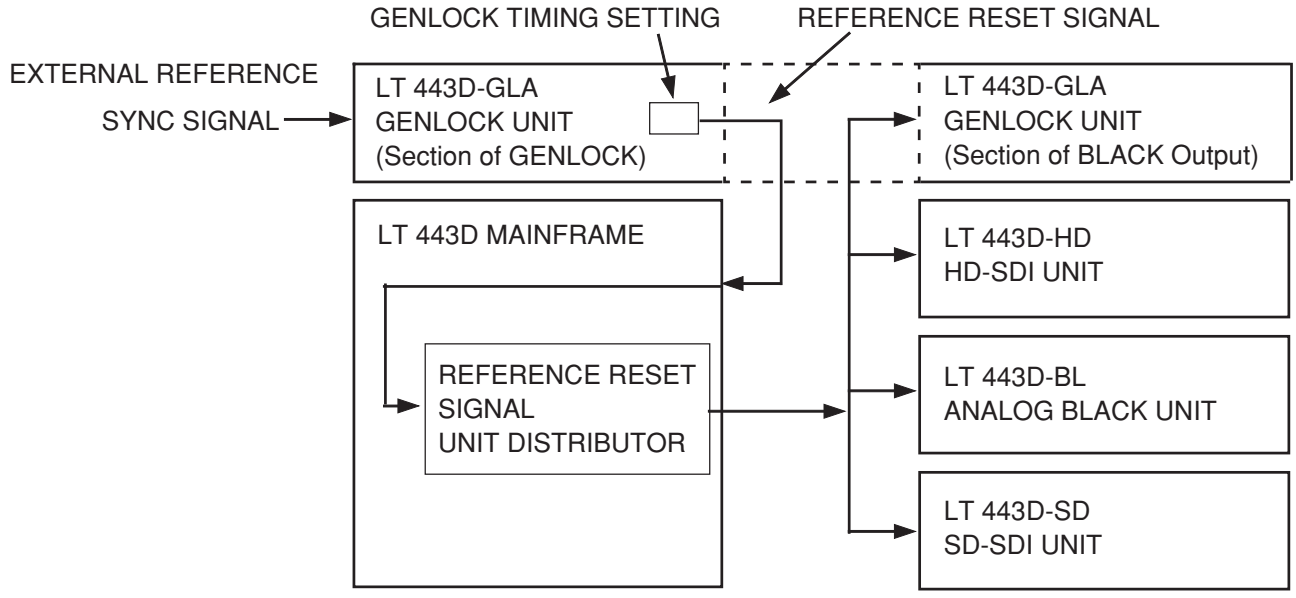
4.4 Setting GENLOCK TIMING

This section describes setting procedure of the analog black burst signal timing with respect to the internal reference signal (i.e., reference reset signal).

There is a time lag to the output signal after the genlock timing is set. It is updated in a period of the reference reset signal.

The reference rest signals are 2.997 Hz and 0.250 Hz.

The GENLOCK SETTING sets the timing for all units installed in the main frame.



4.4.1 F-PHASE

(1) Select [GENLOCK TIMING] from the [1. GLA SETTING] menu, then press the [ENTER] key.

(2) Select [F-PHASE] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 2 —

```
2. GENLOCK TIMING
▼ F-PHASE
```

▼ F-PHASE
◆ V-PHASE
◆ H-PHASE (COARSE): Coarse adjustment
▲ H-PHASE (FINE): Fine adjustment

(3) If setting is performed without a reference input signal, the following message is displayed.

```
REF. (= NO SIGNAL)
      NOT PRESENT
```

When the unit is locked with the reference input signal, the following settings can be performed.

(4) F-PHASE: (FRAME)

This mode is used to set the timing. The timing can be set in one frame steps by pressing the Up or Down key.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 2 [2. GENLOCK TIMING].

Pressing the [MENU] key selects the next higher hierarchy.

Hierarchy level 3 —

```
3. F-PHASE   R: 2.997 Hz
  GLA.          + 0 FRAME
```

— Displays the reference reset signal being used.
R: 2.997 Hz
R: 0.250 Hz

In case of 0 is set.

4.4.2 V-PHASE: (Vertical)

This mode is used to set the vertical timing. Press the Up or Down key to set the timing. The timing can be set in one line steps.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.

Hierarchy level 3 —

```
3. V-PHASE   R: 2.997 Hz
  GLA.          +5 LINE
```

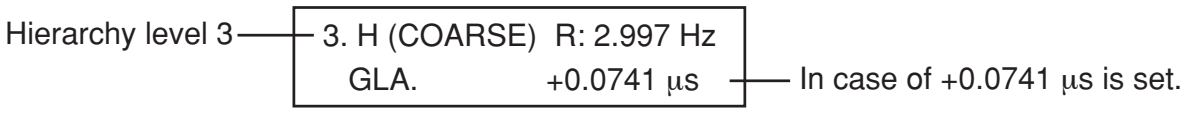
— In case of +5 LINE is set.

4.4.3 H-PHASE (COARSE Adjustment): (Horizontal)

This mode is used to set the horizontal timing. Press the Up or Down key to set the timing. The timing can be set in 74.1 ns steps.

After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 2 [2. GENLOCK TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



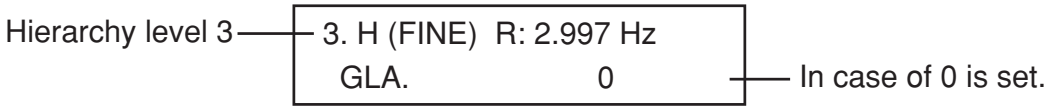
4.4.4 H-PHASE (FINE Adjustment): (Horizontal)

This mode is used to set the horizontal timing. Press the Up or Down key to set the timing.

After setting is completed, press the [ENTER] key.

The menu returns to hierarchy level 2 [2. GENLOCK TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



4.5 Setting BLACK SIGNAL

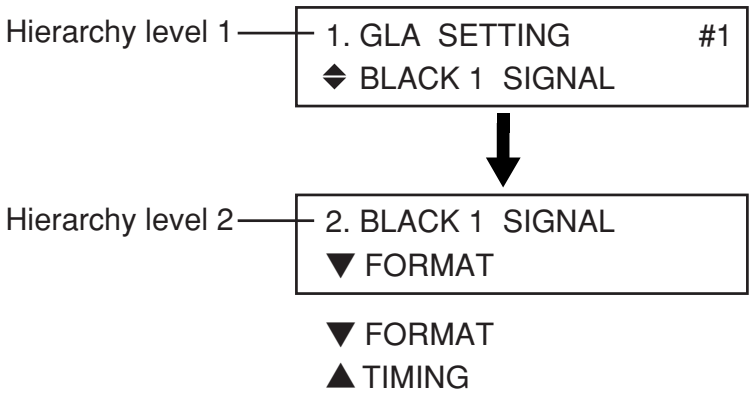
4.5.1 Selecting BLACK SIGNAL

This section describes format and timing setting procedure of the [BLACK 1], [BLACK 2], and [BLACK 3] signals.

(1) Selecting BLACK 1 Signal

Select [BLACK 1 SIGNAL] from the [1. GLA SETTING] menu, then press the [ENTER] key.

Select [FORMAT] by pressing the Up or Down key, then press the [ENTER] key.

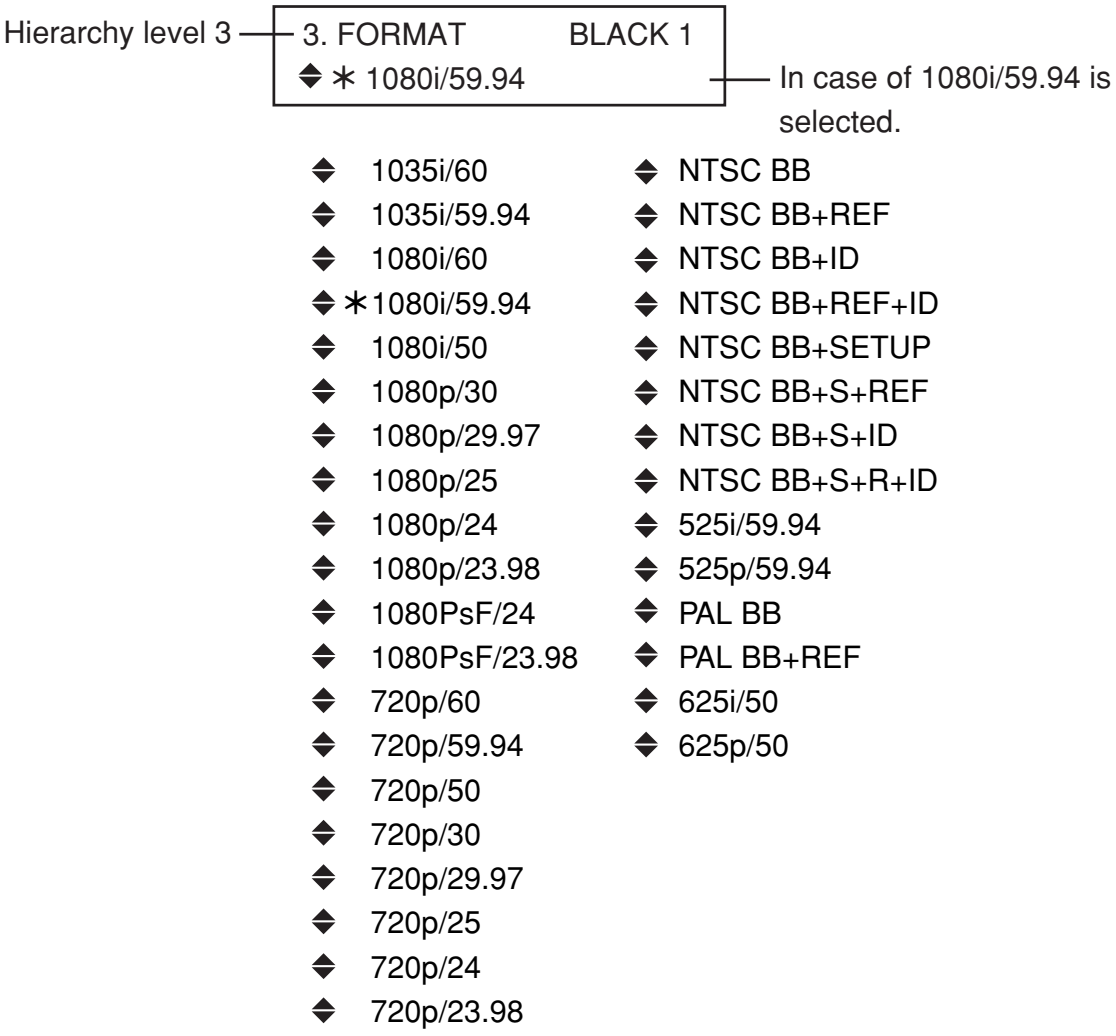


4.5.2 Setting FORMAT

This mode is used to select the black signal format.

(1) Select [FORMAT] from the [2. BLACK 1 SIGNAL] menu, then press the [ENTER] key.

(2) The format marked with asterisk is currently selected.
Select the desired format by pressing the Up or Down key, then press the [ENTER] key. The display returns the hierarchy level 2 [2. BLACK 1 SIGNAL].



Refer to “LIST OF BLACK SIGNAL FORMAT” for detail.

4.5.3 Setting TIMING

This section describes setting procedure of the analog black signal timing with respect to the reference signal.

Select [TIMING] from the [2. BLACK 1 SIGNAL] menu, then press the [ENTER] key.

Select the Frame (F), Vertical (V), or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. TIMING          BLACK 1
▼ F-PHASE
```

▼ F-PHASE
◆ V-PHASE [LINE]
◆ H-PHASE [DOT]
▲ H-PHASE [μs]

(1) F-PHASE (F: Frame)

This mode is used to set the timing in frame steps.

Press the Up or Down key to set the timing.

The settable range is ±5 FRAME for NTSC BB and NTSC BB + XX, ±2 FRAME for PAL BB and PAL BB + XX.

This menu is not displayed when other format is selected; the timing cannot be changed.

Hierarchy level 4

```
4. F-PHASE   R: 6.250 Hz
▼ GLA-BLK 1    +5 FRAME
```

Displays the current reference reset signal for the BLACK signal generator.
R: 2.997 Hz
R: 6.250 Hz
R: 3.000 Hz

(2) V-PHASE (V: Vertical)

This mode is used to set the vertical timing.

The timing can be set in one line steps by pressing the Up or Down key. Holding down this key increments or decrements the timing continuously. (For NTSC BB +ID, PAL BB, and PAL BB + REF, the timing cannot be changed if the Down key is held down for long time. Release the Down key, then hold down the key again in this case.)

Press the [ENTER] key to enter data. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.

Hierarchy level 4

```
4. V-PHASE   R: 6.250 Hz
  GLA-BLK 1      +5 LINE
```

In case of +5 LINE is set.

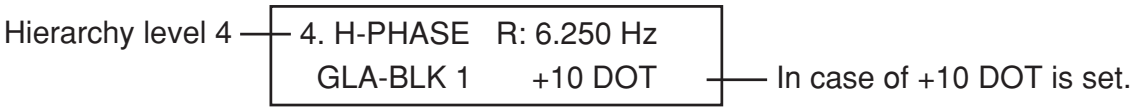
(3) H-PHASE [dot] (H: Horizontal)

This mode is used to set the horizontal timing in dot steps.

Press the Up or Down key to set the timing.

In the 1080i/59.94 format, the settable range is ±2199 DOTs in one dot steps. Holding down this key increments or decrements the timing continuously. After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



(4) H-PHASE [μs] (H: Horizontal)

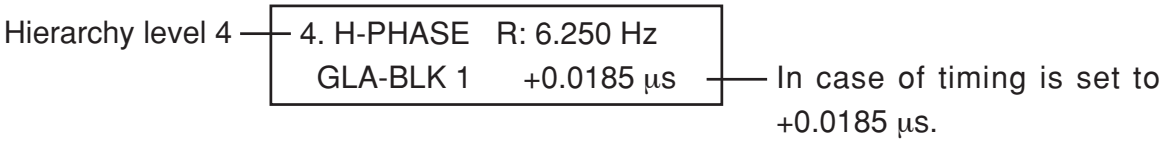
This mode is used to set the horizontal timing.

Press the Up or Down key to set the timing.

The timing can be set in 18.5 ns steps for the NTSC and PAL systems, in 13.5 ns steps for the HDTV system.

Holding down this key increments or decrements the timing continuously. After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



4.6 EXIT

Select [EXIT] from the [1. GENLOCK SETTING] menu, then press the [ENTER] key. The status display screen is displayed.

LT 443D-HD HD-SDI UNIT
LT 443D-HDB HD-SDI & BLACK UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. DESCRIPTION

The LT 443D-HD (HD-SDI Unit) and LT 443D-HDB (HD-SDI & BLACK Unit) add the capability to output 14 types of HD-SDI signal formats to the LT 443D mainframe.
Various functions (e.g., ID character display, simple motion pictures, embedded audio, NATURAL picture pattern ∗1) are provided.
The LT 443D-HDB (HD-SDI & BLACK Unit) can output HD-SDI black signal independently of the HD-SDI test signals.
∗1: The option should be installed.

2. SPECIFICATIONS

∗Specifications are common to both models LT 443D-HD and LT 443D-HDB unless otherwise noted.

2.1 Output

- HD-SDI Video Output 1 system, 2 outputs (75 Ω, BNC)
- HD-SDI Black Output 1 system, 2 outputs (75 Ω, BNC)

(The HD-SDI black signal is only output when the LT 443D-HDB is installed.)

2.2 Specifications

- Conform To SMPTE 240M, SMPTE 274M, SMPTE 296M standards
  SMPTE 292M (Except for Return Loss)

2.3 SDI Characteristics

- Bit Rate 1.485 Gbps, 1.485/1.001 Gbps
- Output Amplitude 800 mVp-p ±10 %
- Overshoot ≤ 10 %
- Rise and Fall Time ≤ 270 ps (20 % to 80 %)
- DC Offset 0 V ±0.5 V
- Output Impedance 75 Ω
- Return Loss ≥ 15 dB (5 MHz to 742.5 MHz)
  ≥ 10 dB (742.5 MHz to 1.485 GHz)

2.4 Function

2.4.1 Common to HD-SDI Video and HD-SDI Black Outputs

- Applicable Format
  1035i/60, 1035i/59.94,
  1080i/60, 1080i/59.94, 1080i/50,
  1080p/30, 1080p/29.97, 1080p/25,
  1080p/24, 1080p/23.98,
  1080PsF/24, 1080PsF/23.98,
  720p/60, 720p/59.94
  720p/50 (Note 1), 720p/30 (Note 1), 720p/29.97 (Note 1),
  720p/25 (Note 1), 720p/24 (Note 1), 720p/23.98 (Note 1)

∗ The HD-SDI video and HD-SDI black signal output formats are the same.

(Note 1) The verification has not completed though the following formats were built in since the firmware version 3.3 of the LT 443D.

• Variable Timing

Variable Range		Entire frame range
Setting	V	Settable in line steps
	H	Settable in clock steps (74.25 MHz or 74.25/1.001 MHz)

∗ The timing of HD-SDI video and HD-SDI black signals can be set respectively.

• Embedded Audio

Number of Channels Embedded	8 channels (4 channels x 2 groups) Each group can be set ON/OFF
Sampling Frequency	48 kHz (sync to video signal)
Resolution	20 bits, 24 bits, selectable
Preemphasis	OFF, 50/15 μs, CCITT, selectable (CS bit is only selected.)
Frame Number	OFF (fixed)
Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k, 5.0 k, 6.0 k, 8.0 k, 9.6 k, 10.0 k, 12.0 k, 15.0 k, 16.0 k, 20.0 kHz, silence
Level	-60 to 0 dBFS (settable in 1 dB steps)
Audio Click	1, 2, 3, 4 sec, OFF

∗ Frequency, level, and audio click can be set to each channel.

∗ When the CHECK FIELD pattern is selected, no audio signal is embedded.

∗ The embedded audio can be set to the HD-SDI video output and HD-SDI black output respectively.

2.4.2 HD-SDI Video Output

• Test Patterns

(1) COLOR BAR 100%		White: 100%, color saturation: 100%, setup: 0%
(2) COLOR BAR 75%		White: 100%, color saturation: 75%, setup: 0%
(3) MULTIFORMAT COLOR BAR		ARIB STD-B28
(4) FLAT FIELD 100%		
(5) FLAT FIELD 50%		
(6) FLAT FIELD 0%		
(7) LINE SWEEP 100%		
Frequency Range	Y	1 to 30 MHz (Marker: 5, 10, 15, 20, 25, 28 MHz)
	Cb, Cr	0.5 to 15 MHz (Marker: 2.5, 5, 7.5, 10, 12.5, 14 MHz)
(8) MULTIBURST 100%		
Frequency	Y	1, 5, 10, 15, 20, 25, 30 MHz
	Cb, Cr	0.5, 2.5, 5, 7.5, 10, 12.5, 15 MHz

(9) BOWTIE 100%		Marker Resolution: 1 ns
(10) RAMP		
Level	Y	0 to 700 mV
	Cb, Cr	-350 to +350 mV
(11) SHALLOW RAMP		
Level	Y, Cb, Cr	-35 to +35 mV
(12) 10 STEP		
Level	Y	0 to 703.2 mV
	Cb, Cr	-351.6 to +351.6 mV
(13) PULSE & BAR		
Level	Y	2T, 3T, 5T pulse & 2T bar
	Cb, Cr	4T, 6T, 10T pulse & 4T bar
(14) CHECK FIELD		Conforms to SMPTE RP-198 standards
(15) RED RASTER 100 %		Color saturation: 100 %
(16) CROSS & DOT		11 (H), 19 (V)
(17) MONOSCOPE		NORMAL, INVERT

• NATURAL Picture ∗1

File	24-bit full color BMP file (1920 x 1035, 1920 x 1080, 1280 x 720)
Number of Selectable Patterns with PATTERN Key	2

• Simple Motion Picture Mode (Scroll)

Direction		8 directions (vertical, horizontal, diagonal)
Speed (Range, Resolution)		
Field Frame	Interlace	Variable in field steps
	Others	Variable in frame steps
V	Interlace	0 to 256 lines in 2 line steps
	Others	0 to 256 lines in 1 line steps
H	Common	0 to 256 dots in 4 dot steps

• ID Characters

Number of Characters	Up to 20
Size	32 x 32, 64 x 64, 128 x 128 dots, selectable
Display Position	Arbitrary position on the screen.
Blinking	OFF, 1 to 10 seconds (in 1 sec steps)

2.4.3 HD-SDI Black Output Mode (LT 443D-HDB only)

• Displayable Pattern

(1) Flat Field	0 %, 40 %, 50 % (selectable)

2.5 General Specifications

Environmental Conditions

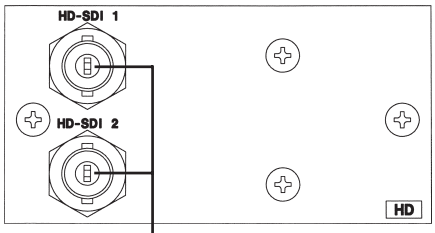
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.5 kg
Accessory	Instruction Manual ..... 1 Screw (for Unit) 2

∗1: The NATURAL picture function is only usable when the LT 443D-70 Option is installed in the mainframe.

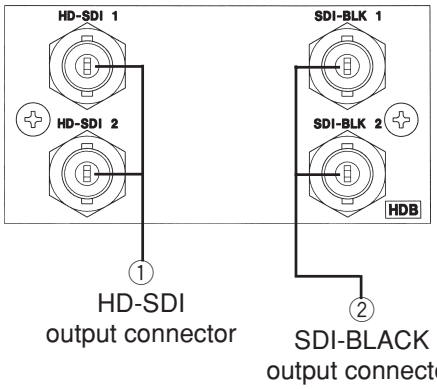
3. PANEL DESCRIPTION

3.1 Rear Panel

LT 443D-HD



LT 443D-HDB



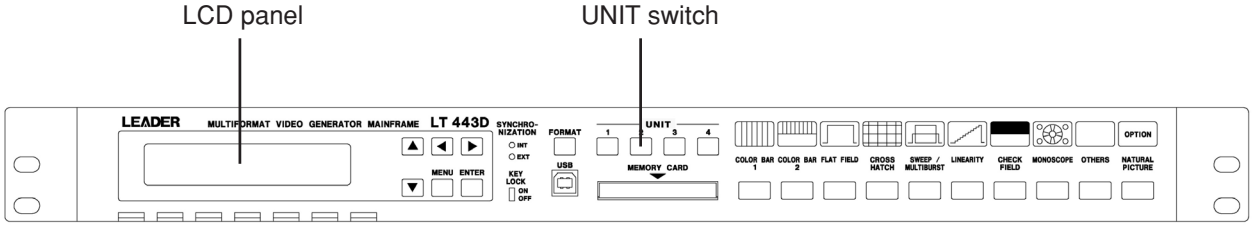
① HD-SDI output connector
Outputs the serial digital signal.
Two systems are provided; both systems output the same signal.

② SDI-BLK output connector
Outputs the serial digital black signal.
Two systems are provided; both systems output the same signal.

4. OPERATING PROCEDURE

∗ Operating procedure is common to both models LT 443D-HD and LT 443D-HDB unless otherwise noted.

The front panel controls and LCD panel on the mainframe are used to set the LT 443D-HD and LT 443D-HDB.
Press the UNIT 2 switch, for example, corresponding to the UNIT compartment where LT 443D-HD or LT 443D-HDB unit is installed.



4.1 SETTING Menu Mode Structure

Pressing the UNIT 2 switch, for example, on the mainframe displays [1. HD SETTING #2] on the LCD panel. (Menu is common to both models LT 443D-HD and LT 443D-HDB.)
The [HD SETTING] menu is used to set the signal format, output timing, embedded audio, Y/Cb/Cr, ID character, pattern scroll, etc.

▼ FORMAT SELECT
◆ HD TIMING
◆ EMBEDDED AUDIO
◆ Y, Cb, Cr ON/OFF
◆ ID CHARACTER
◆ PATTERN SCROLL
◆ PATTERN CHANGE
◆ MULTIFORMAT CB SET
◆ NATURAL PICTURE ∗Option 70 (NATURAL PICTURE) should be installed.
◆ SDI BLACK (LT 443D-HDB only)
▲ EXIT

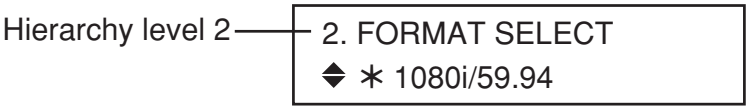
4.2 FORMAT SELECT

This mode is used to select the output signal format.

4.2.1 Setting Format

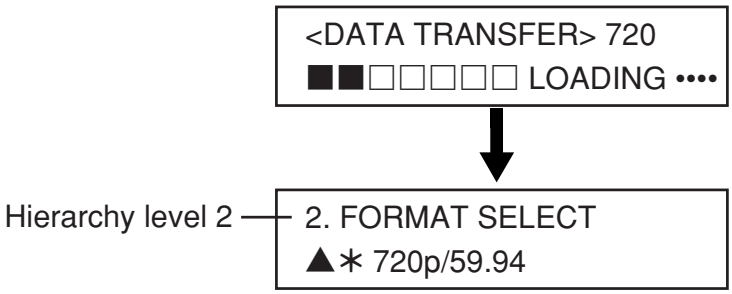
(1) Select [FORMAT SELECT] from the [1. HD SETTING] menu, then press the [ENTER] key.

(2) The format marked with an asterisk is currently selected.



◆ 1035i/60
◆ 1035i/59.94
◆ 1080i/60
◆ ∗1080i/59.94
◆ 1080i/50
◆ 1080p/30
◆ 1080p/29.97
◆ 1080p/25
◆ 1080p/24
◆ 1080p/23.98
◆ 1080PsF/24
◆ 1080PsF/23.98
◆ 720p/60
◆ 720p/59.94
◆ 720p/50
◆ 720p/30
◆ 720p/29.97
◆ 720p/25
◆ 720p/24
◆ 720p/23.98

(3) To obtain the 720p/59.94 format, select [⬍ 720p/59.94] by pressing the Down key, then press the [ENTER] key.



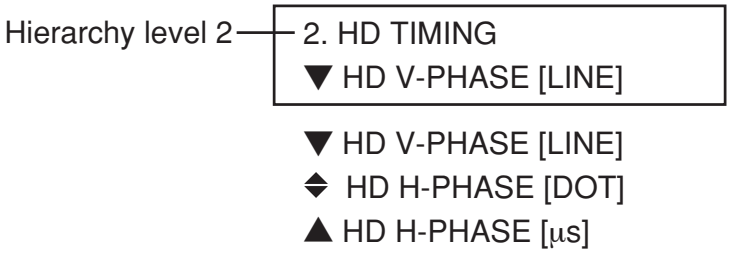
(4) Pressing the [MENU] key returns the display to hierarchy level 1 [1. HD SETTING].

4.3 HD TIMING

This section describes setting procedure of the serial digital signal timing with respect to the internal reference signal (i.e., frame reset signal).

4.3.1 Setting TIMING

(1) Select [HD TIMING] from the [1. HD SIGNAL] menu, then press the [ENTER] key. Select Vertical (V) or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.



(2) V-PHASE [line] (V: Vertical)

This mode is used to set the vertical timing.
Press the Up or Down key to set the timing.
In the 1080i/59.94 format, the settable range is ±1124 lines in one line steps.
After setting is completed, press the [ENTER] key.

(3) H-PHASE [dot] (H: Horizontal)
This mode is used to set the horizontal timing.
Press the Up or Down key to set the timing.

Hierarchy level 3

```
3. HD H-PHASE
        0 DOT
```

In the 1080i/59.94 format, the settable range is ±2199 DOTs in one dot steps.
After setting is completed, press the [ENTER] key.

Hierarchy level 3

```
3. HD H-PHASE
      0.0000 μs
```

In the 1080i/59.94 format, the timing can be set in 13.5 μs steps.
After setting is completed, press the [ENTER] key.

(4) Pressing the [MENU] key returns the display to hierarchy level 2 [2. HD TIMING]. Pressing the [MENU] key again returns the display to hierarchy level 1 [1. HD SETTING].

4.4 EMBEDDED AUDIO

This mode is used to set the embedded audio signal (e.g., audio signal on or off, audio data resolution, emphasis, frame number on or off, channel selection) in each group.
The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

4.4.1 Selecting Group

(1) Select [EMBEDDED AUDIO] from the [1. HD SETTING] menu, then press the [ENTER] key.

Hierarchy level 1

```
1. HD SETTING          #2
◆ EMBEDDED AUDIO
```

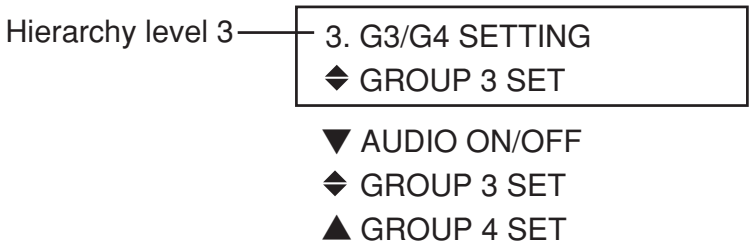
In case of UNIT 2 is selected.

(2) Position the [■] to [G1/G2] or [G3/G4] by pressing the Left or Right key, then press the [ENTER] key.
The next setting mode is displayed.
(The G3/G4 groups are selected, here.)

Hierarchy level 2

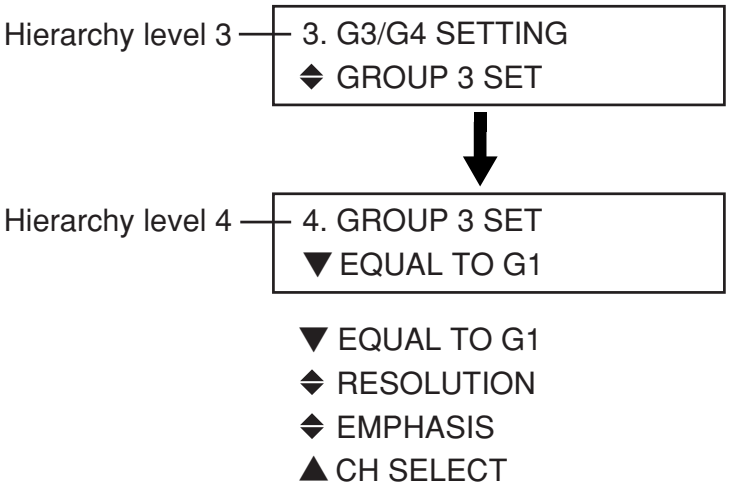
```
2. EMBEDDED AUDIO
   □ G1/G2   ■ G3/G4
```

4.4.2 Setting in Selected Group



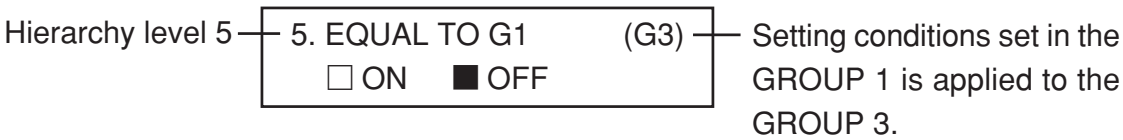
4.4.2.1 Setting GROUP 3 SET

This section describes setting procedure of the [GROUP 3 SET], for example.
Select [◆ GROUP 3 SET] by pressing the Down key, then press the [ENTER] key.
Pressing the [ENTER] key can also set the audio data resolution, emphasis, and channel selection.



(1) Setting [EQUAL TO G1]

The setting conditions of selected item can also be applied to other groups.
For example, when applying [EQUAL TO G1] set in the [GROUP 1] to the [GROUP 3], proceed as follows:



In case of:
GROUP 1 SET, no [EQUAL] setting is provided.
GROUP 2 SET, set [EQUAL TO G1].
GROUP 3 SET, set [EQUAL TO G1].
GROUP 4 SET, set [EQUAL TO G3].

Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET].
Pressing the [MENU] key selects the next higher hierarchy.

(2) Setting [RESOLUTION]

This mode is used to set the digital data resolution of the selected group.

Hierarchy level 5

```
5. RESOLUTION
  □ 20 Bit   ■ 24 Bit
```

Position the [■] to the desired Bit by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET].

(3) Setting [EMPHASIS]

This mode is used to set the emphasis bit of the selected group. The settable items are 50/15, CCITT, and OFF (NO EMPHASIS).

Hierarchy level 5

```
5. EMPHASIS
  □ 50/15 □ CCITT ■ OFF
```

Position the [■] to the desired item by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET]. Pressing the [MENU] key selects the next higher hierarchy.

(4) Setting [CH SELECT]

Each group consists of four channels.

The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

Hierarchy level 5

```
5. CH SELECT
  ▼ GROUP 3 CH 9
```

— In case of GROUP 3 is selected.

▼ GROUP 3 CH 9
◆ GROUP 3 CH 10
◆ GROUP 3 CH 11
▲ GROUP 3 CH 12

Before setting the embedded audio signal frequency, level, and click for each channel, select the desired channel by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 6

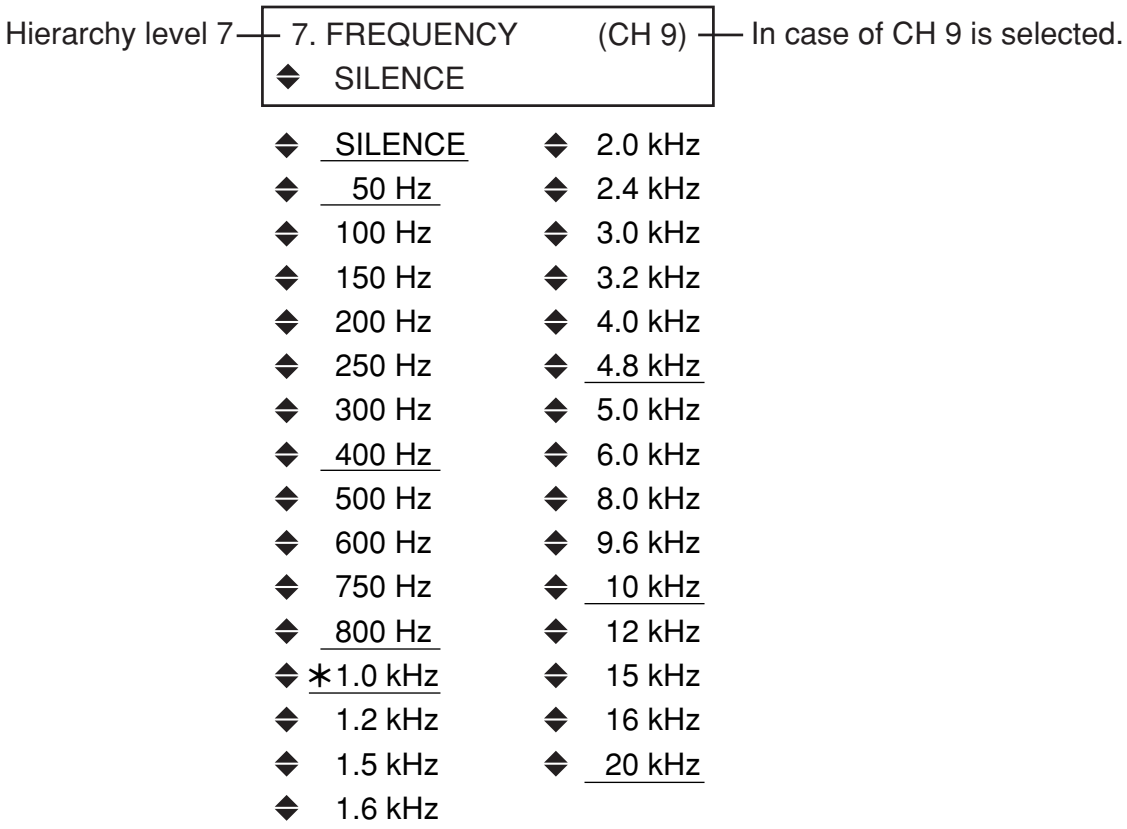
```
6. GROUP 3 CH 9
  ▼ FREQUENCY
```

▼ FREQUENCY
◆ LEVEL
▲ CLICK

① Setting [FREQUENCY]

Frequency can be set to the selected channel.

" ∗ " indicates the frequency currently selected.



Underlined frequencies can be selected sequentially by pressing the Left or Right key.

To select the desired frequency, press the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9]. The frequency can be sequentially selected by pressing the Up or Down key.

Pressing the [MENU] key selects the next higher hierarchy.

② Setting [LEVEL]

The embedded audio signal level of selected channel can be set.

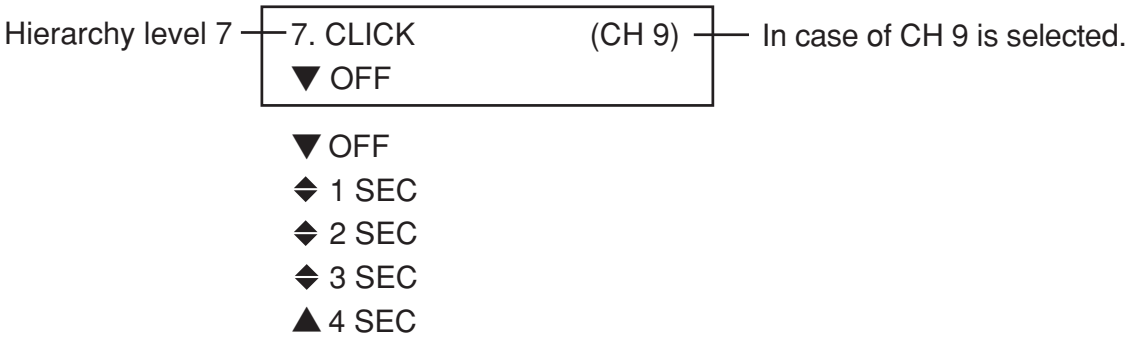
The settable level range is 0 dB to -60 dBFS in one dBFS steps.

Set the level by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9].

Pressing the [MENU] key selects the next higher hierarchy.

③ Setting [CLICK]

A click can be inserted in the embedded audio signal of the selected channel.

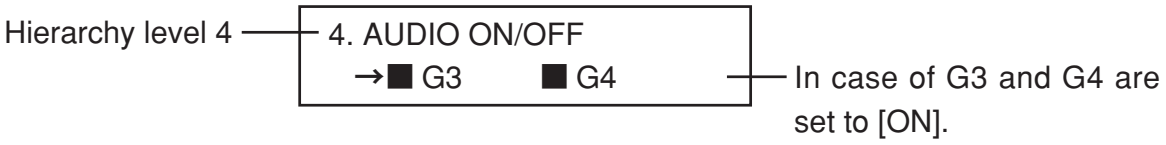


Set the click time by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9].

Pressing the [MENU] key selects the next higher hierarchy.

4.4.2.2 Setting AUDIO ON/OFF

This mode is used to set [AUDIO ON/OFF]. The selected group can be set respectively.



Position the [→] to the G3 or G4 by pressing the Left or Right key, then select [ON] or [OFF] by pressing the Up or Down key. The item marked with [■] is set [ON]. Pressing the [ENTER] key enters data. The menu returns to hierarchy level 3 [3. G3/G4 SETTING].

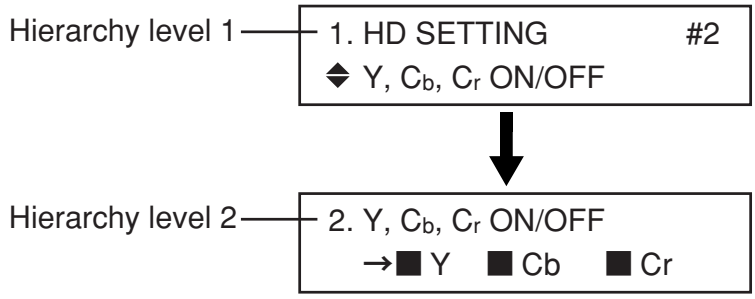
Pressing the [MENU] key selects the next higher hierarchy.

4.5 Y, C_b, C_r

The Y, C_b, C_r components of serial digital signal can be respectively set on or off.

4.5.1 Setting Y, C_b, C_r ON/OFF

(1) Select [Y, C_b, C_r ON/OFF] from the [1. HD SETTING] menu, then press the [ENTER] key.



(2) Position the [→] to [Y], [C_b], or [C_r] by pressing the Left or Right key, then select [ON] or [OFF] by pressing the Up or Down key. The item marked with [■] is set [ON].

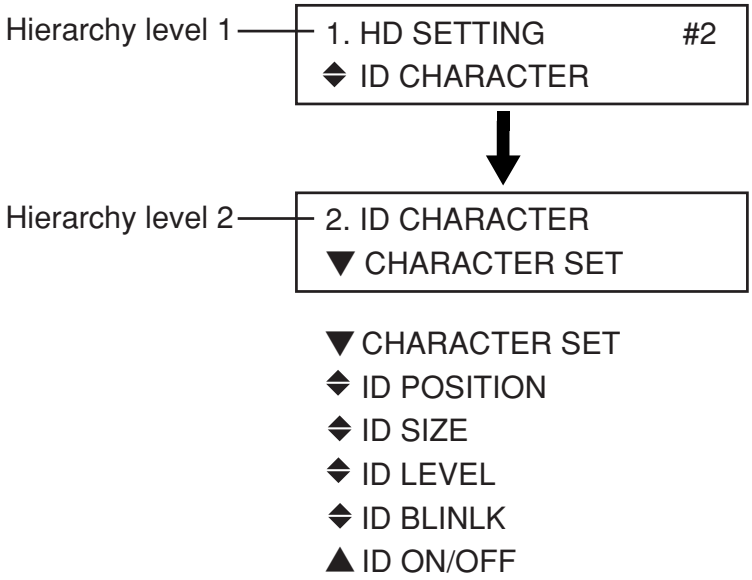
(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 1 [1. HD SETTING].

4.6 ID CHARACTER

This mode is used to superimpose alphanumeric characters on the serial digital video signal.

4.6.1 Creating ID Character

Select [ID CHARACTER] from the [1. HD SETTING] menu, then press the [ENTER] key. The ID character, display position, character size, and ID ON/OFF can be set.



(1) CHARACTER SET

Select [CHARACTER SET] by pressing the Up or Down key, then press the [ENTER] key.

This mode is used to create ID characters.

Up to 20 characters can be displayed.

Move the blink cursor to the character to be set by pressing the Left or Right key, then set the characters by pressing the Up or Down key.

After all characters are set, press the [ENTER] key.

4.6.2 ID POSITION

This mode is used to position the ID characters.

(1) Select [ID POSITION] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. ID POSITION
■ H: 0 DOT    □ V: 0 DOT
```

(2) Position the [■] to [H] or [V] by pressing the Left or Right key, then set the number of dots by pressing the Up or Down key. The upper-left corner of the monitor screen is the reference (0, 0) when setting the parameters in dots.

(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.3 ID SIZE

This mode is used to set the character size.

(1) Select [ID SIZE] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. ID SIZE
■ x1    □ x2    □ x4
```

(2) Position the [■] to [x1], [x2], or [x4] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.4 ID LEVEL (Setting Character Brightness)

This mode is used to set the ID character brightness.

(1) Select [ID LEVEL] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. ID LEVEL
■ 100 %    □ 75 %
```

(2) Position the [■] to [100 %] or [75 %] by pressing the Left or Right key to select the brightness for easy reading: 100 % for white, 75 % for light gray.
Press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.5 ID BLINK (Setting Blinking Time)

This mode is used to set the ID character blinking time and turn on or off. This mode can also be used for checking the system operation status when the stationary pattern is displayed.

(1) Select [ID BLINK] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. ID BLINK
   ▼ ID BLINK TIME
```

▼ ID BLINK TIME
▲ ID BLINK ON/OFF

(2) ID BLINK TIME
This mode is used to set the blinking on and off times (i.e., duration) of the characters.

Hierarchy level 4

```
4. ID BLINK TIME
   ■ ON: 10 s   □ OFF: 10 s
```

Position the [■] to [ON] or [OFF] by pressing the Left or Right key. The "on" time can be set from one to 10 seconds by pressing the Up or Down key.
Press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

(3) ID BLINK ON/OFF
This menu is used to set the ID BLINK mode on or off.

Hierarchy level 4

```
4. ID BLINK ON/OFF
   ■ ON:        □ OFF
```

Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

4.6.6 ID ON/OFF

This mode is used to set ID character display on or off.

(1) Select [ID ON/OFF] by pressing the Up or Down key, then press the [ENTER] key.

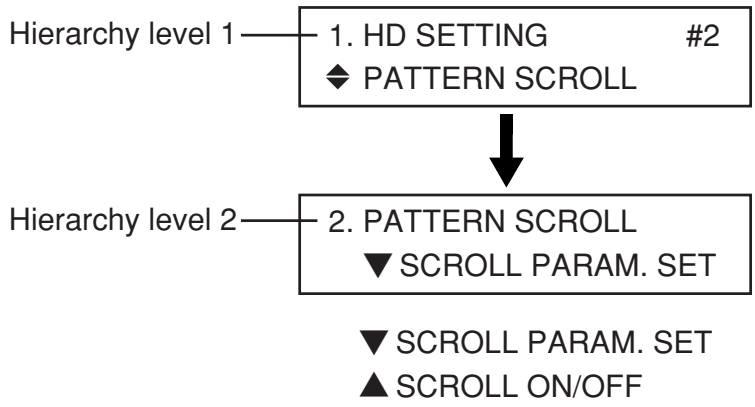
Hierarchy level 3

```
3. ID ON/OFF
   ■ ON:        □ OFF
```

(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [1. ID CHARACTER].

4.7 PATTERN SCROLL

This mode is used to scroll the pattern up, down, left, and right in the effective display areas.
Select [◆ PATTERN SCROLL] from the [1. HD SETTING] menu, then press the [ENTER] key.



▼ SCROLL PARAM. SET
▲ SCROLL ON/OFF

4.7.1 SCROLL PARAM. SET

This mode is used to set the scroll direction and speed.

(1) Select [SCROLL PARAM. SET] by pressing the Up or Down key, then press the [ENTER] key.

▼ DIRECTION
▲ SPEED

(2) Setting SCROLL DIRECTION
Select [DIRECTION] by pressing the Down key, then press the [ENTER] key.
Set the scroll direction by pressing the Up or Down key, then press the [ENTER] key.
The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].
Pressing the [MENU] key selects the next higher hierarchy.

▼ UP & RIGHT
◆ UP
◆ UP & LEFT
◆ LEFT
◆ DOWN & LEFT
◆ DOWN
◆ DOWN & RIGHT
▲ RIGHT

(3) Setting SCROLL SPEED

This mode is used to set the scroll speed.

Select [SPEED] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 4

```
4. SCROLL SPEED
■ H: 0 DOT    □ V: 0 DOT
```

Position the [■] to [H] or [V] by pressing the Left or Right key, then set the scroll speed by pressing the Up or Down key.

The settable range is 0 to 256 dots in four dot steps in the horizontal direction, 0 to 256 dots in two dot steps in the vertical direction.

Pressing the [ENTER] key enters data. The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].

Pressing the [MENU] key selects the next higher hierarchy.

4.7.2 Setting SCROLL ON/OFF

This mode is used to set the pattern scroll mode on or off.

(1) Select [SCROLL ON/OFF] from the [2. PATTERN SCROLL] menu by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. SCROLL ON/OFF
  □ ON:        ■ OFF
```

(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN SCROLL].

Pressing the [MENU] key selects the next higher hierarchy.

4.8. PATTERN CHANGE

All patterns (except CHECK FIELD pattern) indicated on the front panel are sequentially selected from the left to right and displayed.

Select [◆ PATTERN CHANGE] from the [1. HD SETTING] menu, then press the [ENTER] key.

Hierarchy level 1

```
1. HD SETTING          #2
◆ PATTERN CHANGE
```

Hierarchy level 2

```
2. PATTERN CHANGE
  ▼ SPEED
```

```
▼ SPEED
▲ CHANGE ON/OFF
```

4.8.1 Setting PATTERN CHANGE Speed

The settable pattern switching time is 1 to 255 seconds.

(1) Select [SPEED] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. SPEED
                    1 sec
```

(2) Set the pattern switching time by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN CHANGE].
Pressing the [MENU] key selects the next higher hierarchy.

4.8.2 Setting PATTERN CHANGE ON/OFF

This mode is used to set PATTERN CHANGE mode on or off.

(1) Select [PATTERN CHANGE ON/OFF] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. CHANGE ON/OFF
  □ ON:        ■ OFF
```

(2) Select [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key.

4.9 MULTIFORMAT CB SET

Figure below shows the multiformat color bar pattern output from the HD-SDI unit. Three types of patterns can be obtained by selecting the area marked with "∗2 " as follows: (a), (b), and (c).
These three multiformat color bars are designed based on the modifier width prescribed by ARIB STD-B28 standards.
Refer to the specifications prescribed by ARIB STD-B28 standards (ARIB: Association of Radio Industries and Businesses) for detailed multiformat color bar.

Signal of area "∗2" can be selected from:

(a) 75 % white,

(b) 100 % white, or

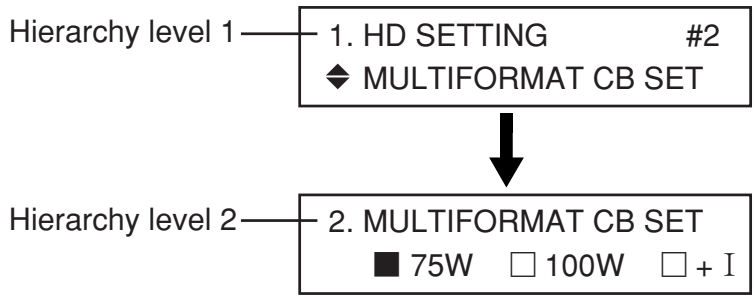
(c) +I.

<table>
<tr><td>40 % Gray</td><td>75 % White</td><td>Yellow</td><td>Cyan</td><td>Green</td><td>Magenta</td><td>Red</td><td>Blue</td><td>40 % Gray</td></tr>
<tr><td>100 % CY</td><td>∗2</td><td colspan="6">75 % White</td><td>100 % B</td></tr>
<tr><td>100 % YL</td><td colspan="7">Y-Ramp</td><td>100 % R</td></tr>
<tr><td>15 % Gray</td><td>0 % Black</td><td colspan="2">100 % White</td><td>0 % Black</td><td>- 2 %</td><td>0 %</td><td>+ 2 %</td><td>0 %</td><td>+ 4 %</td><td>0 % Black</td><td>15 % Gray</td></tr>
</table>

Multiformat color bar pattern

4.9.1 Setting [MULTIFORMAT CB SET]

(1) Select [◆ MULTIFORMAT CB SET] from the [1. HD SETTING] menu, then press the [ENTER] key.



(2) Position the [■] to [75W], [100W], or [+I] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 1 [1. HD SETTING].

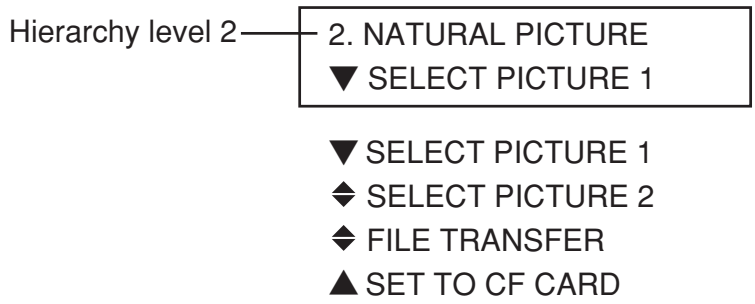
4.10 NATURAL PICTURE (w/OP70)

The NATURAL PICTURE display function is used to display data (i.e., NATURAL PICTURE data converted into the original data dedicated for the LT 443D) transferred from the compact flash (CF) card to a high-speed RAM.
Data should be transferred to a high-speed RAM again when power is turned off since a high-speed RAM is used.

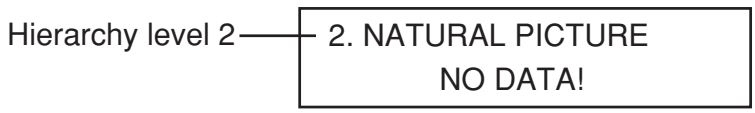
This menu is only displayed when the NATURAL PICTURE option (OP 70) is installed in the mainframe.
Use Windows application software of the LT 443D-70 to store NATURAL PICTURE data on the CF card. Refer to LT 443D-70 instruction manual for detail. (This procedure describes in case of NATURAL PICTURE data is stored on the CF card.)

Select [◆ NATURAL PICTURE] from the [1. HD SETTING] menu, then press the [ENTER] key.

(1) CF Card with NATURAL PICTURE



(2) CF Card without NATURAL PICTURE

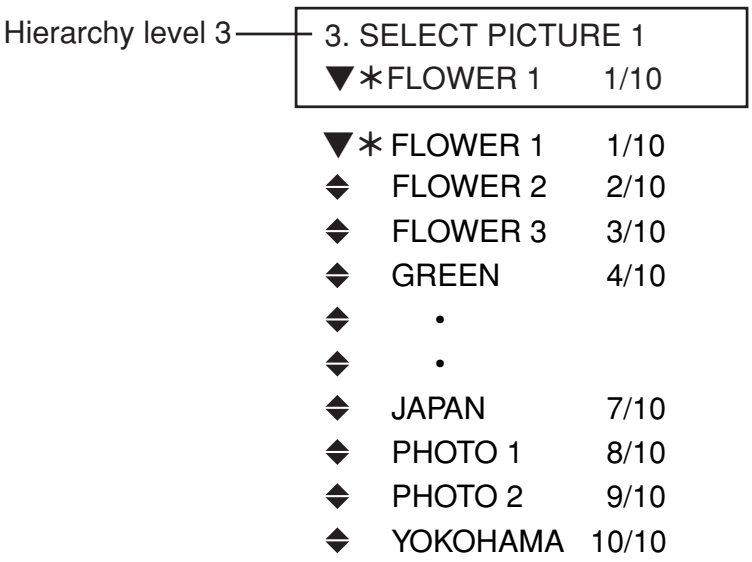


Warning message is displayed; no NATURAL PICTURE file cannot be selected.
When the card is inserted, return to the top menu of [NATURAL PICTURE], then apply the procedure above again to read NATURAL PICTURE file.

4.10.1 Selecting SELECT PICTURE File

(1) Select [SELECT PICTURE 1] from the [2. NATURAL PICTURE] menu by pressing the Up or Down key, then press the [ENTER] key.
The NATURAL PICTURE file list∗ (stored on the CF card in the MEMORY CARD slot) corresponding to the current format size is displayed.

∗ “E:\IMAGE\H1035” folder for 1035 line format (E:\ indicates CF card drive.)
“E:\IMAGE\H1080” folder for 1080 line format
“E:\IMAGE\H720” folder for 720 line format



Amount of NATURAL PICTURE files and file numbers corresponding to the current format size are displayed.
File name is displayed in uppercase letters.
Up to 100 files can be stored in the same format.

(2) Selecting PICTURE 1 (NATURAL PICTURE File)
In case of the number of files are ten, position the [∗] to the file number ([1/10] to [10/10]) by pressing the Up or Down key.
When the [ENTER] key is pressed at the file name without asterisk, the file is selected to [PICTURE 1].
When the [ENTER] key is pressed at the file marked with an asterisk, the file is selected to [PICTURE 1].

(3) Selecting PICTURE 2 (NATURAL PICTURE File)
Apply the same procedure as Step (2), “Selecting PICTURE 1 (NATURAL PICTURE File).”
Natural Picture file should be selected from PICTURE 1 first.

4.10.2 Transferring NATURAL PICTURE

The NATURAL PICTURE is now selected.
Select [◆ FILE TRANSFER], then press the [ENTER] key.
Select [OK] by the [◀] key, then press the [ENTER] key. The PICTURE 1 and PICTURE 2 files are transferred.
When the [◀] is positioned to [CANCEL], the file is not transferred; file name is displayed.

Hierarchy level 2

```
2. NATURAL PICTURE    (X)
◆ FILE TRANSFER
```

"(X)" indicates the number of screens to transfer NATURAL PICTURE data in Section, "Selecting SELECT PICTURE File."
"(X)" is not displayed when the NATURAL PICTURE file is not set or after data is transferred.

Hierarchy level 3

```
3. <FILE TRANSFER>
    □ OK      ■ CANCEL
```

```
  <DATA TRANSFER> 1080
■■□□□□□ LOADING •••
```

```
  <DATA TRANSFER> 1080
■■■■■■■ COMPLETE!
```

The NATURAL PICTURE pattern is output after data is transferred.

4.10.3 Writing NATURAL PICTURE File

NATURAL PICTURE data set in Section 4.10.1, "Selecting SELECT PICTURE File" can be written on the CF card. The contents will be stored in the [E:\IMAGEset_img txt]. (E:\ indicates CF card drive.)

Select [▲ SET TO CF CARD], then press the [ENTER] key.
Select [OK] by pressing the Left key, then press the [ENTER] key. The selected file is now written.

Hierarchy level 2

```
2. NATURAL PICTURE
  ▲ SET TO CF CARD
```

Hierarchy level 3

```
3. SET TO CF CARD
  □ OK      ■ CANCEL
```

The following message is displayed when the file is correctly written.
By writing the file, the file contents written on the CF card is automatically read and NATURAL PICTURE file is displayed when the power is turned on; no manual setting is required.

```
SET TO CF CARD
WRITE COMPLETE!
```

The following message is displayed if the file is written incorrectly. Confirm that the CF card is inserted in place.

```
SET TO CF CARD
WRITE ERROR!
```

4.11 SDI BLACK

This section describes setting procedure of SDI BLACK signal.

∗ This section is only applicable to the LT 443D-HDB unit.

4.11.1 Setting Video Level

Select [SDI BLACK] from the [1. HD SETTING] menu, then press the [ENTER] key.
This menu is used to set the video level, timing, and embedded audio of SDI black signal.

Hierarchy level 1

```
1. HD SETTING          #2
◆ SDI BLACK
```

Hierarchy level 2

```
2. SDI BLACK
▼ SIGNAL
```

```
▼ SIGNAL
◆ TIMING
▲ EMB. AUDIO
```

(1) SIGNAL

Select [SIGNAL] by pressing the Up or Down key, then press the [ENTER] key.
This menu is used to set the video level.

Hierarchy level 3

```
3. SIGNAL
   ■ 0%   □ 40%   □ 50%
```

(2) Position the [■] to [0 %], [40 %], or [50 %] by pressing the Left or Right key.
Press the [ENTER] key. The menu returns to hierarchy level 2 [2. SDI BLACK].

4.11.2 TIMING

This section describes setting procedure of the serial digital (SDI black) signal timing with respect to the internal reference signal (i.e., frame reset signal).

(1) Setting procedure is the same as the Section 4.3, “HD TIMING.”

4.11.3 EMBEDDED AUDIO

This mode is used to set the embedded audio signal (e.g., audio signal on or off, audio data resolution, emphasis, channel selection) in each group.

The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

(1) Setting procedure is the same as the Section 4.4, “EMBEDDED AUDIO.”

4.12 EXIT

Select [EXIT] from the [1. GENLOCK SETTING] menu, then press the [ENTER] key. The status display screen is displayed.

4.13 Notes on Reading Preset Data

See note below when using “PRESET/RECALL” function in the “UTILITY MENU” while displaying the NATURAL PICTURE (i.e., FILE TRANSFER executed).

When new preset data is read by changing a CF card, transfer the NATURAL PICTURE again (FILE TRANSFER).
(No NATURAL PICTURE transfer is required if preset data with different picture size is read.)

4.14 Pattern Selection Key

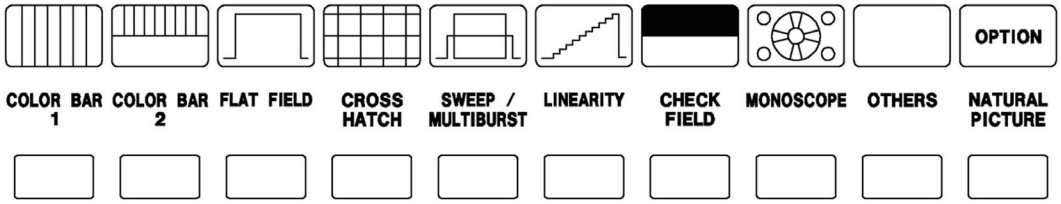


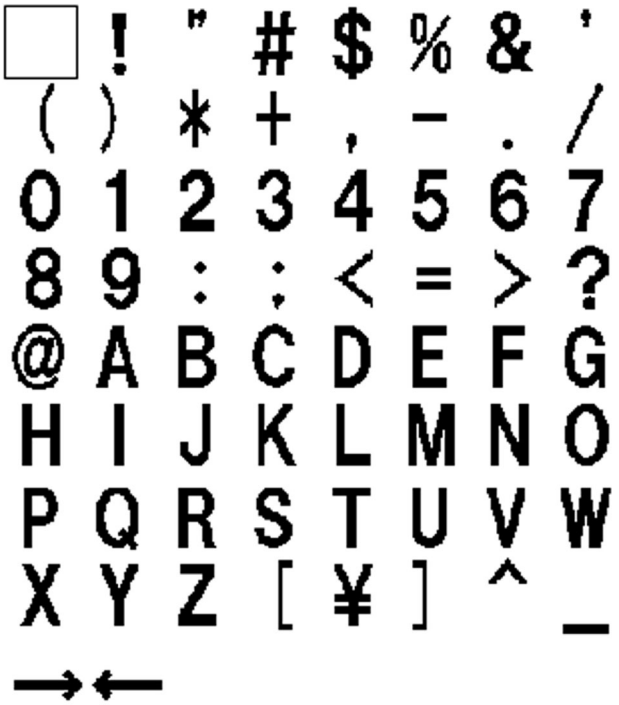
Table below lists the pattern selection keys used for the HD-SDI unit.
The multiple patterns are assigned to some keys listed below.
Pressing the key sequentially selects the pattern. The pattern name is displayed on the LCD panel.

Pattern Selection Key	HD-SDI Output Pattern
COLOR BAR 1	COLOR BAR 100 % COLOR BAR 75 %
COLOR BAR 2	MULTIFORMAT COLOR BAR (One of three patterns is selected. ∗)
FLAT FIELD	FLAT FIELD 100 % FLAT FIELD 50 % FLAT FIELD 0 %
CROSSHATCH	CROSSHATCH & DOT
SWEEP/MULTIBURST	LINE SWEEP 100 % MULTIBURST 100 %
LINEARITY	RAMP SHALLOW RAMP 10 STEP
CHECK FIELD	CHECK FIELD
MONOSCOPE	MONOSCOPE (NORMAL) MONOSCOPE (INVERT)
OTHERS	BOWTIE 100 % PULSE & BAR RED RASTER
NATURAL PICTURE (OPTION)	BLACK (FLAT FIELD 0 %) In case of the Option 70 (NATURAL PICTURE memory) is not installed.

∗ Refer to Section 4.9.1, “MULTIFORMAT CB SET” for selecting the MULTIFORMAT COLOR BAR.

4.15 ID Character Font List

The following ID character fonts can be displayed.
(Fonts below shows the appropriate size and shape.)



LT 443D-BL ANALOG BLACK UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. DESCRIPTION

The LT 443D-BL Analog Black Signal Unit adds the 20 format HDTV analog tri-level sync signal, 525p/625p analog sync signals, and NTSC/PAL black burst signals output capability to the LT 443D mainframe.

Three independent output systems (six outputs, two outputs per system) are provided to output multiformat black sync signal.

The format and output signal timing can be respectively set each output.

The ten-field black signal with ID conforming to the SMPTE 318M standards is also available.

The entire range of timing can be set for the 525p/625p analog sync signals and NTSC/PAL black burst signals in 54 MHz clock steps. The entire range of timing can also be set for the HDTV analog tri-level sync signal in 74.25 MHz or 74.25/1.001 MHz clock steps.

2. SPECIFICATIONS

2.1 Analog Sync Signal Output

2.1.1 BLACK 1, 2/BLACK 3, 4/BLACK 5, 6

Format	HDTV tri-level sync signal conforming to SMPTE 240M/274M/296M standards 525p/625p analog sync signal conforming to SMPTE 293M/ITU-R BT 1358 standards NTSC black burst signal conforming to SMPTE RP-154/SMPTE 170M/SMPTE 318M standards PAL black burst signal conforming to ITU-R BT. 470-6 standards
Sync Level (into 75 Ω)	
• HDTV	Positive polarity: 300 mV ±6 mV Negative polarity: -300 mV ±6 mV
• 525p	-300 mV ±6 mV
• 625p	-300 mV ±6 mV
• NTSC	40 IRE ±1 IRE
• PAL	-300 mV ±6 mV
Blanking Level	0 mV ±15 mV
Rise and fall times	
• HDTV	54 ns ±20 ns
• 525p	70 ns ±10 ns
• 625p	100 ns ±10 ns
• NTSC	140 ns ±10 ns
• PAL	200 ns ±10 ns

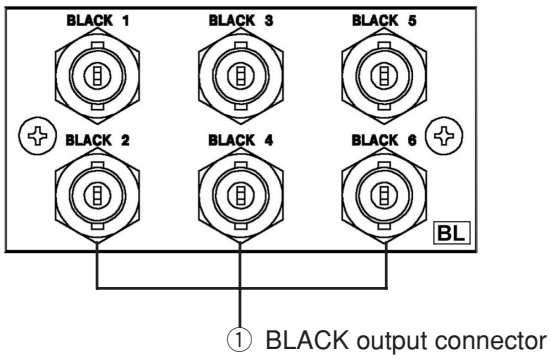
Horizontal Sync Width	
• 1125-Line	Positive polarity : 593 ns ±40 ns
	Negative polarity : 593 ns ±40 ns
• 750-Line	Positive polarity : 539 ns ±40 ns
	Negative polarity : 539 ns ±40 ns
• 525p	2.35 μs ±0.05 μs
• 625p	2.35 μs ±0.05 μs
• NTSC/PAL	4.7 μs ±0.1 μs
Vertical Sync Width	5H (HDTV) / 6 H (525p) / 5H (625p) / 3H (NTSC) / 2.5H (PAL)
Output Impedance	75 Ω
Output Connector	BNC (BLACK 1, 2/BLACK 3, 4/BLACK 5, 6)
Number of Outputs	2 each
Timing Variable Range	
• H-PHASE	Up to ±1 line-1 dot
• Resolution	Variable in 1 dot steps (54 MHz, 74.25 MHz, or 74.25/1.001 MHz converted into clock frequency)
• V-PHASE	Up to ±1 frame-1 line
• Resolution	Variable in 1 line steps
• F-PHASE	Up to ±5 frames (depends on the input signal format.)
• Resolution	Variable in 1 frame steps

2.2 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.4 kg
Accessory	Instruction Manual 1
	Screw (for Unit) 2

3. PANEL DESCRIPTION

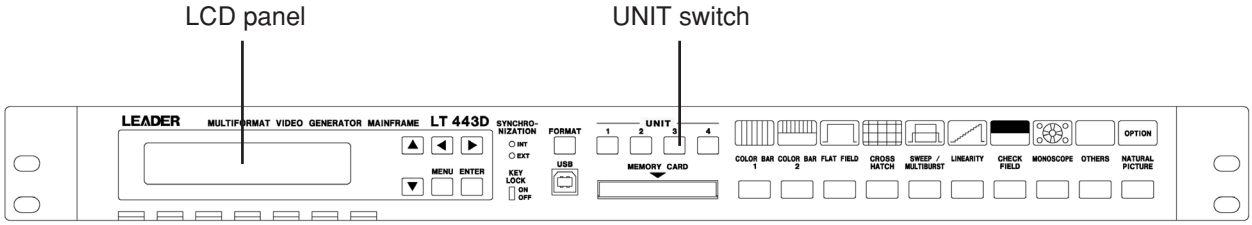
3.1 Rear Panel



① BLACK output connector
Outputs the analog black burst signal and HDTV tri-level sync signal.
Three output systems (two connectors each) are provided.

4. OPERATING PROCEDURE

The front panel controls and LCD panel on the mainframe are used to set the LT 443D-BL.
Press the UNIT 3 switch, for example, corresponding to the UNIT compartment where this unit is installed.



4.1 SETTING Menu Mode Structure

Pressing the UNIT 3 switch, here, on the mainframe displays [1. BL SETTING #3] on the LCD panel.
The [BL SETTING #3] menu is used to set the signal format, output timing, etc.

Hierarchy level 1 — 1. BL SETTING #3 — UNIT compartment No.
▼ BLACK 1, 2 SIGNAL

▼ BLACK 1, 2 SIGNAL
◆ BLACK 3, 4 SIGNAL
◆ BLACK 5, 6 SIGNAL
▲ EXIT

4.2 Selecting Output Connector

This mode is used to select one of three black signal output systems to set the format and timing.

Select [BLACK 1, 2], [BLACK 3, 4], or [BLACK 5, 6] by pressing the Up or Down key, then press the [ENTER] key. In case of [BLACK 1, 2 SIGNAL] is selected:

Hierarchy level 2

```
2. BLACK 1, 2 SIGNAL
▼ FORMAT
```

```
▼ FORMAT
▲ TIMING
```

4.3 FORMAT SELECT

This mode is used to select the output signal format.

4.3.1 Setting FORMAT

(1) Select [FORMAT SELECT] from the [2. BLACK SETTING] menu, then press the [ENTER] key.

(2) The format marked with asterisk is currently selected.
Select the desired format by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. FORMAT BLACK 1, 2
◆ ∗ 1080i/59.94
```

In case of [1080i/59.94] is selected.

- ◆ 1035i/60
- ◆ 1035i/59.94
- ◆ 1080i/60
- ◆ ∗1080i/59.94
- ◆ 1080i/50
- ◆ 1080p/30
- ◆ 1080p/29.97
- ◆ 1080p/25
- ◆ 1080p/24
- ◆ 1080p/23.98
- ◆ 1080PsF/24
- ◆ 1080PsF/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
- ◆ 525p/59.94
- ◆ PAL BB
- ◆ PAL BB+REF
- ◆ 625i/50
- ◆ 625p/50

∗ Refer to “LIST OF BLACK SIGNAL FORMAT” for detail.

4.4 TIMING

This section describes setting procedure of the analog black burst signal timing with respect to the internal reference signal (i.e., frame reset signal).

4.4.1 Setting TIMING

(1) Select [TIMING] from the [2. OUTPUT 1, 2 SIGNAL] menu, then press the [ENTER] key. Select the Frame (F), Vertical (V), or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. TIMING   BLACK 1, 2
▼ F-PHASE
```

▼ F-PHASE ∗ Displayed when NTSC or PAL is selected.
◆ V-PHASE [LINE]
◆ H-PHASE [DOT]
▲ H-PHASE [μs]

(2) F-PHASE (F: Frame)

This mode is used to set the timing in frame steps.
Press the Up or Down key to set the timing.
The settable range is ±5 FRAME for NTSC BB and NTSC BB + XX, ±2 FRAME for PAL BB and PAL BB + XX.
This menu is not displayed when other format is selected; the timing cannot be changed.

Hierarchy level 4

```
4. F-PHASE   R: 6.250 Hz
  BLK 1, 2   +2 FRAME
```

Displays the current reference reset signal for the BLACK signal generator.
R: 2.997 Hz
R: 6.250 Hz
R: 3.000 Hz

(3) V-PHASE [line] (V: Vertical)

This mode is used to set the vertical timing.
The timing can be set in one line steps by pressing the Up or Down key.
Holding down this key increments or decrements the timing continuously.
(For NTSC BB. +ID, PAL BB, and PAL BB + REF, the timing cannot be changed even when the Down key is held down for long time. Release the Down key, then hold down the key again in this case.)
Press the [ENTER] key to enter data to enter data. The menu returns to hierarchy level 3 [3. TIMING].
Pressing the [MENU] key selects the next higher hierarchy.

Hierarchy level 4

```
4. V-PHASE   R: 6.250 Hz
  BLK 1, 2   +5 LINE
```

In case of +5 LINE is set.

(4) H-PHASE [dot] (H: Horizontal)

This mode is used to set the horizontal timing in dot steps.

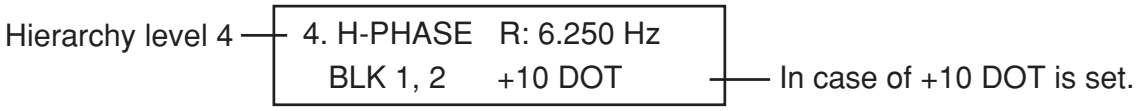
Press the Up or Down key to set the timing.

In the 1080i/59.94 format, the settable range is ±2199 DOTs in one dot steps.

Holding down this key increments or decrements the timing continuously.

After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



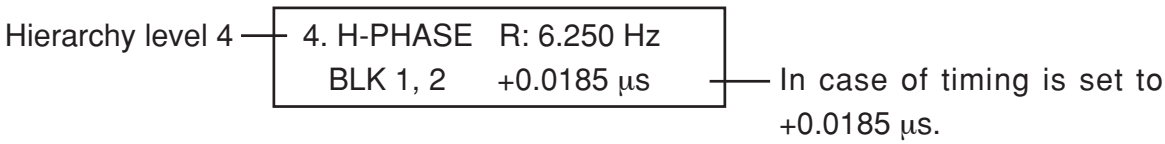
(5) H-PHASE [μs] (H: Horizontal)

This mode is used to set the horizontal timing. Press the Up or Down key to set the timing.

The timing can be set in 18.5 ns steps for the NTSC and PAL systems, in 13.5 ns steps for the HDTV system.

After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 3 [3. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



4.5 EXIT

Select [EXIT] from the [1. GENLOCK SETTING] menu, then press the [ENTER] key. The status display screen is displayed.

LT 443D-SD SD-SDI UNIT
LT 443D-SDB SD-SDI & BLACK UNIT
(4 : 2 : 2 COMPONENT)

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. DESCRIPTION

The LT 443D-SD (SD-SDI Unit) and LT 443D-SDB (SD-SDI & BLACK Unit) add the capability to output 525/625 line format SD-SDI signal (4:2:2 component signal) to the LT 443D mainframe. Various functions (e.g., ID character display, simple motion pictures, embedded audio, NATURAL picture pattern ∗1) are provided.

The LT 443D-SDB (SD-SDI & BLACK Unit) can output SD-SDI black signal independently of the SD-SDI test signals.

∗1:The option should be installed.

2. SPECIFICATIONS

∗Specifications are common to both models LT 443D-SD and LT 443D-SDB unless otherwise noted.

2.1 Output

- SD-SDI Video Output 1 system, 2 outputs (75 Ω, BNC)
- SD-SDI Black Output 1 system, 2 outputs (75 Ω, BNC)

(The SD-SDI black signal is only output when the LT 443D-SDB is installed.)

2.2 Specifications

- Conform To ITU-R BT 601, SMPTE 125M standards
  ITU-R BT 656, SMPTE 259M standards

2.3 SDI Characteristics

- Bit Rate 270 Mbps
- Output Amplitude 800 mVp-p ±10 %
- Overshoot ≤ 10 %
- Rise and Fall Time 0.4 to 1.5 ns (20 % to 80 %)
- DC Offset 0 V ±0.5 V
- Output Impedance 75 Ω
- Return Loss ≥ 15 dB (5 MHz to 270 MHz)

2.4 Function

2.4.1 Common to SD-SDI Video and SD-SDI Black Outputs

- Applicable Format 525i/59.94-270 MHz, 625i/50-270 MHz

∗ The SD-SDI video and SD-SDI black signal output formats are the same.

- Variable Timing

Variable Range		Entire frame range
Setting	V	Settable in line steps
	H	Settable in clock steps (27 MHz)

∗ The timing of SD-SDI video and SD-SDI black signals can be set respectively.

• Embedded Audio

Number of Channels Embedded	8 channels (4 channels x 2 groups) Each group can be set ON/OFF
Sampling Frequency	48 kHz (sync to video signal)
Resolution	20 bits, 24 bits, selectable
Preemphasis	OFF, 50/15 μs, CCITT, selectable (CS bit is only selected.)
Frame Number	ON, OFF, selectable
Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k, 5.0 k, 6.0 k, 8.0 k, 9.6 k, 10.0 k, 12.0 k, 15.0 k, 16.0 k, 20.0 kHz, silence
Level	-60 to 0 dBFS (settable in 1 dB steps)
Audio Click	1, 2, 3, 4 sec, OFF

∗ Frequency, level, and audio click can be set to each channel.

∗ When the CHECK FIELD pattern is selected, no audio signal is embedded.

∗ The embedded audio can be set to the SD-SDI video output and SD-SDI black output respectively.

2.4.2 SD-SDI Video Output

• Test Patterns

(1) COLOR BAR 100 %		White: 100 %, Color saturation: 100 %, Setup: 0 %
(2) COLOR BAR 75 %		White: 100 %, Color saturation: 75 %, Setup: 0 % Applicable to 525i/59.94
(3) EBU COLOR BAR		Applicable to 625i/50
(4) BBC COLOR BAR		Applicable to 625i/50
(5) SMPTE COLOR BAR		Applicable to 525i/59.94
(6) RAMP & COLOR	525	Top 25%: Over size ramp Bottom 75%: 75/0/75/0 SMPTE color bar
	625	Top 25%: Over size ramp Bottom 75%: 100/0/75/0 EBU color bar
(7) FLAT FIELD 100 %		
(8) FLAT FIELD 50 %		
(9) FLAT FIELD 0 %		
(10) FIELD ID		
(11) CROSSHATCH		
Number of Lines	525	16 (H), 17 (V)
	625	19 (H), 17 (V)
(12) LINE SWEEP 100 %		
Frequency Range	Y	0.5 to 5.6 MHz (Marker: 1.0, 2.0, 3.0, 4.0, 5.0 MHz)
	Cb, Cr	0.25 to 2.8 MHz (Marker: 0.5, 1.0, 1.5, 2.0, 2.5 MHz)

(13) LINE SWEEP 60%			
Frequency Range	Y, Cb, Cr		Same as “LINE SWEEP 100 %”
(14) MULTIBURST 100%			
Frequency	Y		0.5, 1.0, 2.0, 3.0, 4.0, 5.6 MHz
	Cb, Cr		0.5, 1.0, 1.5, 2.0, 2.8 MHz
(15) MULTIBURST 60%			
Frequency	Y, Cb, Cr		Same as “MULTIBURST 100 %”
(16) OVER SIZE RAMP			
Level	Y		-38.36 to 735.16 mV
	Cb, Cr		-385.16 to +385.16 mV
(17) DIGITAL LIMIT RAMP			
Level	Y		-47.95 to 763.13 mV (004 H to 3FB H)
	Cb, Cr		-396.88 to +396.08 mV (004 H to 3FB H)
(18) SHALLOW RAMP			
Level	Y	1	0.0 to 79.9 mV
		2	69.5 to 149.4 mV
		3	139.0 to 218.9 mV
		4	207.8 to 287.7 mV
		5	276.5 to 356.4 mV
		6	345.2 to 425.1 mV
		7	413.9 to 493.8 mV
		8	482.6 to 562.6 mV
		9	551.4 to 631.3 mV
		10	620.1 to 700.0 mV
	Cb, Cr	1	-350.0 to -271.9 mV
		2	-281.3 to -203.1 mV
		3	-212.5 to -134.4 mV
		4	-143.8 to -65.6 mV
		5	-75.0 to 3.1 mV
		6	-6.3 to 71.9 mV
		7	63.3 to 141.4 mV
		8	132.8 to 210.9 mV
		9	202.3 to 280.5 mV
		10	271.9 to 350.0 mV
(19) 10 STEP			
Level	Y		0 to 703.2 mV
	Cb, Cr		-351.6 to +351.6 mV
(20) CHECK FIELD			Conforms to SMPTE RP-178 standards.
(21) MONOSCOPE			NORMAL, INVERT
(22) BOWTIE 100%			Marker resolution: 20 ns
(23) PULSE & BAR	525		2T pulse, 12.5T pulse, 2T bar
	625		2T pulse, 20T pulse, 2T bar

(24) RED RASTER		Color saturation: 100 %
(25) MULTIPULSE		
Level	Y	0 to 420 mV
	Cb, Cr	-210 to +210 mV
Frequency	Y	1.0, 2.0, 3.0, 4.0, 5.6 MHz
	Cb, Cr	0.5, 1.0, 1.5, 2.0, 2.8 MHz

• NATURAL Picture*1

File	24-bit full color BMP file (720 x 487, 720 x 576)
Number of Selectable Patterns with PATTERN Key	5

• Simple Motion Picture Mode (Scroll)

Direction		8 directions (vertical, horizontal, diagonal)
Speed (Range, Resolution)		
	Field Frame	Variable in field steps
	V	0 to 256 lines in 2 line steps
	H	0 to 256 dots in 4 dot steps

• ID Characters

Number of Characters	Up to 20
Size	32 x 32 dots, 64 x 64 dots, selectable
Display Position	Arbitrary position on the screen.
Blinking	OFF, 1 to 10 seconds (in 1 sec steps)

2.4.3 SD-SDI Black Output Mode (LT 443D-SDB only)

• Displayable Pattern

(1) Flat Field	0 %, 40 %, 50 % (selectable)

2.5 General Specifications

Environmental Conditions

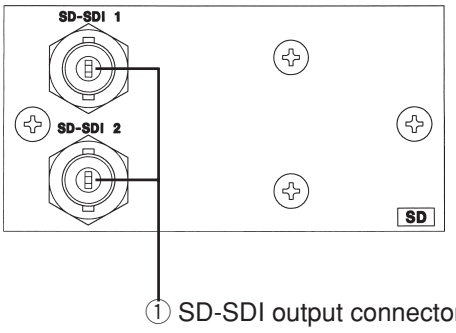
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.4 kg
Accessory	Instruction Manual ..... 1 Screw (for Unit) 2

*1 The Option 70 should be installed to enable the NATURAL PICTURE mode.

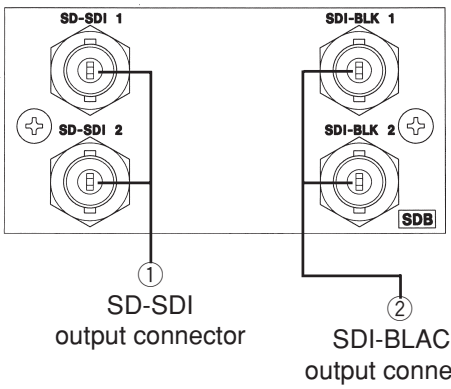
3. PANEL DESCRIPTION

3.1 Rear Panel

LT 443D-SD



LT 443D-SDB



① SD-SDI output connector
Outputs the serial digital signal.
Two systems are provided; both systems output the same signal.

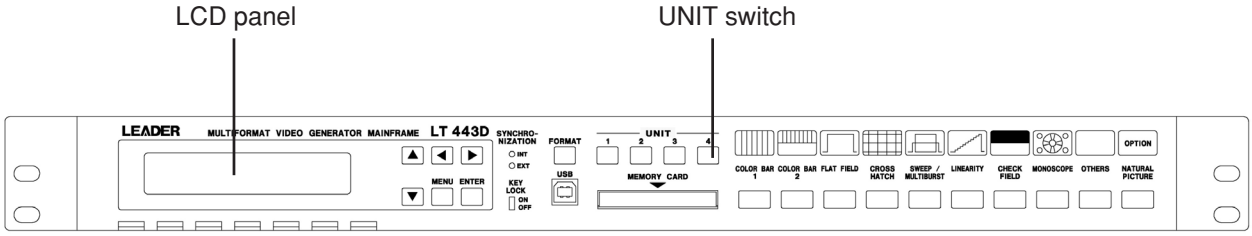
② SDI-BLK output connector
Outputs the serial digital black signal.
Two systems are provided; both systems output the same signal.

4. OPERATING PROCEDURE

∗ Operating procedure is common to both models LT 443D-SD and LT 443D-SDB unless otherwise noted.

The front panel controls and LCD panel on the mainframe are used to set the LT 443D-SD and LT 443D-SDB.

Press the UNIT 4 switch, for example, corresponding to the UNIT compartment where LT 443D-SD or LT 443D-SDB unit is installed.



4.1 SETTING Menu Mode Structure (LT 443D-SD / LT 443D-SDB)

Pressing the UNIT 4 switch, for example, on the mainframe displays [1. SD SETTING #4] on the LCD panel. (Menu is common to both models LT 443D-SD and LT 443D-SDB.)
The [SD SETTING] menu is used to set the signal format, output timing, embedded audio, Y/Cb/Cr, ID character, pattern scroll, etc.

▼ FORMAT SELECT
◆ SD TIMING
◆ EMBEDDED AUDIO
◆ Y, Cb, Cr ON/OFF
◆ ID CHARACTER
◆ PATTERN SCROLL
◆ PATTERN CHANGE
◆ NATURAL PICTURE ∗Option 70 (NATURAL PICTURE) should be installed.
◆ SDI BLACK (LT 443D-SDB only)
▲ EXIT

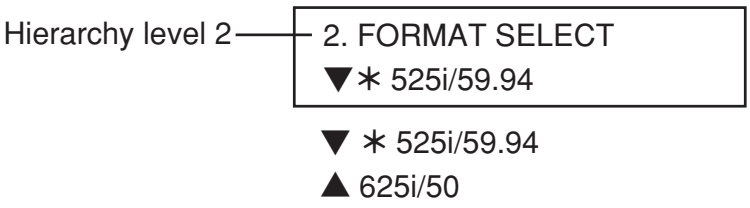
4.2 FORMAT SELECT

This mode is used to select the output signal format.

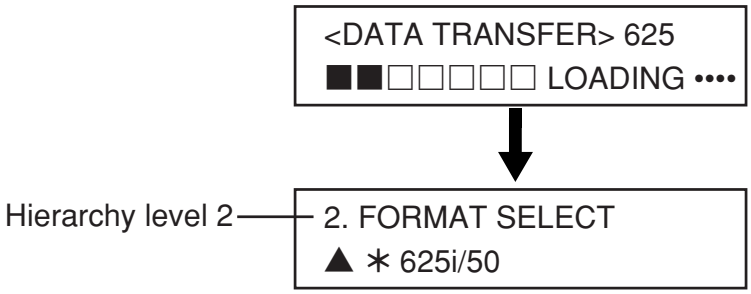
4.2.1 Setting Format

(1) Select [FORMAT SELECT] from the [1. SD SETTING] menu, then press the [ENTER] key.

(2) The format marked with an asterisk is currently selected.



(3) To obtain the 625i format, select [▲ 625p/50] by pressing the Down key, then press the [ENTER] key.



(4) Pressing the [MENU] key returns the display to hierarchy level 1 [1. SD SETTING].

4.3 SD TIMING

This section describes setting procedure of the serial digital signal timing with respect to the internal reference signal (i.e., frame reset signal).
The entire range of timing can be set in one line steps for vertical, 27 MHz clock steps for horizontal.

4.3.1 Setting TIMING

(1) Select [SD TIMING] from the [1. SD SIGNAL] menu, then press the [ENTER] key. Select Vertical (V) or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 2

```
2. SD TIMING
▼ SD V-PHASE [LINE]
```

▼ SD V-PHASE [LINE]
◆ SD H-PHASE [DOT]
▲ SD H-PHASE [μs]

(2) V-PHASE [line] (V: Vertical)
This mode is used to set the vertical timing.
Press the Up or Down key to set the timing.
In the 525i/59.94 format, the settable range is ±524 lines in one line steps.
In the 625i/50 format, the settable range is ±624 lines in one line steps.
After setting is completed, press the [ENTER] key.

Hierarchy level 3

```
3. SD V-PHASE
        0 LINE
```

(3) H-PHASE [dot], [μs] (H: Horizontal)
This mode is used to set the horizontal timing.
Press the Up or Down key to set the timing.

Hierarchy level 3

```
3. SD H-PHASE
        0 DOT
```

In the the 525i/59.94 format, the settable range is ±1715 DOTs in one dot steps.
After setting is completed, press the [ENTER] key.

Hierarchy level 3

```
3. SD H-PHASE
      0.0000 μs
```

In the 525i/59.94 format, the settable range is ±63.5185 μs, equal to ±1715 DOTs, in "0.037 μs x number of dots" steps.
After setting is completed, press the [ENTER] key.

(4) Pressing the [MENU] key returns the display to hierarchy level 2 [2. SD TIMING]. Pressing the [MENU] key again returns the display to hierarchy level 1 [1. SD SETTING].

4.4 EMBEDDED AUDIO

This mode is used to set the embedded audio signal (e.g., audio signal on or off, audio data resolution, emphasis, frame number on or off, channel selection) in each group.
The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

4.4.1 Selecting Group

(1) Select [EMBEDDED AUDIO] from the [1. SD SETTING] menu, then press the [ENTER] key.

Hierarchy level 1

```
1. SD SETTING
◆ EMBEDDED AUDIO
```

(2) Position the [■] to [G1/G2] or [G3/G4] by pressing the Left or Right key, then press the [ENTER] key.
Other setting modes can also be set by using the Left or Right key, and [ENTER] key. (The G3/G4 groups are selected, here.)

Hierarchy level 2

```
2. EMBEDDED AUDIO
  □ G1/G2   ■ G3/G4
```

4.4.2 Setting in Selected Group

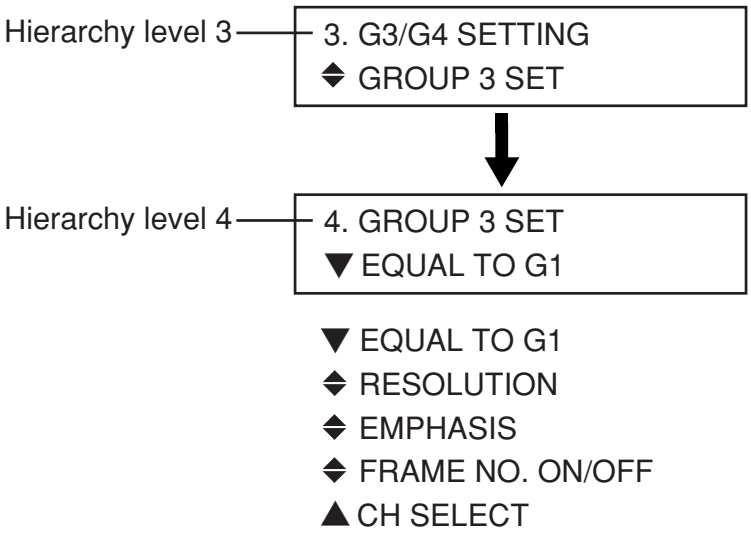
Hierarchy level 3

```
3. G3/G4 SETTING
◆ GROUP 3 SET
```

▼ AUDIO ON/OFF
◆ GROUP 3 SET
▲ GROUP 4 SET

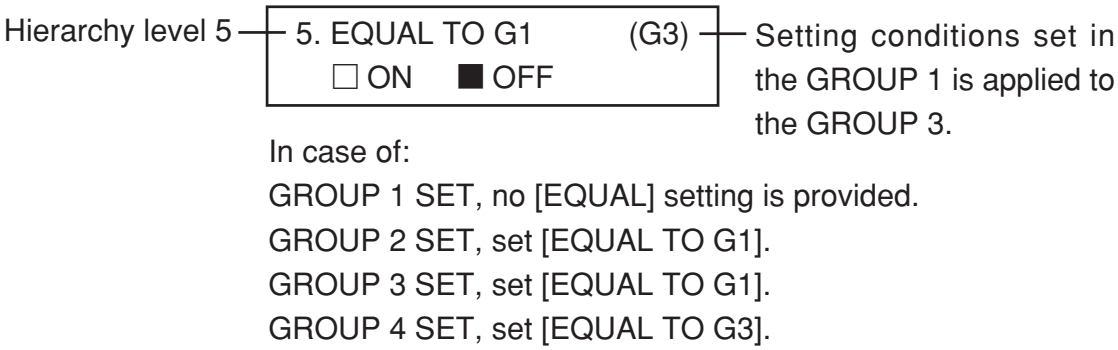
4.4.2.1 Detailed Setting GROUP 3 SET

This section describes setting procedure of the [GROUP 3 SET], for example.
Select [◆ GROUP 3 SET] by pressing the Down key, then press the [ENTER] key.
Other setting modes (i.e., audio data resolution, emphasis, frame number on or off, and channel selection) can also be set by using the Left or Right key, and [ENTER] key.



(1) Setting [EQUAL TO G1]

Setting conditions of the selected item can also be applied to other groups.
For example, when applying [EQUAL TO G1] set in the [GROUP 1] to the [GROUP 3], proceed as follows:

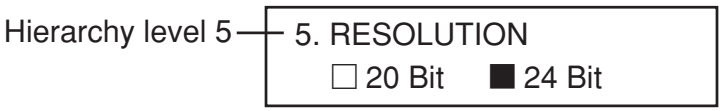


In case of:
GROUP 1 SET, no [EQUAL] setting is provided.
GROUP 2 SET, set [EQUAL TO G1].
GROUP 3 SET, set [EQUAL TO G1].
GROUP 4 SET, set [EQUAL TO G3].

Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET].
Pressing the [MENU] key selects the next higher hierarchy.

(2) Setting [RESOLUTION]

This mode is used to set the digital data resolution of the selected group.



Position the [■] to the desired Bit by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET].

(3) Setting [EMPHASIS]

This mode is used to set the emphasis bit of the selected group. The settable items are 50/15, CCITT, and OFF (NO EMPHASIS).

Hierarchy level 5

```
5. EMPHASIS
  □ 50/15 □ CCITT ■ OFF
```

Position the [■] to the desired item by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET]. Pressing the [MENU] key selects the next higher hierarchy.

(4) Setting [FRAME NO. ON/OFF]

This mode is used to set the frame number of embedded audio signal on or off.

Hierarchy level 5

```
5. FRAME NO. ON/OFF
  ■ ON    □ OFF
```

Position the [■] to the desired item by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 4 [4. GROUP 3 SET]. Pressing the [MENU] key selects the next higher hierarchy.

(5) Setting [CH SELECT]

Each group consists of four channels.

The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

Hierarchy level 5

```
5. CH SELECT
  ▼ GROUP 3 CH 9
```

In case of GROUP 3 is selected.

▼ GROUP 3 CH 9
◆ GROUP 3 CH 10
◆ GROUP 3 CH 11
▲ GROUP 3 CH 12

Before setting the embedded audio signal frequency, level, and click for each channel, select the desired channel by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 6

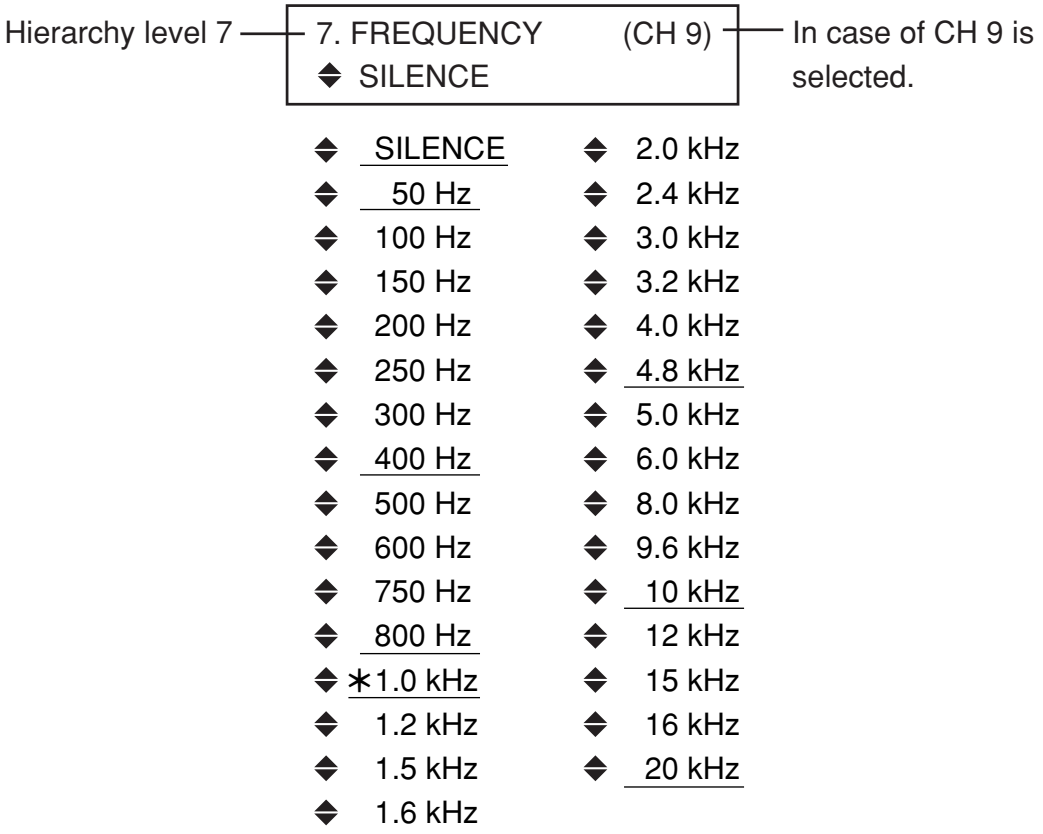
```
6. GROUP 3 CH 9
  ▼ FREQUENCY
```

▼ FREQUENCY
◆ LEVEL
▲ CLICK

① Setting [FREQUENCY]

" ∗ " indicates the frequency currently selected.

Frequency can be set to the selected channel.



Underlined frequencies can be selected sequentially by pressing the Left or Right key.

To select the desired frequency, press the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9].

The frequency can be sequentially selected by pressing the Up or Down key.

Pressing the [MENU] key selects the next higher hierarchy.

② Setting [LEVEL]

The embedded audio signal level of selected channel can be set.

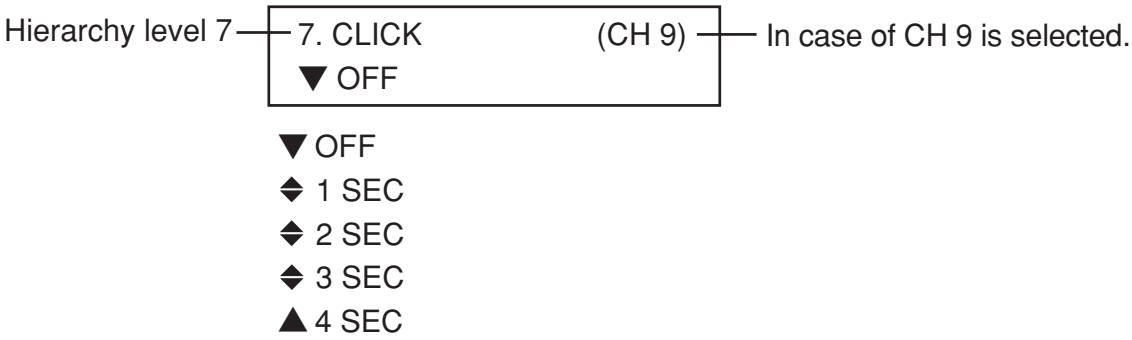
The settable level range is 0 dB to -60 dBFS in one dBFS steps.

Set the level by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9].

Pressing the [MENU] key selects the next higher hierarchy.

③ Setting [CLICK]

A click can be inserted in the embedded audio signal of the selected channel.

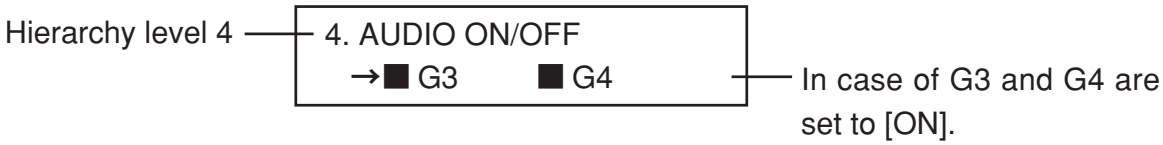


Set the click time by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 6 [6. GROUP 3 CH 9].

Pressing the [MENU] key selects the next higher hierarchy.

4.4.2.2 Setting AUDIO ON/OFF

This mode is used to set [AUDIO ON/OFF]. The selected group can be set respectively.



Position the [→] to the G3 or G4 by pressing the Left or Right key, then select [ON] or [OFF] by pressing the Up or Down key. The item marked with [■] is set [ON]. Pressing the [ENTER] key enters data. The menu returns to hierarchy level 3 [3. G3/G4 SETTING].

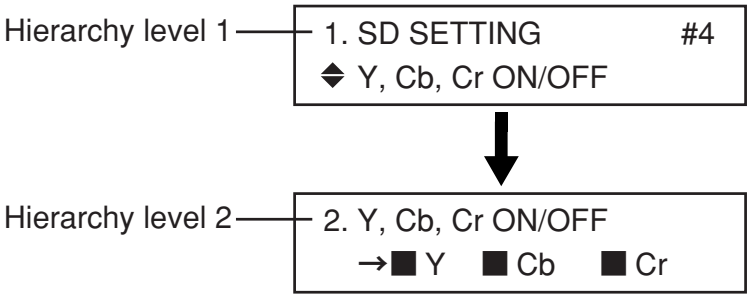
Pressing the [MENU] key selects the next higher hierarchy.

4.5 Y, Cb, Cr

The Y, Cb, Cr components of serial digital signal can be respectively set on or off.

4.5.1 Setting Y, Cb, Cr ON/OFF

(1) Select [Y, Cb, Cr ON/OFF] from the [1. SD SETTING] menu, then press the [ENTER] key.



(2) Position the [→] to [Y], [Cb], or [Cr] by pressing the Left or Right key, then select [ON] or [OFF] by pressing the Up or Down key. The item marked with [■] is set [ON].

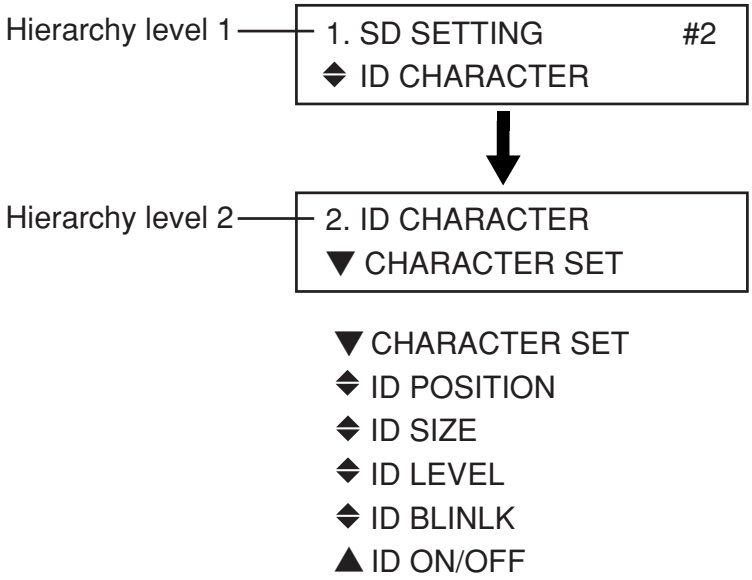
(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 1 [1. SD SETTING].

4.6 ID CHARACTER

This mode is used to superimpose alphanumeric characters on the serial digital video signal.

4.6.1 Creating ID Character

Select [ID CHARACTER] from the [1. SD SETTING] menu, then press the [ENTER] key. The ID character, display position, character size, and ID ON/OFF can be set.



(1) CHARACTER SET

Select [CHARACTER SET] by pressing the Up or Down key, then press the [ENTER] key.

This mode is used to create ID characters.

Up to 20 characters can be displayed.

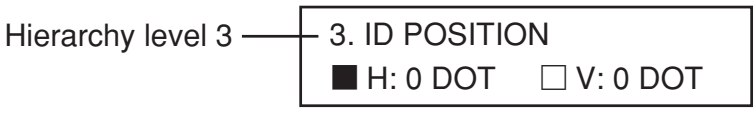
Move the blink cursor to the character to be set by pressing the Left or Right key, then set the characters by pressing the Up or Down key.

After all characters are set, press the [ENTER] key.

4.6.2 ID POSITION

This mode is used to position the ID characters.

(1) Select [ID POSITION] by pressing the Up or Down key, then press the [ENTER] key.



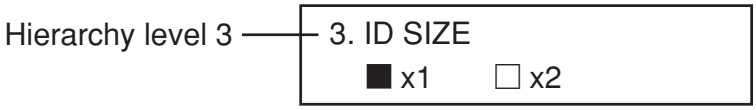
(2) Position the [■] to [H] or [V] by pressing the Left or Right key, then set the number of dots by pressing the Up or Down key. The upper-left corner of the monitor screen is the reference (0, 0) when setting the parameters in dots.

(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.3 ID SIZE

This mode is used to set the character size.

(1) Select [ID SIZE] by pressing the Up or Down key, then press the [ENTER] key.



(2) Position the [■] to [x1] or [x2] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.4 ID LEVEL (Setting Character Brightness)

This mode is used to set the ID character brightness.

(1) Select [ID LEVEL] by pressing the Up or Down key, then press the [ENTER] key.

(2) Position the [■] to [100 %] or [75 %] by pressing the Left or Right key to select the brightness for easy reading: 100 % for white, 75 % for light gray.
Press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.5 ID BLINK (Setting Blinking Time)

This mode is used to set the ID character blinking time and turn on or off. This mode can also be used for checking the system operation status when the stationary pattern is displayed.

(1) Select [ID BLINK] by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 3

```
3. ID BLINK
   ▼ ID BLINK TIME
```

```
▼ ID BLINK TIME
▲ ID BLINK ON/OFF
```

(2) ID BLINK TIME

This mode is used to set the blinking on and off times (i.e., duration) of the characters..

Hierarchy level 4

```
4. ID BLINK TIME
   ■ ON: 10 s   □ OFF: 10 s
```

Position the [■] to [ON] or [OFF] by pressing the Left or Right key. The “on” time can be set from one to 10 seconds by pressing the Up or Down key.
Press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

(3) ID BLINK ON/OFF

This menu is used to set the ID BLINK mode on or off.

Hierarchy level 4

```
4. ID BLINK ON/OFF
   ■ ON:        □ OFF
```

Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

4.6.6 ID ON/OFF

This mode is used to set ID character display on or off.

(1) Select [ID ON/OFF] by pressing the Up or Down key, then press the [ENTER] key.

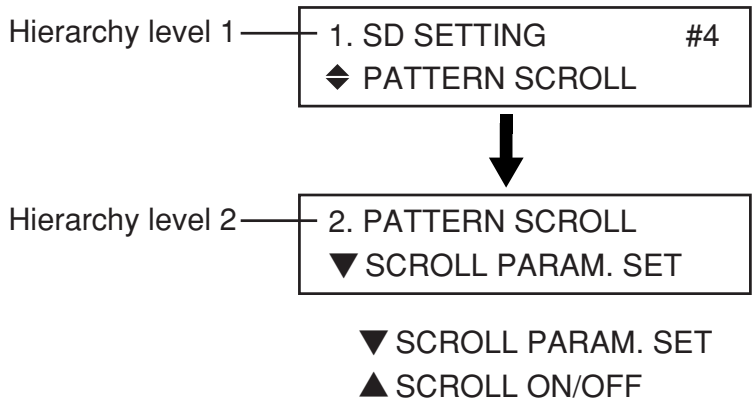
Hierarchy level 3

```
3. ID ON/OFF
   ■ ON:        □ OFF
```

(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.7 PATTERN SCROLL

This mode is used to scroll the pattern up, down, left, and right in the effective display ares. Select [◆PATTERN SCROLL] from the [1. SD SETTING] menu, then press the [ENTER] key.



▼ SCROLL PARAM. SET
▲ SCROLL ON/OFF

4.7.1 SCROLL PARAM. SET

This mode is used to set the scroll direction and speed.

(1) Select [SCROLL PARAM. SET] by pressing the Up or Down key, then press the [ENTER] key.

▼ DIRECTION
▲ SPEED

(2) Setting SCROLL DIRECTION

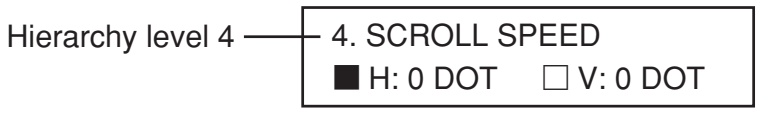
Select [DIRECTION] by pressing the Up or Down key, then press the [ENTER] key.
Set the scroll direction by pressing the Up or Down key, then press the [ENTER] key.
The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].
Pressing the [MENU] key selects the next higher hierarchy.

▼ UP & RIGHT
◆ UP
◆ UP & LEFT
◆ LEFT
◆ DOWN & LEFT
◆ DOWN
◆ DOWN & RIGHT
▲ RIGHT

(3) Setting SCROLL SPEED

This mode is used to set the scroll speed.

Select [SPEED] by pressing the Up or Down key, then press the [ENTER] key.



Position the [■] to [H] or [V] by pressing the Left or Right key, then set the scroll speed by pressing the Up or Down key.

The settable range is 0 to 256 dots in four dot steps in the horizontal direction, 0 to 256 dots in two dot steps in the vertical direction.

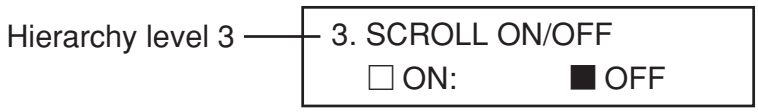
Pressing the [ENTER] key enters data. The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].

Pressing the [MENU] key selects the next higher hierarchy.

4.7.2 Setting SCROLL ON/OFF

This mode is used to set the pattern scroll mode on or off.

(1) Select [SCROLL ON/OFF] from the [2. PATTERN SCROLL] menu by pressing the Up or Down key, then press the [ENTER] key.



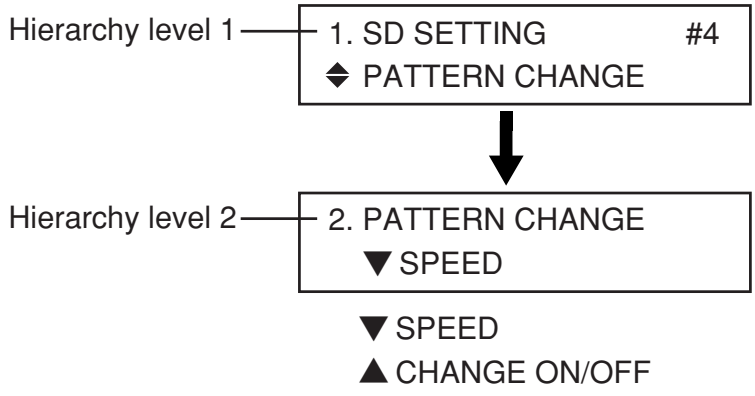
(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN SCROLL].

Pressing the [MENU] key selects the next higher hierarchy.

4.8. PATTERN CHANGE

All patterns (except CHECK FIELD pattern) indicated on the front panel are sequentially selected from the left to right and displayed.

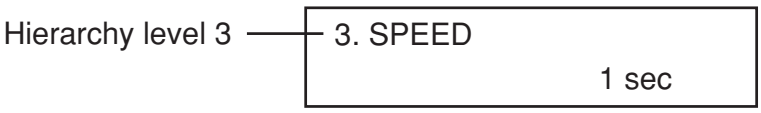
Select [◆ PATTERN CHANGE] from the [1. SD SETTING] menu, then press the [ENTER] key.



4.8.1 Setting PATTERN CHANGE Speed

The settable pattern switching time is 1 to 255 seconds.

(1) Select [SPEED] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.

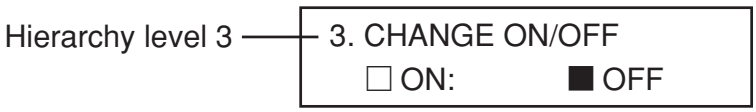


(2) Set the pattern switching time by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN CHANGE].
Pressing the [MENU] key selects the next higher hierarchy.

4.8.2 Setting PATTERN CHANGE ON/OFF

This mode is used to set PATTERN CHANGE mode on or off.

(1) Select [PATTERN CHANGE ON/OFF] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.



(2) Select [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key.

4.9 NATURAL PICTURE (w/OP70)

The NATURAL PICTURE display function is used to display data (i.e., NATURAL PICTURE data converted into the original data dedicated for the LT 443D) transferred from the compact flash (CF) card to a high-speed RAM.
Data should be transferred to a high-speed RAM again when power is turned off since a high-speed RAM is used.

This menu is only displayed when the NATURAL PICTURE option (OP 70) is installed in the mainframe.
Use Windows application software of the LT 443D-70 to store NATURAL PICTURE data on the CF card. Refer to LT 443D-70 instruction manual for detail. (This procedure describes in case of NATURAL PICTURE data is stored on the CF card.)

Select [◆ NATURAL PICTURE] from the [1. SD SETTING] menu, then press the [ENTER] key.

(1) CF Card with NATURAL PICTURE

Hierarchy level 2

```
2. NATURAL PICTURE
▼ SELECT PICTURE 1
```

```
▼ SELECT PICTURE 1
◆ SELECT PICTURE 2
◆ SELECT PICTURE 3
◆ SELECT PICTURE 4
◆ SELECT PICTURE 5
◆ FILE TRANSFER
▲ SET TO CF CARD
```

(2) CF Card without NATURAL PICTURE

Hierarchy level 2

```
2. NATURAL PICTURE
        NO DATA!
```

Warning message is displayed; no NATURAL PICTURE file cannot be selected.
If the CF card is inserted, return to the top menu of [NATURAL PICTURE], then apply the procedure above again to read NATURAL PICTURE file.

4.9.1 Selecting SELECT PICTURE File

(1) Select [SELECT PICTURE 1] from the [2. NATURAL PICTURE] menu by pressing the Up or Down key, then press the [ENTER] key.
The NATURAL PICTURE file list∗ (stored on the CF card in the MEMORY CARD slot) corresponding to the current format size is displayed.
∗"E:\IMAGE\H525" folder for 525 line format
(E:\ indicates CF card drive.)
"E:\IMAGE\H625" folder for 625 line format

Hierarchy level 3

```
3. SELECT PICTURE 1
▼∗FLOWER 1      1/10
```

```
▼∗ FLOWER 1      1/10
◆   FLOWER 2     2/10
◆   FLOWER 3     3/10
◆   GREEN        4/10
◆      •
◆      •
◆   YOKOHAMA    7/10
◆   JAPAN        8/10
◆   PHOTO 1      9/10
◆   PHOTO 2     10/10
```

Amount of NATURAL PICTURE files and file numbers corresponding to the current format size are displayed.
File name is displayed in uppercase letters.
Up to 100 files can be stored in the same format.

(2) Selecting PICTURE 1 (NATURAL PICTURE File)
In case of the number of files are ten, position the [∗] to the file number ([1/10] to [10/10]) by pressing the Up or Down key.
When the [ENTER] key is pressed at the file name without asterisk, the file is selected to [PICTURE 1].
When the [ENTER] key is pressed at the file marked with an asterisk, the file selected to [PICTURE 1] is canceled.

(3) Selecting PICTURE 2 to PICTURE 5(NATURAL PICTURE File)
Apply the same procedure as Step (2), "Selecting PICTURE 1 (NATURAL PICTURE File)." Up to five pictures can be displayed.
Natural Picture file should be selected from PICTURE 1 first.

4.9.2 Transferring NATURAL PICTURE

The NATURAL PICTURE is now selected.
Select [◆ FILE TRANSFER], then press the [ENTER] key.
Select [OK] by the [◀] key, then press the [ENTER] key. The PICTURE 1 to PICTURE 5 files are transferred.
When the [==] is positioned to [CANCEL], the file is not transferred; file name is displayed.

Hierarchy level 2

```
2. NATURAL PICTURE    (X)
◆ FILE TRANSFER
```

"(X)" indicates the number of screens to transfer NATURAL PICTURE data in Section, "Selecting SELECT PICTURE File."
"(X)" is not displayed when the NATURAL PICTURE file is not set or after data is transferred.

Hierarchy level 3

```
3. <FILE TRANSFER>
     □ OK      ■ CANCEL
```

```
<DATA TRANSFER> 525
■■□□□□□ LOADING•••
```

```
<DATA TRANSFER> 525
■■■■■■■ COMPLETE!
```

The NATURAL PICTURE pattern is output after data is transferred.

4.9.3 Writing NATURAL PICTURE File

NATURAL PICTURE data set in Section 4.9.1, “Selecting SELECT PICTURE File” can be written on the CF card. The contents will be stored in the [E:\IMAGEset_img txt]. (E:\ indicates CF card drive.)

Select [▲ SET TO CF CARD], then press the [ENTER] key.
Select [OK] by pressing the Left key, then press the [ENTER] key. The selected file is now written.

Hierarchy level 2

```
2. NATURAL PICTURE
   ▲ SET TO CF CARD
```

Hierarchy level 3

```
3. SET TO CF CARD
   □ OK    ■ CANCEL
```

The following message is displayed when the file is correctly written.
By writing the file, the file contents written on the CF card is automatically read and NATURAL PICTURE file is displayed when the power is turned on; no manual setting is required.

```
SET TO CF CARD
WRITE COMPLETE!
```

The following message is displayed if the file is written incorrectly. Confirm that the CF card is inserted in place.

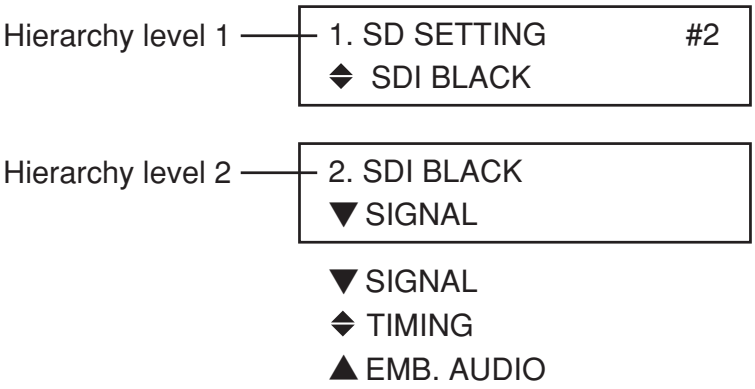
```
SET TO CF CARD
WRITE ERROR!
```

4.10 SDI BLACK

This section describes setting procedure of SDI BLACK signal.
∗ This section is only applicable to the LT 443D-SDB unit.

4.10.1 Setting Video Level

Select [SDI BLACK] from the [1. SD SETTING] menu, then press the [ENTER] key.
This menu is used to set the video level, timing, and embedded audio of SDI black signal.



(1) SIGNAL

Select [SIGNAL] by pressing the Up or Down key, then press the [ENTER] key. This menu is used to set the video level.

(2) Position the [■] to [0 %], [40 %], or [50 %] by pressing the Left or Right key. Press the [ENTER] key. The menu returns to hierarchy level 2 [2. SDI BLACK].

4.10.2 TIMING

This section describes setting procedure of the serial digital (SDI black) signal timing with respect to the internal reference signal (i.e., frame reset signal).

(1) Setting procedure is the same as the Section 4.3, “SD TIMING.”

4.10.3 EMBEDDED AUDIO

This mode is used to set the embedded audio signal (e.g., audio signal on or off, audio data resolution, emphasis, frame number on or off, channel selection) in each group. The relationship between the group and channel numbers is as follows:

[GROUP 1]: CH 1 to CH 4
[GROUP 2]: CH 5 to CH 8
[GROUP 3]: CH 9 to CH 12
[GROUP 4]: CH 13 to CH 16

(1) Setting procedure is the same as the Section 4.4, “EMBEDDED AUDIO.”

4.11 EXIT

Select [EXIT] from the [1. GENLOCK SETTING] menu, then press the [ENTER] key. The status display screen is displayed.

4.12 Notes on Reading Preset Data

See note below when using “PRESET/RECALL” function in the “UTILITY MENU” while displaying the NATURAL PICTURE (i.e., FILE TRANSFER executed).

When new preset data is read by changing a CF card, transfer the NATURAL PICTURE again (FILE TRANSFER).
(No NATURAL PICTURE transfer is required if preset data with different picture size is read.)

4.13 Pattern Selection Key

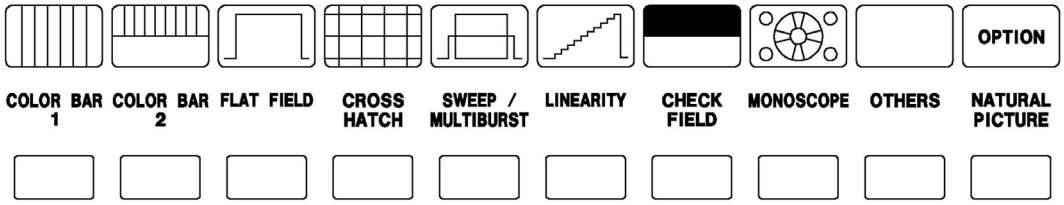
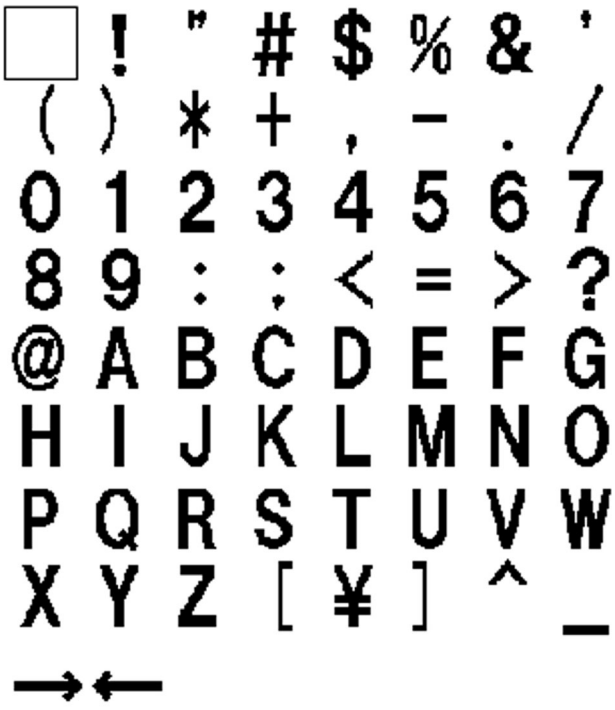


Table below lists the pattern selection keys used for the SD-SDI unit.
When multiple patterns are assigned to the key listed below, pressing the key sequentially select the pattern. The pattern name is displayed on the LCD panel.

Pattern Selection Key	SD-SDI Output Pattern	
	525 Line	625 Line
COLOR BAR 1	COLOR BAR 100 % COLOR BAR 75 %	COLOR BAR 100 % EBU COLOR BAR BBC COLOR
COLOR BAR 2	RAMP & COLOR SMPTE	RAMP & COLOR
FLAT FIELD	FLAT FIELD 100 % FLAT FIELD 50 % FLAT FIELD 0 % FIELD ID	FLAT FIELD 100 % FLAT FIELD 50 % FLAT FIELD 0 % FIELD ID
CROSS HATCH SWEEP/MULTI BURST	CROSS HATCH LINE SWEEP 100 % LINE SWEEP 60 % MULTI BURST 100 % MULTI BURST 60 %	CROSS HATCH LINE SWEEP 100 % LINE SWEEP 60 % MULTI BURST 100 % MULTI BURST 60 %
LINEARITY	OVERSIZE RAMP DIGITAL LIMIT RAMP SHALLOW RAMP 10 STEP	OVERSIZE RAMP DIGITAL LIMIT RAMP SHALLOW RAMP 10 STEP
CHECK FIELD MONOSCOPE	CHECK FIELD MONOSCOPE (NORMAL) MONOSCOPE (INVERT)	CHECK FIELD MONOSCOPE (NORMAL) MONOSCOPE (INVERT)
OTHERS	BOWTIE 100 % PULSE & BAR RED RASTER MULTI PULSE	BOWTIE 100 % PULSE & BAR RED RASTER MULTI PULSE
NATURAL PICTURE (OPTION)	FLAT FIELD 0 % In case of the Option 70 (NATURAL PICTURE memory) is not installed.	FLAT FIELD 0 % In case of the Option 70 (NATURAL PICTURE memory) is not installed.

4.14 ID Character Font List

The following ID character fonts can be displayed.
(Fonts below shows the appropriate size and shape.)



LOGO MARK DISPLAY FUNCTION

INSTRUCTION MANUAL

LT 443D-HD
LT 443D-HDB
LT 443D-SD
LT 443D-SDB

NOTE:
This instruction manual covers only the additional specifications (logo mark display) of the LT 443D-HD/HDB/SD/SDB.
For all other information, see the item of “HD-SDI UNIT/HD-SDI & BLACK UNIT” or “SD-SDI UNIT/SD-SDI & BLACK UNIT” in this manual.

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. DESCRIPTION

Displays a logo mark that has been converted from a bitmap to 4-level monochrome data at an arbitrary position in the effective area

2. SPECIFICATIONS

Logo Mark Data:	4-level monochrome data between levels 0 and 3
Maximum size:	1920 (dots) x 1024 (lines)
Display position:	Displays the logo mark at an arbitrary position on the display. ∗The upper left corner of the logo mark is the display start point. If the display area deviates from the effective area, the deviant section becomes blank data (black) and are not displayed folded back.
Display Level:	Set arbitrary levels for levels 0 to 3 ∗In addition to displaying at a specified level, the level 0 sections can be displayed translucently to show the background. In this case, the displayed data becomes 4-level monochrome data.
Simultaneous Display with the ID Character:	Can be displayed simultaneously with the ID character ∗The ID character take precedence in sections where the ID character and the display area overlap.
File Format	
Before conversion:	24-bit full-color bitmap data (.bmp) format
After conversion:	LT 443D dedicated (.lg) format
Conversion Color Matrix:	Y = 0.212∗R + 0.701∗G + 0.087∗B Converts 256-level monochrome date (Y) to four levels (levels 0 to 3) using arbitrary threshold values.
Conversion Method:	Converted using the LT 443D logo mark conversion application that comes standard.
Logo Mark Data Transfer:	Save the data to a commercially sold Compact Flash card and transferred to the unit by the LT 443D main frame. ∗The data transferred to the unit cannot be held when the power is turned OFF.

3. Operating Environment of the Application

Below are the system requirements for running the application.

1) System

   A PC/AT compatible with a Pentium 100 MHz CPU or faster and at least 32 MB of memory.

2) OS
   Windows 98, Windows Me, or Windows 2000 (with the operating system running correctly).

3) Hard disk
   Free disk space of 30 MB or more (if the swap file area and the storage area for data are added, a larger disk space is necessary).

4) Disk drive
   Drive that can read CD-R

5) Display
   Display equipped with SVGA resolution or better.

6) Pointing device
   Mouse or an alternative function.

7) Memory card interface
   An interface that can read/write to Compact Flash cards must be installed.

4. COPYRIGHT

LEADER ELECTRONICS CORP. holds the copyright to the LT 443D logo mark conversion software application (the software) and the sample data that are provided. The software can be used as an accessory by those customers who have purchased the LT 443D.
Customers are not allowed to alter, transfer, or sell the software for any reason.
Copying of the software is allowed only for using the LT 443D or backing up the software.
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5. SCOPE OF WARRANTY

LEADER ELECTRONICS CORP. will not be held responsible for the results obtained by the software and sample data.
Should a serious defect be found such as damage on the medium containing the software within 30 days after purchase, the medium will be replaced free of charge.

6. OPERATING PROCEDURE

6.1 Installing the LT 443D Logo Mark Conversion Application Software

(1) If other software programs are running, close them.

(2) Set the "**LOGO MARK SOFTWARE**" CD-R in the CD-ROM drive, and open the **English** folder on the CD-R using **My Computer** or some similar means.

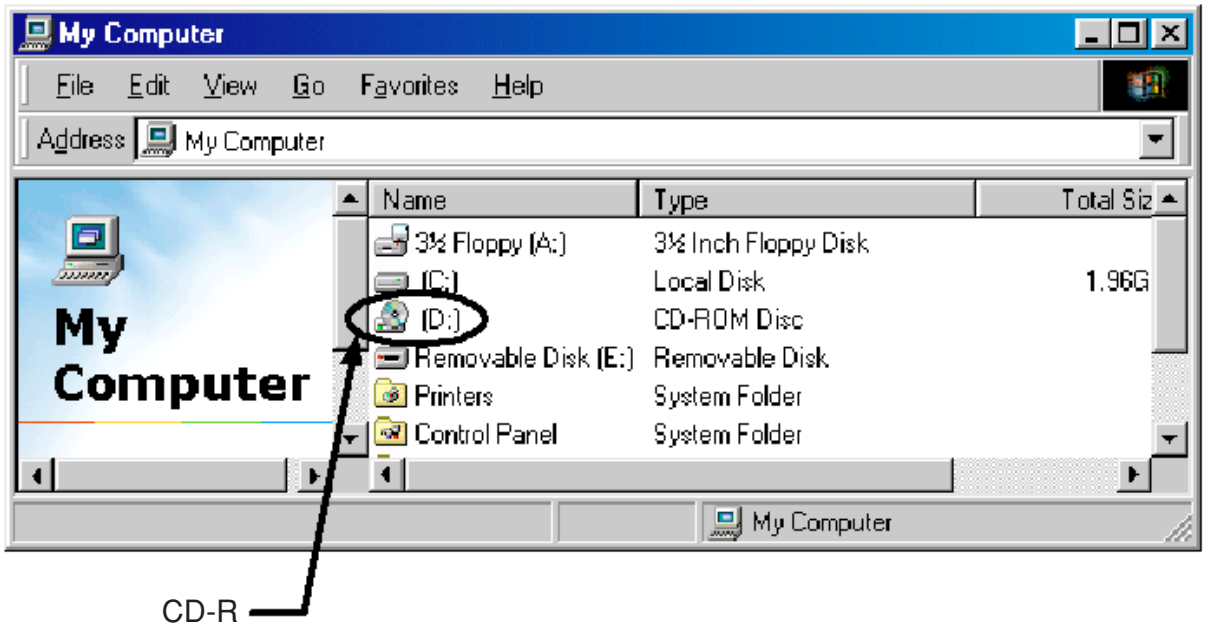


Figure 6-1-1

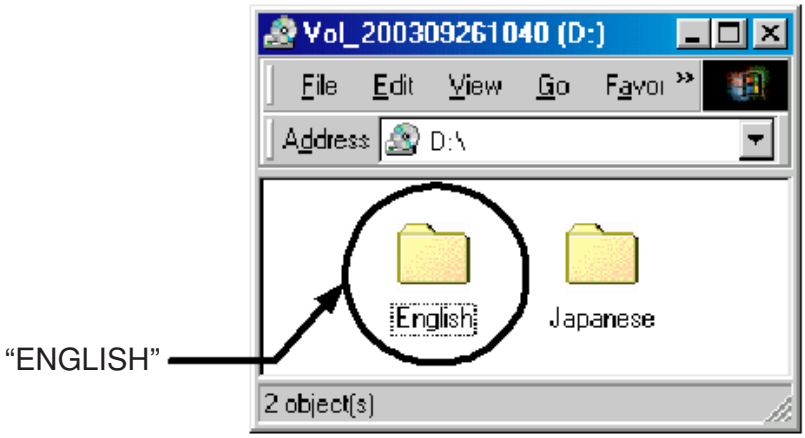


Figure 6-1-2

(3) Double-click **setup.exe** to start the installation program.

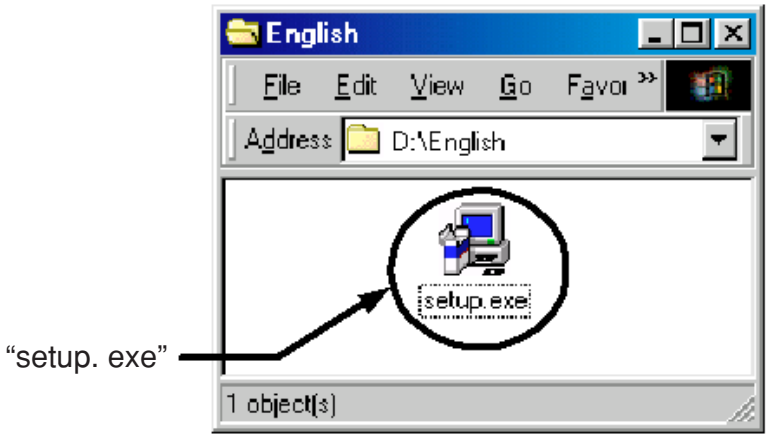


Figure 6-1-3

(4) The following screen appears. Click **Next**.

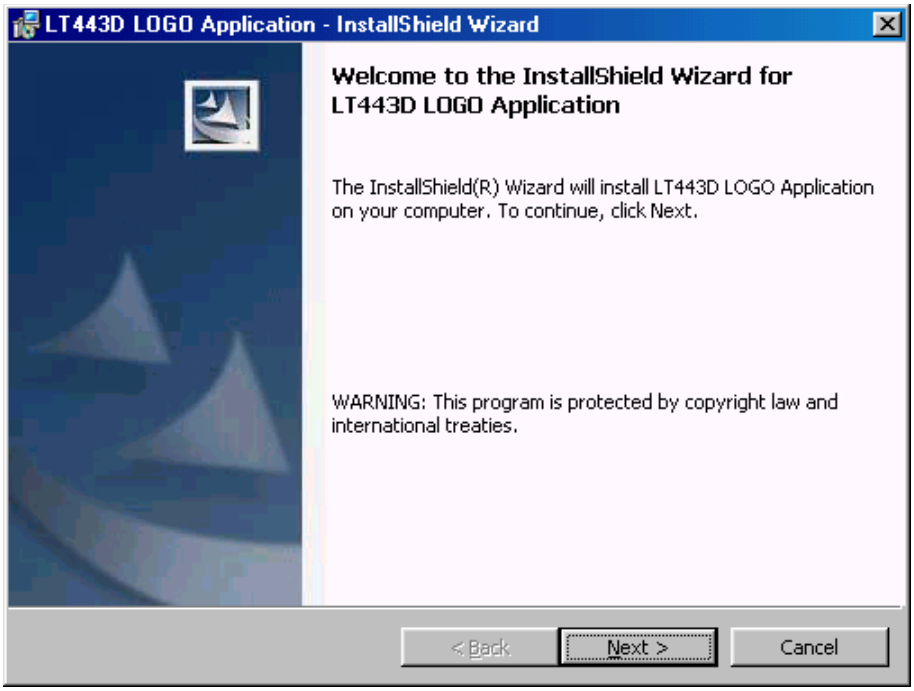


Figure 6-1-4

(5) When a screen appears indicating that the installation is complete, click **Finish**. The installation is finished.

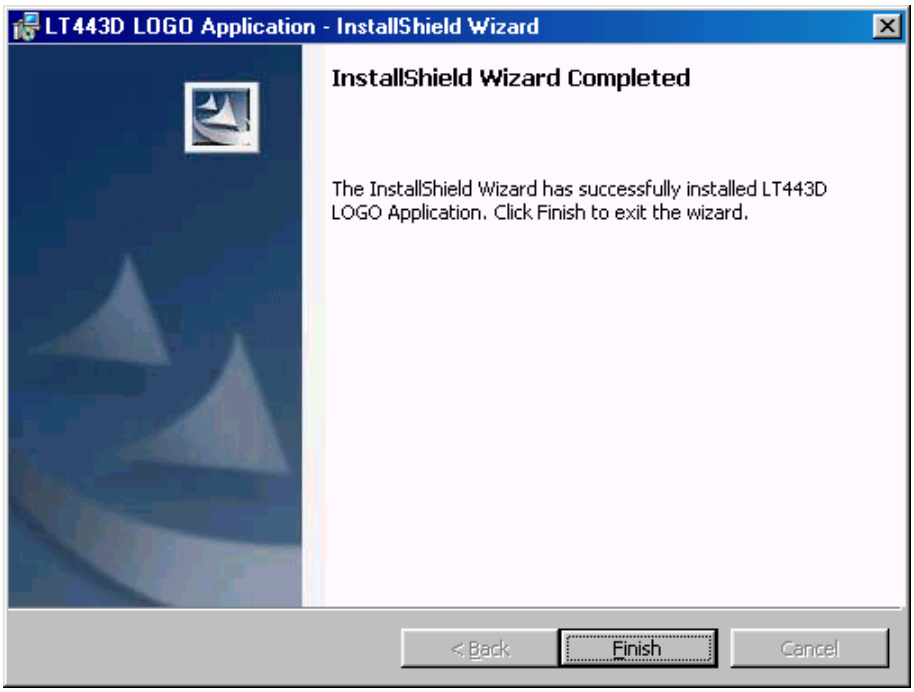


Figure 6-1-5

6.2 Preparing the Logo Mark Data

The logo mark data for the LT 443D is created by converting a bitmap file into a dedicated LT 443D format using the LT 443D Logo Mark Conversion Application Software. Therefore, you must prepare a source bitmap.

6.2.1 Bitmap File Format

A 24-bit color Windows bitmap file (.bmp extension) is used. Compressed bitmap files (.rle extension) and bitmap files that use index colors cannot be used.

6.2.2 Bitmap File Name

Due to the limitations on the LT 443D, file names that can be used must be less than or equal to 8 alphanumeric characters (8.3 format). If the bitmap file name is longer than 8 characters, rename the file. When a file is converted into the dedicated LT 443D format, only the extension changes. The name before the extension remains the same. Below is an example.

Example: File name when LOGO1.BMP is converted

Before conversion	→	After conversion
LOGO1. BMP		LOGO1. LG

∗ Do not use file names that are longer than 8 characters, because the file name will not appear correctly on the LT 443D LCD.

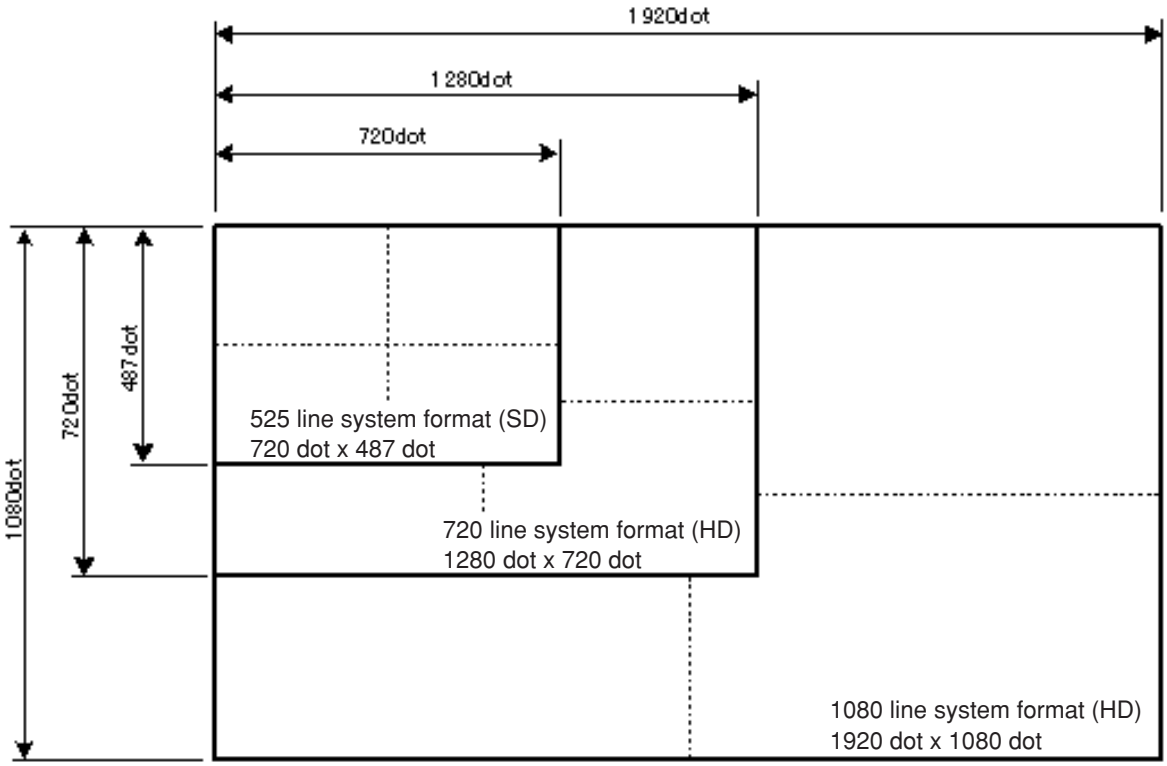
6.2.3 Resolution of Bitmap Files

The maximum resolution (display size) of the bitmap files that can be used as original data for the logo mark is 1920 dots (horizontal) x 1024 dots (vertical). The resolution of the file in the dedicated LT 443D format after conversion depends on the resolution of the bitmap file before the conversion. (The resolution does not change as a result of the conversion.)

6.2.4 Display Size of the Logo Mark

The resolution of the logo mark does not change as a result of the data conversion into the dedicated LT 443D format, because it is determined by the resolution of the bitmap file. However, the actual display size of the logo mark when it is displayed on a color monitor or some similar means varies depending on the video format, because the display size is related relatively to the resolution of the video format. Decide on the resolution of the logo mark by referring to the resolution of the video format to be used.

The resolutions of the video formats are compared in the figure below. A table listing the resolutions of the video formats are also given.



Comparison of the resolutions of the video formats

Resolution of Video Formats

Video Format		Resolution Horizontal x Vertical [dot]
HD	1035 line system	1920 x 1035
	1080 line system	1920 x 1080
	720 line system	1280 x 720
SD	525 line system	720 x 487
	625 line system	720 x 576

6.3 Creating the Log Mark Data

6.3.1 Converting the Data

(1) Click Select File and open the bitmap data to be converted.
The length of bitmap file name must be less than or equal to 8 alphanumeric characters.
When the file opens, the contents are displayed.

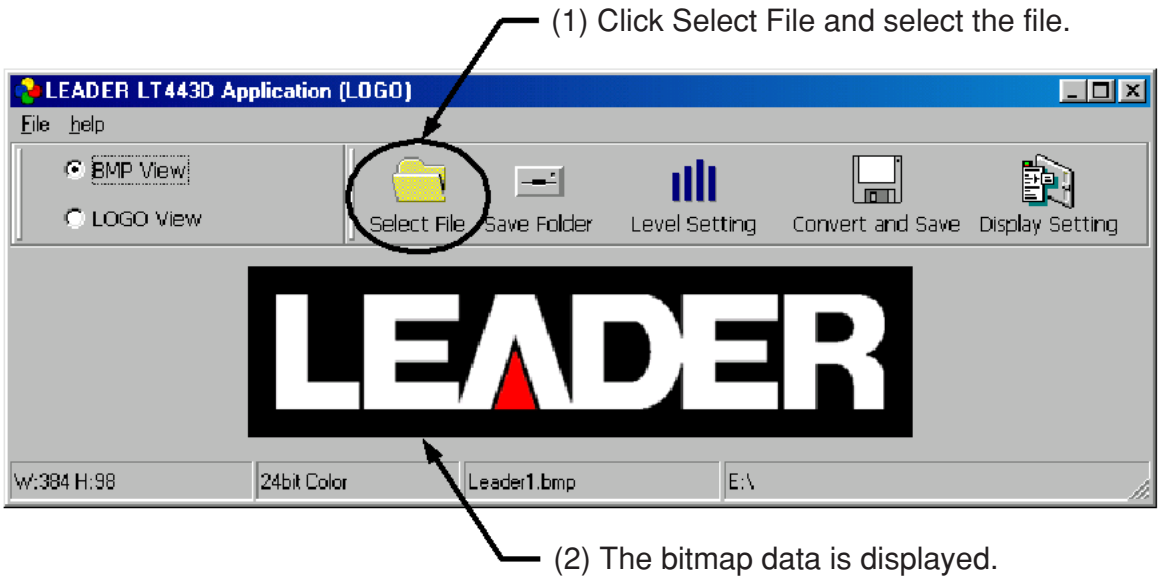


Figure 6-3-1

(2) Select LOGO View to preview the displayed image when the data is converted into 4-level logo mark data.

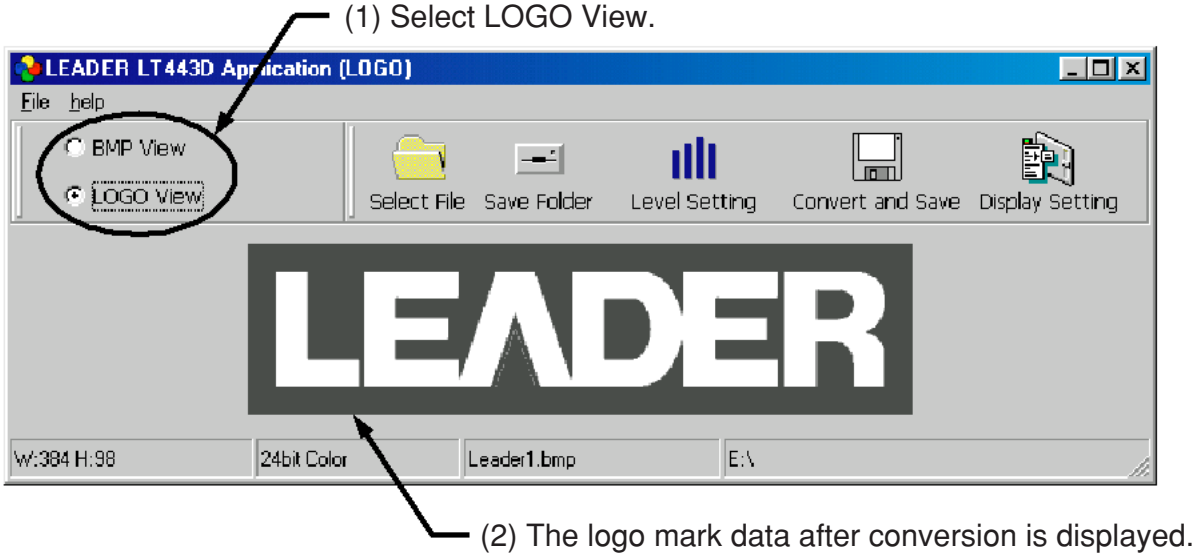


Figure 6-3-2

∗The logo mark display here shows the image using black, dark gray, light gray, and white for levels 0 to 3, respectively. The actual display on the LT 443D can be set arbitrarily from the LT 443D menu. (For a description of how to set the display, see section 6.5.3, “LOGO LEVEL.”)

(3) To change the threshold values used to convert the logo mark data (into 4-level monochrome), click Level Setting to open a setup window and change the settings. Click the Refresh button to view the logo mark data after changing threshold values.

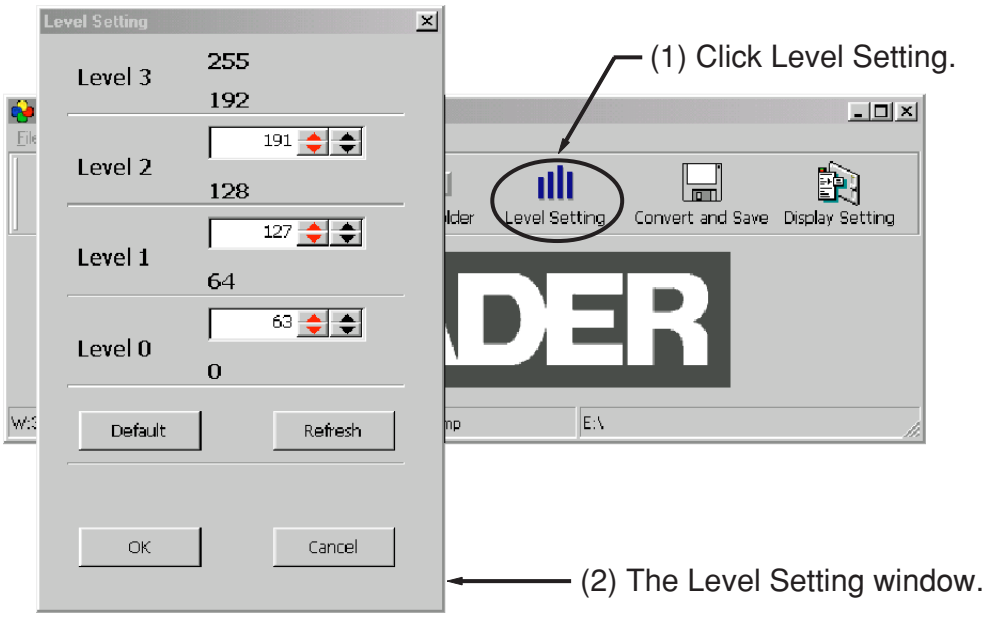


Figure 6-3-3

(4) Click the Save Folder button to select the save destination. If you specify the root directory of the Compact Flash card (CF card) as the save destination, the converted data is saved directly to the CF card. This simplifies the creation of the CF card.
Click Convert and Save to start the data conversion. The “logo” folder is created automatically under the directory specified by Save Folder, and the converted logo mark data is saved in the folder.

∗For a description of how to handle the logo mark data when the save destination is not set to the CF card drive, see section 6.3.3, “Save Destination of the Logo Mark Data.”

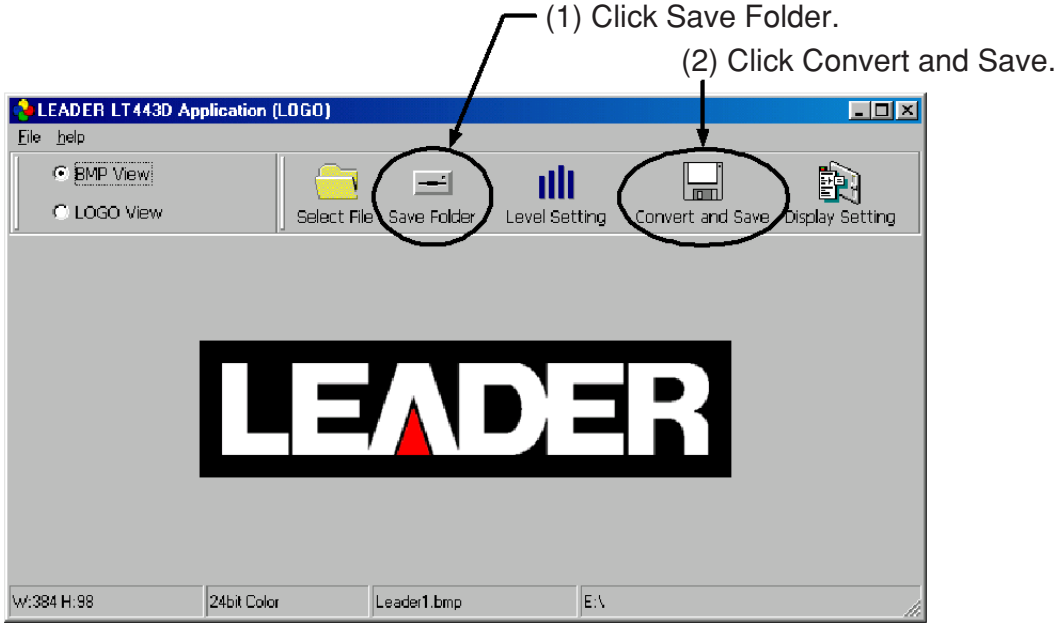


Figure 6-3-4

6.3.2 Display Setting

Display Setting is a function used to automatically transfer the specified logo mark data to the specified unit from the CF card when the LT 443D is turned on according to the information in the display setting file. The display setting file (set_logo.txt) is created in advance in the “logo” folder. It contains information on which files are to be used from the dedicated LT 443D logo mark data stored on the CF card.

The “display setting” can be specified on the LT 443D Logo Mark Conversion Application Software or the LT 443D. This section explains the procedures for using the LT 443D Logo Mark Conversion Application Software.

To enter the setting from the LT 443D menu, see section 6.5.6.3, “SET TO CF CARD.”

(1) Executing Display Setting

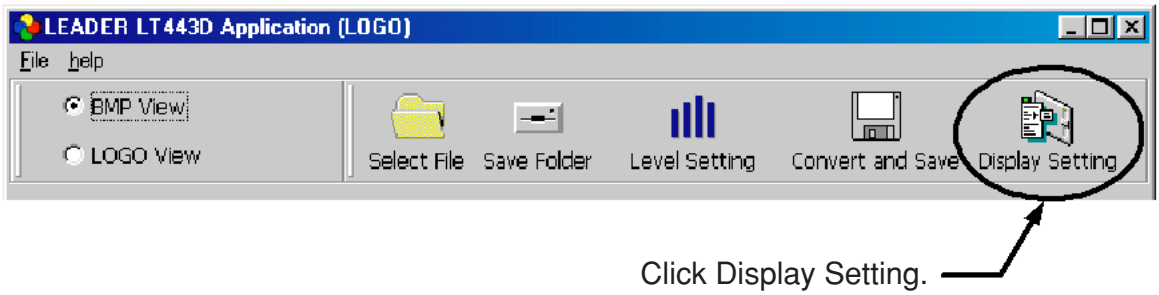


Figure 6-3-5

(2) Selecting the Unit

Select the unit whose display setting is to be changed. (Below is an example in which UNIT 2 is selected.)

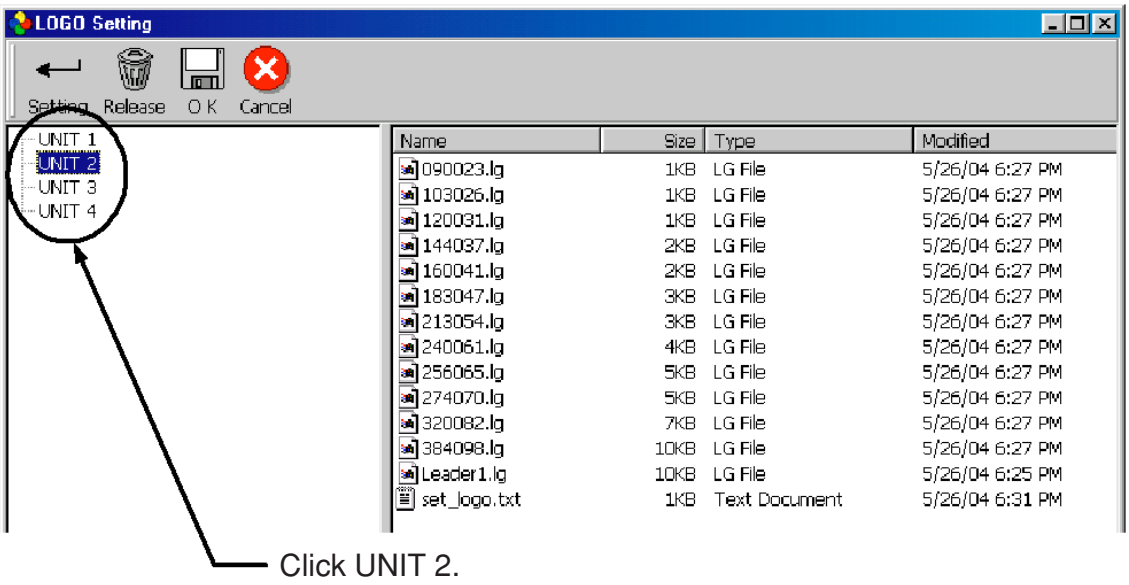


Figure 6-3-6

(3) Selecting the Logo Mark Data File

Select the log mark data file that will be transferred to the unit and click the Setting button to confirm. To clear the selection, click the Release button.

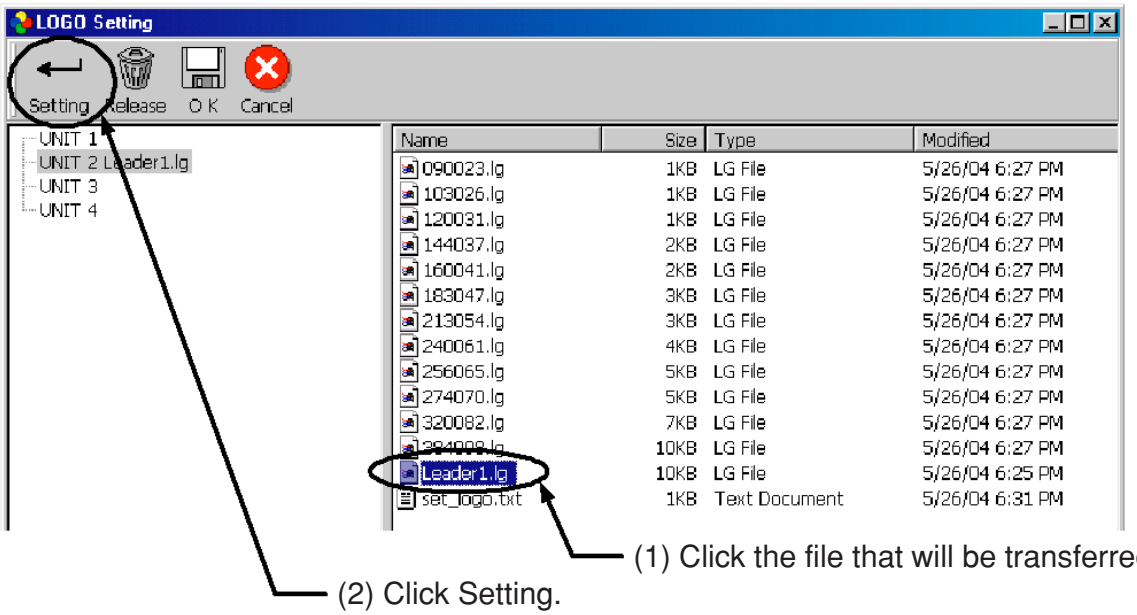


Figure 6-3-7

(4) Saving the Display Setting File

Click the OK button to save the display setting file. The name of the saved file is set_logo.txt. If you do not wish to save the setting, click the Cancel button.

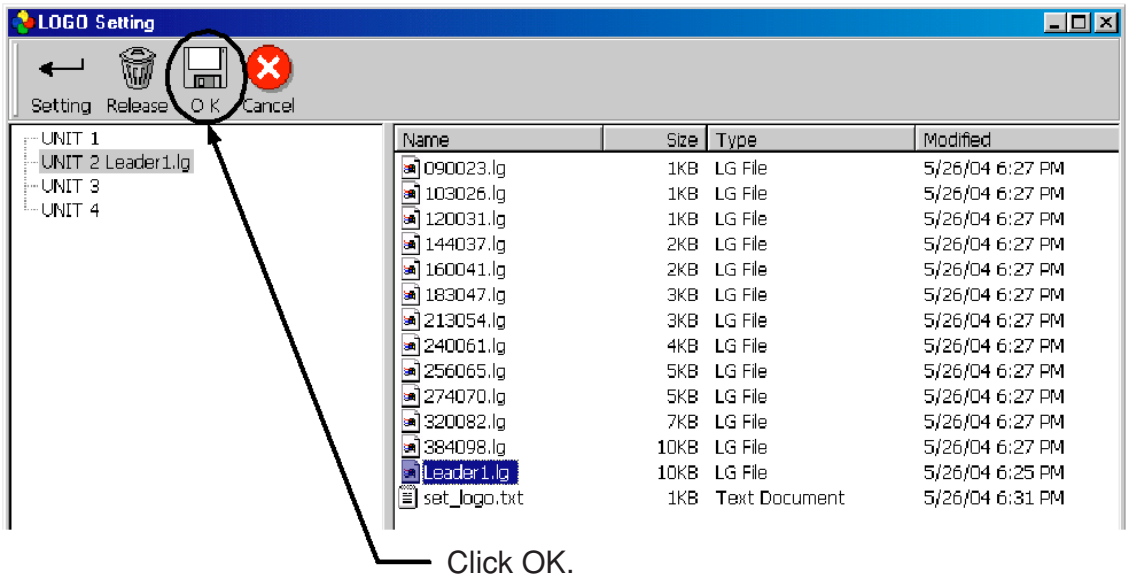
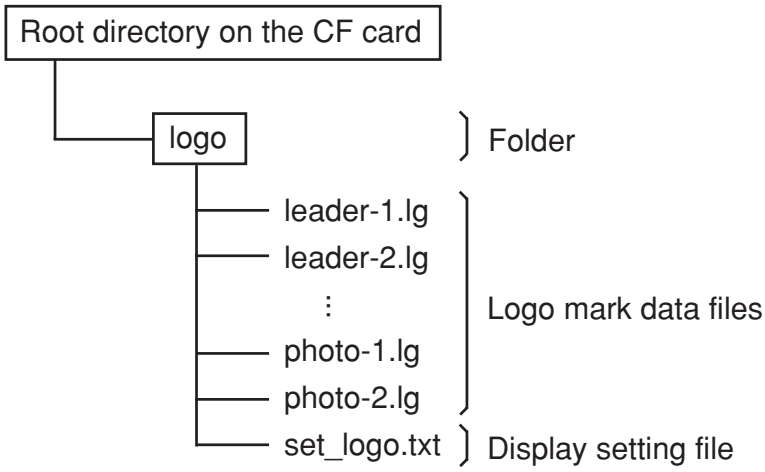


Figure 6-3-8

6.3.3 Save Destination of the Logo Mark Data

The directory structure of the CF card used to display the logo mark must be as shown in the figure below.

If the data save destination was set to a directory other than the root directory of the CF card drive in section 6.3.1, “Converting the Data,” copy the “logo” folder that is automatically created at the save destination to the root directory on the CF card.



6.4 Overview of the Procedure for Displaying the Logo Mark

This section gives an overview of the procedure for displaying the logo mark using the CF card containing the logo mark data (this section uses the sample logo mark data stored on the LOGO MARK SOFTWARE CD-R that is provided).

For details on the operating procedures of the logo mark setting menu on the LT 443D, see section 6.5, “Logo Mark Setting Menu on the LT 443D.” For details on the sample data used in the explanation, see section 6.7, “Sample Data.”

(1) Set the CF card
Insert the CF card containing the logo mark data into the MEMORY CARD slot on the LT 443D main frame.

(2) Select the unit to which the logo mark display is to be assigned
Select the unit that is to display the logo mark using the [UNIT] key on the LT 443D main frame.

(3) Display the logo mark setting menu
Select [LOGO] from the menu (setting menu) of the selected unit.

(4) Select the logo mark data
Select [LOGO SET] → [LOGO SELECT] to display the file names of logo mark data written on the CF card. Display the file name of the logo mark you wish to display and press the [ENTER] key. An asterisk is displayed in front of the file name to indicate that the file is selected.

(5) Transfer the logo mark data
Transfer the selected logo mark data to the unit. Select [LOGO SET] → [LOGO TRANSFER] to select OK, and press the [ENTER] key.

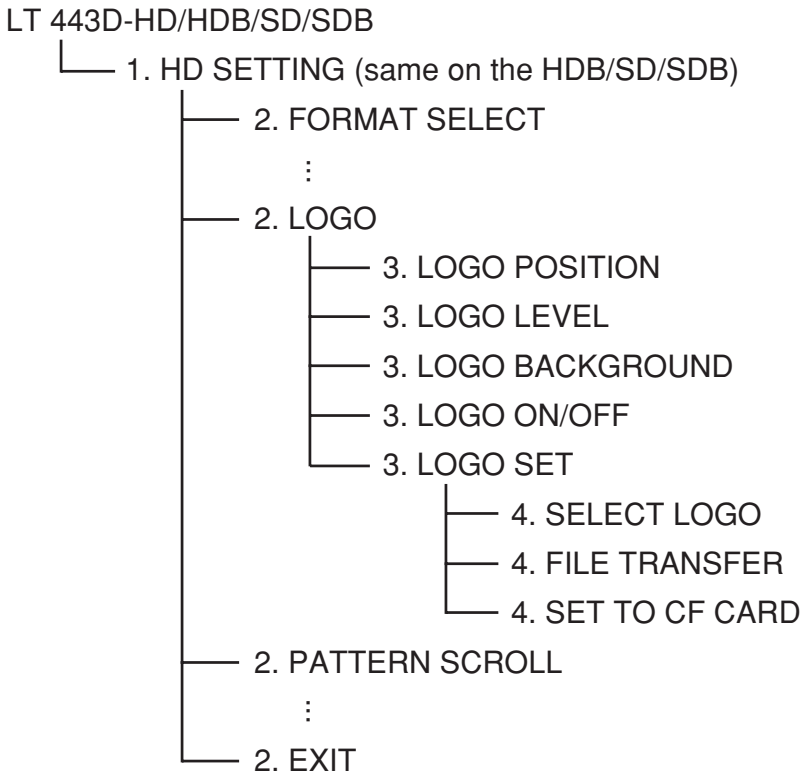
(6) Display the transferred logo mark
To display the transferred logo data, select [LOGO] → [LOGO ON/OFF] to select ON and press the ENTER key.

(7) Set the display settings
As necessary, set the display conditions of the logo mark such as the display position and gradation levels.

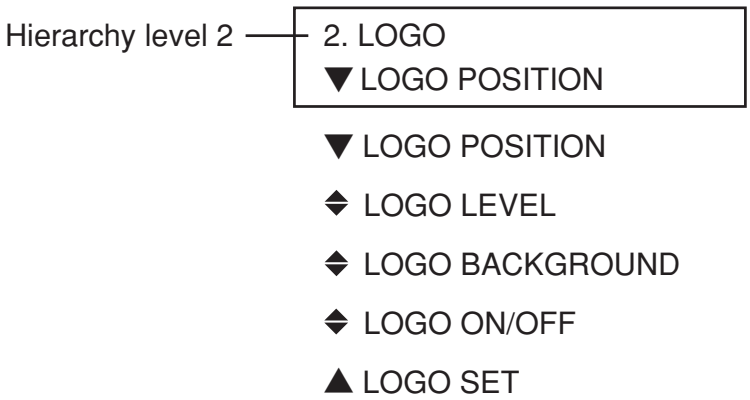
6.5 Logo Mark Setting Menu on the LT 443D

The logo mark display is a function used to superimpose a logo mark data that has been converted from bitmap to 4-level monochrome data on the video signal.

6.5.1 Logo Mark Menu Tree Structure



Select [LOGO] from the menu on the unit on which the logo mark is to be displayed and press the [ENTER] key. Set the logo mark items such as the display position, display level, and ON/OFF.



6.5.2 LOGO POSITION

Sets the display position of the logo mark on screen.

(1) Press the ▲ or ▼ key to select [LOGO POSITION] and press the [ENTER] key.

Hierarchy level 3 —

```
3. LOGO POSITION
■ H : 200DOT □ V : 350DOT
```

(2) Press the ◀ or ▶ key to set the [■] mark to [H] or [V]. Then, press the ▲ or ▼ key to set the DOT value. The start position reference on the display is [0, 0] at the upper left corner of the display. Press the [ENTER] key to confirm. The menu returns to level 2 [2. LOGO].

6.5.3 LOGO LEVEL

Sets the intensity level of levels 0 to 3 when the logo mark is actually displayed on screen.

(1) Press the ▲ or ▼ key to select [LOGO LEVEL] and press the [ENTER] key.

Hierarchy level 3 —

```
3. LOGO LEVEL
▲ LEVEL  0  040H (0%)
```

(2) Press the ▲ or ▼ key to select the level you wish to adjust from level 0 to 3. Then, press the ▶ key.

Hierarchy level 3 —

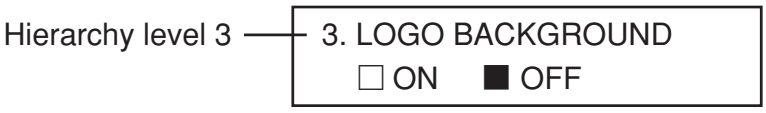
```
3. LOGO LEVEL
   LEVEL  0  ▲ 040H (0%)
```

(3) Press the ▲ or ▼ key to set the value of the level. Intensity 0% and 100% correspond to [040H] and [3ACH], respectively. Press the [ENTER] key to confirm. The menu returns to step (1).

6.5.4 LOGO BACKGROUND

Set whether to display level 0 of the logo mark at the specified intensity level or show the background by making level 0 translucent.

(1) Press the ▲ or ▼ key to select [LOGO BACKGROUND] and press the [ENTER] key.

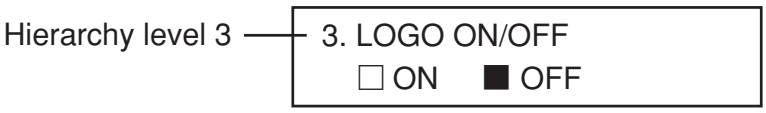


(2) Press the ◀ or ▶ key to set the [■] mark to ON or OFF.
Press the [ENTER] key to confirm. The menu returns to level 2 [2. LOGO].
(ON: Display the background using translucent display (no level 0 display), OFF: Display the intensity level assigned to level 0)

6.5.5 LOGO ON/OFF

Turn the logo mark display ON/OFF.

(1) Press the ▲ or ▼ key to select [LOGO ON/OFF] and press the [ENTER] key.



(2) Press the ◀ or ▶ key to set the [■] mark to ON or OFF.
Press the [ENTER] key to confirm. The menu returns to level 2 [2. LOGO].

∗ If the logo mark data has not been transferred from the CF card to the unit, the logo mark will not be displayed even if you select ON. Even if the logo mark data has been transferred, the logo mark will not be displayed if the logo mark is not turned ON.

6.5.6 LOGO SET

This menu is used to transfer the logo mark data stored on the CF card to the corresponding unit.

∗ The explanation below assumes that the logo mark data is already stored on the CF card. For the procedure of creating the logo mark data, see section 6.3, “Creating the Logo Mark Data.”

(1) Insert the CF card containing the logo mark data into the MEMORY CARD slot on the LT 443D main frame.

(2) Press the ▲ or ▼ key to select [LOGO SET] and press the [ENTER] key.
Select the logo mark data to be transferred, transfer the data, and carry out other tasks.

Hierarchy level 3

```
3. LOGO SET
▼ SELECT LOGO
```

```
▼ SELECT LOGO
◆ FILE TRANSFER
▲ SET TO CF CARD
```

6.5.6.1 SELECT LOGO

Select the logo mark data file to be transferred.

(1) Press the ▲ or ▼ key to select [SELECT LOGO] and press the [ENTER] key.
A list of logo mark data files stored on the CF card is displayed.

Hierarchy level 4

```
4. SELECT LOGO
▼∗ LOGO-01          1/10
```

```
▼ ∗ LEADER-1        1/10
◆    LEADER-2       2/10
◆    LOGO-1         3/10
◆       •
◆       •
◆       •
◆    LOGO-6         8/10
◆    PHOTO-1        9/10
▲    PHOTO-2        10/10
```

(2) Press the ▲ or ▼ key to select the file to be transferred and press the [ENTER] key.
The file with an asterisk is the selected file.

6.5.6.2 FILE TRANSFER

Transfer the file selected in section 6.5.6.1, “SELECT LOGO” to the unit.

(1) Press the ▲ or ▼ key to select [FILE TRANSFER] and press the [ENTER] key.

Hierarchy level 4

```
4. FILE TRANSFER
  □ OK    ■ CANCEL
```

(2) Press the ◀ or ▶ key to set the [■] mark to OK or CANCEL.
If you press the [ENTER] key when [OK] is selected, the logo mark data is transferred. Then, the display below appears when the transfer is complete. Press the [MENU] key to return to [FILE TRANSFER] under [3. LOGO SET].

Hierarchy level 4

```
4. FILE TRANSFER
■■■■■■■ COMPLETE !
```

6.5.6.3 SET TO CF CARD

Save the information specified in section 6.5.6.1, “SELECT LOGO” to the CF card. The information is saved to “X:\logo\set_logo.txt” as a display setting file. If a display setting file already exists, it is overwritten (“X:\” denotes the CF card drive). By setting this file, the logo mark data is automatically transferred from the CF card when the LT 443D is turned on.
You can also set the display setting file by carrying out the procedures described in section 6.3.2, “Display Setting.”

(1) Press the ▲ or ▼ key to select [SET TO CF CARD] and press the [ENTER] key.

Hierarchy level 4

```
4. SET TO CF CARD
  □ OK    ■ CANCEL
```

(2) Press the ◀ or ▶ key to set the [■] mark to OK or CANCEL.
If you press the [ENTER] key when OK is selected, the specified information is saved to the CF card. When the save operation is finished, the display below appears. Press the [MENU] key to return to [SET TO CF CARD] under [3. LOGO SET].

Hierarchy level 4

```
4. SET TO CF CARD
  WRITE COMPLETE !
```

6.6 Precautions on Using the Logo Mark Function

LOGO ON/OFF setting

If the logo mark data has not been transferred from the CF card to the unit, the logo mark will not be displayed even if LOGO ON/OFF is set to ON. Even if the logo mark data has been transferred, the logo mark will not be displayed if the logo mark is not turned ON. (Be careful especially when transferring and displaying the logo mark data automatically using the display setting file at startup.)

Period over which the transferred data is held

The logo mark data transferred to the unit is held while the power remains ON (the data is held even if the format is switched). The data can be held even if the CF card is removed. However, if the power is turned OFF, the transferred data is cleared. Therefore, the logo mark data must be transferred from the CF card again. (If the logo mark data is to be transferred and displayed automatically using the display setting file at startup, the CF card must be inserted in the LT 443D.)

Display setting file

The automatic data transfer using the display setting file is valid only when the LT 443D is turned ON. Automatic transfer does not occur if a CF card containing a display setting file is inserted into the LT 443D that is turned ON. (To display the logo mark without turning the power OFF, you must operate the LT 443D menu and transfer the data manually.)

6.7 Sample Data

Data that has already been converted to LT 443D logo mark format is stored as sample data on the LOGO MARK SOFTWARE CD-R that is provided.
Logo mark data in several display sizes for various video formats are provided, so that you can compare the sizes.

(1) Sample Data Specifications

• Logo Mark Display Content: LEADER logo mark

• Conversion Level Setting: Default

• Resolution: See the table below.

List of Sample Data Resolutions (Sizes)

Sample Data			Applicable Video Format	
File Name	Resolution (Size) Horizontal x Vertical [dots]	Horizontal Size Reference	Format	Resolution
090023. LG	90 X 23	1/8 of 720 dots	SD 525 line system 625 line system	720 X 487 720 X 576
103026. LG	103 X 26	1/7 of 720 dots		
120031. LG	120 X 31	1/6 of 720 dots		
144037. LG	144 X 37	1/5 of 720 dots		
160041. LG	160 X 41	1/8 of 1280 dots	HD 720 line system	1280 X 720
183047. LG	183 X 47	1/7 of 1280 dots		
213054. LG	213 X 54	1/6 of 1280 dots		
256065. LG	256 X 65	1/5 of 1280 dots		
240061. LG	240 X 61	1/8 of 1920 dots	HD 1035, 1080 line system	1920 X 1035 1920 X 1080
274070. LG	274 X 70	1/7 of 1920 dots		
320032. LG	320 X 32	1/6 of 1920 dots		
384098. LG	384 X 98	1/5 of 1920 dots		

∗ The numbers in the file names indicate the logo mark resolution.

Example: 0 9 0 ① 0 2 3 ②. LG

①: Horizontal size

②: Vertical size

(2) Using the Sample Data

Copy the “LOGO” folder on the LOGO MARK SOFTWARE CD-R that is provided to the CF card.

LT 443D-DA DIGITAL AUDIO UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

TABLE OF CONTENTS

1. SPECIFICATIONS

1.1 Description

Installing the LT 443D-DA Digital Audio Unit in the LT 443D mainframe can output AES/EBU digital audio signals (four systems), silence signals (one system), and 48 kHz word clock signals.

The AES/EBU signal characteristics (e.g., output level, frequency) can be independently set for each output system.

The sampling frequency is synchronized with the video signal of plug-in unit installed in the mainframe.

1.2 Specifications

1.2.1 Output

• AES/EBU Digital Audio Output

Number of Outputs	4 (2-channel output)
Output Impedance	75 Ω unbalanced
Output Amplitude	1 Vp-p ±0.1 V (into 75 Ω)
Output Connector	BNC

• Silence Signal (DARS grade 2) Output

Number of Outputs	1 (2-channel output)
Output Impedance	75 Ω unbalanced
Output Amplitude	1 Vp-p ±0.1 V (into 75 Ω)
Output Connector	BNC

• 48 kHz Word Clock

Number of Outputs	1
Output Impedance	75 Ω unbalanced (“1 Vp-p” output)
Output Amplitude	1 Vp-p ±0.1 V (into 75 Ω), 5 V CMOS, selectable
Output Connector	BNC

1.2.2 Signal Specifications

• Specifications	ANSI S4.40 (AES3-1992), AES 11-1997 SMPTE 276M, AES-3id-2001

1.2.3 Function

• Sampling Frequency	48 kHz (sync to video signal)
• Resolution	20 bits, 24 bits, selectable
• Preemphasis	OFF, 50/15 μs, CCITT, selectable (CS bit can only be selected.)

• Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k, 5.0 k, 6.0 k, 8.0 k, 9.6 k, 10 k, 12 k, 15 k, 16 k, 20 kHz, silence
• Level	-60 to 0 dBFS (settable in 1 dB steps)
• Audio Click	1, 2, 3, 4 sec, none
• Output ON/OFF	Selectable
• Timing	
Variable Range	±1 AES/EBU frame Settable in 512 fs (24.576 MHz) steps

∗ The timing can be varied with respect to the Video Unit installed in the LT 443D mainframe.
The settings are common to the digital audio, silence and word clock signals.

∗ Frequency, level, and audio click can be set to each channel.
Other items (except timing) can be respectively set to the 2-channel output.

1.2.4 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Environment	Indoor use
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.32 kg
Accessory	Instruction Manual ..... 1 Screw (for Unit) 2

2. PANEL DESCRIPTION

2.1 Front Panel

Refer to the LT 443D Mainframe instruction manual for front panel description.

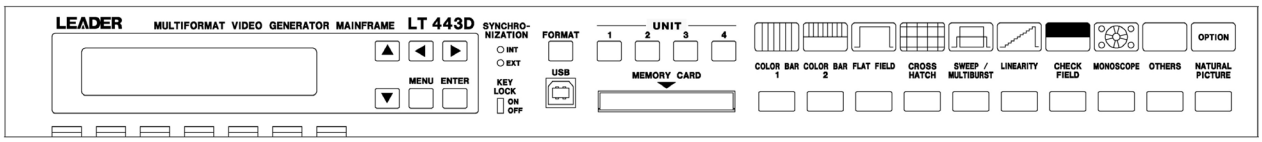


Figure 2-1

2.2 Rear Panel

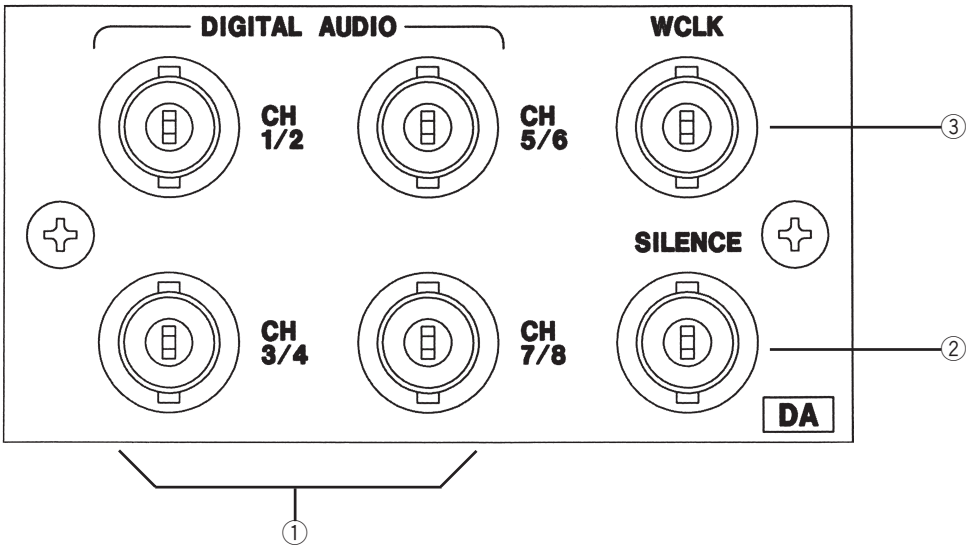


Figure 2-2

① DIGITAL AUDIO

Outputs the AES/EBU digital audio signals. BNC connectors are used. Output impedance is 75 Ω.

② SILENCE

Outputs the silence signals (DARS grade 2). BNC connectors are used. Output impedance is 75 Ω.

③ WCLK

Outputs the 48 kHz word clock signals. BNC connectors are used. Output level can be selected: 1 Vp-p (into 75 Ω) or 5 V (CMOS level).

3. OPERATING PROCEDURE

3.1 Connection

⚠ **CAUTION** Do not apply ±1 V (DC or peak AC) or higher external voltage to the output connectors. Otherwise, you may damage the instrument or other property.

3.1.1 Cables Used

Use cables (w/BNC connectors) suitable for signal and output impedance.

3.1.2 Termination

The cable end should be terminated with appropriate impedance to obtain correct output level. Table 3-1 shows the output impedance and terminator for each connector.

Output Connector	Signal	Termination
① DIGITAL AUDIO	AES/EBU digital audio signal	75 Ω
② SILENCE	Silence signal	75 Ω
③ WCLK	48 kHz word clock (1 Vp-p output)	75 Ω
	48 kHz word clock (5 V CMOS output)	-

Table 3-1

3.2 Setting Output Signal

3.2.1 AES/EBU Digital Audio Output

The LT 443-DA provides four output systems (2-channel output) for AES/EBU digital audio signal. See Table 3-2.

Setting Items	Description	Settable In:
Output ON/OFF	Sets AES/EBU digital audio signal on/off	2-channel output steps
Resolution	20 bits, 24 bits, selectable	2-channel output steps
Preemphasis	OFF, 50/15 μs, CCITT, selectable (CS bit can only be selected.)	2-channel output steps
Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k,5.0 k, 6.0 k, 8.0 k, 9.6 k, 10 k, 12 k, 15 k, 16 k, 20 kHz, silence	1 channel steps
Level	-60 to 0 dBFS (settable in 1 dB steps)	1 channel steps
Click	1, 2, 3, 4 sec, none, selectable	1 channel steps

Table 3-2

3.2.2 Silence Signal (DARS grade 2) Output

The LT 443-DA provides one output system (2-channel output) for silence signal. See Table 3-3.

Setting Items	Description
REF Signal Bit	Grade 2 REF signal, fixed

Table 3-3

3.2.3 48 kHz Word Clock Output

The LT 443-DA provides one output system for 48 kHz word clock signal. See Table 3-4.

Setting Items	Description
Output Level	1 Vp-p (into 75 Ω) or 5 V CMOS, selectable

Table 3-4

3.2.4 Setting Timing

This mode is used to set the timing of the Video Unit installed in the LT 443D mainframe. The setting is common to all output signals (e.g., digital audio, silence, word clock). See Table 3-5.

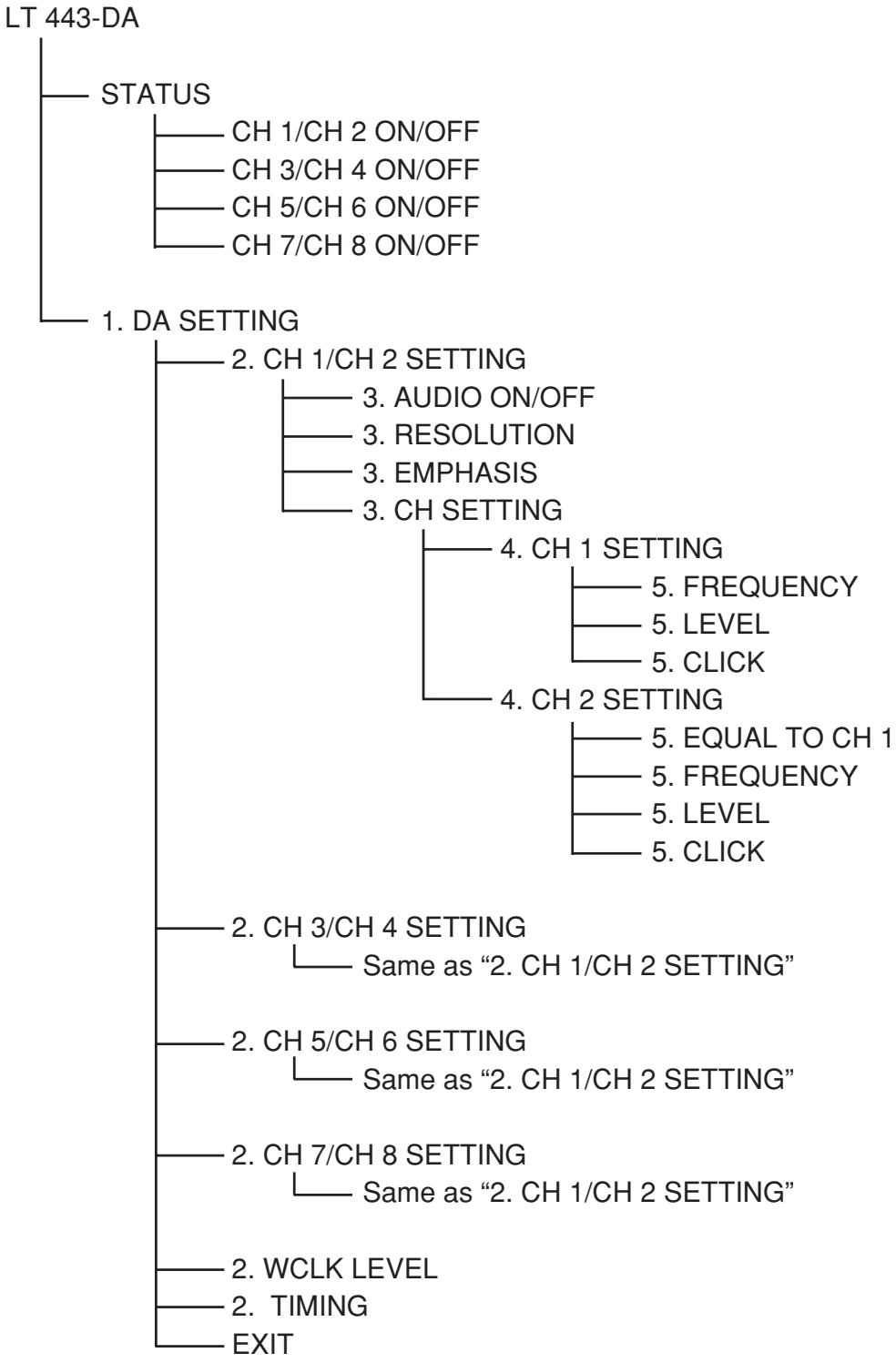
Setting Items	Description	Steps
Timing Variable	±1 AES/EBU frame (settable in 512 fs steps)	Common to all outputs

Table 3-5

3.3 Setting Output Signal

When setting the output signal, select the UNIT compartment number (indicated on the LT 443D mainframe front panel) where the LT 443-DA is installed, then proceed to menu operation.

3.3.1 Menu Structure

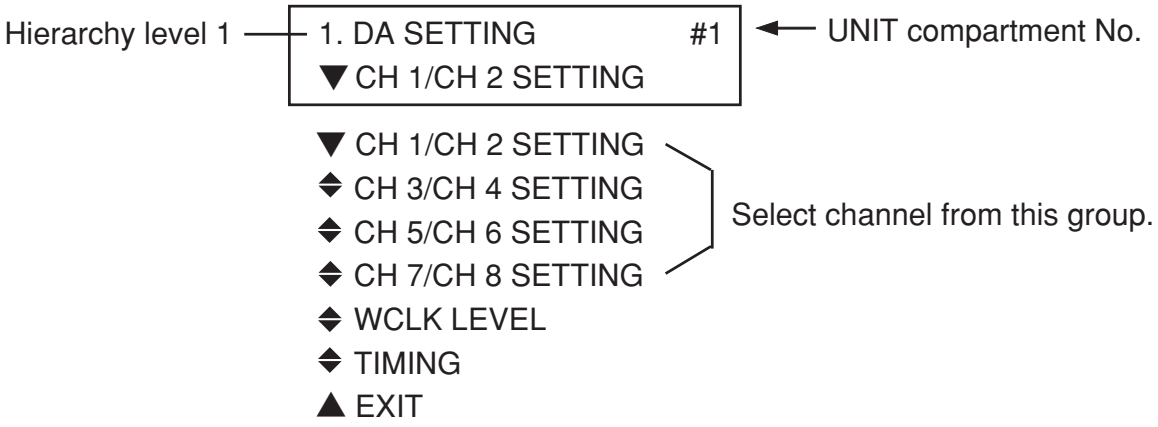


3.3.2 Setting AES/EBU Digital Audio Signal

3.3.2.1 Selecting Channel To be Set

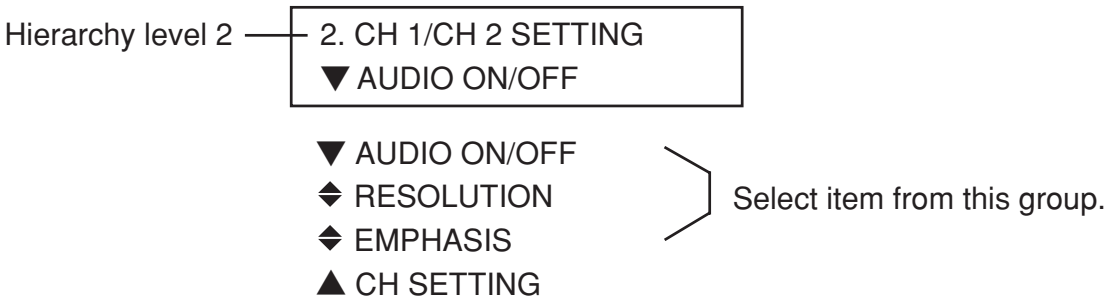
Select the desired 2-channel output from the [1. DA SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.

Example: To set the CH 1/CH 2 output, select [CH 1/CH 2 SETTING].



3.3.2.2 Setting 2-Channel Output

Select the desired item (i.e., output ON/OFF, resolution, preemphasis) from the menu selected in the Section 3.3.2.1, “Selecting Channel” by pressing the [Up] or [Down] key, then press the [ENTER] key.



∗The following steps describe setting procedure in case of the CH 1/CH 2 is selected.

(1) AUDIO ON/OFF

Select [ON] or [OFF] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.

∗ When [ON] or [OFF] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key. If exiting the menu without pressing the [ENTER] key, no data is stored.

(2) RESOLUTION

Select [20 BIT] or [24 BIT] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.

∗When [20 BIT] or [24 BIT] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key.

Hierarchy level 3 —

```
3. RESOLUTION
■ 20 BIT    □ 24 BIT
```

(3) EMPHASIS

Select [50/15], [CCITT], or [OFF] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.

∗When [50/15], [CCITT], or [OFF] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key. If exiting the menu without pressing the [ENTER] key, no data is stored.

Hierarchy level 3 —

```
3. EMPHASIS
□ 50/15  □ CCITT  ■ OFF
```

3.3.2.3 Setting Single Channel Output

Select [CH SETTING] from the menu selected in the Section 3.3.2.1, “Selecting Channel” by pressing the [Up] or [Down] key, then press the [ENTER] key.

Hierarchy level 2 —

```
2. CH 1/CH 2 SETTING
▼ CH SETTING
```

▼ AUDIO ON/OFF
◆ RESOLUTION
◆ EMPHASIS
▲ CH SETTING ← Select this.

∗The following steps describe setting procedure in case of the CH 1/CH 2 is selected.

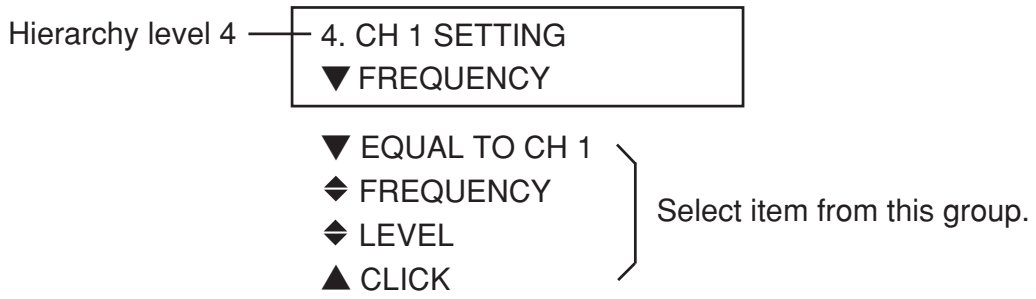
Select channel to be set from the [3. CH SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.

Hierarchy level 3 —

```
3. CH SETTING
▼ CH 1 SETTING
```

▼ CH 1 SETTING
▲ CH 2 SETTING
} Select channel from this group.

Select the desired item (i.e., frequency, level, click) from the [4. CH 1 SETTING] or [4. CH 2 SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key. Some operating conditions set in the [4. CH 1 SETTING] menu can also be used in the [4. CH 2 SETTING].



∗ [EQUAL TO CH 1] is only available when [4. CH 2 SETTING] is selected.

(1) Setting EQUAL TO CH 1

∗ This item is only available when CH 2 (even channel number) is selected.

Select [ON] or [OFF] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.
When [ON] is selected, signals output from the CH 1 and CH 2 are the same. If the setting of CH 1 is changed, the CH 2 is also changed.
When [OFF] is selected, the CH 1 and CH 2 can be set independently.

∗ When [ON] or [OFF] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key.
When [ON] is selected, [FREQUENCY], [LEVEL], and [CLICK] menus are not displayed.

(2) FREQUENCY

Select frequency by pressing the [Up] or [Down] key, then press the [ENTER] key. [∗] indicates the selected item.

∗When frequency is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.

◆ SILENCE	◆ 2.0 kHz
◆ 50 Hz	◆ 2.4 kHz
◆ 100 Hz	◆ 3.0 kHz
◆ 150 Hz	◆ 3.2 kHz
◆ 200 Hz	◆ 4.0 kHz
◆ 250 Hz	◆ 4.8 kHz
◆ 300 Hz	◆ 5.0 kHz
◆ 400 Hz	◆ 6.0 kHz
◆ 500 Hz	◆ 8.0 kHz
◆ 600 Hz	◆ 9.6 kHz
◆ 750 Hz	◆ 10 kHz
◆ 800 Hz	◆ 12 kHz
◆ 1.0 kHz	◆ 15 kHz
◆ 1.2 kHz	◆ 16 kHz
◆ 1.5 kHz	◆ 20 kHz
◆ 1.6 kHz	

∗Underlined frequencies can be selected sequentially by pressing the [Left] or [Right] key.

(3) LEVEL

Set the level (-60 to 0 dBFS in 1 dB steps) by pressing the [Up] or [Down] key, then press the [ENTER] key.

∗When level is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.

Hierarchy level 5 —

```
5. LEVEL
        -20 dBFS
```

(4) CLICK

Select click time by pressing the [Up] or [Down] key, then press the [ENTER] key.

∗When click time is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.

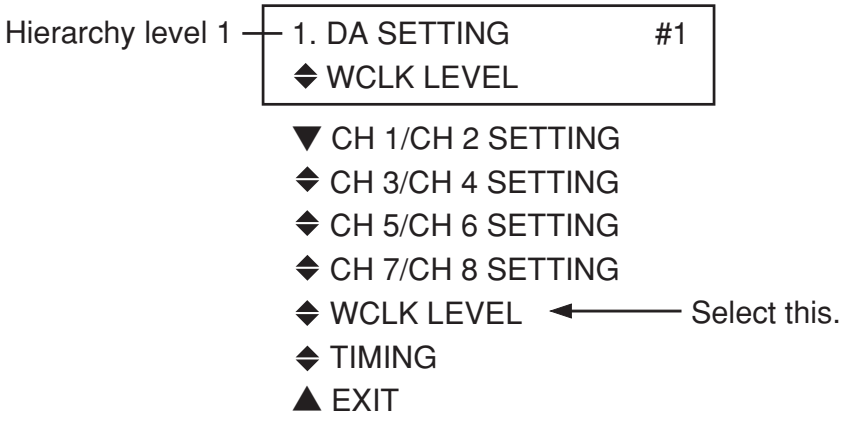
Hierarchy level 5 —

```
5. CLICK
▼ OFF
```

▼ OFF
◆ 1 SEC
◆ 2 SEC
◆ 3 SEC
▲ 4 SEC

3.3.3 Setting 48 kHz Word Clock Output

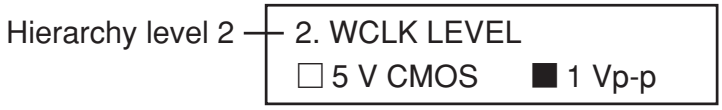
Select word clock from the [1. DA SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.



(1) WCLK LEVEL

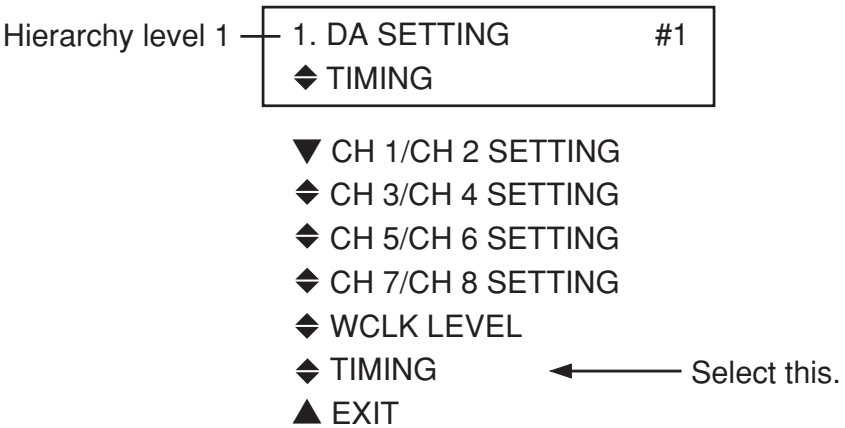
Select [5 V CMOS] or [1 Vp-p] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.

∗ When [5 V CMOS] or [1 Vp-p] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key. If exiting the menu without pressing the [ENTER] key, no data is stored.



3.3.4 SETTING TIMING

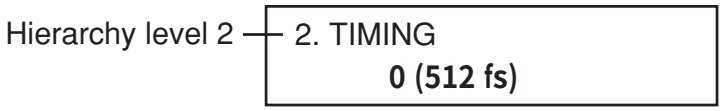
Select TIMING from the [1. DA SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.



(1) Setting TIMING

Select TIMING (±1 AES/EBU frame, settable in 512 fs steps) by pressing the [Up] or [Down] key, then press the [ENTER] key.

∗When TIMING is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key. If exiting the menu without pressing the [ENTER] key, no data is stored.



LT 443D-AA ANALOG AUDIO UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

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1. SPECIFICATIONS

1.1 Description

Installing the LT 443D-AA Analog Audio Unit in the LT 443D mainframe can output analog audio signal (two systems).

Output characteristics (e.g., output level, frequency) can be independently set for each output system.

The sound sampling frequency is synchronized with the video signal of plug-in unit installed in the mainframe.

1.2 Specifications

1.2.1 Output

• Number of Outputs	2
• Output Impedance	600 Ω, balanced
• Output Amplitude	0.775 Vrms (into 600 Ω at 0 dBm)
• Output Amplitude Accuracy	±0.5 dB (at 1 kHz)
• Output Amplitude Flatness	±0.5 dB (1 kHz ref.)
• Output Connector	XLR-3P x 2

1.2.2 Function

• Sampling Frequency	48 kHz (Sync to video signal)
• Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k, 5.0 k, 6.0 k, 8.0 k, 9.6 k, 10 k, 12 k, 15 k, 16 k, 20 kHz, silence
• Level	-40 to 4 dBm (settable in 1 dBm steps)

1.2.3 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Environment	Indoor use
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.28 kg
Accessory	Instruction Manual ..... 1 Screw (for Unit) 2

2. PANEL DESCRIPTION

2.1 Front Panel

Refer to the LT 443D Mainframe instruction manual for front panel description.

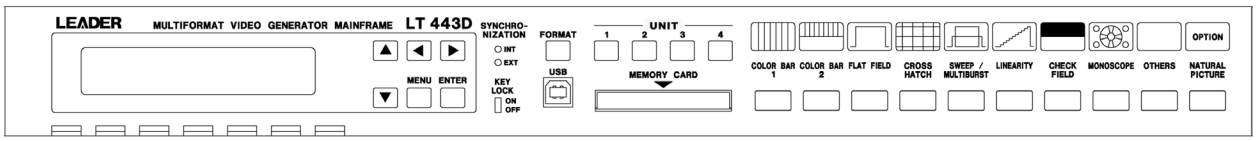


Figure 2-1

2.2 Rear Panel

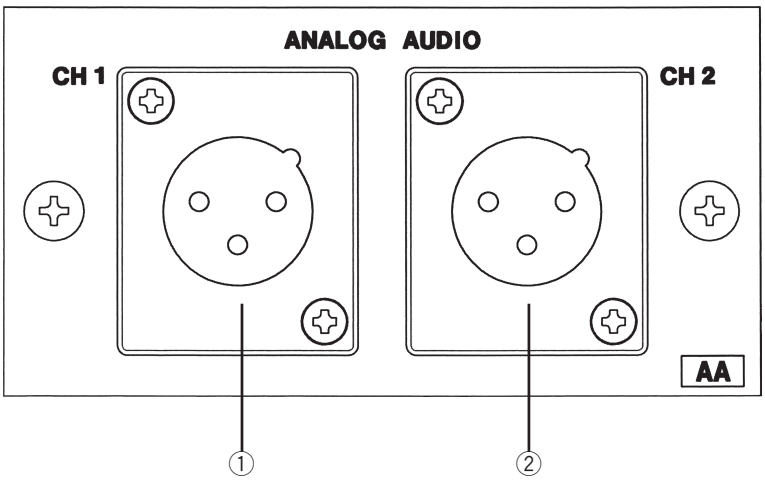


Figure 2-2

① CH 1

Outputs the analog audio signals. XLR-3P connector is used. Output impedance is 600 Ω, balanced.

② CH 2

Outputs the analog audio signals. XLR-3P connector is used. Output impedance is 600 Ω, balanced.

3. OPERATING PROCEDURE

3.1 Connection

⚠ CAUTION Do not apply ±1 V (DC or peak AC) or higher external voltage to the output connectors. Otherwise, you may damage the instrument or other property.

3.1.1 Cables Used

Use cables (w/XLR connectors) suitable for signal and output impedance.

3.1.2 Termination

The cable end should be terminated with appropriate impedance to obtain correct output level. Table 3-1 shows the output impedance and terminator for each connector.

Output Connector	Signal	Termination
① CH 1	Analog audio signal (balanced output)	600 Ω
② CH 2	Analog audio signal (balanced output)	600 Ω

Table 3-1

3.2 Setting Items

The LT 443-AA provides two analog audio signal output systems. The CH 1 and CH 2 signals can be set independently. See Table 3-2.

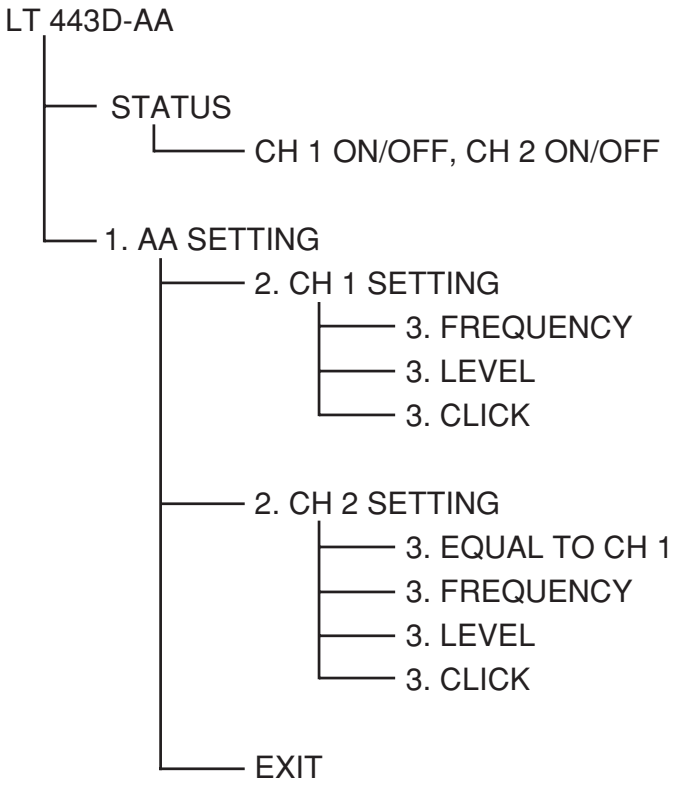
Setting Items	Description
Frequency	50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1.0 k, 1.2 k, 1.5 k, 1.6 k, 2.0 k, 2.4 k, 3.0 k, 3.2 k, 4.0 k, 4.8 k, 5.0 k, 6.0 k, 8.0 k, 9.6 k, 10 k, 12 k, 15 k, 16 k, 20 kHz, silence
Level	-40 to 4 dBm (settable in 1 dBm steps), selectable
Click	1, 2, 3, 4 sec, none, selectable

Table 3-2

3.3 Setting Output Signal

When setting the output signal, select the UNIT compartment number (indicated on the LT 443D mainframe front panel) where the LT 443-AA is installed, then proceed to menu operation.

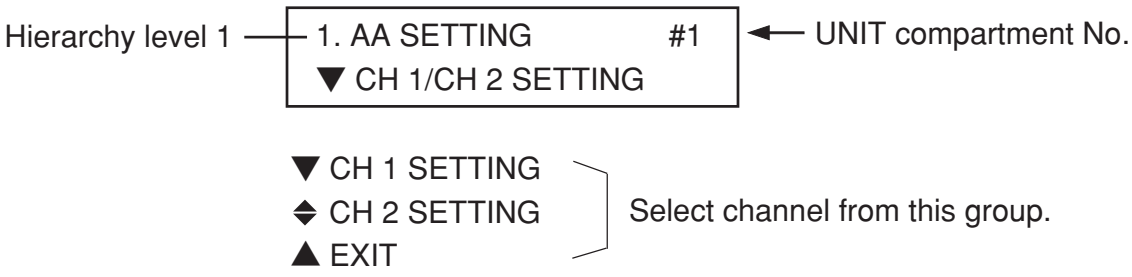
3.3.1 Menu Structure



3.3.2 Operating Procedure

3.3.2.1 Selecting Channel To Be Set

Select channel from the [1. AA SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.

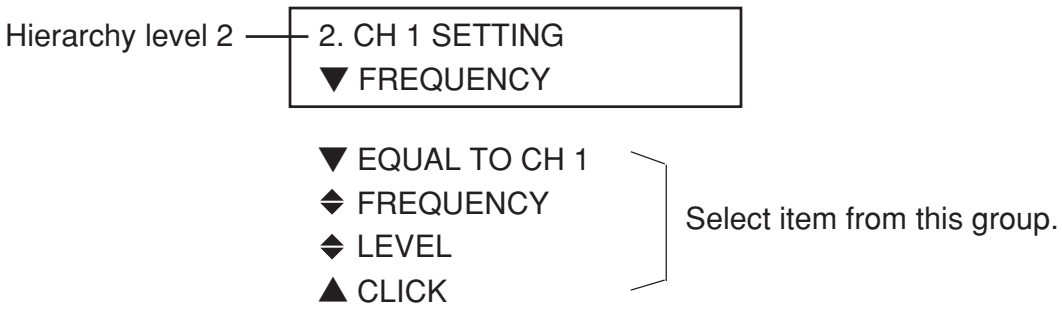


∗ The following steps describe setting procedure in case of the CH 1 is selected. The same procedure can also be applied to CH 2.

3.3.2.2 Setting Output Conditions

Select the desired item (i.e., frequency, level, click) from the [2. CH 1 SETTING] or [2. CH 2 SETTING] menu by pressing the [Up] or [Down] key, then press the [ENTER] key.

Some operating conditions set in the [2. CH 1 SETTING] menu can also be used in the [2. CH 2 SETTING].



∗ [EQUAL TO CH 1] is only available when [2. CH 2 SETTING] is selected.

(1) Setting EQUAL TO CH 1

∗ This item is only available when CH 2 is selected.

Select [ON] or [OFF] by pressing the [Left] or [Right] key, then press the [ENTER] key. [■] indicates the selected item.

When [ON] is selected, signals output from the CH 1 and CH 2 are the same. If the setting of CH 1 is changed, the CH 2 is also changed.

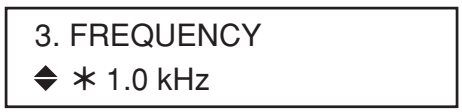
When [OFF] is selected, the CH 1 and CH 2 can be set independently.

∗ When [ON] or [OFF] is selected by pressing the [Left] or [Right] key, this item is executed. To store data, press the [ENTER] key.
When [ON] is selected, [FREQUENCY], [LEVEL], and [CLICK] menus are not displayed.

(2) FREQUENCY

Select frequency by pressing the [Up] or [Down] key, then press the [ENTER] key. [∗] indicates the selected item.

∗ When frequency is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.



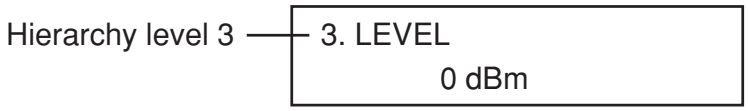
◆ SILENCE	◆ 2.0 kHz
◆ 50 Hz	◆ 2.4 kHz
◆ 100 Hz	◆ 3.0 kHz
◆ 150 Hz	◆ 3.2 kHz
◆ 200 Hz	◆ 4.0 kHz
◆ 250 Hz	◆ 4.8 kHz
◆ 300 Hz	◆ 5.0 kHz
◆ 400 Hz	◆ 6.0 kHz
◆ 500 Hz	◆ 8.0 kHz
◆ 600 Hz	◆ 9.6 kHz
◆ 750 Hz	◆ 10 kHz
◆ 800 Hz	◆ 12 kHz
◆ 1.0 kHz	◆ 15 kHz
◆ 1.2 kHz	◆ 16 kHz
◆ 1.5 kHz	◆ 20 kHz
◆ 1.6 kHz	

∗ Underlined frequencies can be selected sequentially by pressing the [Left] or [Right] key.

(3) LEVEL

Set the level (-40 to 4 dBm in 1 dB steps) by pressing the [Up] or [Down] key, then press the [ENTER] key.

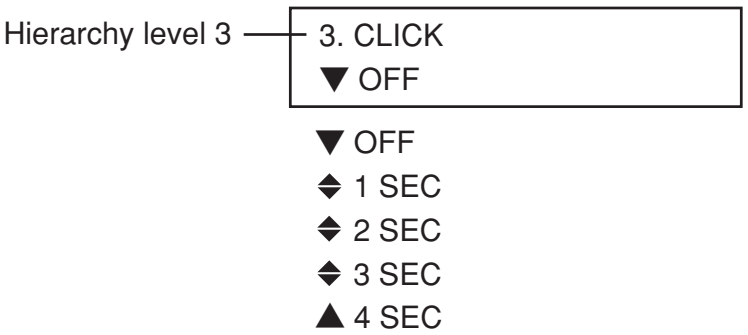
∗ When level is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.



(4) CLICK

Select click time by pressing the [Up] or [Down] key, then press the [ENTER] key.

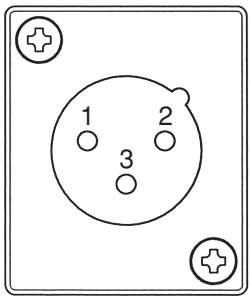
∗ When click time is selected by pressing the [Up] or [Down] key, this item is executed. To store data, press the [ENTER] key.



3.4 Connector Pin Assignments

Pin No.	Signal Name
1	Ground
2	Output (HOT)
3	Output (COLD)

Table 3-3



LT 443D-CS ANALOG COMPOSITE UNIT

INSTRUCTION MANUAL

LEADER ELECTRONICS CORP.

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1. DESCRIPTION

The LT 443D-CS Analog Composite Unit adds the NTSC/PAL analog composite signal output capability to the LT 443D mainframe. Various functions (e.g., ID character, simple motion pictures, embedded audio, NATURAL picture pattern ✶1) are provided.

✶1: The NATURAL picture function is only usable when the Option LT 443D-70 is installed in the mainframe.

2. SPECIFICATIONS

2.1 Test Signal Output

• Format

NTSC
NTSC + REFERENCE ✶2
NTSC + ID ✶3
NTSC + REFERENCE + ID ✶2 ✶3
NTSC + SETUP
NTSC + SETUP + REF ✶2
NTSC + SETUP + ID ✶3
NTSC + SETUP + REF + ID ✶2 ✶3
PAL ✶4
PAL + REFERENCE ✶4 ✶2

✶2 REFERENCE and REF denote Field Reference.
✶3 ID denotes 10-field sequence identification.
✶4 The 25-Hz offset subcarrier is used for the PAL system.

• Pattern

COLOR BAR 100 %	White: 100 %, Color saturation: 100 %
COLOR BAR 75 %	White: 100 %, Color saturation: 75 % (NTSC only)
EBU COLOR BAR	(PAL only)
BBC COLOR BAR	(PAL only)
SMPTE COLOR BAR	(NTSC only)
FLAT FIELD 100 %	
FLAT FIELD 50 %	
FLAT FIELD 0 %	
CROSSHATCH 1	NTSC: 16 lines (H), 17 lines (V)
	PAL: 19 lines (H), 17 lines (V)
CROSSHATCH 2	NTSC: 13 lines (H), 17 lines (V)
	PAL: 13 lines (H), 17 lines (V)
LINE SWEEP 100 %	0.5 to 5.6 MHz (Marker: 1.0, 2.0, 3.0, 4.0, 5.0 MHz)
LINE SWEEP 60 %	Same as LINE SWEEP 100 %
MULTIBURST 100 %	0.5, 1.0, 2.0, 3.0, 4.0, 5.75 MHz
MULTIBURST 60 %	Same as MULTIBURST 100 %
SHALLOW RAMP	
10 STEP	

MOD 10 STEP	
RAMP	
MOD RAMP	
MONOSCOPE	NORMAL, INVERT
RED RASTER	Color saturation: 75 %
WINDOW	
PULSE & BAR	NTSC: 2T pulse, 12.5T pulse, 2T bar PAL: 2T pulse, 20T pulse, 2T bar

• NATURAL Picture ∗5 — Up to five screens of 24-bit full color BMP file can be simultaneously switched.

• APL

MODE	APL OFF, APL HIGH, APL LOW, APL (BOUNCE), BOUNCE APL (BOUNCE) is switched at a preset time interval for APL HIGH and APL LOW. BOUNCE is switched at a preset time interval for FLAT FIELD 100% and FLAT FIELD 0 %.
Time Interval	1 to 20 seconds (settable in one second steps)

• ID Character

Number of Characters	Up to 20
Size	32 x 32 dots, 64 x 64 dots, selectable
Display Position	Arbitrary position on the screen.
Blinking	OFF, 1 to 10 seconds (settable in one second steps)

• Simple Motion Picture Function

Direction	8 directions (up, down, left, right, and combinations)
Speed	H: 0 to 256 dots in 4 dot steps V: 0 to 256 lines in 2 line steps (Pattern can be scrolled in field time steps.)

∗5 The Option LT 443D-70 should be installed in the mainframe to enable this function.

• Timing Variable — The timing of OUTPUT 1 and 2 can be varied simultaneously.

H-PHASE	Up to ±1 line-1 dot
Resolution	Variable in 1 dot steps (corresponding to 27 MHz clock frequency)
V-PHASE	Up to ±1 frame-1 line
Resolution	Variable in 1 line steps
F-PHASE	NTSC: Up to ±5 frames PAL: Up to ±2 frames
Resolution	Variable in 1 frame steps

• Number of Outputs — 2

2.2 Black Signal Output

• Format	Depends on the test signal format. (Supports the Field Reference and 10-field sequence identification)
• Output Signal	Analog black burst
• Timing Variable	The timing of OUTPUT 1 and 2 can be varied simultaneously.
H-PHASE	Up to ±1 line-1 dot
Resolution	Variable in 1 dot steps (corresponding to 27 MHz clock frequency)
V-PHASE	Up to ±1 frame-1 line
Resolution	Variable in 1 line steps
F-PHASE	NTSC: Up to ±5 frames PAL: Up to ±2 frames
Resolution	Variable in 1 frame steps
• Number of Outputs	2 systems (one each)
• Signal Level	1 Vp-p (into 75 Ω)

2.3 Horizontal Drive Pulse Output

• Format	Depends on the test signal format.
• Signal Level	2 Vp-p (into 75 Ω)
• Signal Polarity	Negative
• Timing Variable	
H-PHASE	Up to ±1 line-1 dot
Resolution	Variable in 1 dot steps (corresponding to 27 MHz clock frequency)
• Number of Outputs	1

2.4 Vertical Drive Pulse Output

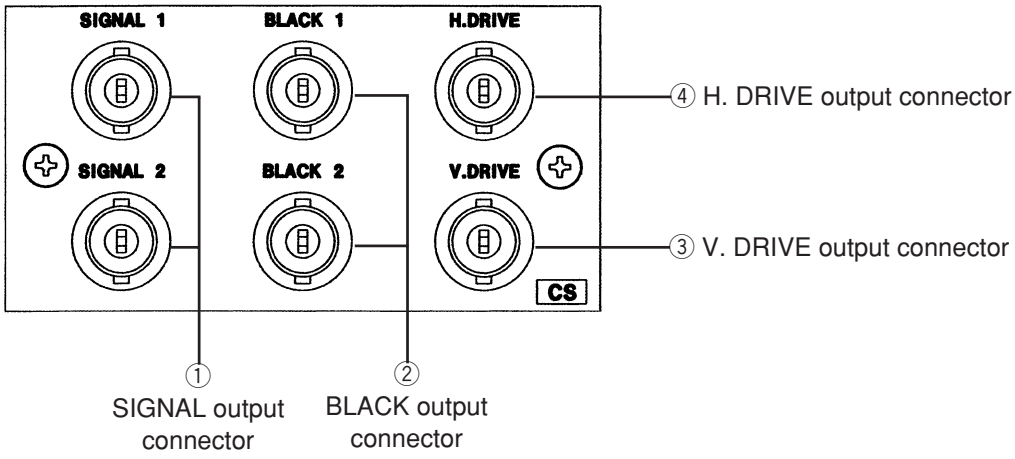
• Format	Depends on the test signal format.
• Signal Level	2 Vp-p (into 75 Ω)
• Signal Polarity	Negative
• Timing Variable	
V-PHASE	Up to ±1 frame-1 line
Resolution	Variable in 1 line steps
• Number of Outputs	1

2.5 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 ˚C
Operating Humidity Range	≤ 90 % RH (without condensation)
Spec-Guaranteed Temperature Range	10 to 35 ˚C
Spec-Guaranteed Humidity Range	≤ 85 % RH (without condensation)
Operating Environment	Indoor use
Operating Altitude	Up to 2000 m
Overvoltage Category	I
Pollution Degree	2
Power Source	Supplied by the LT 443D mainframe
Dimensions and Weight	79 (W) x 41 (H) x 371 (D) mm (excluding projections) 0.4 kg
Accessory	Instruction Manual .....1 Screw (for Unit) 2

3. PANEL DESCRIPTION

3.1 Rear Panel



① SIGNAL output connector
Outputs the composite video signal.
Two systems are provided; both systems output the same signal.

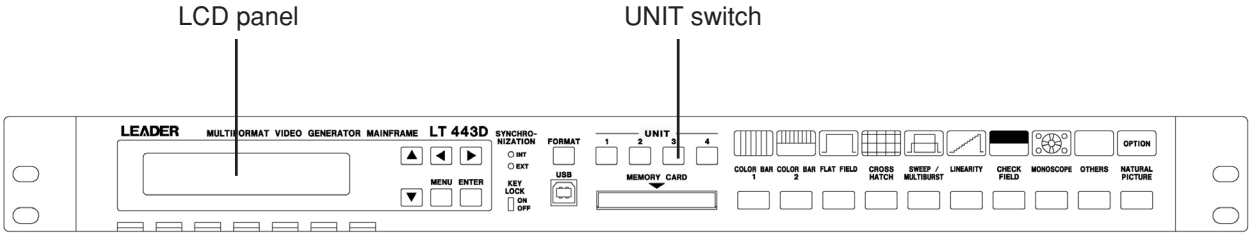
② BLACK output connector
Outputs the analog black burst signal.
Two systems are provided; both systems output the same signal.

③ V. DRIVE output connector
Outputs the V. DRIVE signal.

④ H. DRIVE output connector
Outputs the H. DRIVE signal.

4. OPERATING PROCEDURE

The front panel controls and menu displayed on the LCD panel of the mainframe are used to set the LT 443D-CS.
Press the UNIT switch corresponding to the UNIT compartment where this unit is installed. (The UNIT 3 switch is pressed, here.)



4.1 SETTING Menu Mode Structure

Pressing the UNIT 3 switch, for example, on the mainframe displays [1. CS SETTING #3] on the LCD panel.

Select the desired signal format to be output from the [CS SETTING] menu, then set the timing, Y • C, ID character, pattern scroll, etc.

▼ FORMAT SELECT
◆ SIGNAL TIMING
◆ Y, C ON/OFF
◆ APL
◆ ID CHARACTER
◆ PATTERN SCROLL
◆ PATTERN CHANGE
◆ NATURAL PICTURE
◆ BLACK 1 TIMING
◆ BLACK 2 TIMING
◆ V. DRIVE TIMING
◆ H. DRIVE TIMING
▲ EXIT

4.2 FORMAT SELECT

This mode is used to select the format of signals output from the SIGNAL 1, 2, BLACK 1, 2, H. DRIVE, and V DRIVE connectors. The format is common to each output.

4.2.1 Setting FORMAT

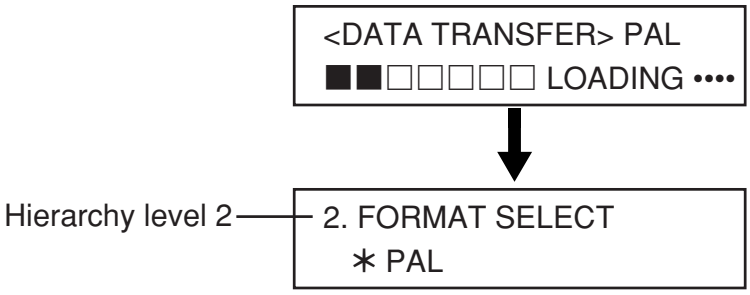
(1) Select [FORMAT SELECT] from the [1. CS SETTING] menu, then press the [ENTER] key.

(2) The format marked with asterisk is currently selected.

▼ ∗NTSC
◆ NTSC + REFERENCE
◆ NTSC + ID
◆ NTSC + REFERENCE + ID
◆ NTSC + SETUP
◆ NTSC + SETUP + REF
◆ NTSC + SETUP + ID
◆ NTSC + SETUP + REF + ID
◆ PAL
▲ PAL + REFERENCE

Note: REFERENCE and REF denote Field Reference.
ID denotes 10-field sequence identification.

(3) When changing the format to PAL, press the Down key for [◆ PAL], then press the [ENTER] key.



(4) Pressing the [MENU] key returns the display to hierarchy level 1 [1. CS SETTING].

4.3 SIGNAL TIMING

This section describes setting procedure of the signal timing with respect to the internal reference signal (i.e., frame reset signal).

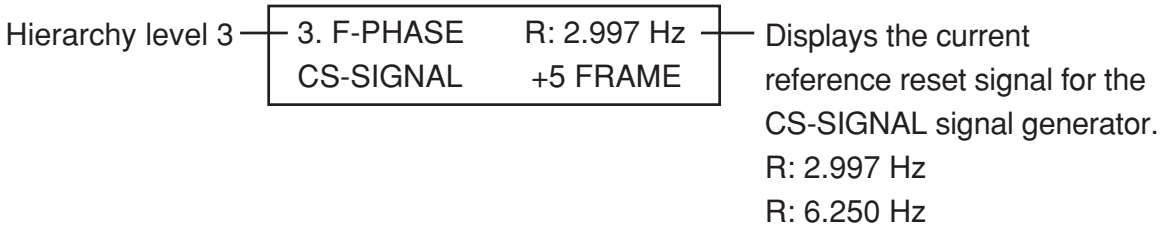
4.3.1 Setting TIMING

(1) Select [SIGNAL TIMING] from the [1. CS SIGNAL] menu, then press the [ENTER] key. Select Vertical (V) or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.

▼ F-PHASE
◆ V-PHASE [LINE]
◆ H-PHASE [DOT]
▲ H-PHASE [μs]

(2) F-PHASE (F: Frame)

This mode is used to set the timing in frame steps.
Press the Up or Down key to set the timing.

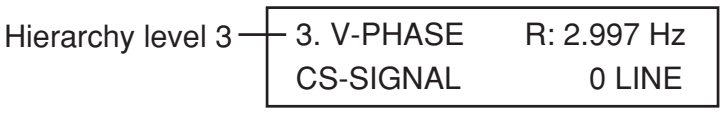


(3) V-PHASE [line] (V: Vertical)

This mode is used to set the vertical timing. Press the Up or Down key to enter data.
The settable range is as follows:

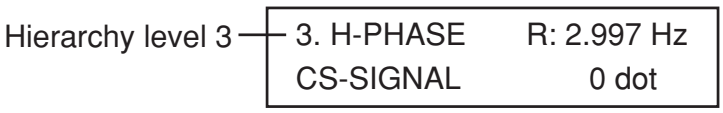
NTSC: ±524 lines in one line steps
PAL: ±624 lines in one line steps

Press the [ENTER] key to enter data.

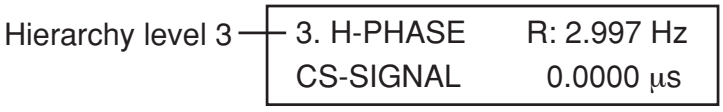


(4) H-PHASE [dot], [μs] (H: Horizontal)

This mode is used to set the horizontal timing in dot steps.
Press the Up or Down key to set the timing.



The settable range is ±1715 dots for NTSC, 1727 dots for PAL.
Press the [ENTER] key to enter data.



The settable range is as follows:

NTSC: ±1715 dots (63.5185 μs) in 0.0370 μs steps
PAL: 1727 dots (63.9629 μs) in 0.0370 μs steps

Press the [ENTER] key to enter data.

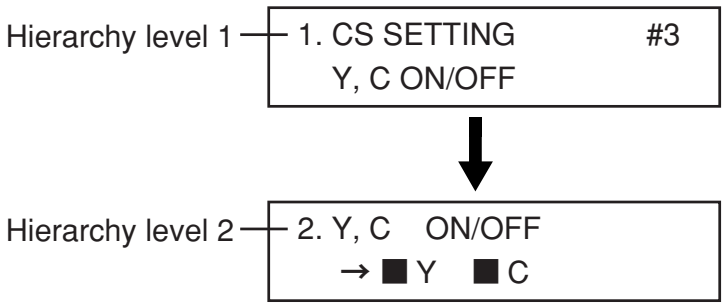
(5) Pressing the [MENU] key returns the display to hierarchy level 2 [2. SIGNAL TIMING]. Pressing the [MENU] key again returns the display to hierarchy level 1 [1. SIGNAL SETTING].

4.4 Y, C

This mode is used to set the Y and C component ON/OFF respectively.

4.4.1 Setting Y, C ON/OFF

(1) Select [Y, C ON/OFF] from the [1. CS SETTING] menu, then press the [ENTER] key.

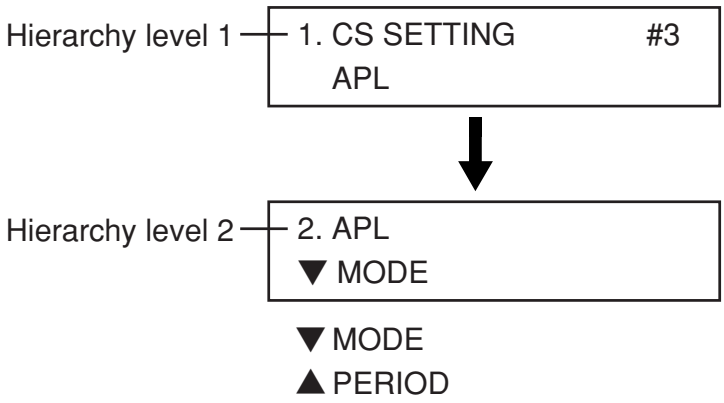


(2) Position the [→] to the [Y] or [C] by pressing the Left or Right key, then select [ON] or [OFF] by pressing the Up or Down key. The item marked with [■] is set [ON].

(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 1 [1. CS SETTING].

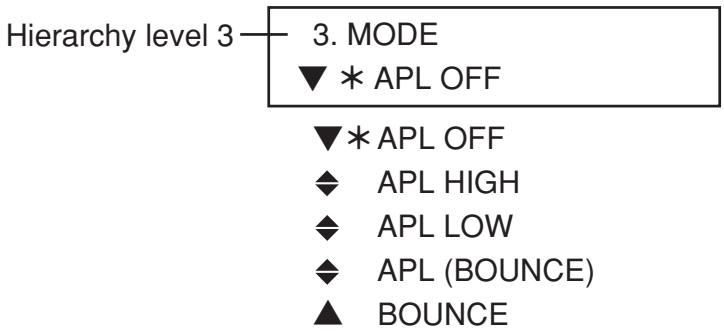
4.5 APL

This mode is used to set the APL and BOUNCE functions for the video signals.
Select [APL] from the [1. CS SETTING] menu, then press the [ENTER] key.



4.5.1 Setting APL MODE

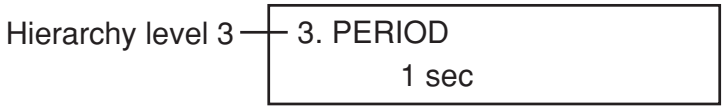
Select the [MODE] by pressing the Up or Down key, then press the [ENTER] key.
The format marked with asterisk is currently selected.



APL OFF	The selected signal is output as is.
APL HIGH	For NTSC, the selected signal is divided into five-line groups, then four lines (i.e., except the last line) are replaced with the FLAT FIELD 100%. For PAL, the selected signal is divided into four-line groups, then three lines (except the last line) are replaced with the FLAT FIELD 100%.
APL LOW	For NTSC, the selected signal is divided into five-line groups, then four lines (except the last line) are replaced with the FLAT FIELD 0%. For PAL, the selected signal is divided into four-line groups, then three lines (except the last line) are replaced with the FLAT FIELD 0%.
APL (BOUNCE)	The APL HIGH and APL LOW signals are output alternately at a preset time interval set in the Section 4.5.2, “Setting PERIOD.”
BOUNCE	Regardless of the selected video signals, FLAT FIELD 100% and FLAT FIELD 0% are output alternately at a preset time interval set in the Section 4.5.2, “Setting PERIOD.”

4.5.2 Setting PERIOD

Select [PERIOD] by pressing the Up or Down key, then press the [ENTER] key.
The period can be set from one to 20 seconds by pressing the Up or Down key.

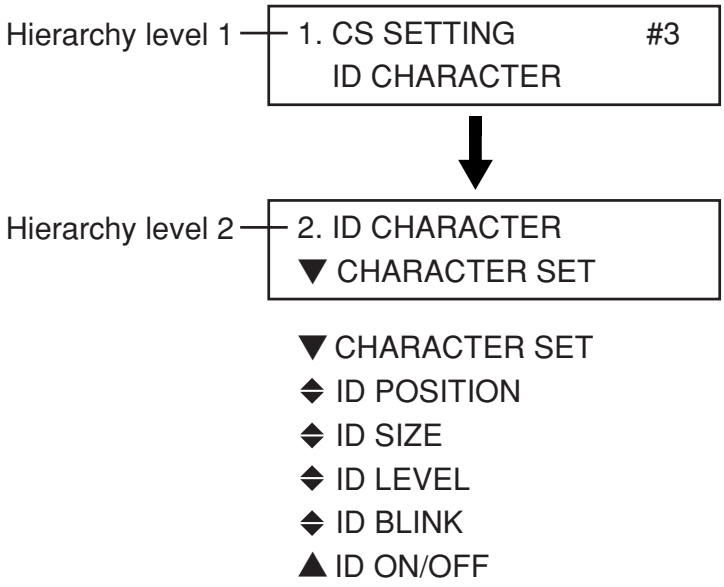


4.6 ID CHARACTER

This mode is used to superimpose alphanumeric characters on the serial digital video signal.

4.6.1 Creating ID Character

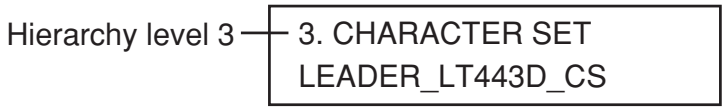
Select [ID CHARACTER] from the [1. CS SETTING] menu, then press the [ENTER] key. The ID character, display position, character size, and ID ON/OFF can be set.



(1) CHARACTER SET

Select [CHARACTER SET] by pressing the Up or Down key, then press the [ENTER] key.

This mode is used to create ID characters. Up to 20 characters can be displayed.



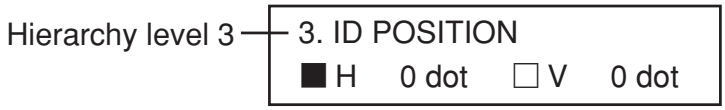
Move the blink cursor to the character to be set by pressing the Left or Right key, then set the characters by pressing the Up or Down key.

After all characters are set, press the [ENTER] key.

4.6.2 ID POSITION

This mode is used to set the display position of ID characters.

(1) Select [ID POSITION] by pressing the Up or Down key, then press the [ENTER] key.



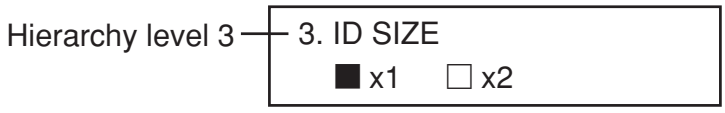
(2) Position the [■] to [H] or [V] by pressing the Left or Right key, then set the number of dots by pressing the Up or Down key. The upper-left corner of the monitor screen is the reference (0, 0) when setting the parameters in dots.

(3) Pressing the [ENTER] key enters data. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.3 ID SIZE (Setting Character Size)

This mode is used to set the ID character size.

(1) Select [ID SIZE] by pressing the Up or Down key, then press the [ENTER] key.



(2) Position the [■] to [x1] or [x2] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.4 ID LEVEL (Setting Character Brightness)

This mode is used to set the ID character brightness.

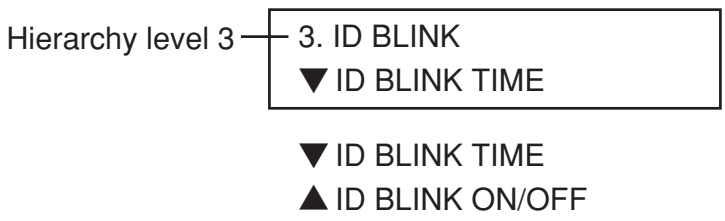
(1) Select [ID LEVEL] by pressing the Up or Down key, then press the [ENTER] key.

(2) Position the [■] to [100%] or [75%] by pressing the Left or Right key to select the brightness for easy reading: 100% for white, 75% for light gray.
Press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.6.5 ID BLINK (Setting Blinking Time)

This mode is used to set the ID character blinking time and turn this mode on or off. This mode can also be used for checking the system operation status when the still pattern is displayed.

(1) Select [ID BLINK] by pressing the Up or Down key, then press the [ENTER] key.



(2) ID BLINK TIME

This mode is used to set the blinking on and off times (i.e., duration) of the characters.

Position the [■] to [ON] or [OFF] by pressing the Left or Right key. The “ON” time can be set from one to 10 seconds by pressing the Up or Down key.
Position the [■] to [OFF] by pressing the Left or Right key. The “OFF” time can be set from one to 10 seconds by pressing the Up or Down key.
Press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

(3) ID BLINK ON/OFF

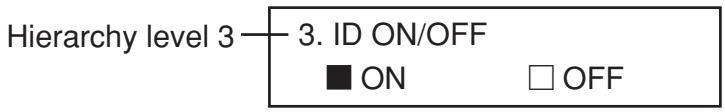
This menu is used to set the ID BLINK mode on or off.

Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 3 [3. ID BLINK].

4.6.6 ID ON/OFF

This mode is used to set ID character display on or off.

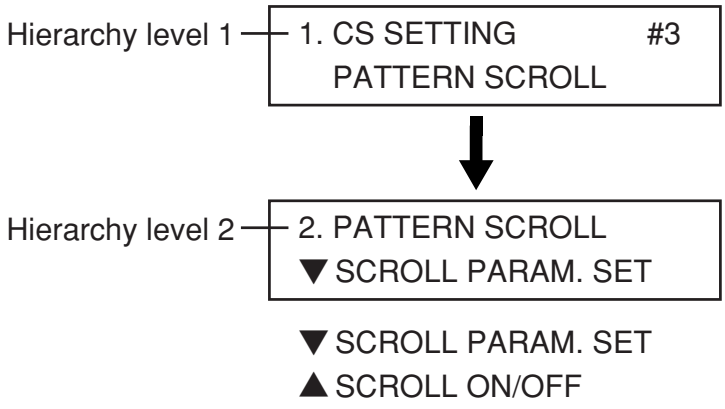
(1) Select [ID ON/OFF] by pressing the Up or Down key, then press the [ENTER] key.



(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. ID CHARACTER].

4.7 PATTERN SCROLL

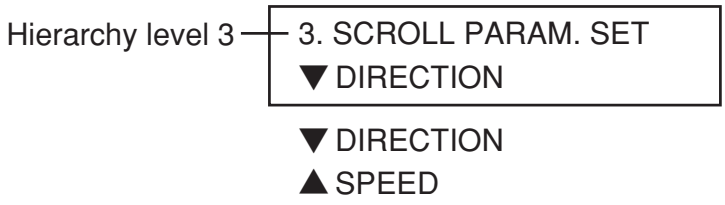
This mode is used to scroll the pattern up, down, left, and right in the effective display areas. Select [◆PATTERN SCROLL] from the [1. CS SETTING] menu, then press the [ENTER] key.



4.7.1 SCROLL PARAM. SET

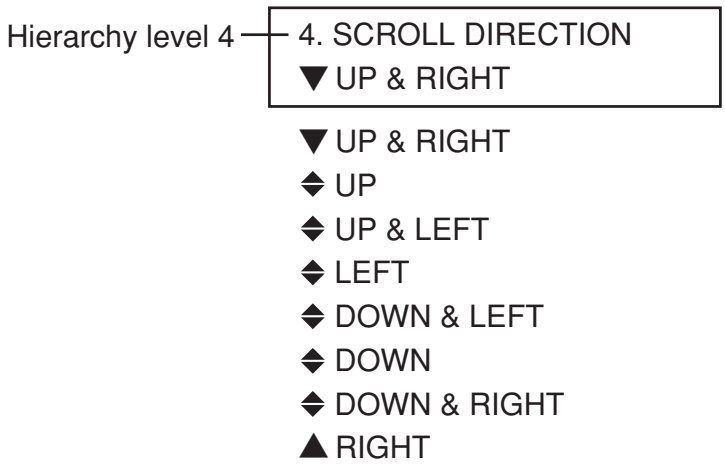
This mode is used to set the scroll direction and speed.

(1) Select [SCROLL PARAM. SET] by pressing the Up or Down key, then press the [ENTER] key.



(2) Setting SCROLL DIRECTION

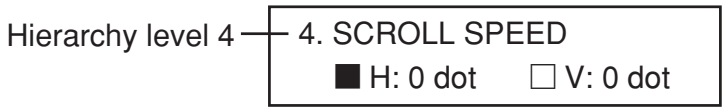
Select [DIRECTION] by pressing the Up or Down key, then press the [ENTER] key.
Set the scroll direction by pressing the Up or Down key, then press the [ENTER] key.
The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].
Pressing the [MENU] key selects the next higher hierarchy.



(3) Setting SCROLL SPEED

This mode is used to set the scroll speed.

Select [SPEED] by pressing the Up or Down key, then press the [ENTER] key.



Position the [■] to [H] or [V] by pressing the Left or Right key, then set the scroll speed by pressing the Up or Down key.

The settable range is 0 to 256 dots in four dot steps in the horizontal direction, 0 to 256 dots in two dot steps in the vertical direction.

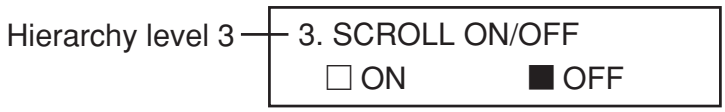
Pressing the [ENTER] key enters data. The menu returns to hierarchy level 3 [3. SCROLL PARAM. SET].

Pressing the [MENU] key selects the next higher hierarchy.

4.7.2 Setting SCROLL ON/OFF

This mode is used to set the pattern scroll mode on or off.

(1) Select [SCROLL ON/OFF] from the [2. PATTERN SCROLL] menu by pressing the Up or Down key, then press the [ENTER] key.



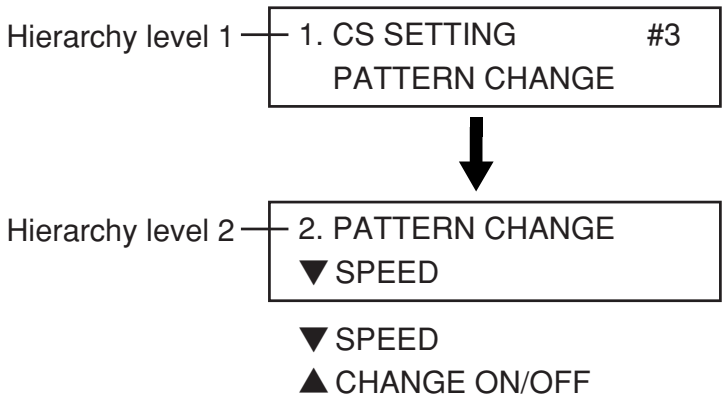
(2) Position the [■] to [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN SCROLL].

Pressing the [MENU] key selects the next higher hierarchy.

4.8 PATTERN CHANGE

All patterns (except CHECK FIELD pattern) indicated on the front panel are sequentially selected from the left to right and displayed.

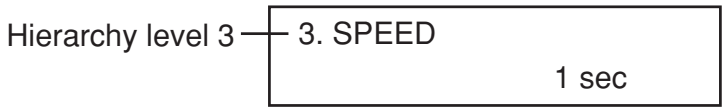
Select [◆ PATTERN CHANGE] from the [1. CS SETTING] menu, then press the [ENTER] key.



4.8.1 Setting PATTERN CHANGE Speed

The settable pattern switching time is 1 to 255 seconds.

(1) Select [SPEED] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.

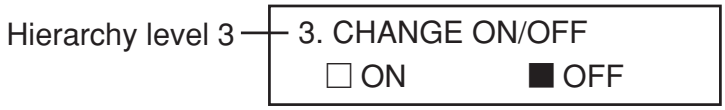


(2) Set the pattern switching time by pressing the Up or Down key, then press the [ENTER] key. The menu returns to hierarchy level 2 [2. PATTERN CHANGE].
Pressing the [MENU] key selects the next higher hierarchy.

4.8.2 Setting PATTERN CHANGE ON/OFF

This mode is used to set PATTERN CHANGE mode on or off.

(1) Select [PATTERN CHANGE ON/OFF] from the [2. PATTERN CHANGE] menu by pressing the Up or Down key, then press the [ENTER] key.



(2) Select [ON] or [OFF] by pressing the Left or Right key, then press the [ENTER] key.

(3) When the CHANGE ON/OFF mode is set to [ON], the LCD panel displays the following message:

(4) To select [OFF], sequentially press the [ENTER] key, Right key, and [ENTER] key.

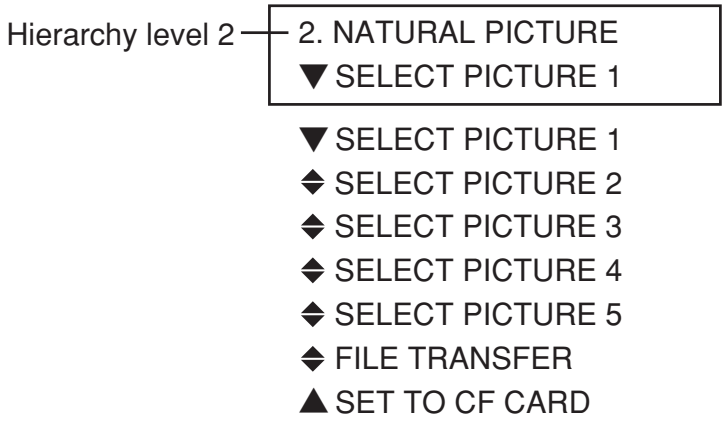
4.9 NATURAL PICTURE (w/OP70)

The NATURAL PICTURE display function is used to display data (i.e., bit map data of NATURAL PICTURE converted into the original data dedicated for the LT 443D) transferred from the CF card to a high-speed RAM in this unit.
Data should be transferred to a high-speed RAM again when power is turned off since a high-speed RAM is used.

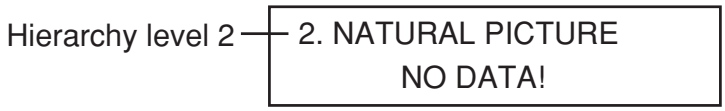
This menu is only displayed when the NATURAL PICTURE option (OP 70) is installed in the mainframe.
Use Windows application software of the LT 443D-70 to store NATURAL PICTURE data on the CF card. Refer to LT 443D-70 instruction manual for detail. (This procedure can be applied when NATURAL PICTURE data is stored on the CF card.)

Select [NATURAL PICTURE] from the [1. CS SETTING] menu, then press the [ENTER] key.

(1) CF Card with NATURAL PICTURE



(2) No CF Card inserted or CF Card without NATURAL PICTURE



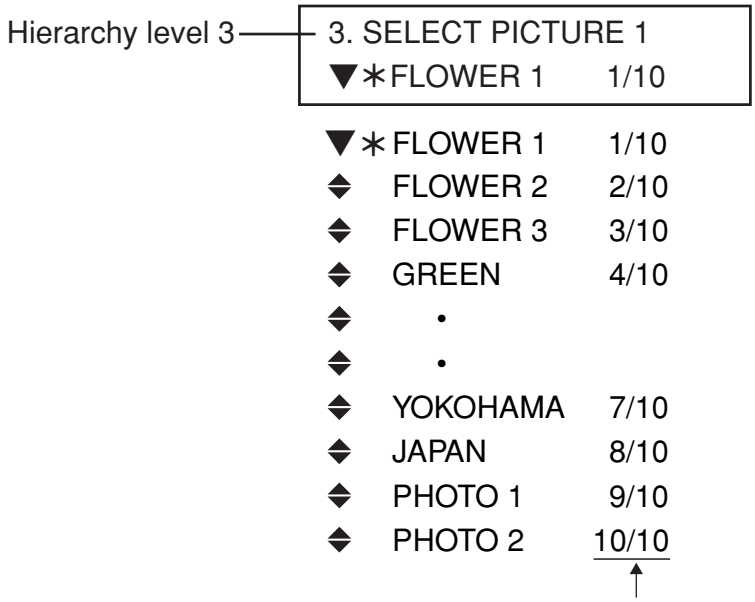
Warning message is displayed; no NATURAL PICTURE file cannot be selected.
To read the NATURAL PICTURE file list when the card is inserted after the NATURAL PICTURE mode is enabled, return to the top menu of [NATURAL PICTURE], then apply the procedure above again.

4.9.1 Selecting SELECT PICTURE File

(1) Select [SELECT PICTURE 1] from the [2. NATURAL PICTURE] menu by pressing the Up or Down key, then press the [ENTER] key.

The NATURAL PICTURE file∗ list (stored on the CF card in the MEMORY CARD slot) corresponding to the current format size is displayed as shown below:

∗ NTSC format: “E:\IMAGE\NTSC” folder (E:\ denotes CF card drive)
PAL format: “E:\IMAGE\PAL” folder



Amount of NATURAL PICTURE files and file numbers corresponding to the current format size are displayed.
File name is displayed in uppercase letters.
Up to 100 files can be stored in the same format.

(2) Selecting PICTURE 1 (NATURAL PICTURE File)
In case of the number of files are ten, position the [∗] to the file number ([1/10] to [10/10]) by pressing the Up or Down key.
When the [ENTER] key is pressed at the file name without asterisk, the file is selected to [PICTURE 1].
When the [ENTER] key is pressed at the file marked with an asterisk, the file selected to [PICTURE 1] is canceled.

(3) Selecting PICTURE 2 to PICTURE 5
Apply the same procedure as Step (2), “Selecting PICTURE 1 (NATURAL PICTURE File)” to display the desired PICTURE (up to five PICTUREs).
Natural Picture file should be selected from PICTURE 1 first.

4.9.2 Transferring NATURAL PICTURE

The NATURAL PICTURE is now selected.
Select [◆ FILE TRANSFER (X)], then press the [ENTER] key.
Select [OK] by the [◀] key, then press the [ENTER] key. The PICTURE 1 to PICTURE 5 files are transferred.
When [CANCEL] is selected, the file is not transferred; returns to file name display menu.

Hierarchy level 2

```
2. NATURAL PICTURE (X)
◆ FILE TRANSFER
```

"(X)" indicates the number of screens to transfer NATURAL PICTURE data in Section, "Selecting SELECT PICTURE File."
"(X)" is not displayed when the NATURAL PICTURE file is not set or after data is transferred.

Hierarchy level 3

```
3. <FILE TRANSFER>
    □ ON      ■ OFF
```

```
<DATA TRANSFER> NTSC
■■□□□□□ LOADING •••
```

```
<DATA TRANSFER> NTSC
■■■■■■■ COMPLETE!
```

The NATURAL PICTURE pattern is output after data is transferred.

4.9.3 Writing NATURAL PICTURE File

NATURAL PICTURE data set in Section 4.9.1, "Selecting SELECT PICTURE File" can be written on the CF card. The contents will be stored in the [E:\IMAGE\set_img txt]. (E:\ indicates CF card drive.)
Select [▲ SET TO CF CARD], then press the [ENTER] key.
Select [OK] by pressing the Left key, then press the [ENTER] key. The selected file is now written.

Hierarchy level 2

```
2. NATURAL PICTURE
  ▲ SET TO CF CARD
```

Hierarchy level 3

```
3. SET TO CF CARD
  □ OK      ■ CANCEL
```

The following message is displayed when the file is correctly written.
By writing the file, the file contents written on the CF card is automatically read and NATURAL PICTURE file is displayed when the power is turned on; no manual setting is required.

```
SET TO CF CARD
WRITE COMPLETE!
```

The following message is displayed if the file is written incorrectly. Confirm that the CF card is inserted in place.

```
SET TO CF CARD
WRITE ERROR!
```

4.10 Setting BLACK TIMING

4.10.1 Setting BLACK 1 TIMING

This section describes setting procedure of the analog black burst signal timing with respect to the reference signal.
Select [1. BLACK 1 TIMING], then press the [ENTER] key.
Select the Frame (F), Vertical (V), or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key.

Hierarchy level 2

```
2. BLACK 1 TIMING
▼ F-PHASE
```

▼ F-PHASE
◆ V-PHASE [LINE]
◆ H-PHASE [DOT]
▲ H-PHASE [μs]

(1) F-PHASE (F: Frame)

This mode is used to set the timing in frame steps.
Press the Up or Down key to set the timing.

Hierarchy level 3

```
3. F-PHASE      R: 2.997 Hz
CS-BLK 1        +5 FRAME
```

Displays the current reference reset signal for the BLACK signal generator.
R: 2.997 Hz
R: 6.250 Hz

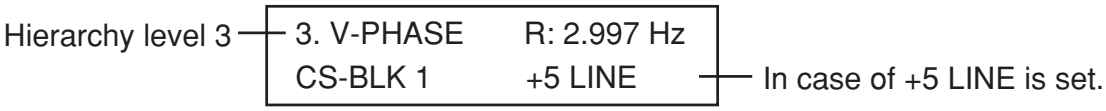
(2) V-PHASE (V: Vertical)

This mode is used to set the vertical timing.

The timing can be set in one line steps by pressing the Up or Down key.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 2 [2. BLACK 1 TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



(3) H-PHASE [dot] (H: Horizontal)

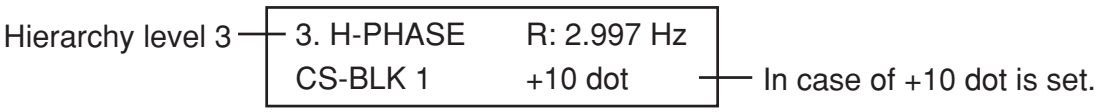
This mode is used to set the horizontal timing in dot steps.

Press the Up or Down key to set the timing.

For NTSC, the settable range is ±1715 dots in one dot steps.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 3 [3. BLACK 1 TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



(4) H-PHASE [μs] (H: Horizontal)

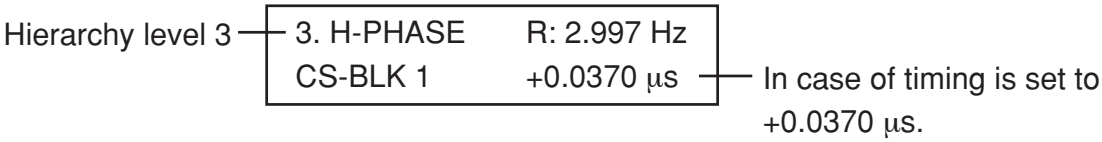
This mode is used to set the horizontal timing.

Press the Up or Down key to set the timing.

The timing can be set in 0.0370 μs steps.

After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 2 [2. BLACK 1 TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



4.10.2 Setting BLACK 2 TIMING

This mode is used to set the analog black burst signal timing with respect to the reference signal.

Select [1. BLACK 2 TIMING], then press the [ENTER] key.

Select the Frame (F), Vertical (V), or Horizontal (H) to set the timing by pressing the Up or Down key, then press the [ENTER] key. (Refer to Section 4.10.1, “Setting BLACK 1 TIMING.”)

4.11 Setting V. DRIVE TIMING

4.11.1 Setting TIMING

This section describes setting procedure of the V. DRIVE signal with respect to the internal reference signal.

Select [1. V. DRIVE TIMING], then press the [ENTER] key.

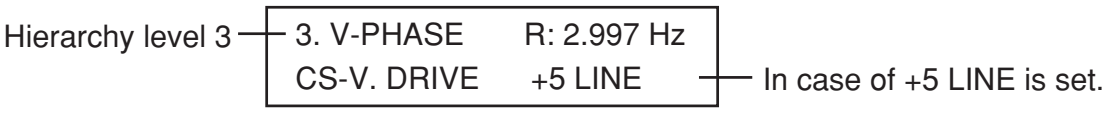
(1) V-PHASE (V: Vertical)

This mode is used to set the vertical timing.

The timing can be set in one line steps by pressing the Up or Down key.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 1 [1. V. DRIVE TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



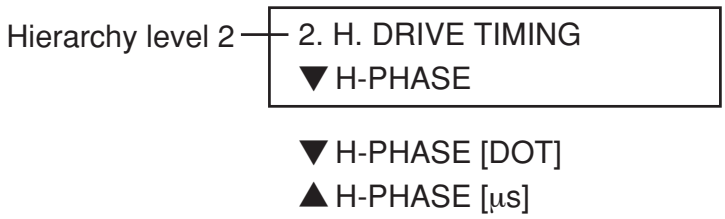
4.12 Setting H. DRIVE TIMING

4.12.1 Setting TIMING

This section describes setting procedure of the H. DRIVE signal with respect to the internal reference signal.

Select [1. H. DRIVE TIMING], then press the [ENTER] key.

Select the item to set the timing by pressing the Up or Down key, then press the [ENTER] key.



(1) H-PHASE [dot] (H: Horizontal)

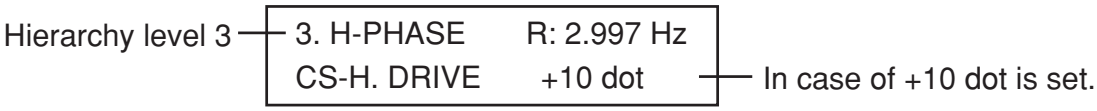
This mode is used to set the horizontal timing in dot steps.

Press the Up or Down key to set the timing.

For NTSC, the settable range is ±1715 dots in one dot steps.

Press the [ENTER] key to enter data. The menu returns to hierarchy level 2 [2. H. DRIVE TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



(2) H-PHASE [μs] (H: Horizontal)

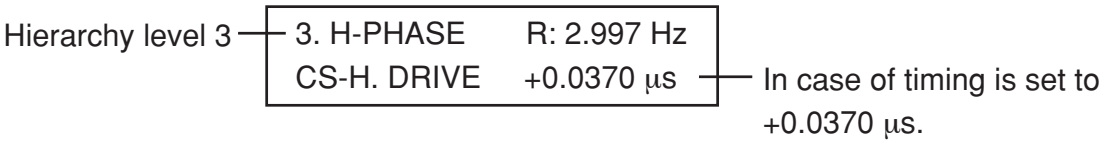
This mode is used to set the horizontal timing in μs.

Press the Up or Down key to set the timing.

The timing can be set in 0.0370 μs steps for both NTSC and PAL.

After setting is completed, press the [ENTER] key. The menu returns to hierarchy level 2 [2. TIMING].

Pressing the [MENU] key selects the next higher hierarchy.



4.13 EXIT

Selecting [EXIT] displays the status display screen.

4.14 Pattern Selection Key

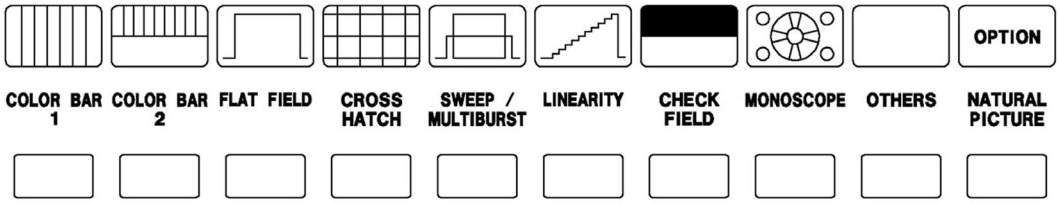
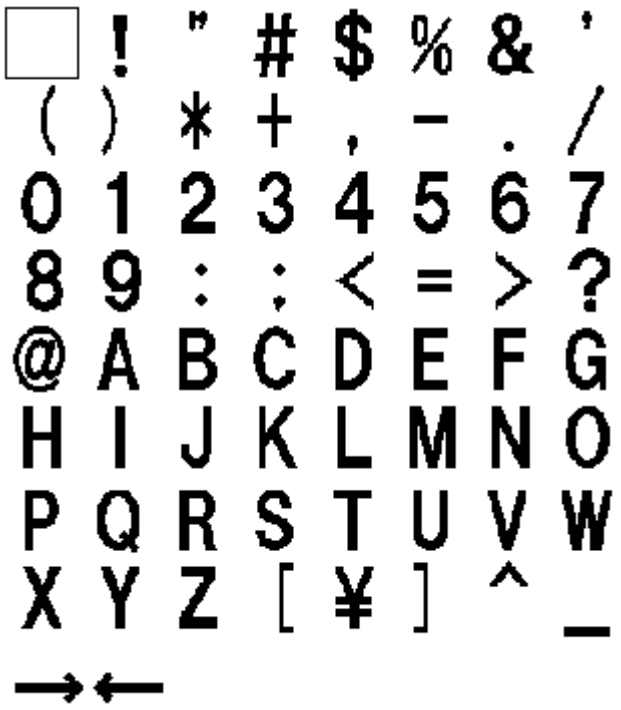


Table below lists the pattern selection keys used for the LT 443D-CS unit.
The multiple patterns are assigned to some keys listed below.
Pressing the key sequentially selects the pattern. The pattern name is displayed on the LCD panel.

Pattern Selection Key	LT 443D-CS Output Patten	
	NTSC	PAL
COLOR BAR 1	COLOR BAR 100 % COLOR BAR 75 %	COLOR BAR 100 % EBU COLOR BAR BBC COLOR
COLOR BAR 2	SMPTE	Not used
FLAT FIELD	FLAT FIELD 100 % FLAT FIELD 50 % FLAT FIELD 0 %	FLAT FIELD 100 % FLAT FIELD 50 % FLAT FIELD 0 %
CROSS HATCH	CROSS HATCH 1 CROSS HATCH 2	CROSS HATCH 1 CROSS HATCH 2
SWEEP/MULTIBURST	LINE SWEEP 100 % LINE SWEEP 60 % MULTIBURST 100 % MULTIBURST 60 %	LINE SWEEP 100 % LINE SWEEP 60 % MULTI BURST 100 % MULTI BURST 60 %
LINEARITY	SHALLOW RAMP 10 STEP MOD 10 STEP RAMP MOD RAMP	SHALLOW RAMP 10 STEP MOD 10 STEP RAMP MOD RAMP
CHECK FIELD	Not used	Not used
MONOSCOPE	MONOSCOPE (NORMAL) MONOSCOPE (INVERT)	MONOSCOPE (NORMAL) MONOSCOPE (INVERT)
OTHERS	RED RASTER WINDOW PULSE & BAR	RED RASTER WINDOW PULSE & BAR
NATURAL PICTURE (OPTION)	BLACK (FLAT FIELD 0 %) In case of the Option 70 (NATURAL PICTURE memory) is not installed.	BLACK (FLAT FIELD 0 %) In case of the Option 70 (NATURAL PICTURE memory) is not installed.

4.15 ID Character Font List

The following ID character fonts can be displayed.
(Fonts below shows the approximate size and shape.)



The black background of ID characters is displayed in 20-character long, however, the length can be shortened corresponding to the number of characters displayed.

To shorten the background, display the [CHARACTER SET] screen, then enter [◀] at the end of ID. (Holding down the Down key displays [◀] at the end of [CHARACTER SET].)

When ID CHARACTER “ABC” is entered, for example:

	ID Entered	Background
Background for 20 characters	ABC	**ABC**
Background for 3 characters	ABC◀	**ABC**

LIST OF BLACK SIGNAL FORMAT

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LIST OF BLACK SIGNAL FORMAT

Table below lists the LT 443D-GLA and LT 443D-BL analog black signal formats.

Format No.	FORMAT Name Displayed	System Nomenclature
1	1035i/60	1920 x 1035i/60
2	1035i/59.94	1920 x 1035i/59.94
3	1080i/60	1920 x 1080i/60
4	1080i/59.94	1920 x 1080i/59.94
5	1080i/50	1920 x 1080i/50
6	1080p/30	1920 x 1080p/30
7	1080p/29.97	1920 x 1080p/29.97
8	1080p/25	1920 x 1080p/25
9	1080p/24	1920 x 1080p/24
10	1080p/23.98	1920 x 1080p/23.98
11	1080PsF/24	1920 x 1080PsF/24
12	1080PsF/23.98	1920 x 1080PsF/23.98
13	720p/60	1280 x 720p/60
14	720p/59.94	1280 x 720p/59.94
15	720p/50	1280 x 720p/50
16	720p/30	1280 x 720p/30
17	720p/29.97	1280 x 720p/29.97
18	720p/25	1280 x 720p/25
19	720p/24	1280 x 720p/24
20	720p/23.98	1280 x 720p/23.98
21	NTSC BB	NTSC BB
22	NTSC BB+REF	NTSC BB with Field REF
23	NTSC BB+ID	NTSC BB with 10 field ID
24	NTSC BB+REF+ID	NTSC BB with Field REF & 10 field ID
25	NTSC BB+Setup	NTSC BB with Setup
26	NTSC BB+S+REF	NTSC BB with Setup & Field REF
27	NTSC BB+S+ID	NTSC BB with Setup & 10 field ID
28	NTSC BB+S+R+ID	NTSC BB with Setup & Field REF & 10 field ID
29	525i/59.94	525i/59.94
30	525p/59.94	525p/59.94
31	PAL BB	PAL BB
32	PAL BB+REF	PAL BB FIELD REF
33	625i/50	625i/50
34	625p/50	625p/50

Note

Field REF The following Field ID signal is added.
NTSC : 714 mV reference signal to line 10 (every two frames).
PAL : 700 mV reference signal to line 7 (every four frames).

10 field ID　10-field sequence identification signal conforming to SMPTE 318M standards is added.

Setup　Setup (7.5 IRE, 7.5%) is added.

∗ [Format]　Format No. 1 to 20 are HD black signals.

∗ [Format]　Format No. 21 to 28, 31, and 32 are SD black signals for sync lock and burst lock.

∗ [Format]　Format No. 29, 30, 33, and 34 are SD black signals for sync lock.

∗ When using a conventional composite black signal, use [NTSC BB] or [PAL BB] without ID and REF.

LT 443D MENU TREE

INSTRUCTION MANUAL

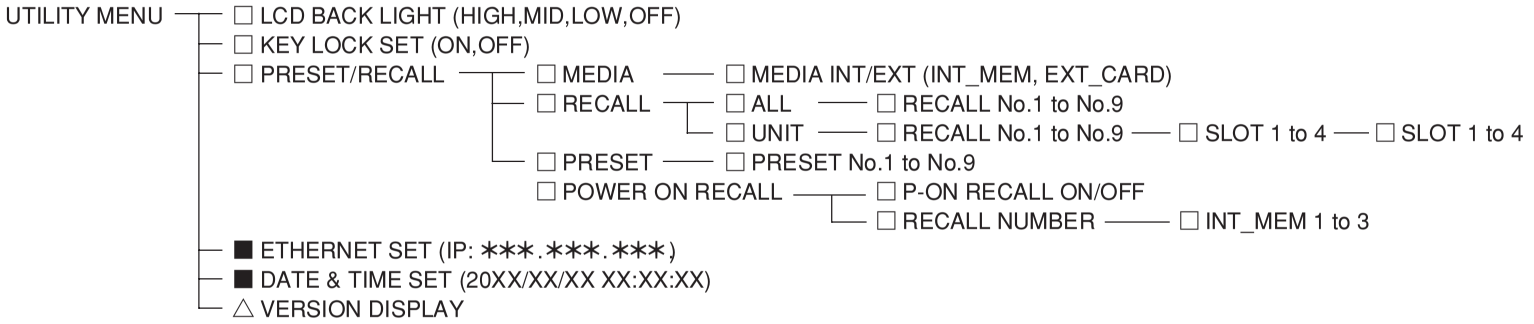
LEADER ELECTRONICS CORP.

MENU TREE

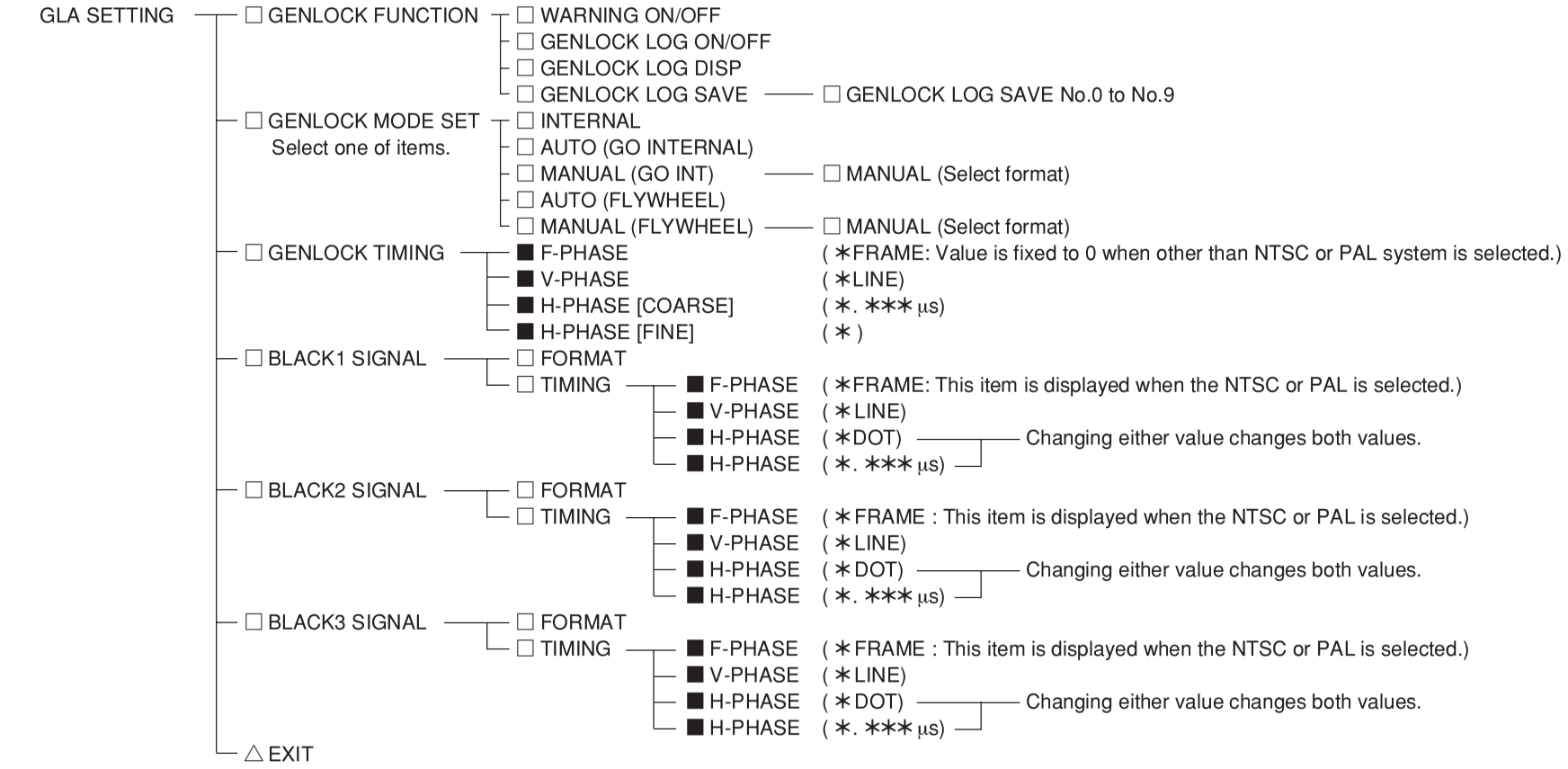
T443D, -70, -GLA, -HD, -HDB, -BL, -SD, -SDB, -DA, -AA, -CS

Legend ■ : Enter numeric value. ☐ : Select from the menu. △ : For movement or confirmation.

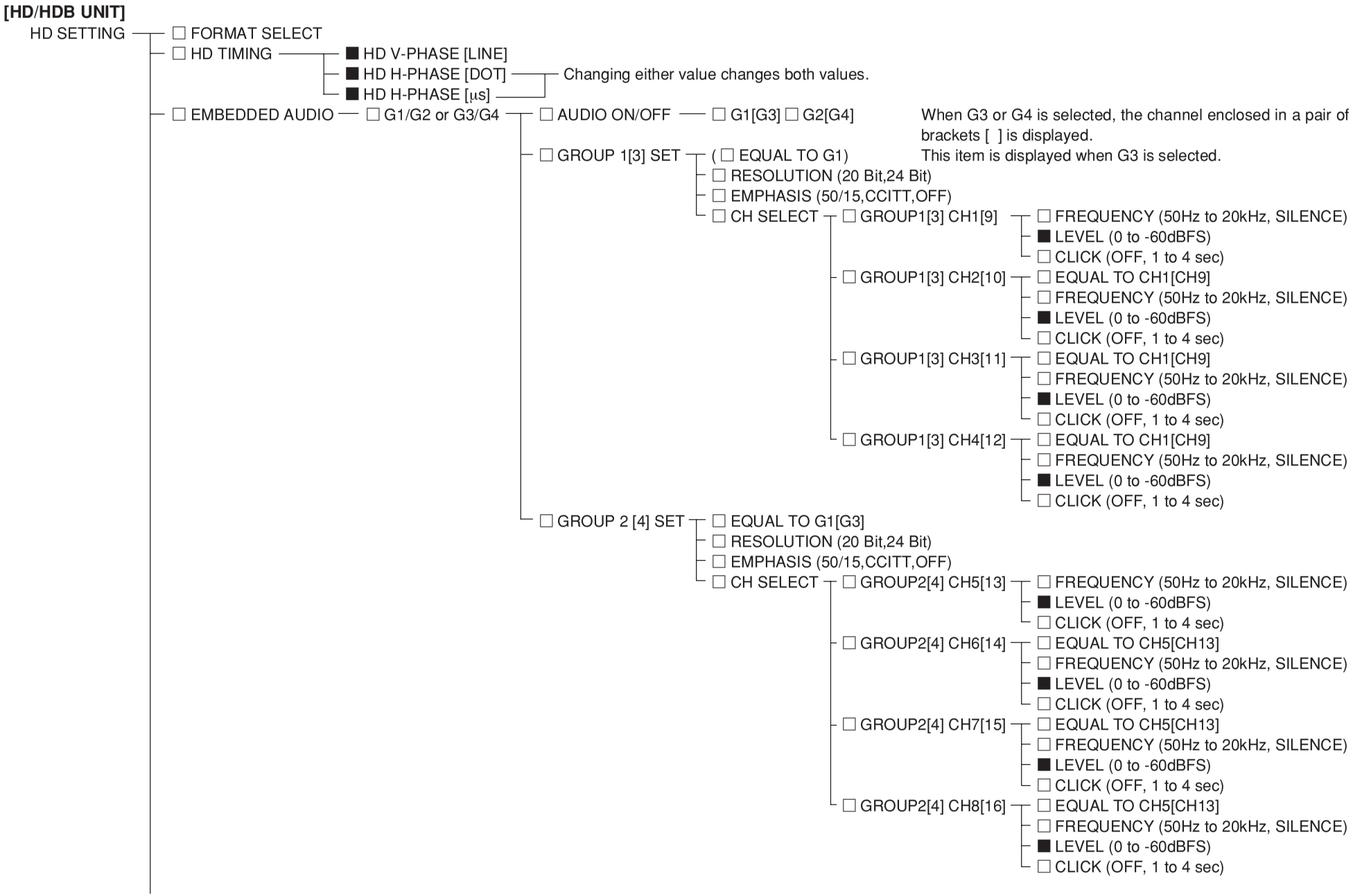
[MAINFRAME]

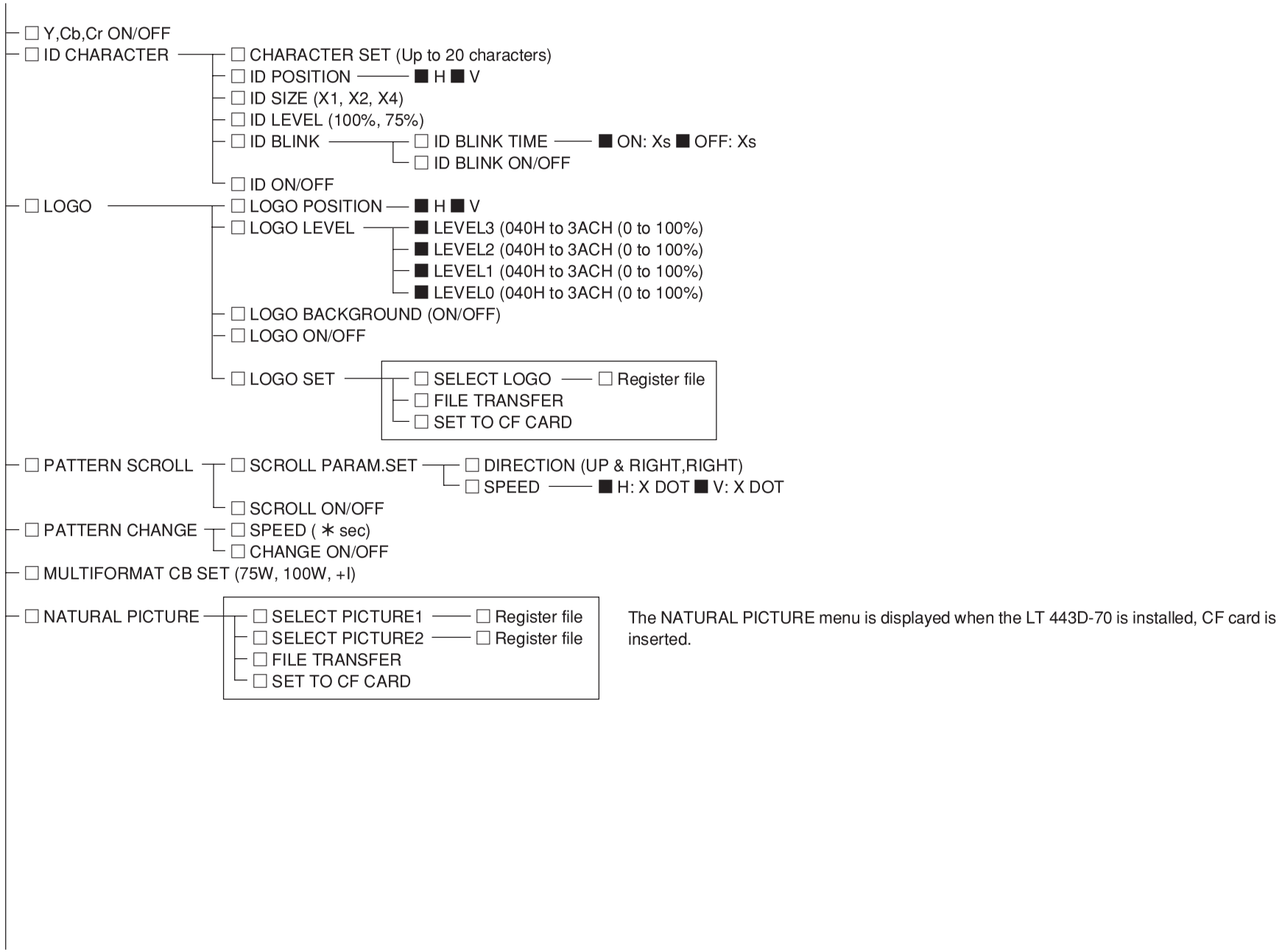


[GLA UNIT]

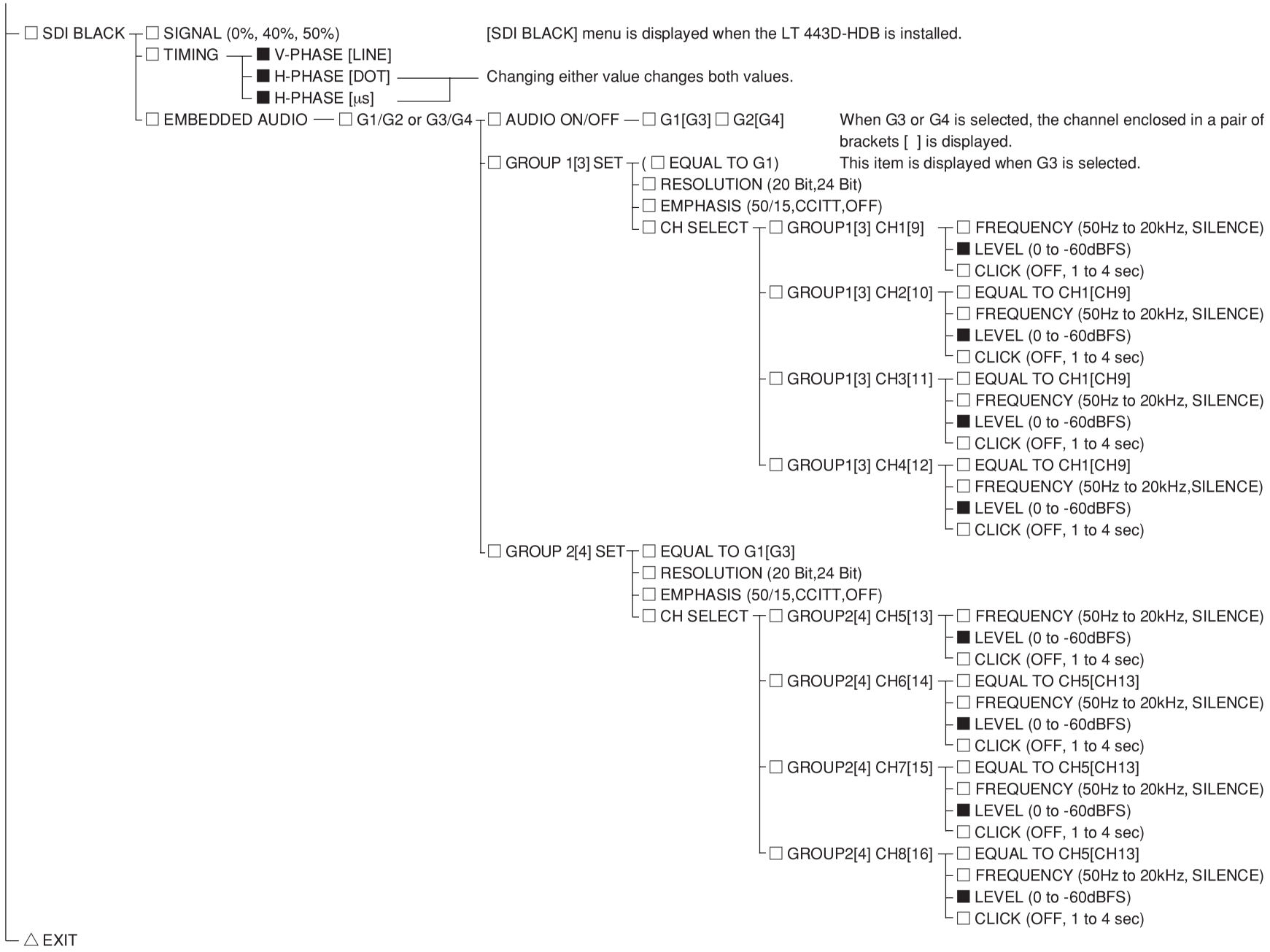

GLA SETTING
☐ GENLOCK FUNCTION
☐ WARNING ON/OFF
☐ GENLOCK LOG ON/OFF
☐ GENLOCK LOG DISP
☐ GENLOCK LOG SAVE
☐ GENLOCK LOG SAVE No.0 to No.9
☐ GENLOCK MODE SET
Select one of items.
☐ INTERNAL
☐ AUTO (GO INTERNAL)
☐ MANUAL (GO INT)
☐ MANUAL (Select format)
☐ AUTO (FLYWHEEL)
☐ MANUAL (FLYWHEEL)
☐ MANUAL (Select format)
☐ GENLOCK TIMING
■ F-PHASE (∗FRAME: Value is fixed to 0 when other than NTSC or PAL system is selected.)
■ V-PHASE (∗LINE)
■ H-PHASE [COARSE] (∗. ∗∗∗ μs)
■ H-PHASE [FINE] (∗)
☐ BLACK1 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗FRAME: This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗LINE)
■ H-PHASE (∗DOT)
■ H-PHASE (∗. ∗∗∗ μs)
Changing either value changes both values.
☐ BLACK2 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗FRAME : This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗LINE)
■ H-PHASE (∗DOT)
■ H-PHASE (∗. ∗∗∗ μs)
Changing either value changes both values.
☐ BLACK3 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗FRAME : This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗LINE)
■ H-PHASE (∗DOT)
■ H-PHASE (∗. ∗∗∗ μs)
Changing either value changes both values.
△ EXIT

[HD/HDB UNIT]

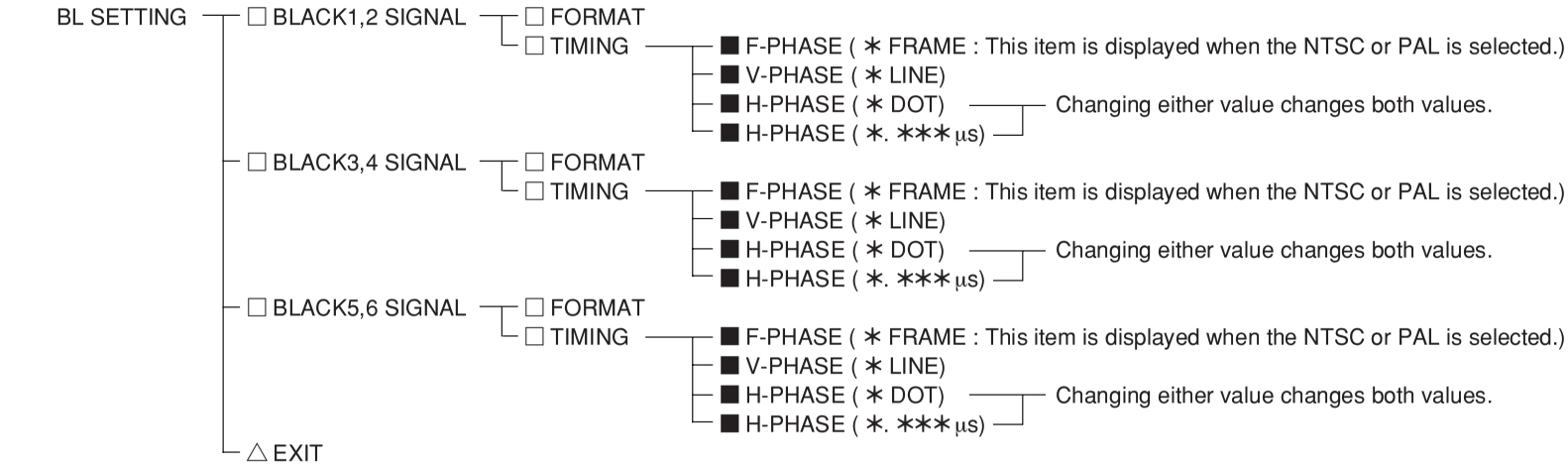

HD SETTING
☐ FORMAT SELECT
☐ HD TIMING
■ HD V-PHASE [LINE]
■ HD H-PHASE [DOT]
■ HD H-PHASE [μs]
Changing either value changes both values.
☐ EMBEDDED AUDIO
☐ G1/G2 or G3/G4
☐ AUDIO ON/OFF
☐ G1[G3] ☐ G2[G4]
When G3 or G4 is selected, the channel enclosed in a pair of brackets [ ] is displayed.
☐ GROUP 1[3] SET
(☐ EQUAL TO G1)
This item is displayed when G3 is selected.
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ CH SELECT
☐ GROUP1[3] CH1[9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH2[10]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH3[11]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH4[12]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP 2 [4] SET
☐ EQUAL TO G1[G3]
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ CH SELECT
☐ GROUP2[4] CH5[13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH6[14]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH7[15]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH8[16]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)



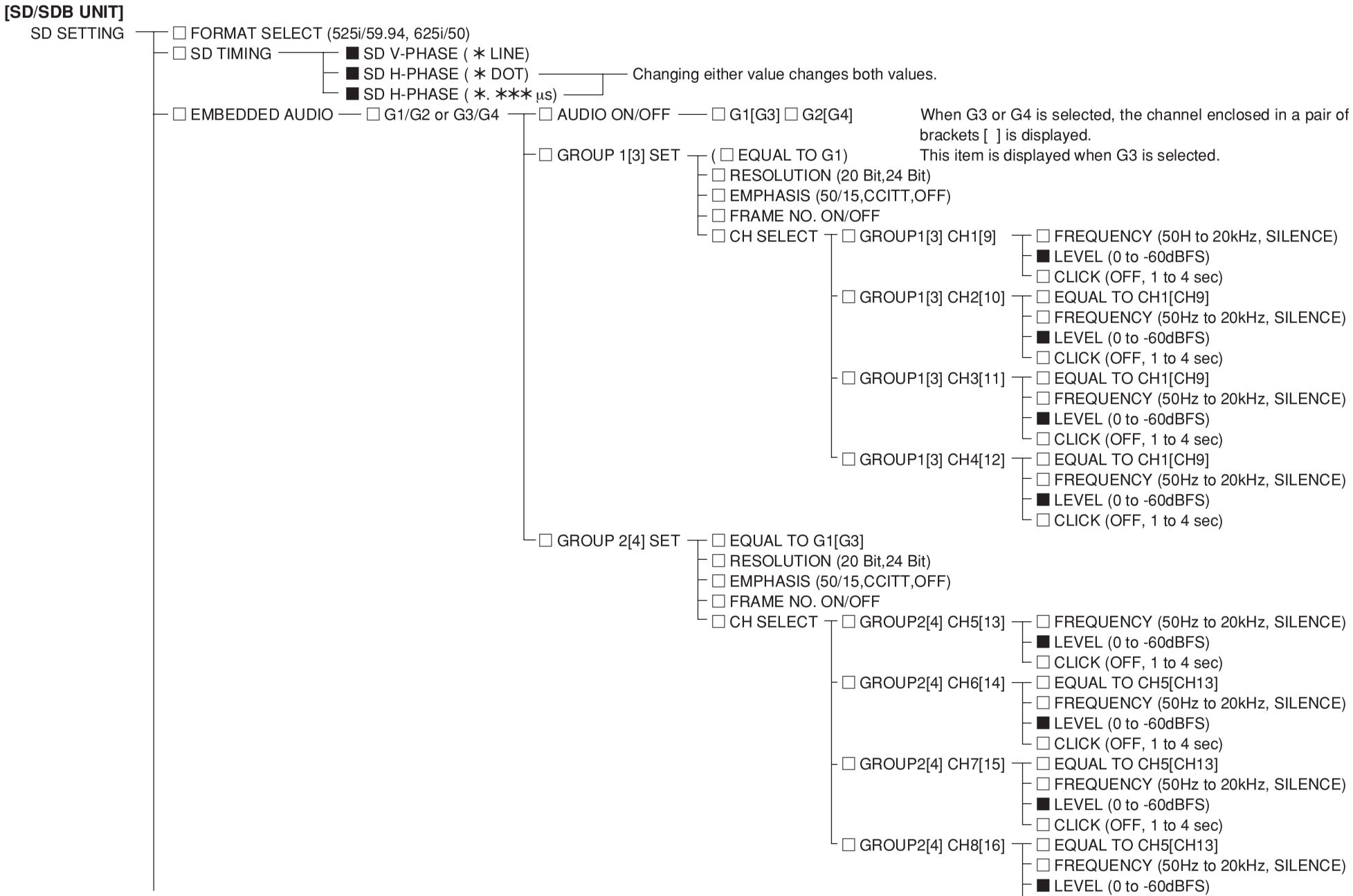
The NATURAL PICTURE menu is displayed when the LT 443D-70 is installed, CF card is inserted.

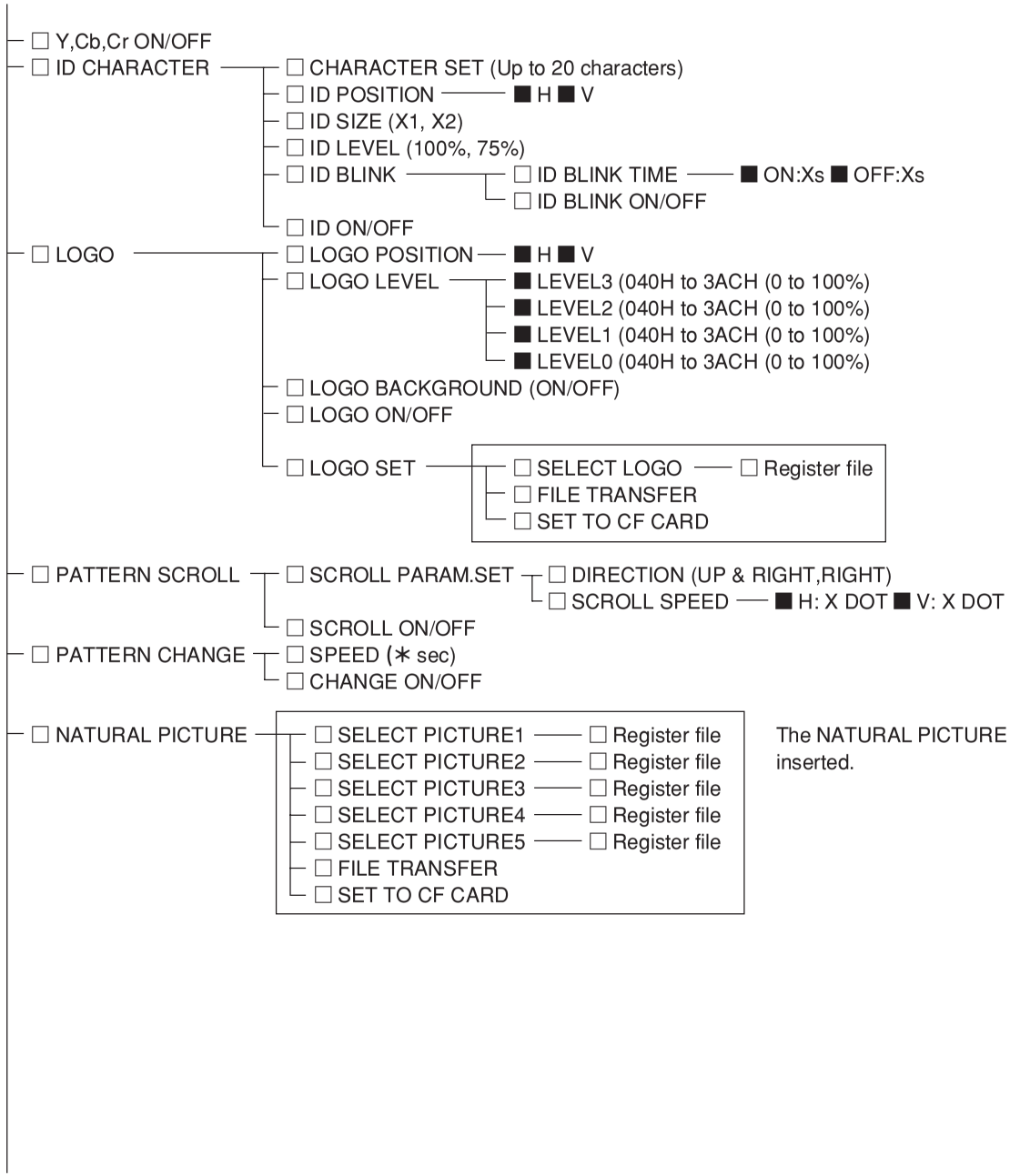

☐ SDI BLACK
☐ SIGNAL (0%, 40%, 50%)
[SDI BLACK] menu is displayed when the LT 443D-HDB is installed.
☐ TIMING
■ V-PHASE [LINE]
■ H-PHASE [DOT]
■ H-PHASE [μs]
Changing either value changes both values.
☐ EMBEDDED AUDIO
☐ G1/G2 or G3/G4
☐ AUDIO ON/OFF
☐ G1[G3] ☐ G2[G4]
When G3 or G4 is selected, the channel enclosed in a pair of brackets [ ] is displayed.
☐ GROUP 1[3] SET
(☐ EQUAL TO G1)
This item is displayed when G3 is selected.
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ CH SELECT
☐ GROUP1[3] CH1[9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH2[10]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH3[11]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH4[12]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz,SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP 2[4] SET
☐ EQUAL TO G1[G3]
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ CH SELECT
☐ GROUP2[4] CH5[13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH6[14]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH7[15]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH8[16]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
△ EXIT

[BL UNIT]

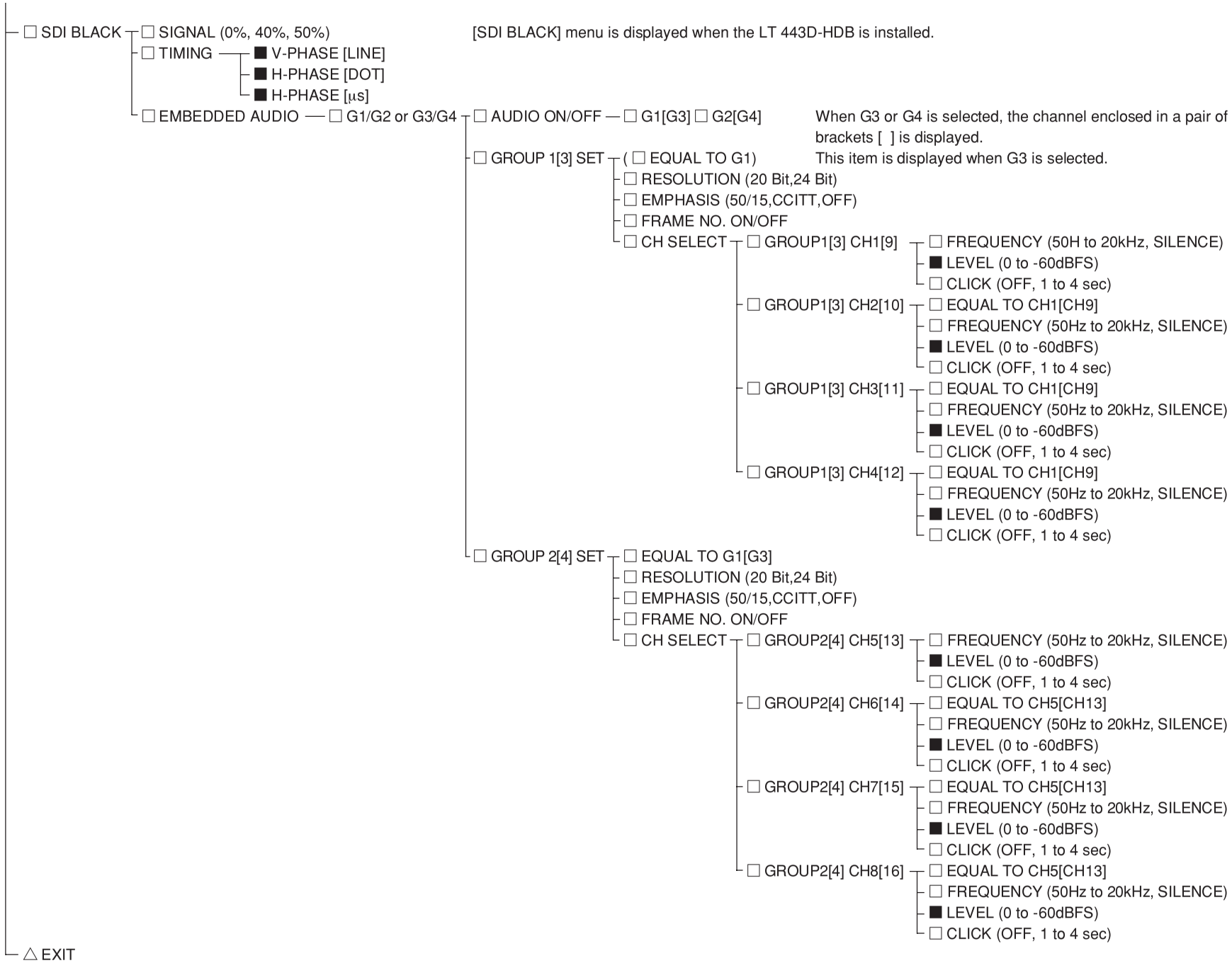

BL SETTING
☐ BLACK1,2 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗ FRAME : This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗ LINE)
■ H-PHASE (∗ DOT)
■ H-PHASE (∗. ∗∗∗μs)
Changing either value changes both values.
☐ BLACK3,4 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗ FRAME : This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗ LINE)
■ H-PHASE (∗ DOT)
■ H-PHASE (∗. ∗∗∗μs)
Changing either value changes both values.
☐ BLACK5,6 SIGNAL
☐ FORMAT
☐ TIMING
■ F-PHASE (∗ FRAME : This item is displayed when the NTSC or PAL is selected.)
■ V-PHASE (∗ LINE)
■ H-PHASE (∗ DOT)
■ H-PHASE (∗. ∗∗∗μs)
Changing either value changes both values.
△ EXIT

[SD/SDB UNIT]


SD SETTING
☐ FORMAT SELECT (525i/59.94, 625i/50)
☐ SD TIMING
■ SD V-PHASE (∗ LINE)
■ SD H-PHASE (∗ DOT)
■ SD H-PHASE (∗. ∗∗∗ μs)
Changing either value changes both values.
☐ EMBEDDED AUDIO
☐ G1/G2 or G3/G4
☐ AUDIO ON/OFF
☐ G1[G3] ☐ G2[G4]
When G3 or G4 is selected, the channel enclosed in a pair of brackets [ ] is displayed.
☐ GROUP 1[3] SET
(☐ EQUAL TO G1)
This item is displayed when G3 is selected.
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ FRAME NO. ON/OFF
☐ CH SELECT
☐ GROUP1[3] CH1[9]
☐ FREQUENCY (50H to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH2[10]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH3[11]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP1[3] CH4[12]
☐ EQUAL TO CH1[CH9]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP 2[4] SET
☐ EQUAL TO G1[G3]
☐ RESOLUTION (20 Bit,24 Bit)
☐ EMPHASIS (50/15,CCITT,OFF)
☐ FRAME NO. ON/OFF
☐ CH SELECT
☐ GROUP2[4] CH5[13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH6[14]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH7[15]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ GROUP2[4] CH8[16]
☐ EQUAL TO CH5[CH13]
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)



The NATURAL PICTURE menu is displayed when the LT 443D-70 is installed, CF card is inserted.

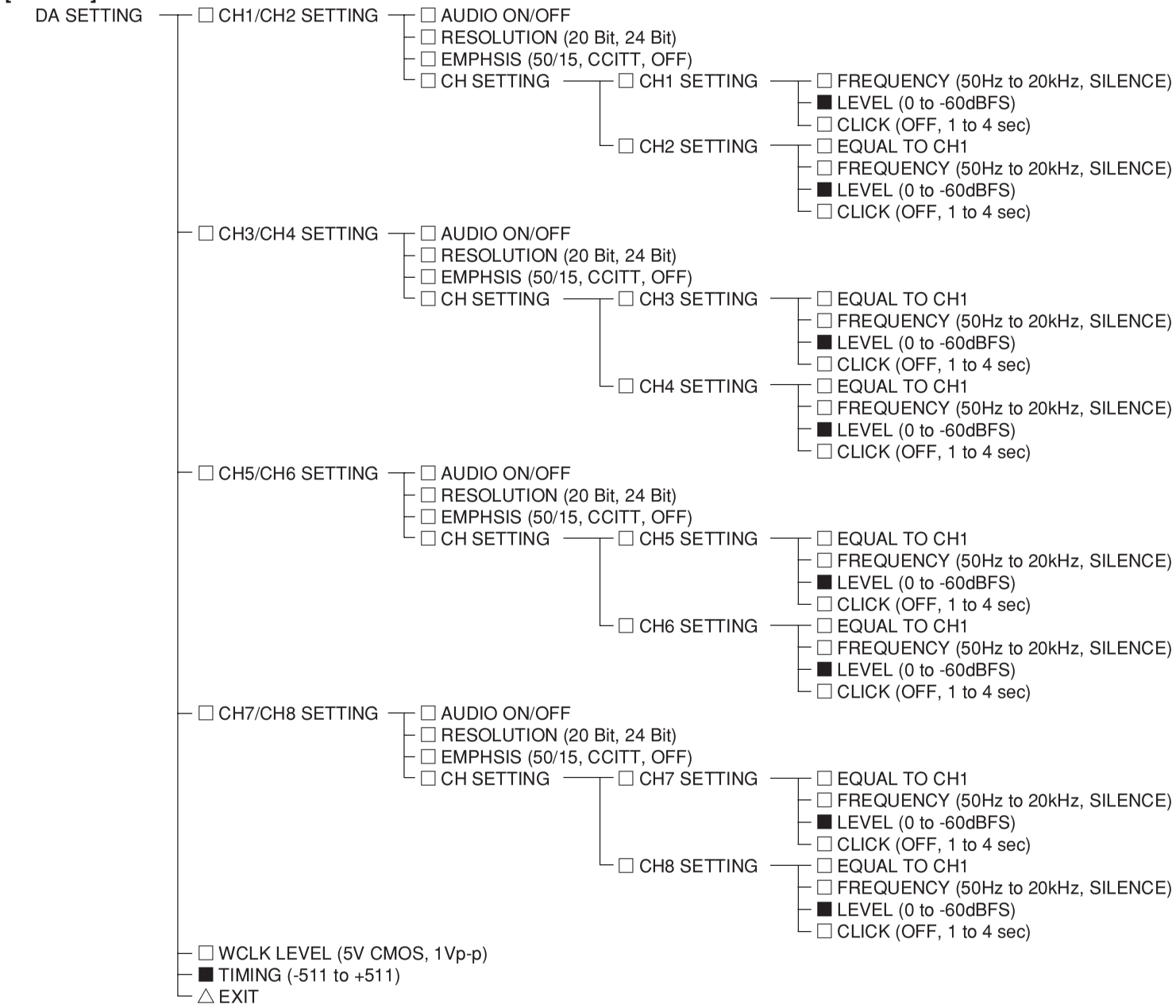


[SDI BLACK] menu is displayed when the LT 443D-HDB is installed.

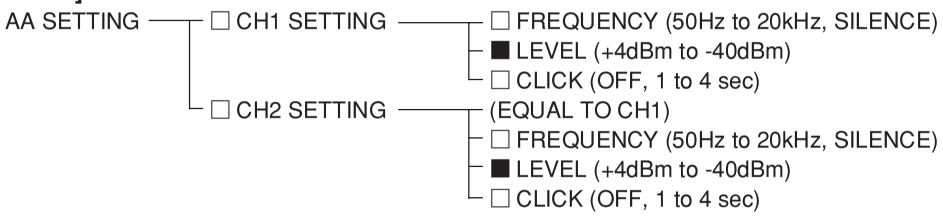
When G3 or G4 is selected, the channel enclosed in a pair of brackets [ ] is displayed.

This item is displayed when G3 is selected.

[DA UNIT]


DA SETTING
☐ CH1/CH2 SETTING
☐ AUDIO ON/OFF
☐ RESOLUTION (20 Bit, 24 Bit)
☐ EMPHSIS (50/15, CCITT, OFF)
☐ CH SETTING
☐ CH1 SETTING
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH2 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH3/CH4 SETTING
☐ AUDIO ON/OFF
☐ RESOLUTION (20 Bit, 24 Bit)
☐ EMPHSIS (50/15, CCITT, OFF)
☐ CH SETTING
☐ CH3 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH4 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH5/CH6 SETTING
☐ AUDIO ON/OFF
☐ RESOLUTION (20 Bit, 24 Bit)
☐ EMPHSIS (50/15, CCITT, OFF)
☐ CH SETTING
☐ CH5 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH6 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH7/CH8 SETTING
☐ AUDIO ON/OFF
☐ RESOLUTION (20 Bit, 24 Bit)
☐ EMPHSIS (50/15, CCITT, OFF)
☐ CH SETTING
☐ CH7 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH8 SETTING
☐ EQUAL TO CH1
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (0 to -60dBFS)
☐ CLICK (OFF, 1 to 4 sec)
☐ WCLK LEVEL (5V CMOS, 1Vp-p)
■ TIMING (-511 to +511)
△ EXIT

[AA UNIT]


AA SETTING
☐ CH1 SETTING
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (+4dBm to -40dBm)
☐ CLICK (OFF, 1 to 4 sec)
☐ CH2 SETTING
(EQUAL TO CH1)
☐ FREQUENCY (50Hz to 20kHz, SILENCE)
■ LEVEL (+4dBm to -40dBm)
☐ CLICK (OFF, 1 to 4 sec)

[CS UNIT]

- CS SETTING
  - ☐ FORMAT SELECT
  - ☐ SIGNAL TIMING
    - ■ F-PHASE
    - ■ V-PHASE[LINE]
    - ■ H-PHASE[DOT]
    - ■ H-PHASE[us]
  - ☐ Y, C ON/OFF
  - ☐ APL
    - ☐ MODE (APL OFF, APL HIGH, APL LOW, APL BOUNCE, BOUNCE)
    - ■ PERIOD (1 to 20sec)
  - ☐ ID CHARACTER
    - ☐ CHARACTER SET (Up to 20 characters.)
    - ☐ ID POSITION — ■ H ■ V
    - ☐ ID SIZE (× 1, × 2)
    - ☐ ID LEVEL (100%, 75%)
    - ☐ ID BLINK
      - ☐ ID BLINK TIME — ■ ON: Xs ■ OFF: Xs
      - ☐ ID BLINK ON/OFF
    - ☐ ID ON/OFF
  - ☐ PATTERN SCROLL
    - ☐ SCROLL PARAM.SET
      - ☐ DIRECTION (UP & RIGHT,RIGHT)
      - ☐ SPEED — ■ H: X DOT ■ V: X DOT
    - ☐ SCROLL ON/OFF
  - ☐ PATTERN CHANGE
    - ☐ SPEED — ■ H: X DOT ■ V: X DOT
    - ☐ CHANGE ON/OFF
  - ☐ NATURAL PICTURE
    - ☐ SELECT PICTURE1 — ☐ Register file
    - ☐ SELECT PICTURE2 — ☐ Register file
    - ☐ SELECT PICTURE3 — ☐ Register file
    - ☐ SELECT PICTURE4 — ☐ Register file
    - ☐ SELECT PICTURE5 — ☐ Register file
    - ☐ FILE TRANSFER
    - ☐ SET TO CF CARD
  - ☐ BLACK1 TIMING
    - ■ F-PHASE
    - ■ V-PHASE[LINE]
    - ■ H-PHASE[DOT]
    - ■ H-PHASE[μs]
  - ☐ BLACK2 TIMING
    - ■ F-PHASE
    - ■ V-PHASE[LINE]
    - ■ H-PHASE[DOT]
    - ■ H-PHASE[μs]
  - ☐ V.DRIVE TIMING — ■ V-PHASE[LINE]
  - ☐ H.DRIVE TIMING
    - ■ H-PHASE[DOT]
    - ■ H-PHASE[μs]
  - △ EXIT

The NATURAL PICTURE menu is displayed when the LT 443D-70 is installed, CF card is inserted.