LT 4400
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.

■ Warning on Fuse

When the fuse is melted the instrument stops operation. If the fuse melted, please contact your local LEADER agent.

■ Warning on Installation Environment

● 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. Be sure not to obstruct air circulation.

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, allows the instrument to sit for 30 minutes without the power on.

GENERAL SAFETY SUMMARY

WARNING

- **About the Operating Humidity Range**
  Operating humidity range is ≤ 85 % RH. (without condensation)
  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.

■ Warning While Operating

While operating the instrument if smoke, fire, or a bad smell occurs, turn off the instrument at once for it could cause a fire hazard. When such a case occurs, turn off the power switch and pull the plug of the cord from the plug socket. Contact your local LEADER agent after confirming there is no fire.

■ 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.

■ Warnings Concerning the LCD Panel

Glass is used on the LCD panel. If you break the glass, the fragments may cause injury. Do not apply strong shock to the glass or damage the surface of the glass with sharp metal objects.

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 on AC Adaptor

The instrument that uses the AC adaptor should use the thing surely specified.
If things other than specification are used, there is danger of the instrument malfunction and a fire.

■ 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.

■ Caution on Connection of the Instrument and a Display

While the instrument is being connected with a ground terminal of the display, connect or disconnect the signal cable .
By connecting the ground of the display with the instrument, the output part of the instrument becomes difficult to break easily.
Be careful especially, when you connect the display under development.

Connect the ground by the following method.

・The ground terminal of the instrument connects with the ground of the display.

GENERAL SAFETY SUMMARY

■ Routine Maintenance

Remove the power cord plug from the socket when cleaning the instrument.
Avoid the use of thinner or benzene solvents for cleaning cases, panels and knobs since this might remove the paint or damage plastic surfaces.
Wipe cases, panels, and knobs lightly with a soft cloth damped with neutral detergent.
Do not allow water, detergent, or other foreign objects to enter the instrument while cleaning.
If a liquid or metal object enters the instrument, it can cause electric shock or fire.

■ About the Mark by Directive of WEEE in Europe

This product and accessories are object products of European WEEE directive. When you discard this product and accessories, please process according to the regulation system of each country and various places.
(WEEE Directive: Waste Electrical and Electronic Equipment)

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.
After you have read the manual, keep the manual in a safe place for quick reference.

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

1.2.1 Line Voltage and Fuse

WARNING

Confirm that the power line voltage is correct before connecting the power cord.
Usable AC voltage range of an accessory AC adaptor is 100 V to 250 V. The power frequency of the power line should be 50/60 Hz.
If the fuse melted, please contact your local LEADER agent after confirming there is no fire. (A fuse is in the power supply circuit inside the instrument.)
The voltage range of the DC power supply is 10 V to 18 V. Do not apply voltage exceeding this range as it can cause a malfunction or fire.

1.2.2 Maximum Allowable Input Voltage

CAUTION

The maximum allowable input voltage to the input connectors is shown in the table 1-1 below. Do not apply excessive voltage to prevent damage to the instrument.

Table 1-1 Maximum allowable input voltage

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

1.2.3 Shorting the Output Connectors, Reverse Voltage

Do not short any output connectors to prevent damage the instrument.Do not supply external power to Output terminal, this could cause the instrument to malfunction. Otherwise, you may damage the instrument or other property.

1.2.4 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.

1.2.5 Damage Caused by Static Electricity

Electronic parts are susceptible to damage from electrostatic discharge (ESD). The core wire of the coaxial cable may be charged with static electricity. If you are connecting a coaxial cable that is not connected on either end to an input/output connector of the instrument, short the cable's core wire and external conductor beforehand.

1.2.6 About the Mounting to the Rack

When you mount the instrument to the rack, be sure to prepare the mechanical parts supporting main body.
In addition, the rail supporting a main body is prepared as an option goods.

1.2.7 About the Electric Shock Hazard etc.

When you perform an examination and adjustment of a television, VTR, and other related devices, refer to the service manual of each device.
When you connect this instrument to the inside of a device to be measured, be sure to remove that power cord from a socket, and an electric shock hazard should not occur.
Especially when you connect this instrument to the device which contains high-voltage circuits, such as television, wears the glove which endures the high voltage and be careful of it not to get an electric shock.

1.2.8 About Preheating

To secure more accurate operation, turn on the power before about 30 minutes of use, and stabilize an internal temperature.

2 SPECIFICATIONS

2.1 General

The 1U half-rack sized compact LT 4400 Multiformat Video Generator applicable to both HD-SDI and SD-SDI systems outputs SDI video signals.
The various output capabilities are provided: color bar, SDI check field test pattern, ID characters, logomark in QVGA size(*1), safety-area marker, superimposing embedded audio, genlock mode to synchronize external reference signal, and three independent analog black signal systems.

*1 Up to 1920 dots x 1080 lines can be displayed when the Option (LT 4400-70) is installed.

2.2 Features

- Applicable to both HD-SDI and SD-SDI systems
  Applicable to both HDTV (18 types of HDTV formats) and SDTV (525i/59.94, 625i/50) systems. The HDTV or SDTV can be selected.
- Superimposing ID characters
  The ID characters can be superimposed at the arbitrary position on the screen. The character blinks to indicate the freeze status.
- Superimposing logomark
  The logomark up to 320 dots x 240 lines in QVGA size(*1) can be superimposed at the arbitrary position on the screen. The logomark is converted from the bit map to four-grade monochrome data.
- Safety-area marker
  The 90 % and 80 % safety-area markers can be superimposed on the screen.
  The 4:3 aspect-ratio marker can also be superimposed in HDTV format.
- Superimposing embedded audio
  The 16 channels of embedded audio signals (4 channels x 4 groups) can be superimposed. The frequency and level can be respectively set to each channel.
- Genlock mode
  This instrument can be locked by the NTSC/PAL black burst signals and HDTV tri-level sync signal for variable the timing. The NTSC/PAL black burst signals with field reference pulse signal, and NTSC/PAL black burst signal with 10-field ID are also applicable.
- Stay-in sync function
  This function ensures the stable operation in genlock mode even when the external reference signal is accidentally intermitted.
- Analog black signal output
  Three independent analog black signal output systems are provided. The black burst signal with the same format as the SDI output, or HDTV tri-level sync signal with the same format of clock frequency can be selected for variable the timing. The NTSC/PAL black burst signals with field reference pulse signal, and NTSC black burst signal with 10-field ID are also applicable.
- Pattern scroll (Simple motion picture mode)
  The simple motion picture mode is provided to scroll the pattern.
- Word clock output
  The 48 kHz word clock output is provided to synchronize the audio signal.

● Applicable to SNMP
The network system can easily be constructed since this instrument supports SNMP. (Not available currently)

2.3 Specifications

2.3.1 SDI Video Output

SDI Characteristics

Bit Rate:	1.485Gbps, 1.485/1.001Gbps, or 270Mbps	
Output Amplitude:	800mVp-p±10%	
Overshoot:	≤10%	
Rise and Fall Times:	≤270ps (between 20% and 80%)	(HDTV)
	0.4 to 1.5 ns (between 20 % and 80 %)	(SDTV)
DC Offset:	0V±0.5V	
Output Impedance:	75 Ω	
Return Loss:	≥15dB (5MHz to 742.5MHz)	
	≥10 dB (742.5 MHz to 1.485 GHz)	
Number of Outputs:	1 system, 2 outputs (HD-SDI/SD-SDI selectable)	
Output Connector:	BNC	

Conform To

HDTV:	SMPTE 274M, SMPTE 296M, and SMPTE 292M (Except for Return Loss)
SDTV:	ITU-R BT 601, SMPTE 125M, ITU-R BT 656, and SMPTE 259M

Applicable Format

HDTV:	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
SDTV:	525i/59.94-270MHz, 625i/50-270MHz

Variable Timing

Variable Range:		Entire frame range
Setting	V:	Settable in line steps
	H:	Settable in clock steps (74.25MHz, 74.25/1.001MHz, 27MHz)

Test Patterns

HDTV:	100%/75% COLOR BAR MULTIFORMAT COLOR BAR (ARIB STD-B28) (Pattern 2 Section: 100% White/ 75% White/ +I selectable) CHECK FIELD
SDTV:	100% COLOR BAR (applicable to both 525i/59.94, 625i/50) 75% COLOR BAR/ SMPTE COLOR BAR (applicable to 525i/59.94) EBU COLOR BAR/ BBC COLOR BAR (applicable to 625i/50)

	CHECK FIELD (applicable to both 525i/59.94, 625i/50)
Safety Area Marker	
HDTV:	Action safety area (90%)
	Title safety area (80%)
	4:3 aspect ratio
	Selectable ON/OFF individually
SDTV:	Action safety area (90%)
	Title safety area (80%)
	Selectable ON/OFF individually
ID Characters	
Number of Characters:	Up to 20 characters
Size:	32x32/ 64x64/ 128x128 dots selectable
Display Position:	Displays at an arbitrary position on the screen
Freeze Confirmation Display:	Blinking OFF, 1 to 9 seconds
Logomark	
Logomark Data:	4-level monochrome data between 0 and 3
Maximum Size:	320 dots × 240 lines (QVGA size) (*1)
Display Position:	Displays at an arbitrary position on the screen
Display Level:	Set arbitrary levels for levels 0 to 3
Simultaneous Display with the ID Character:	Simultaneous display with the ID character
File Format	
Before Conversion:	24-bit full-color bitmap data (.bmp) format
After Conversion:	LT 4400/ LT 443D dedicated (.lg) format
Conversion Color Matrix:	Y = 0.212 *R + 0.701 *G + 0.087 *B
	Converts 256-level monochrome data (Y) to four levels (levels 0 to 3) using arbitrary threshold values.
Conversion Method:	Converted using the logo mark conversion application.
Transferring the Logo Mark Data:	Saves the data to a commercially sold Compact Flash card and inserts it to the LT 4400. (*2)
Pattern Scroll (Simple Motion Picture Mode)	
Direction:	8 directions (vertical, horizontal, diagonal)
Speed (Range, Resolution)	
V:	0 to 255 lines in 1 line steps
H:	0 to 254 dots in 2 dot steps
Embedded Audio (*3)	
Number of Channels Embedded:	16 ch (4ch x 4group) Each group can be set ON/OFF
Sampling Frequency:	48 kHz (sync to video signal)
Resolution:	20 bits, or 24 bits, selectable (*4)
Pre-emphasis:	OFF, 50/15 μs, or CCITT, selectable (CS bit can only be selected)
Frequency:	SILENCE/400Hz/ 800Hz/ 1kHz, selectable (sets to each channel)

Level: -60 to 0 dBFS, in 1 dBFS steps (sets to each channel)
Audio Click: 1 sec/2 sec/3 sec/4 sec/OFF, selectable (sets to each channel)

*1 Up to 1920 dots x 1080 lines can be displayed when the Option (LT 4400-70) is installed.
*2 The data loaded from CF card to the LT 4400 cannot be held when the power is turned OFF.
*3 When the CHECK FIELD pattern is selected, no audio signal is embedded.
*4 When the input format is SD and makes it 24 bits, the number of the output channels becomes up to 12 channels (3group).

2.3.2 Genlock Function

Reference Input Signal

Input Configuration: BNC (75Ω, loop through)
Signal Standards
NTSC black burst signal: SMPTE RP154, SMPTE 170M, SMPTE 318M
PAL black burst signal: EBU N14, ITU-R BT.470-6
HDTV tri-level sync: SMPTE 274M, SMPTE 296M
Sync Level
NTSC black burst signal: -286mV
PAL black burst signal: -300mV
HDTV tri-level sync: ±300mV
Maximum Allowable Input Voltage: ± 4.5V (DC + peak AC)
Operating Input Level Range: ±6 dB
External Lock Range: ± 10 ppm
Jitter
Burst Lock Mode: ≤ 0.5°
Sync Lock Mode: ≤ 1ns

Operation Modes

INTERNAL: Internal reference signal is used for operation. (INT mode)
AUTO (GO INTERNAL): The EXT 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 (STAYinSYNC): 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 STAYinSYNC mode is provided. After the external reference signal is recovered, the system is automatically locked.

MANUAL (STAYinSYNC): 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 STAYinSYNC mode is provided. The STAYinSYNC mode will be held until the reset operation is performed via the front panel even after the external reference signal is recovered.

Genlock Timing

Variable Range

NTSC black burst signal:	± 5 frames
PAL black burst signal:	± 2 frames
HDTV tri-level sync:	1 frame (entire frame range)

Resolution

H:	0.0741 µs steps (13.5 MHz clock steps)
V:	Variable in 1 line steps
F:	Variable in 1 frame steps

Reference Point at the time of the NTSC black burst input: The phase coincident point of line 4 of the NTSC and line 1 of the HDTV

Reference Point at the time of the PAL black burst input: The phase coincident point of line 1 of the PAL and line 1 of the HDTV

2.3.3 Analog Sync Signal Output

Format

NTSC black burst signal:	SMPTE RP154, SMPTE 170M, SMPTE 318M
PAL black burst signal:	EBU N14
HDTV tri-level sync:	SMPTE 274M, SMPTE 296M

Output Signal

Number of Outputs:	6 Outputs (three output systems which equip with two connectors each)
Setting Output Format:	Settable

Output Connector

Output Impedance:	75 Ω
Output Connector:	BNC

Output Timing

Setting:	Three systems can be set individually.
Variable Range	
NTSC black burst signal:	± 5 frames
PAL black burst signal:	± 2 frames
HDTV tri-level sync:	1 frame (entire frame range)
Setting Resolution	
NTSC/PAL black burst signal:	0.0185 µs steps (54 MHz clock steps)
HDTV tri-level sync:	0.0135 µs steps (74.25/1.001MHz in clock steps or 74.25MHz in clock steps)

2.3.4 Word Clock Output

Frequency:	48kHz
Output Impedance:	75Ω unbalanced (for 1 Vp-p output setting)
Output Amplitude:	1Vp-p±0.1V (into 75 Ω) or 5V CMOS, selectable
Output Connector:	BNC
Number of Outputs:	1
Timing Variable	
Variable Range:	±1 AES/EBU frame
Setting Resolution:	512 fs (24.576 MHz) steps

2.3.5 Memory Card Slot

Function:	Storing/ reading preset data Reading logo data

2.3.6 Ethernet Connector

Type:	10BASE-T/100BASE-TX, auto switching
Function:	Transferring operation status (e.g., genlock status) Remote control (e.g., pattern switching) SNMP supported (All the functions described above are supported in the future)

2.3.7 LCD Panel

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

2.3.8 General Specifications

Environmental Conditions

Operating Temperature:	0 to 40℃
Operating Humidity:	≤ 85% RH (without condensation)
Spec-Guaranteed Temperature:	10 to 35℃
Spec-Guaranteed Humidity:	≤ 85% RH (without condensation)
Operating Environment:	Indoor use
Operating Altitude:	Up to 2,000m
Overvoltage Category:	I
Pollution Degree:	2

Power Requirements:	DC12V (10 to 18V), 20Wmax.	
Dimentions and Weight:	213 (W) x 44 (H) x 400 (D) mm (excluding projections)	
	1.8kg	
Accessories	Instruction Manual	1
	AC adapter	1

2.4 LT 4400-70 (OP70) Full Size Logo Option

2.4.1 General

LT 4400-70 is the option to extend the logomark size from 320 dots x 240 lines (QVGA) to the full screen size of 1920 dots x 1080 lines.

2.4.2 Features

- Applicable to logo of full screen
  The logo of full screen size of up to 1920 dots x 1080 lines can be displayed.

2.4.3 Specifications

Logomark
  Maximum Size: 1920 dots x 1080 lines
Environmental Conditions: Other specifications apply to standard model.

3 PANEL DESCRIPTION

3.1 Front Panel

Figure 3-1 shows the LT 4400 front panel.

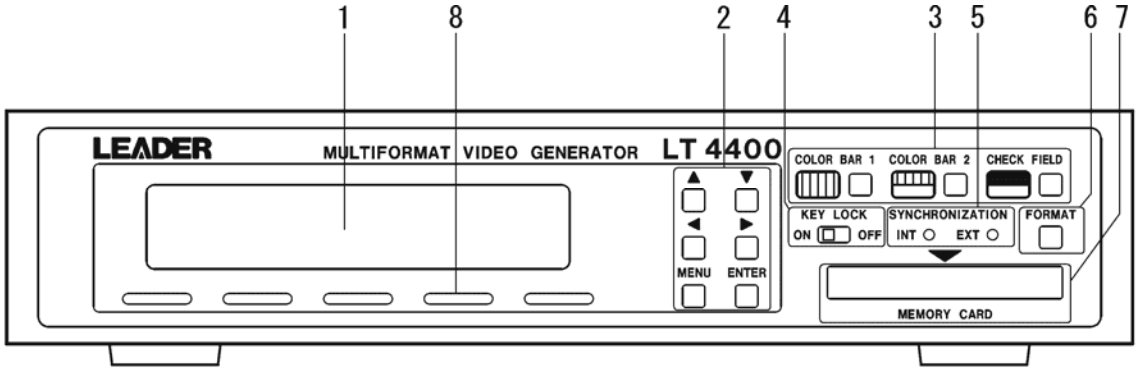


Figure 3-1 Front panel

1 LCD panel
20-character x 2-line LCD display

2 Menu keys
Sets the menu. Refer to Section 4.3, “Menu Keys”.

3 Pattern keys
Selects the output patterns. Refer to Section 4.5, “Selecting Pattern Key”.

4 Key lock switch (KEY LOCK)
Locks the FORMAT key. Refer to Section 4.6, “KEY LOCK Switch”.

5 Synchronization display (SYNCHRONIZATION)
The EXT lights when the instrument locks to the external reference signal (i.e., black burst, tri-level sync signal). The INT lights when the instrument locks to the internal sync signal.

6 Format key (FORMAT)
Selects the format of analog black signal and SDI signal. Refer to Section 4.4, "Format Key".

7 Memory card slot (MEMORY CARD)
The MEMORY CARD slot is used to store the preset data and genlock log, transfer the logo data, and upgrade the version.

Notes on Operation

・Memory card: Manufactured by SanDisk is recommended.
・This instrument cannot recognize the memory card formatted in FAT32 mode; use the FAT mode for formatting the card.

Especially, select the FAT mode since the card of larger capacity than 32 MB is formatted with the Windows XP, the FAT32 file system will be selected in default status. The FAT mode should be selected.

- A memory card operated with "Vcc=5 V" cannot be used.
- When the card cannot be inserted as far as it goes, remove it. Confirm the direction of the card, then insert the card again. Otherwise, you may damage the card.
- Do not remove the card or turn the power off while in access operation.

8 Ventilation Hole

WARNING

Do not block airflow through the ventilation hole. Otherwise, you run the risk of fire or instrument damage.

3.2 Rear Panel

Figure 3-2 shows the LT 4400 rear panel.

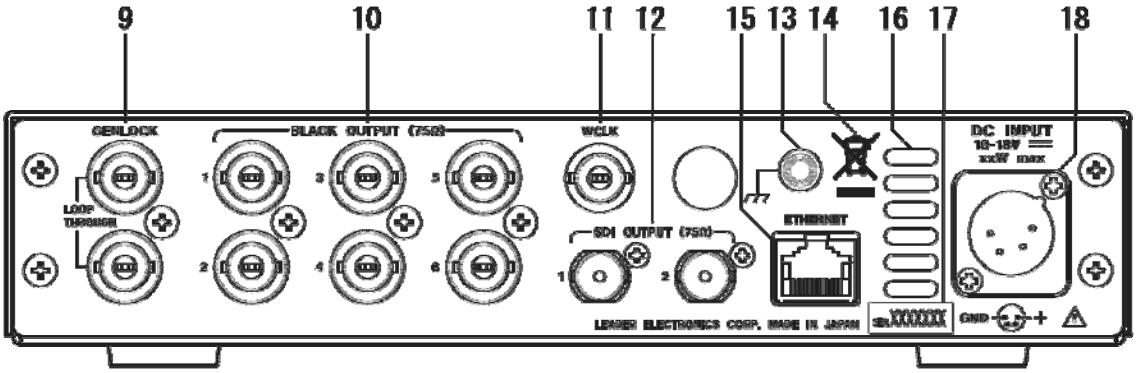


Figure 3-2 Rear panel.

9 Genlock signal Input Connector (GENLOCK)
Loop-through input accepts the external reference signal.
Refer to Chapter 7, “GENLOCK SIGNAL SETTINGS (GL SETTING)”.

10 Analog Black Signal Output Connector (BLACK OUTPUT)
Outputs the analog black burst signal and HDTV tri-level sync signal.
Refer to Chapter 8, “ANALOG BLACK SIGNAL SETTINGS (BLK SETTING)”.

11 Word Clock Output (WCLK)
Outputs the 48 kHz word clock signals.
Refer to Chapter 10, “WORD CLOCK SETTING” (WCLK SETTING).

12 SDI Output Connector (SDI OUTPUT)
Outputs the serial digital signal. It is the switching system of the SD/ HD, and outputs the same signal. Refer to Chapter 9, SDI SIGNAL SETTINGS (SDI SETTING)”.

13 Grounding Terminal

Connected to the outside ground.

14 The Mark by Directive of WEEE
This product and accessories are object products of European WEEE directive. When you discard this product and accessories, please process according to the regulation system of each country and various places.
Refer to “About the Mark by Directive of WEEE in Europe” in “ GENERAL SAFETY SUMMARY”.

15 Ethernet Connector (Ethernet)
Ethernet connector applicable to 100BASE-TX/10BASE-T.

16 Vent Holes

WARNING

Vent holes for cooling the LT 4400. Smoke or fire may result if you use the LT 4400 with the vent holes blocked. Do not block the vent holes.

17 Serial Number
Provide this number when contacting LEADER.

18 DC Power Input Connector (DC INPUT)
Use to connect an accessory AC adaptor. Usable DC voltage range is 10 to 18 V.

4 OPERATING PROCEDURE

4.1 Turning Power On

There is no power switch on the LT 4400; connecting the accessory AC adaptor immediately supplies the power.

1 Initialization

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 LT4400
INITIALIZING...
```

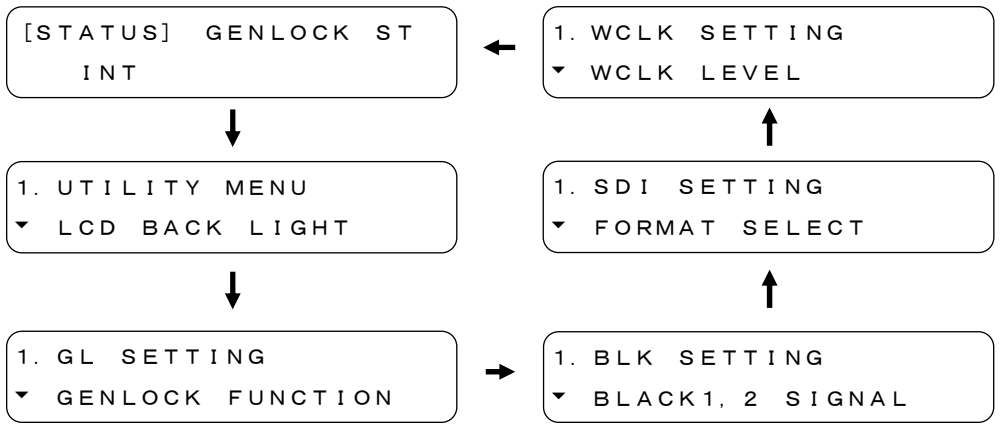
2 Status Display

The following message is displayed until initialization is completed.

```
[STATUS] GENLOCK ST
   INT
```

4.2 Main Menu

The menu consists of six groups in hierarchical structure. When the top menu is selected, pressing the MENU key sequentially selects the menus as shown in Figure below.



Each explanation is as follows.

1 STATUS
The STATUS is used to display the current setting status. This screen is only used for confirming the current status; not used for setting the operating conditions.
Refer to Chapter 5, “STATUS DISPLAY (STATUS)”

2 UTILITY MENU
The UTILITY MENU is used to set the main frame setting conditions (e.g., backlight, calendar).
Refer to Chapter 6, “MAINFRAME SETTING (UTILITY MENU)”.

3 GL SETTING
The GL SETTING is used to set the genlock signals.
Refer to Chapter 7, “GENLOCK SIGNAL SETTINGS (GL SETTING)”.

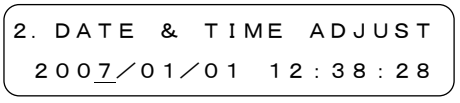
4 BLK SETTING
The BLK SETTING is used to set the analog black signals.
Refer to Chapter 8, “ANALOG BLACK SIGNAL SETTINGS (BLK SETTING)”.

5 SDI SETTING
The SDI SETTING is used to set the SDI signals
Refer to Chapter 9, “SDI SIGNAL SETTINGS (SDI SETTING)”.

6 WCLK SETTING
The WCLK SETTING is used to set the word clock.
Refer to Chapter 10, “WORD CLOCK SETTINGS (WCLK SETTING)”.

4.3 Menu Keys

1 [▲] key and [▼] key
These keys are used to change the setting items or numeric values in the menu selected.
The [▲] key is only enabled when the 「▲」 or 「▲▼」 is displayed at the lower-left corner of the screen.
The [▼] key is only enabled when the 「▼」 or 「▲▼」 is displayed at the lower-left corner of the screen.

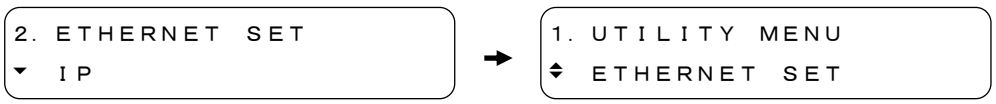


2 [◀] key, [▶] key
It uses for selecting or moving the items.

3 ［MENU］ key

This key is used to display the upper hierarchical layer.

The current layer number is displayed at the upper-left corner of the screen.



While displaying the setting screen, pressing the MENU key does not enter the current settings; returns to the upper hierarchical layer by one.

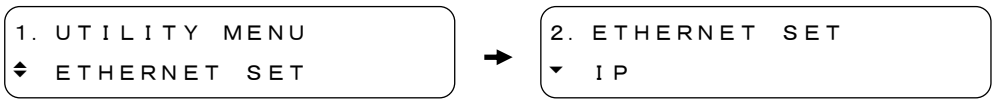
On the top menu screen, pressing the MENU key sequentially selects the main menu.

Refer to Section 4.2, "Main Menu".

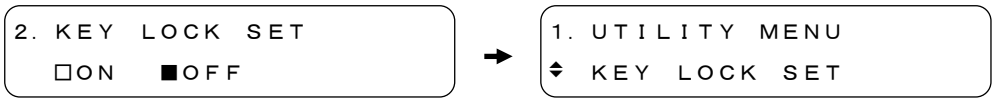
4 ［ENTER］ key

This key is used to display the next lower hierarchical layer.

The current layer number is displayed at the upper-left corner of the screen.



While displaying the setting screen, pressing the ENTER key enters the current data, then returns to the upper hierarchical layer by one. (*1)



*1: In some cases, the current settings may not be entered and the setting item is marked with asterisk (*) even when this key is pressed.

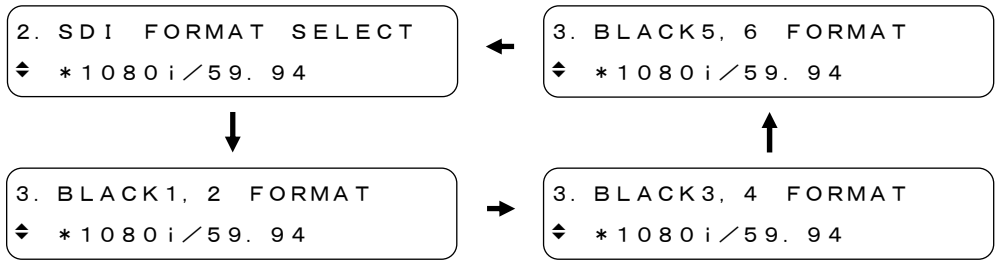
4.4 Format Key

The FORMAT key is a shortcut key used to select the format of SDI SETTING and BLK SETTING. Procedure is described below for selecting the format by using the FORMAT key.

1 Selecting Signal

Press the FORMAT key to select the desired signal: "SDI" (*1), "BLACK 1, 2", "BLACK 3, 4," and "BLACK 5, 6" (*2).

Pressing the FORMAT key sequentially selects the signals as shown in Figure below.



*1 The SDI signal format can also be selected. Proceed as follows:
“SDI SETTING - SDI FORMAT SELECT"
Refer to Section 9.1, "Setting Format".

*2 The analog black signal format can also be selected. Proceed as follows:
“BLK SETTING - BLACK SIGNAL - BLACK FORMAT”
Refer to Section 8.1, "Setting Format".

2 Selecting Format

Select the format by using the [▲] and [▼] keys. Table 4-1 lists the selectable format. Pressing the ENTER key enters the format. The format is marked with asterisk (*).

Table 4-1 Format list

SDI	BLACK
1080i/60	
1080i/59.94 (initial setting)	
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	
525i/59.94	NTSC BB
625i/50	NTSC BB+REF（*1）
	NTSC BB+ID（*2）
	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

*1 "REF" denotes the identification signal containing the following signals.
・The 714-mV reference signal is added to every 2 frames on the line 10. (NTSC)
・The 700-mV reference signal is added to every 4 frames on the line 7. (PAL)

*2 "ID" denotes the signal containing the ID signal conforming to SMPTE 318M standards.

4.5 Selecting Pattern Key

Press the Pattern selection key to select the pattern. (see Figure 4-1)

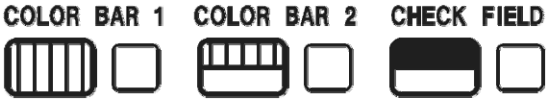


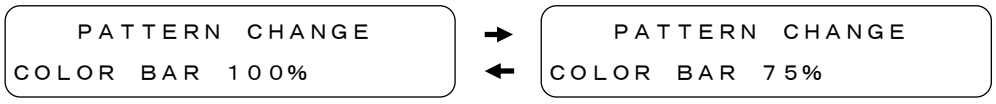
Figure 4-1 Pattern selection key

Table 4-2 lists the selectable patterns. In case of the multiple patterns are assigned to the single key, these patterns are sequentially selected by pressing the key.

Table 4-2 Pattern list

SDI FORMAT	COLOR BAR 1	COLOR BAR 2	CHECK FIELD
HD	COLOR BAR 100% COLOR BAR 75%	MULTI COLOR BAR 100% MULTI COLOR BAR 75% MULTI COLOR BAR (+I)	CHECK FIELD
SD（525i/59.94）	COLOR BAR 100% COLOR BAR 75%	SMPTE COLOR BAR	CHECK FIELD
SD（625i/50）	COLOR BAR 100%	EBU COLOR BAR BBC COLOR BAR	CHECK FIELD

For example, when the SDI FORMAT is set to HD, pressing the COLOR BAR 1 key sequentially selects the patterns as shown in Figure below.



4.6 KEY LOCK Switch

Setting the KEY LOCK switch ON only locks the FORMAT key (*1).
Use an insulated flat-head screwdriver to set the KEY LOCK switch ON.

While the KEY LOCK switch is set ON, pressing the FORMAT key displays the following screen.

All front panel keys will be locked when the KEY LOCK SET in the UTILITY MENU is set ON.
Refer to Section 6.2, "Setting the KEY LOCK Mode".

*1 The format can be selected from the SDI SETTING or BLK SETTING menu.

4.7 Upgrading the Firmware

The LT 4400 can upgrade the software and hardware (FPGA) simultaneously.
When upgrading the software, proceed as follows:
To procure the latest software, contact your local LEADER agent.

1 Confirming Software Version
When confirming the version, proceed as follows:
“UTILITY MENU - VERSION DISPLAY.”
The method of upgrade varies depending on the versions.
Refer to Section 6.7, "Displaying the Version".

2 Backup of Settings
All settings will be initialized when the version is upgraded.
To retain the current settings, the following items should be backed up.

・Preset data:
Store them on the memory card (*1).
Refer to Section 6.3.3, "Storing Preset Data".

*1 The preset data etc. cannot be stored to the memory card to be upgraded.
Please prepare the card only for data.

・ETHERNET:
Make a memorandum.

3 Upgrading Version
The method of upgrade varies depending on the current software versions.

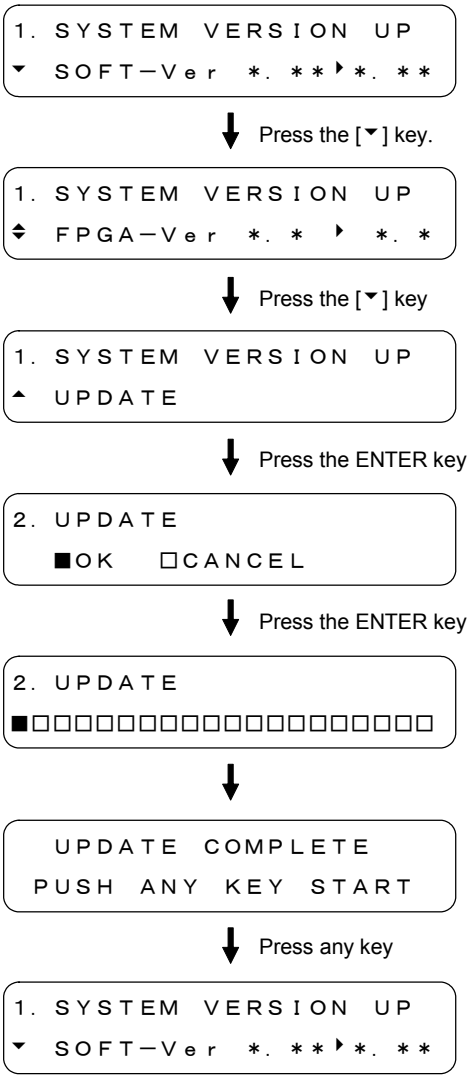
・In case of the Ver1.65 and later: Carries out the upgrade of software and hardware (FPGA).
・In case of the Ver1.45 or previous: Carries out the upgrade of software and hardware (FPGA) after upgrading of software.

Note that the following instructions when upgrading the version.

*The preset data etc. cannot be stored to the memory card to be upgraded.
Please use it as a card only for upgrade.
* Disconnect all cables (except the power cord) connected to this instrument before upgrading the version.
Especially, note that trouble may occur if upgrading is performed when the genlock mode is in operation.
The incorrect signal may be output while upgrading the version.
* Do not carry out the following operation while upgrading the version. If you do so, the instrument may not be restarted.
・Pulling out or inserting of a memory card
・Turning off the power
・Operating of the keys
*After upgrading of software and hardware (FPGA) is completed, it is displayed as

shown in the following figure.
When not being displayed as shown in the following figure even if 15 minutes or more have passed since the upgrade was started, upgrade has not been completed correctly. Turn off the power once, and do the upgrade again.
When not normally starting even if you have upgraded once again, please feel free to contact your local LEADER agent.

- Upgrading Procedure (When the current software version is ver1.65 and later)



The software version is displayed when the memory card to be upgraded is connected.

FPGA version is displayed.

UPDATE screen is displayed.

Select the OK by using the [◂] and [▸] keys.
When canceling the upgrading, select CANSEL.

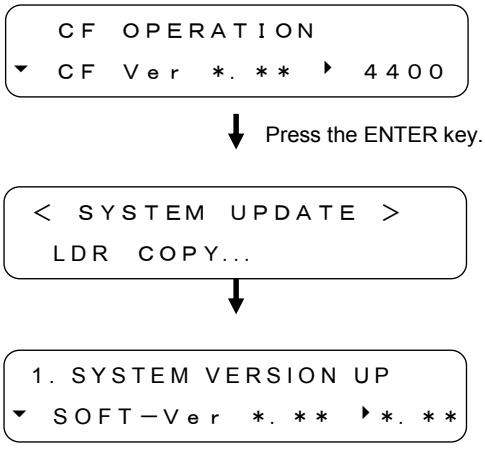
Upgrading is in progress. The INT and EXT LEDs in the SYNCHRONIZATION group light alternately. It takes about 10 minutes.

The screen as shown in left Figure is displayed when the upgrade is completed.

The instrument automatically restarts. After the screen as shown in left Figure is displayed, remove the memory card to be upgraded.

- Upgrading Procedure (When the current software version is ver1.45 or previous)
  Please upgrade in the following procedure.

a) Upgrading the software



The screen as shown in Figure left is displayed when the memory card to be upgraded is connected.

Upgrading is in progress. The INT and EXT LEDs in the SYNCHRONIZATION group light alternately.
It takes about 3 minutes.

After the version is upgraded, the instrument automatically restarts. The software version that has been just upgraded is displayed. Both of "*.**" become the same version numbers.

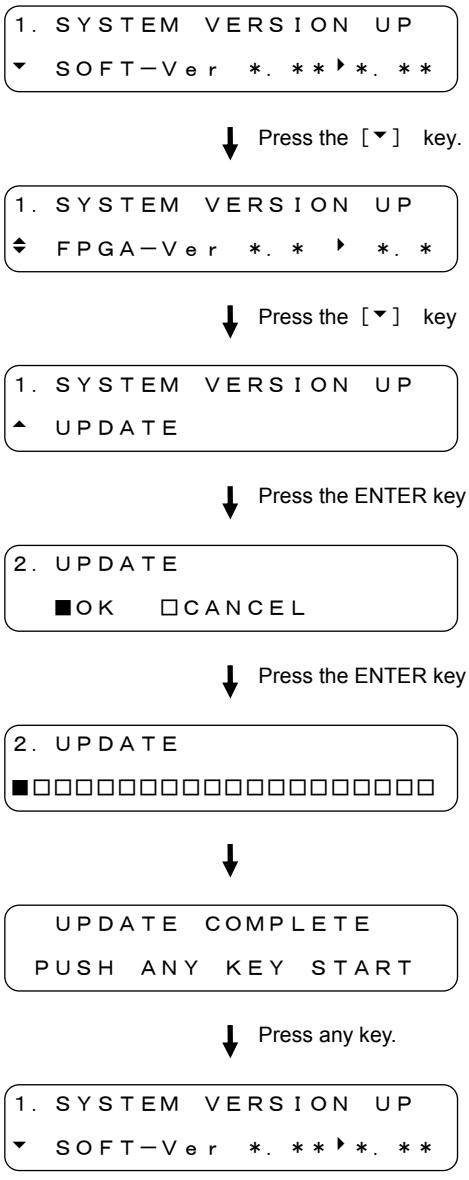
b) Initialization

Initializes the software after removing the memory card to be upgraded.

Installs the memory card to be upgraded again after initialization is completed.

Refer to Section 4.8, "Initialization".

C) Upgrading the version of software and hardware (FPGA)



The screen as shown in Figure left is displayed when the memory card to be upgraded is connected. Both of "*.**" become the same version numbers.

FPGA version is displayed.

UPDATE screen is displayed.

Select the OK by using the [◂] and [▸] keys.
When canceling the upgrading, select CANSEL.

Upgrading is in progress. The INT and EXT LEDs in the SYNCHRONIZATION group light alternately.
It takes about 10 minutes.

The screen as shown in left Figure is displayed when the upgrade is completed

The instrument automatically restarts. After the screen as shown in left Figure is displayed, remove the memory card to be upgraded.

4 Confirming Version

Perform the procedure described in Step 1, "Confirming Version". Confirm that the version is the same as the version displayed in Step 3, "Upgrading Version".

5 Initialization

Initialize this instrument, then confirm that the instrument correctly restarts.

To initialize this instrument, hold down the MENU and FORMAT keys simultaneously, then turn the power on. Since all settings are initialized, apply the backup data as required.

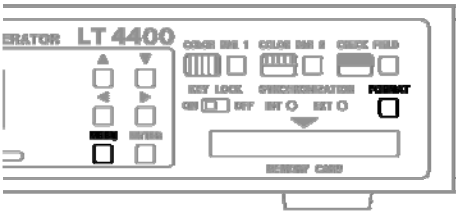
Refer to Section 4.8, "Initialization".

4.8 Initialization

The default settings can be made for all settings conditions.
Store the preset data on the memory card since the preset data are deleted when initialized.
Refer to Section 6.3.3, "Storing Preset Data".

In addition, the logomark stored on the main frame is also deleted. Stores the logomark on the main frame again when using it after initialization.
Refer to Section 9.7.8, “Saving Logomark”.

● Initialization Procedure



Turn the power off. Hold down the MENU and FORMAT keys simultaneously, then turn the power on.

↓

```
MEMORY  INITIALIZE
```

After the screen is displayed as shown in Figure left, remove the MENU and FORMAT keys.

↓

```
INITIALIZE  COMPLETE
PUSH  ANY  KEY  RESTART
```

The instrument is now initialized. The INT LED and EXT LED in the SYNCHRONIZATION group blink simultaneously.

↓ Press any front panel key.

```
LEADER  LT4400
INITIALIZING...
```

Initialization will be started.

5 STATUS DISPLAY (STATUS)

The STATUS is used to display the current major setting status. This screen is only used for confirmation; not used for setting the operating conditions.

To display the STATUS, press the MENU key repeatedly until STATUS is displayed.

After the STATUS is displayed, select the item to be displayed by using the [▲] and [▼] keys.

5.1 Genlock Signal

5.1.1 Displaying Status

In "GENLOCK ST", the state of Genlock is displayed.

```
[STATUS]  GENLOCK ST
   INT
```

5.2 Analog Black Signal

5.2.1 Displaying Format

The "BLACK 1, 2", "BLACK 3, 4", and "BLACK 5, 6" screens display the analog black signal format.

Refer to Section 8.1, "Setting Format".

```
[STATUS]  BLACK 1, 2
◆ 1080i/59.94
```

```
[STATUS]  BLACK 3, 4
◆ 1080i/59.94
```

```
[STATUS]  BLACK 5, 6
◆ 1080i/59.94
```

5.3 SDI Signal

5.3.1 Displaying Format

The FORMAT screen displays the SDI signal format.

Refer to Section 9.1, "Setting Format".

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

5.3.2 Displaying Vertical Timing

The TIMING-V-PHASE screen displays the vertical timing of SDI signal.

Refer to Section 9.2.1, “Vertical Timing”

5.3.3 Displaying Horizontal Timing

The TIMING-H-PHASE screen displays the horizontal timing of SDI signal in dots.

Refer to Section 9.2.2, “Horizontal Timing (dot)”.

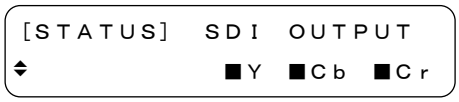
5.3.4 Displaying Embedded Audio Signal ON/OFF

The EMB. AUDIO screen displays the embedded signal on/off status of each group. Refer to Section 9.3.3, “Audio Signal ON/OFF (in each group)”

5.3.5 Displaying ON/OFF of Y, Cb, and Cr

The SDI OUTPUT screen displays the on/off status of Y, Cb, and Cr respectively.

Refer to Section 9.4, “Setting ON/OFF of Y, Cb, Cr”



5.3.6 Displaying Action Safety Area ON/OFF

The SAFETY AREA-90% AREA screen displays the action safety area on/off status.

Refer to Section 9.5.1, “Action Safety Area”.

5.3.7 Displaying Title Safety Area ON/OFF

The SAFETY AREA-80% AREA screen displays the title safety area on/off status.

Refer to Section 9.5.2, “Title Safety Area”.

5.3.8 Displaying 4:3 Aspect Ratio Marker ON/OFF

The SAFETY AREA-4:3 AREA screen displays the 4:3 aspect-ratio marker on/off status.

Refer to Section 9.5.3, “4:3 Aspect-Ratio Marker”.

5.3.9 Displaying ID Character ON/OFF

The ID CHARA screen displays the ID character on/off status.

Refer to Section 9.6.7, “Displaying ID Character”.

5.3.10 Displaying Logomark ON/OFF

The LOGO displays screen the logomark on/off status.

Refer to Section 9.7.4, “Displaying Logomark”.

5.3.11 Displaying Pattern Scroll Mode ON/OFF

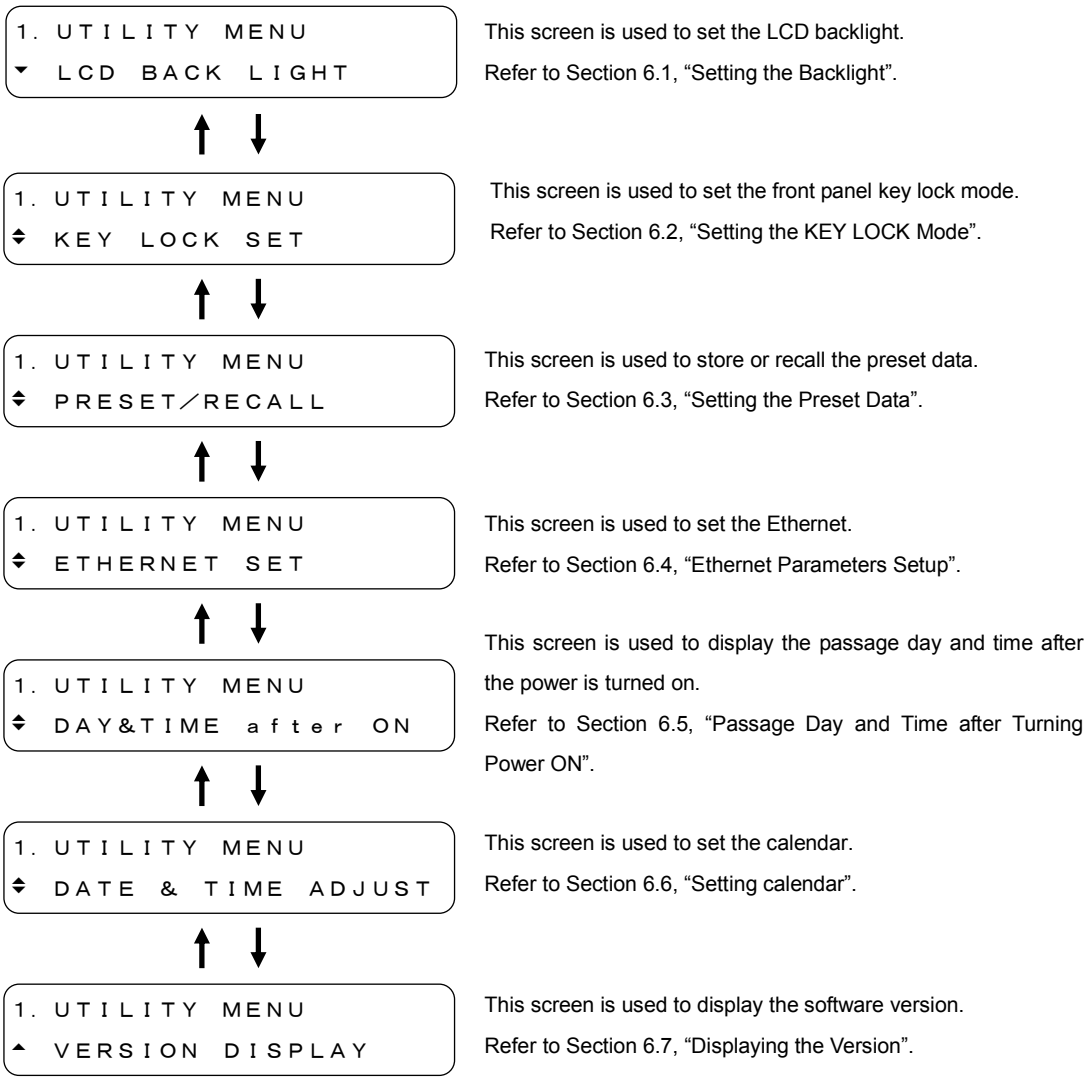
The PTN SCROLL screen displays pattern scroll mode on/off status.

Refer to Section 9.8.3, “Pattern Scroll Mode ON/OFF”.

6 MAINFRAME SETTING (UTILITY MENU)

The UTILITY MENU is used to set the main frame setting conditions.

To display the UTILITY MENU, press the MENU key repeatedly until UTILITY MENU is displayed. After the UTILITY MENU is displayed, select the item to be displayed by using the [▲] and [▼] keys.



6.1 Setting the Backlight

The LCD BACK LIGHT is used to set the brightness and lighting time of the backlight.

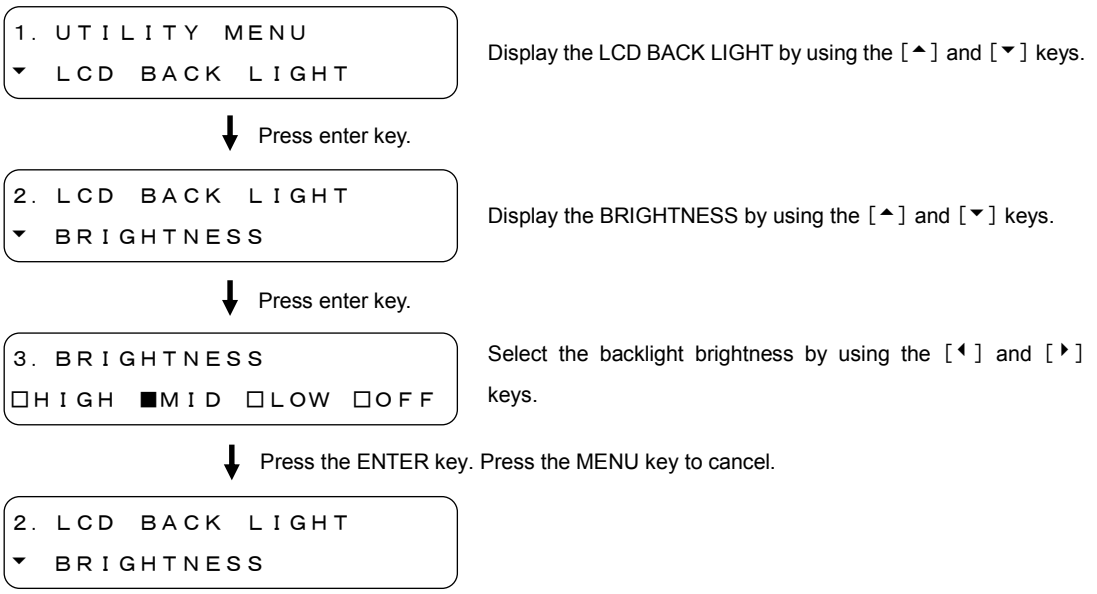
6.1.1 Brightness of the Backlight

The BRIGHTNESS is used to select the brightness from four preset brightness levels.

● Description of Setting Items

HIGH, MID, LOW	The brightness can be selected in the following order: LOW - MID - HIGH The initial setting is HIGH.
OFF	Backlight is powered off.

● Setting Brightness of the Backlight



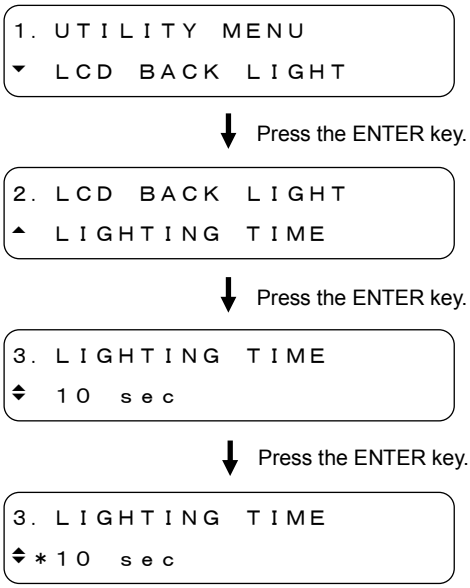
6.1.2 Lighting Time of the Backlight

The LIGHTING TIME is used to select the lighting time of the backlight.

● Description of Setting Items

ALL	The backlight lights always. (initial setting)
1 to 10 sec	The backlight lights during the time selected, then goes off.

● Setting Lighting Time of the Backlight



Display the LCD BACK LIGHT by using the [▲] and [▼] keys.

Display the LIGHTING TIME by using the [▲] and [▼] keys.

Select the backlight lighting time by using the [▲] and [▼] keys.

"*" is displayed before the set time.

6.2 Setting the KEY LOCK Mode

The KEY LOCK SET is used to set the front panel key lock mode.
This capability is useful to prevent accidental key operation.

● Description of Setting Items

ON	Enables the key lock mode.
OFF	Disables the key lock mode. (initial setting)

● Key Lock Setting Procedure

Display the KEY LOCK SET by using the [▲] and [▼] keys.

Press the ENTER key.

Select ON to enable this mode by using the [◀] and [▶] keys.
To disable this mode, select OFF.

Press the ENTER key. Press the MENU key to cancel.

● Key Lock Canceling Procedure

When ON is selected, pressing any key displays the screen as shown in Figure left.

Hold down the MENU key for at least three seconds.

The key lock mode is canceled. After this mode is canceled, screen as shown in Figure left is displayed for about two seconds. No key operation is accepted while this screen is displayed.

The FORMAT key can only be locked when the KEY LOCK switch on the front panel is set ON.
Refer to Section 4.6, "KEY LOCK Switch".

6.3 Setting the Preset Data

The PRESET/RECALL is used to store/recall the preset data, and power-on recall function.

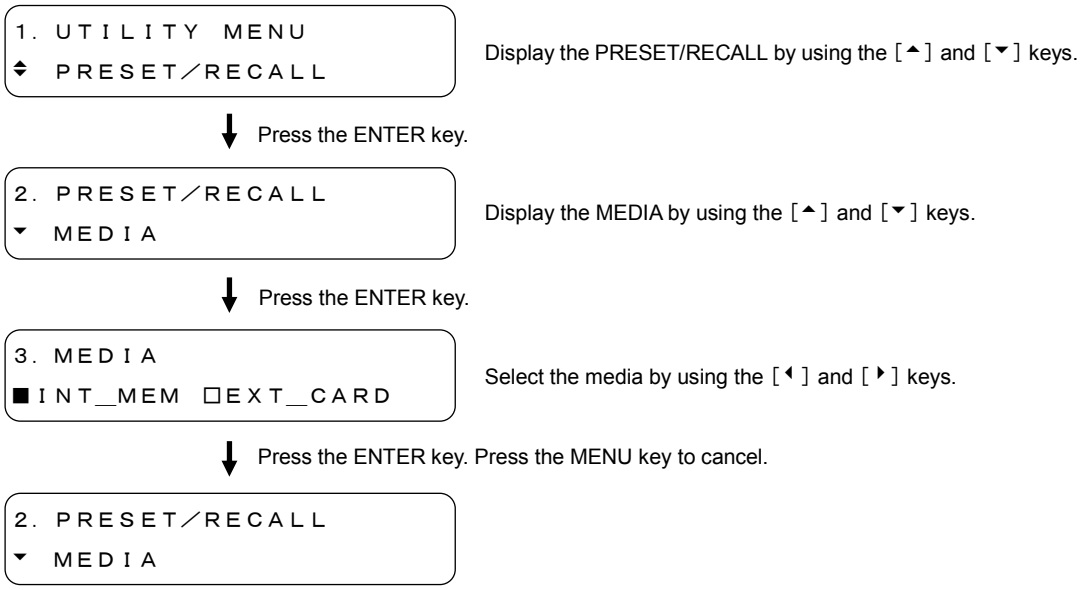
6.3.1 Selecting Media

The MEDIA is used to select the media to store/recall the preset data.

● Description of Setting Items

INT_MEM	Selects the internal memory card. (initial setting)
EXT_CARD	Selects the external memory card.

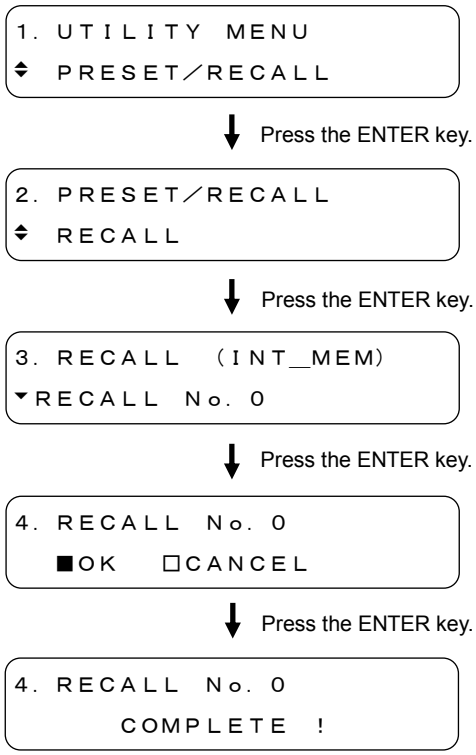
● Media Selecting Procedure



6.3.2 Recalling Preset Data

The RECALL is used to recall the preset data stored in Section 6.3.3, "Storing Preset Data".

● Recalling Procedure of Preset Data



Display the PRESET/RECALL by using the [▲] and [▼] keys.

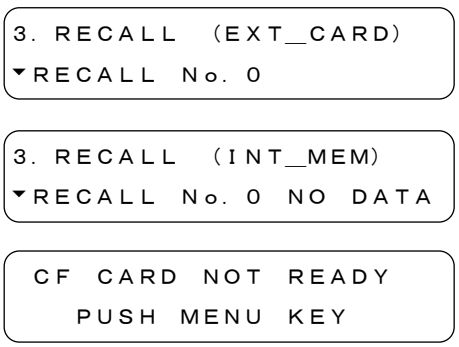
Display the RECALL by using the [▲] and [▼] keys.

Select the preset number (i.e., 0 to 9) to be recalled by using the [▲] and [▼] keys. (*1)

Select OK by using the [◀] and [▶] keys.
When no recalling operation is required, select CANCEL.

The preset data is now recalled. Press the MENU key to return to the PRESET/RECALL menu.

* Screens may be displayed as shown in Figures below.



In case of the EXT_CARD is selected in Section 6.3.1, "Selecting Media".

In case of the preset data does not exist.

In case of the memory card is not installed even when the EXT_CARD is selected in Section 6.3.1, "Selecting Media".

6.3.3 Storing Preset Data

The PRESET is used to store the preset data.
Up to ten preset data can respectively be stored in the internal memory and memory card.

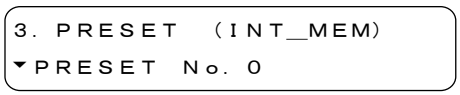
● Storing Procedure of Preset Data

Display the PRESET/RECALL by using the [▲] and [▼] keys.

↓ Press the ENTER key.

Display the PRESET by using the [▲] and [▼] keys.

↓ Press the ENTER key.



Select the preset number (i.e., 0 to 9) to be stored by using the [▲] and [▼] keys. (*1)

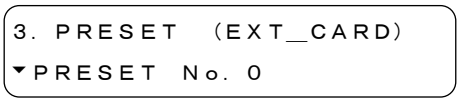
↓ Press the ENTER key. Press the MENU key to cancel.

Select OK by using the [◀] and [▶] keys.
When no store operation is required, select CANCEL.

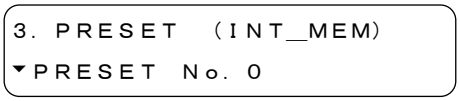
↓ Press the ENTER key. Press the MENU key to cancel.

The preset data is now stored. Press the MENU key to return to the "2.PRESET/RECALL". (*2)

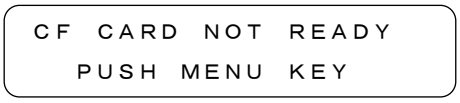
*1 Screens may be displayed as shown in Figures below.



In case of the EXT_CARD is selected in Section 6.3.1, "Selecting Media".



In case the preset data is already stored.



In case the memory card is not installed even when the EXT_CARD is selected in Section 6.3.1, "Selecting Media".

*2 In case the preset data is already stored, it is displayed as shown in Figure below.

6.3.4 POWER ON RECALL

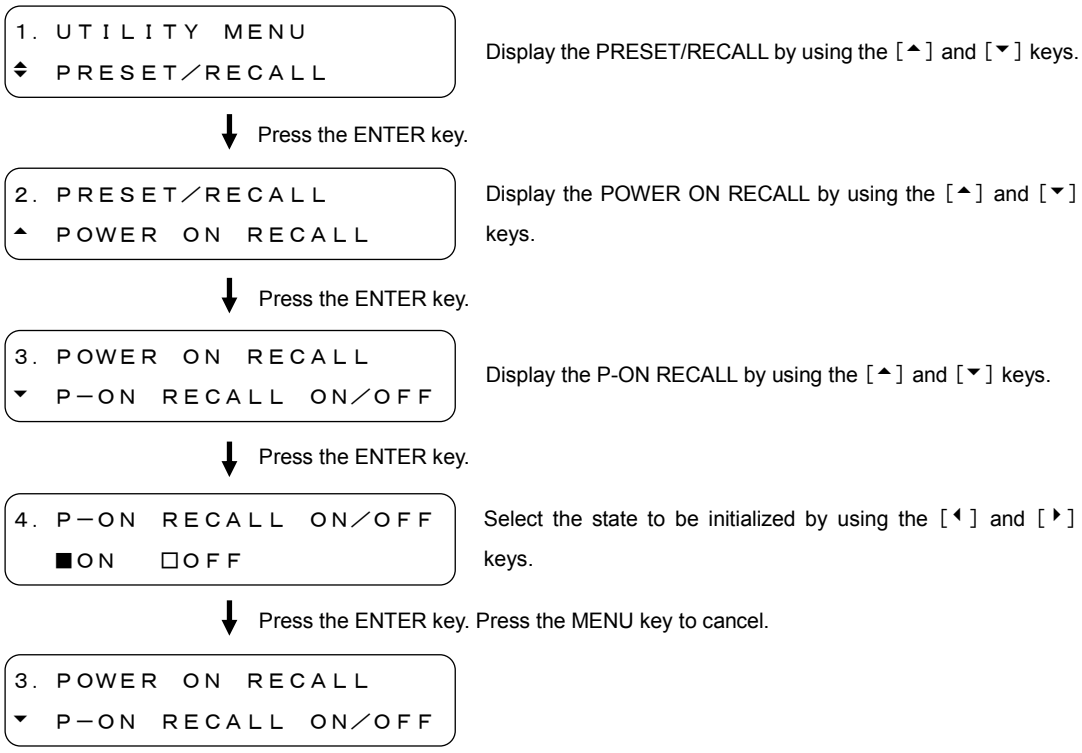
In POWER ON RECALL, when the power supply is turned on, select whether the initialization is performed by the setting (except for a setting of the pattern selection key) of the last memory, or by after recalling the setting of the preset.
The setting of the preset can be select from both an internal memory and an external memory regardless of selection of Section 6.3.1, "Selection of Media".
When there is no data in the specified preset number, the initialization is performed by the setting (except for a setting of the pattern selection key) of the last memory.

● Description of Setting Items

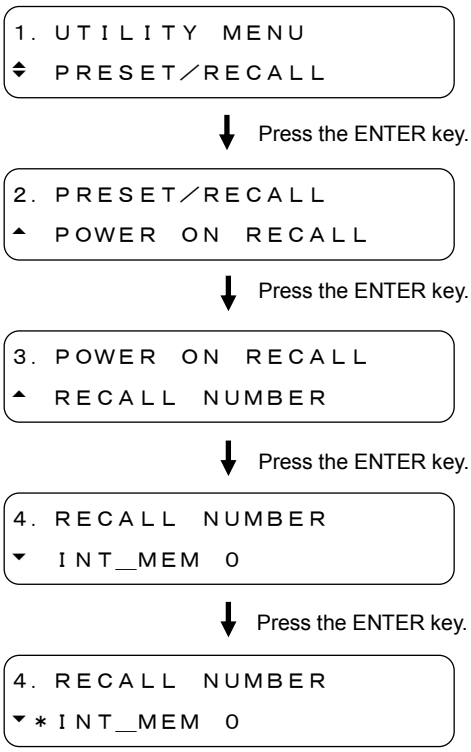
ON The initialization will be performed after the preset data is recalled when the power is turned on.

OFF The initialization will be performed by the setting (except for a setting of the pattern selection key) of the last memory. (initial setting)

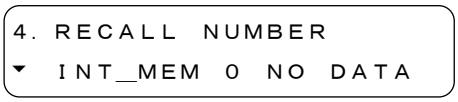
● Setting Procedure of POWER ON RECALL



● Selecting Procedure of Preset Data



* In case the preset data does not exist, screens may be displayed as shown in Figures below.



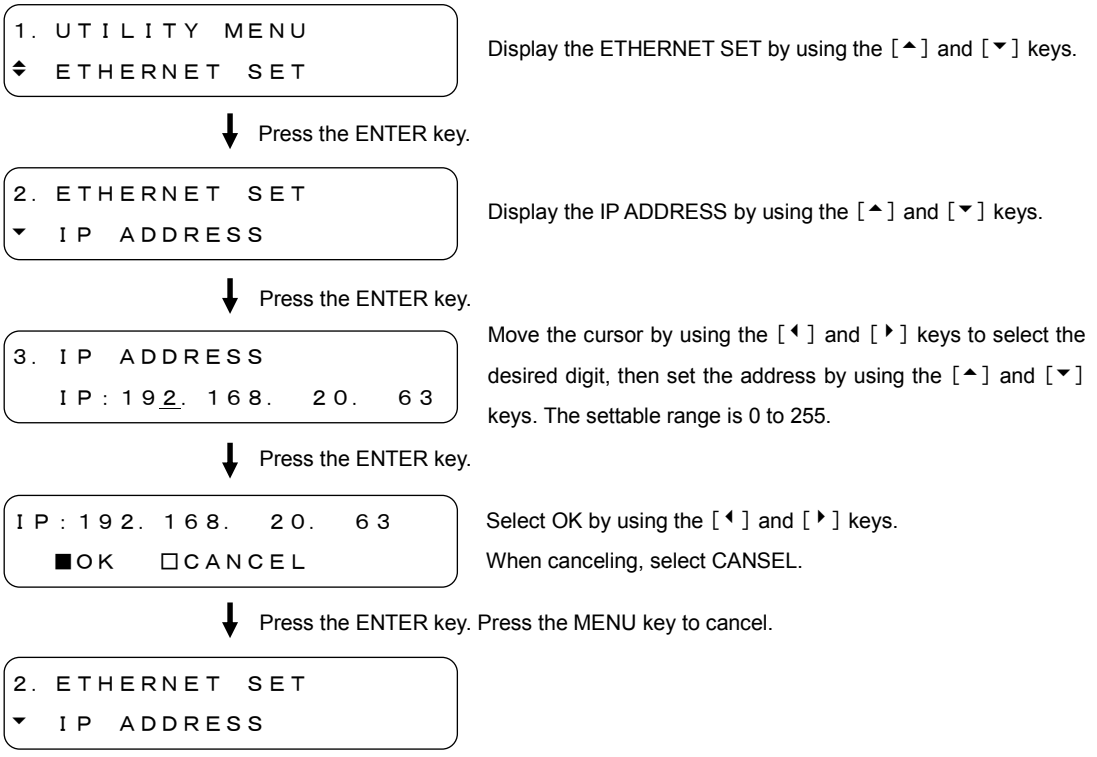
6.4 Ethernet Parameters Setup

The ETHERNET SET is used to set the Ethernet. The remote control status and genlock status can be remotely monitored. (This function is not currently applicable for SNMP user.)

6.4.1 Setting IP Address

The IP is used to set the IP address. To enable the settings, turn the power off, then power on again.

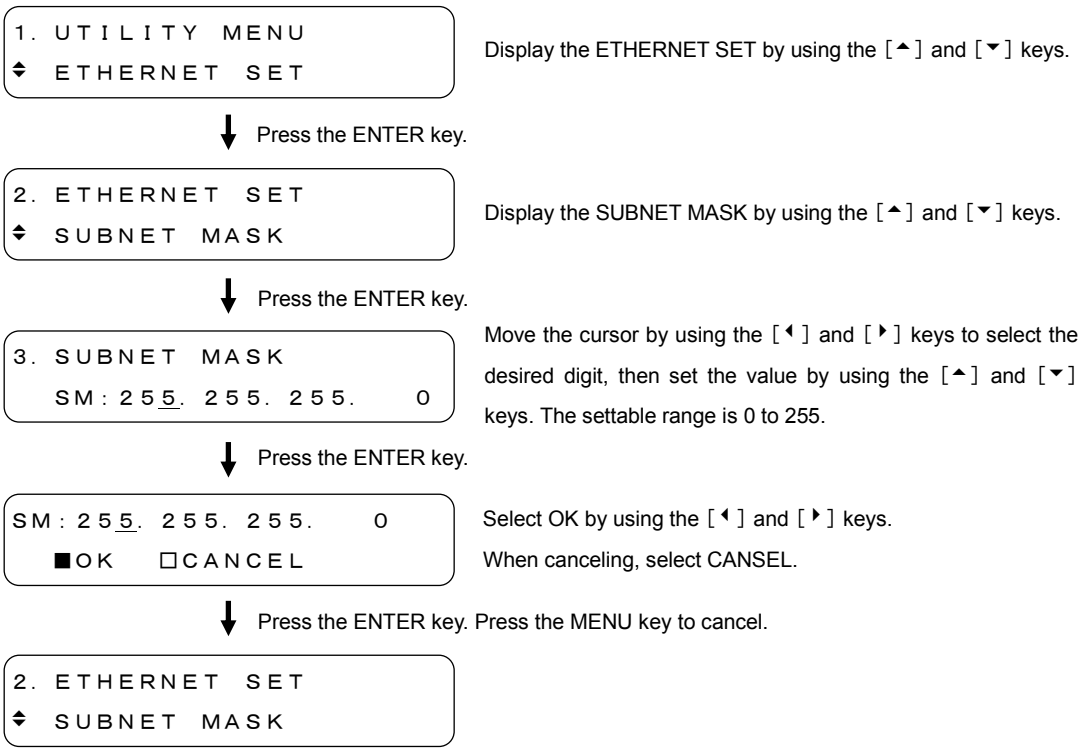
● Setting Procedure of IP Address



6.4.2 SUBNET MASK

The SUBNET MASK is used to set the subnet mask.
To enable the settings, turn the power off, then power on again.

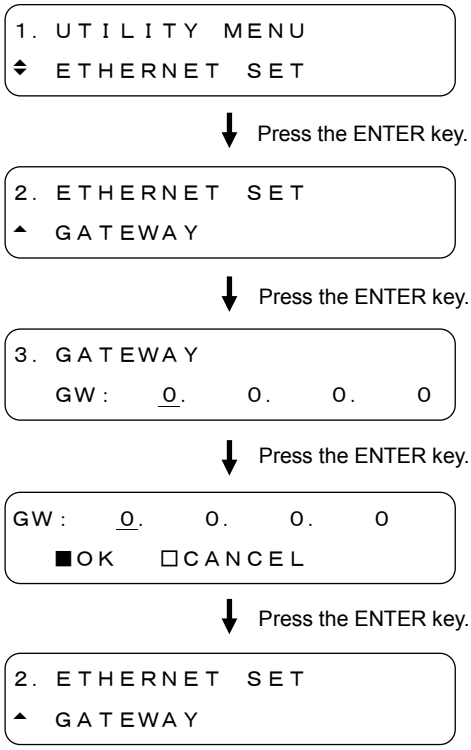
● Setting Procedure of SUBNET MASK



6.4.3 GATEWAY

The GATEWAY is used to set the gateway.
To enable the settings, turn the power off, then power on again.

● GATEWAY Setting Procedure



Display the ETHERNET SET by using the [▲] and [▼] keys.

Display the GATEWAY by using the [▲] and [▼] keys.

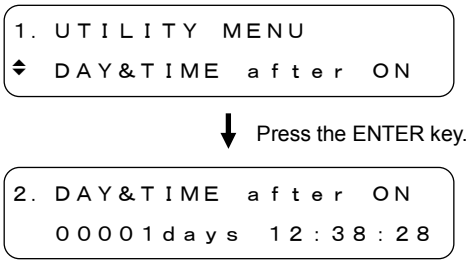
Move the cursor by using the [◀] and [▶] keys to select the desired digit, then set the value by using the [▲] and [▼] keys. The settable range is 0 to 255.

Select OK by using the [◀] and [▶] keys.
When canceling, select CANSEL.

6.5 Passage Day and Time after Turning Power On

The "DAY & TIME after ON" is used to display the passage day and time after the power is turned on.

● Displaying Passage Time



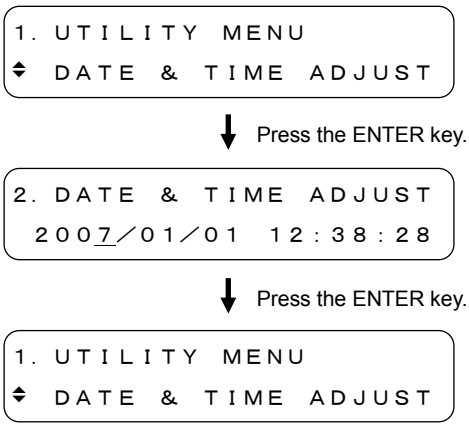
Display the DAY & TIME after ON by using the [▲] and [▼] keys.

Passage day and time after turning the power on is displayed.

6.6 Setting Calendar

The DATE & TIME ADJUST is used to set the calendar. The calendar is retained while the instrument is powered on. When the power is turned off, the calendar returns to the initial settings (i.e., 2007/01/01 00:00:00).
When the calendar is set, the log time stamp displayed in Section 7.1.3, "Displaying Log" is changed from the passage day and time to calendar.

● Calendar Setting Procedure



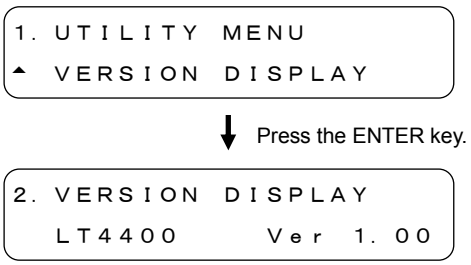
Display the DATE & TIME ADJUST by using the [▲] and [▼] keys.

Move the cursor by using the [◀] and [▶] keys to select the desired digit, then set the value by using the [▲] and [▼] keys.

6.7 Displaying the Version

The VERSION DISPLAY is used to display the software version.

● Displaying Procedure of Software Version

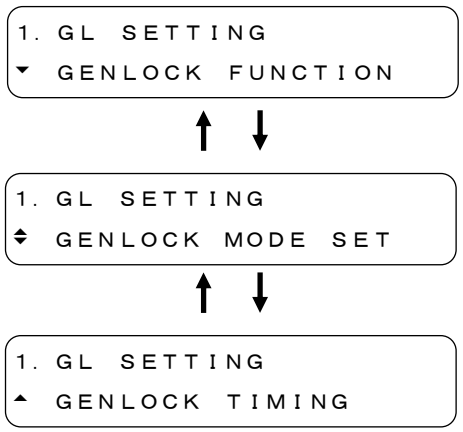


Display the VERSION DISPLAY by using the [▲] and [▼] keys.

Software version is displayed.

7 GENLOCK SIGNAL SETTINGS (GL SETTING)

The GL SETTING is used to set the genlock signal. To display the GL SETTING, press the MENU key repeatedly until GL SETTING is displayed. After the GL SETTING is displayed, select the item to be set by using the [▲] and [▼] keys.



Sets the warning screen of unlock frequency and log mode.
Refer to Section 7.1, “Setting Warning Screen of Unlock Frequency and Log Mode”.

Sets the genlock mode.
Refer to Section 7.2, “Setting GENLOCK Mode”.

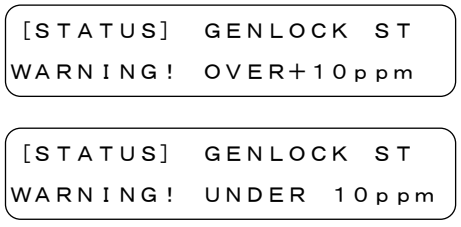
Sets the genlock timing.
Refer to Section 7.3, “Setting GENLOCK TIMING”.

7.1 Setting Warning Screen of Unlock Frequency and Log Mode.

The GENLOCK FUNCTION is used to set the warning screen of unlock frequency and log mode.

7.1.1 Warning Screen Display

The WARNING ON/OFF is used to select whether the warning screen displays or not if the lock frequency to be locked exceeds ±10 ppm with respect to the internal reference frequency.
The GENLOCK ST in the STATUS screen displays the warning screen as shown in Figure below.
Refer to Section 5.1.1, "Displaying Status".

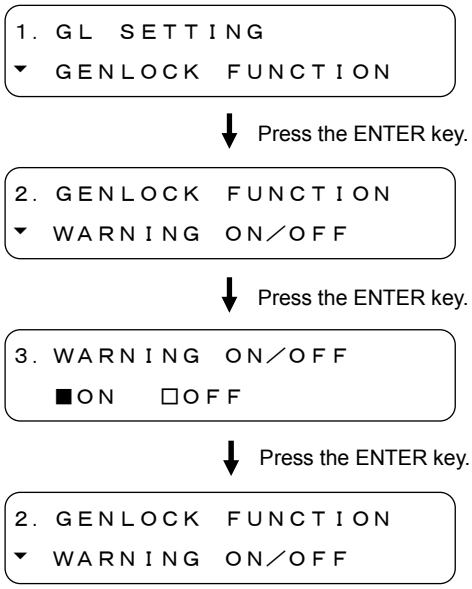


The frequency exceeds 10 ppm.

The frequency is under 10 ppm.

- Description of Setting Items
  - ON Displays the warning screen.
  - OFF Does not display the warning screen. (initial setting)

● Setting Procedure of Warning Screen



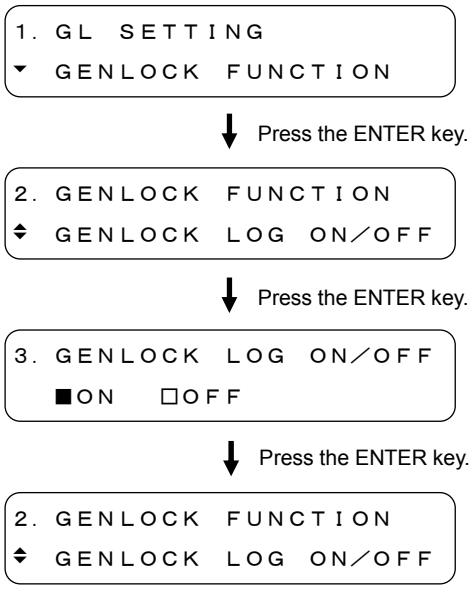
7.1.2 Recording Log

The GENLOCK LOG ON/OFF is used to determine whether to log the genlock status in the main frame. The log data is retained while the instrument is powered on: turning power off deletes data.
Refer to Section 7.1.3, "Displaying Log" to display the log being saved.
Refer to Section 7.1.4, "Saving Log" to save the log data.

● Description of Setting Items

ON Records the log data in the main frame.
OFF Does not record the log data in the main frame. (initial setting)

● Log Recording Procedure



7.1.3 Displaying Log

The GENLOCK LOG DISP is used to display the data logged in Section 7.1.2, "Recording Log".
Up to 64 characters x 99 lines can be displayed. When the number of logs exceeds 99 lines, the oldest log will be deleted. Figure below shows an example.

```
3. GENLOCK LOG DISP
 5:0000days00:00:27▸
```

The log number and time stamp are displayed. When the continued information exists, 「▸」 is displayed.

↓ To display the continued information, press the 「▸」 key.

```
3. GENLOCK LOG DISP
 5:7 DATE & TIME AD▸
```

The log number and the screen continued form the previous screen are displayed. The first letter is the same as the last letter on the previous screen.

↓ To display the continued information, press the 「▸」 key.

```
3. GENLOCK LOG DISP
 5:DJUST
```

The logs are numbered from 1 to 99. To select the log number, press the [▲] key and [▼] keys.

```
3. GENLOCK LOG DISP
 5:0000days00:00:27▸
```

[▼] key ⇄ [▲] key

```
3. GENLOCK LOG DISP
 4:0000days00:00:23▸
```

The time stamp is displayed in passage day and time after the power is turned on.
When the calendar is set in Section 6.6, "Setting Calendar", the calendar is displayed instead of the passage day and time.

```
3. GENLOCK LOG DISP
 5: 2007/01/01 12:3▸
```

● Log Displaying Procedure

```
1. GL SETTING
▼ GENLOCK FUNCTION
```

Display the GENLOCK FUNCTION by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. GENLOCK FUNCTION
◆ GENLOCK LOG DISP
```

Display the GENLOCK LOG DISP by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. GENLOCK LOG DISP
 5:0000days00:00:27▸
```

Confirm the log status by using the [▲], [▼], [◀], and [▶] keys.

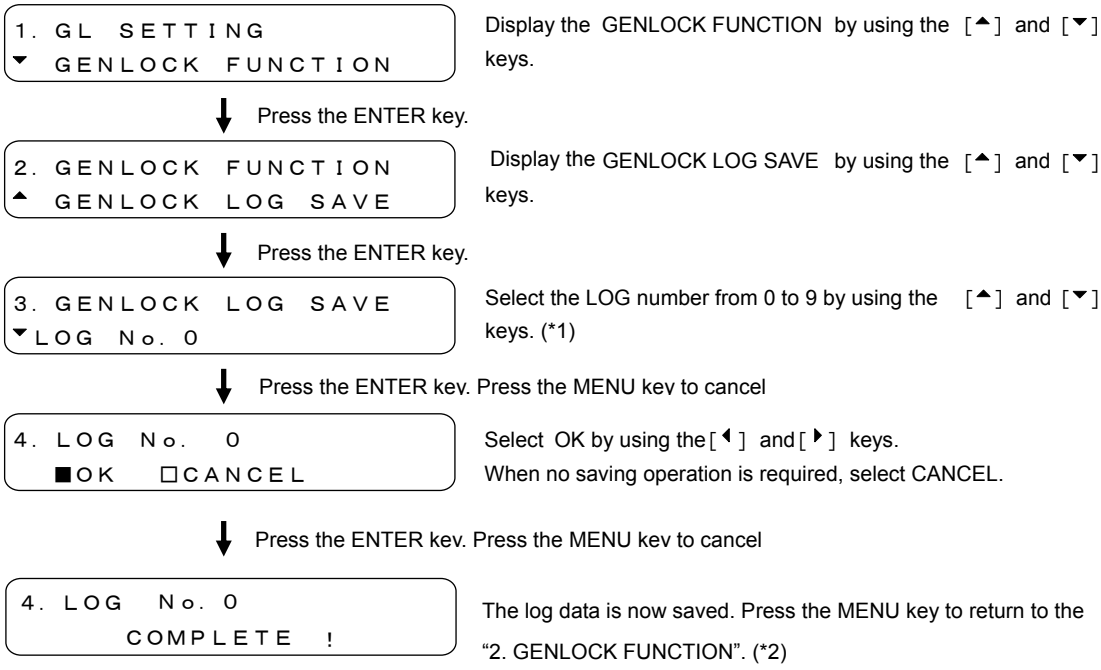
↓ Press the ENTER key or MENU key to return.

```
2. GENLOCK FUNCTION
◆ GENLOCK LOG DISP
```

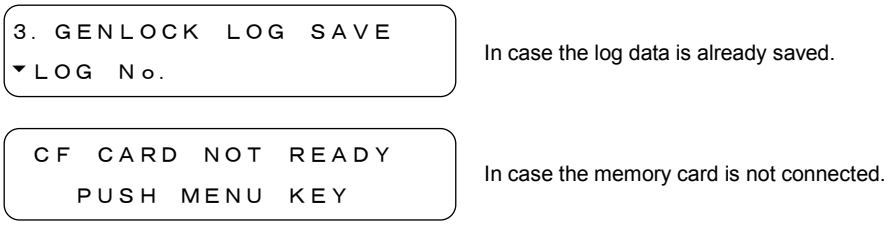
7.1.4 Saving Log

The GENLOCK LOG SAVE is used to save up to ten log data saved in Section 7.1.2, "Recording Log" on the memory card.
The logs are saved in the LOG folder named "LOG_0.TXT" to "LOG_9.TXT" in text file format.

● Log Saving Procedure



*1 Screens may be displayed as shown in Figures below.



*2 In case the logo data is already saved, it is displayed as shown in Figure below.

7.2 Setting GENLOCK Mode

The GENLOCK MODE SET is used to select the genlock mode.

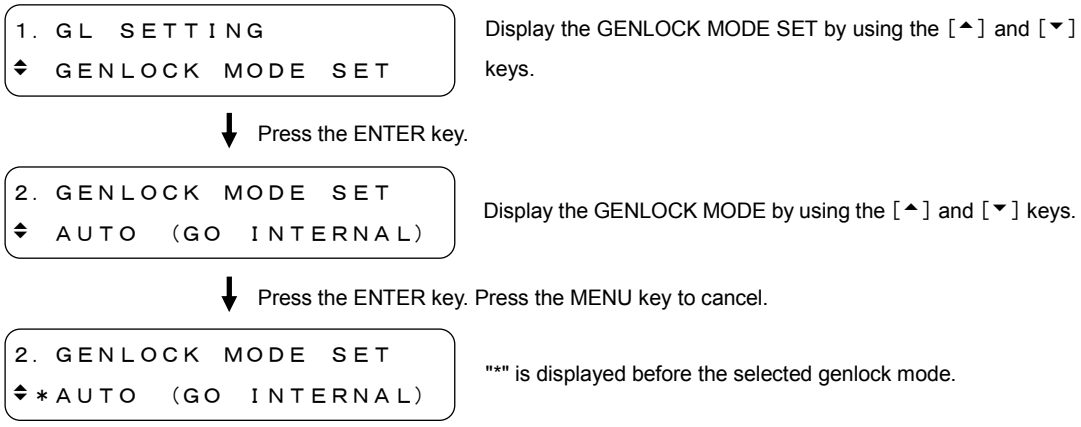
● Description of Setting Items

INTERNAL	The internal reference signal is used. Select this item when no need to lock the instrument to the external signal. (initial setting)
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 is automatically genlocked to such signals as HD tri-level sync signal, NTSC, and PAL. When the external reference signal is used to lock the instrument, select this mode to immediately lock the instrument to the external reference signal even when ignoring any abnormal picture momentarily is displayed due to a transient in lock operation.
MANUAL (GO INTERNAL)	The instrument locks to the signal being set 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 the power is turned on. The INT mode is automatically selected when no external reference signal is applied to the GENLOCK input, or signal format not match to the specified format is applied. When the external reference signal is used to lock the instrument, select this mode to immediately lock this instrument to the external reference signal even when ignoring any abnormal picture momentarily is displayed due to a transient in lock operation.
AUTO (STAYinSYNC)	The EXT mode is automatically selected when the external reference signal is applied to the GENLOCK input after the power is turned on. If the external reference signal is accidentally intermitted during operation, the STAYinSYNC function retains the conditions immediately before trouble occurs to continue the operation. The EXT LED blinks in this case. After the external signal is recovered, the instrument automatically goes into lock status. It may take a time until the instrument locks. The transient may occur when locking the system.

MANUAL (STAYinSYNC)

This instrument locks to the signal being set 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 the power is turned on.
If the external reference signal is accidentally intermitted during operation, the instrument continues the operation immediately before the signal intermittent since the STAYinSYNC mode is provided. The EXT LED blinks in this case. The STAYinSYNC mode will be held until the reset operation is performed via the front panel controls and pressing the ENTER key even after the external is recovered. If unlock status occurs when this instrument locks to the specified external signal, select this mode to lock the instrument after operation is completed. When the external reference signal in specified format is used to lock the instrument, select this mode to immediately lock this instrument to the external reference signal even when ignoring any abnormal picture momentarily is displayed due to a transient in lock operation.

● Selecting Procedure of GENLOCK Mode (except MANUAL)



● Selecting Procedure of GENLOCK Mode (MANUAL)

When MANUAL (GO INT) or MANUAL (STAYinSYNC) is selected in the genlock mode, also the genlock format.

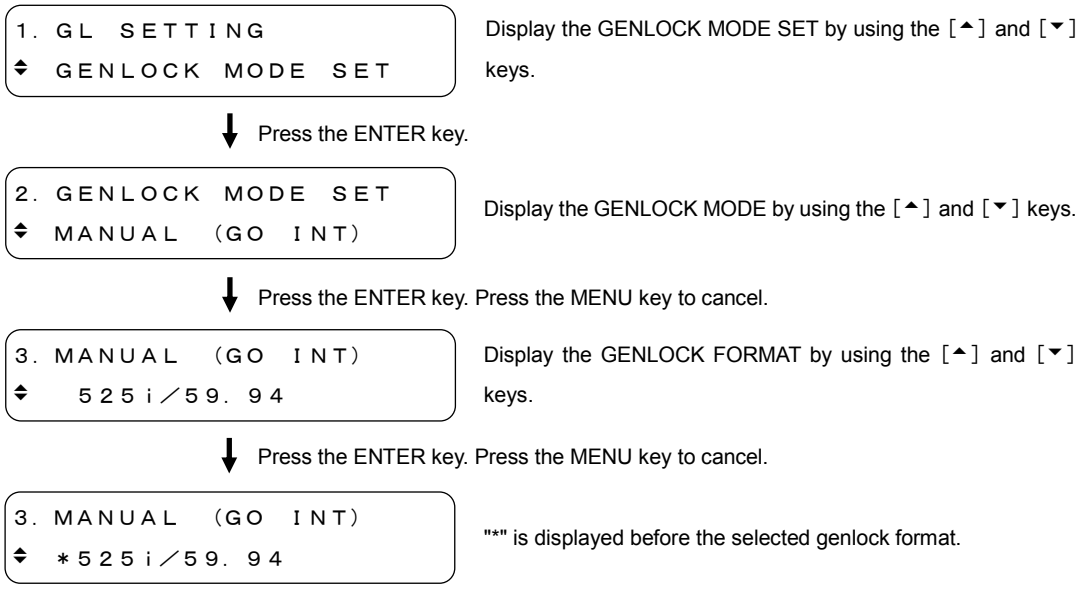


Table 7-1 lists the selectable genlock formats. The genlock format is expressed in the number of total frame lines instead of the number of active picture lines.
Refer to Table 4-1, "Format list" for the REF.ID.

Table 7-1 List of Genlock format

1125i/60	750p/60	NTSC BB
1125i/59.94 (initial setting)	750p/59.94	NTSC BB+REF
1125i/50	750p/50	NTSC BB+ID
1125p/30	750p/30	NTSC BB+REF+ID
1125p/29.97	750p/29.97	525i/59.94
1125p/25	750p/25	525p/59.94
1125p/24	750p/24	PAL BB
1125p/23.98	750p/23.98	PAL BB+REF
1125PsF/24		625i/50
1125PsF/23.98		625p/50

7.3 Setting GENLOCK TIMING

The GENLOCK TIMING is used to set the analog black signal timing with respect to the internal reference signal. There is a time lag to the output signal after the timing is set. The timing is updated in a period of the internal reference signal. Two types of the reference signals are provided: 2.997 Hz and 0.250 Hz. The genlock signal should be applied for this setting. If there is no usable genlock signal, the following screen is displayed.

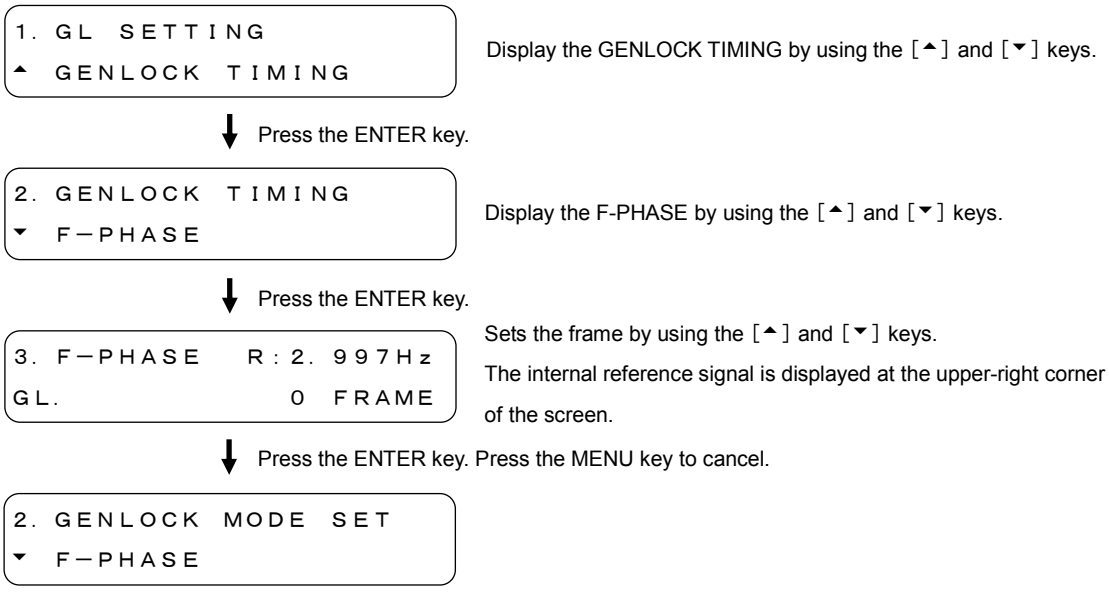
7.3.1 Timing in Frame Steps

The F-PHASE is used to set the timing in frame steps. The timing can be set in NTSC and PAL formats. The settable range depends on the format.

● Settable Range

NTSC: ±5 frames, in 1 frame steps
PAL: ±2 frames, in 1 frame steps

● Setting Procedure of Timing in Frame Steps



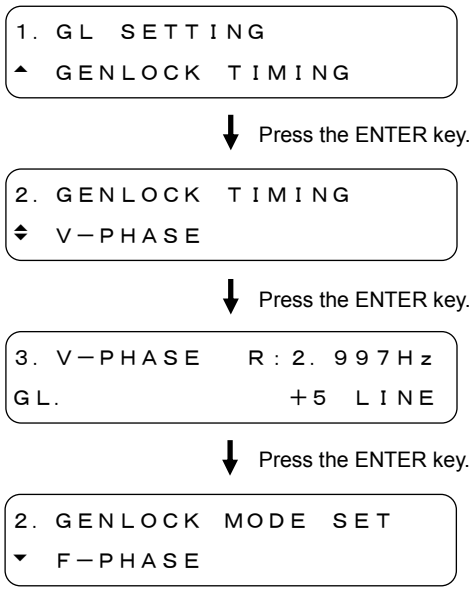
7.3.2 Vertical Timing.

The V-PHASE is used to set the vertical timing.
The settable range depends on the format.

● Settable Range

1125i, 1125p, 1125PsF: ±1125 lines, in 1 line steps
750p: ±750 lines, in 1 line steps
525i, 525p for NTSC: ±525 lines, in 1 line steps
625i, 625p for PAL: ±625 lines, in 1 line steps

● Setting Procedure of Vertical Timing



7.3.3 Horizontal Timing (Course Adjustment)

The H-PHASE (COURSE) is used to set the horizontal timing. The settable range depends on the format.

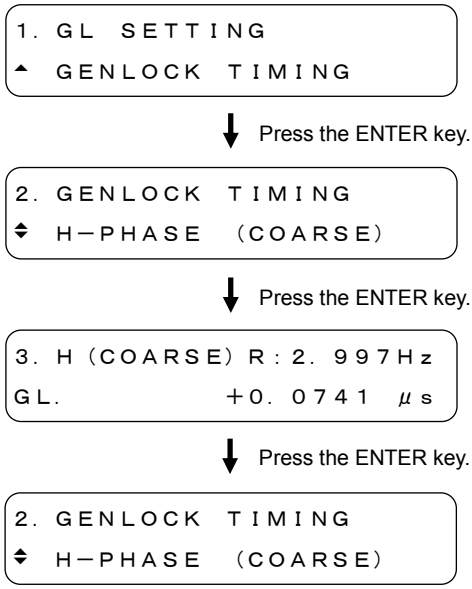
● Settable Range

Refer to Table 7-2. The step is about 0.0741 μs.

Table 7-2 Horizontal timing settable range

Format	H-PHASE [μs]
1125i/60	±14.8148
1125i/59.94	±14.8148
1125i/50	±17.7778
1125p/30	±14.8148
1125p/29.97	±14.8148
1125p/25	±17.7778
1125p/24	±18.5185
1125p/23.98	±18.5185
1125PsF/24	±18.5185
1125PsF/23.98	±18.5185
750p/60	±11.1111
750p/59.94	±11.1111
750p/50	±13.3333
750p/30	±22.2222
750p/29.97	±22.2222
750p/25	±26.6667
750p/24	±27.7778
750p/23.98	±27.7778
NTSC BB	±31.7778
NTSC BB+REF	±31.7778
NTSC BB+ID	±31.7778
NTSC BB+REF+ID	±31.7778
525i/59.94	±31.7778
525p/59.94	±15.8519
PAL BB	±32.0000
PAL BB+REF	±32.0000
625i/50	±32.0000
625p/50	±16.0000

● Setting Procedure of Horizontal Timing



7.3.4 Horizontal Timing (Fine Adjustment)

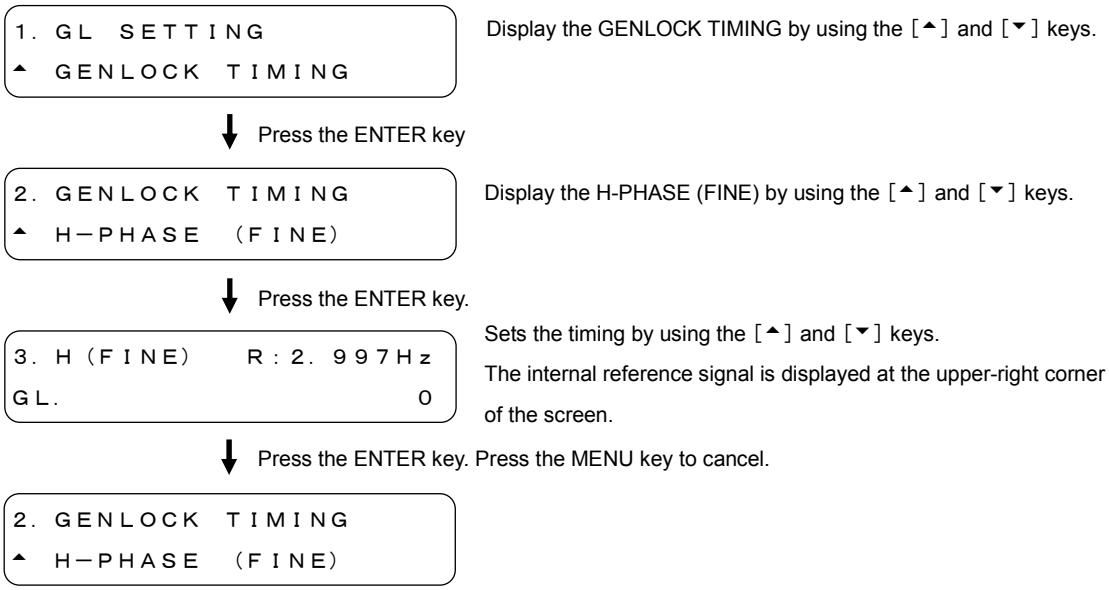
The H-PHASE (FINE) is used to set the horizontal timing.

● Settable Range

±100, in 1 steps

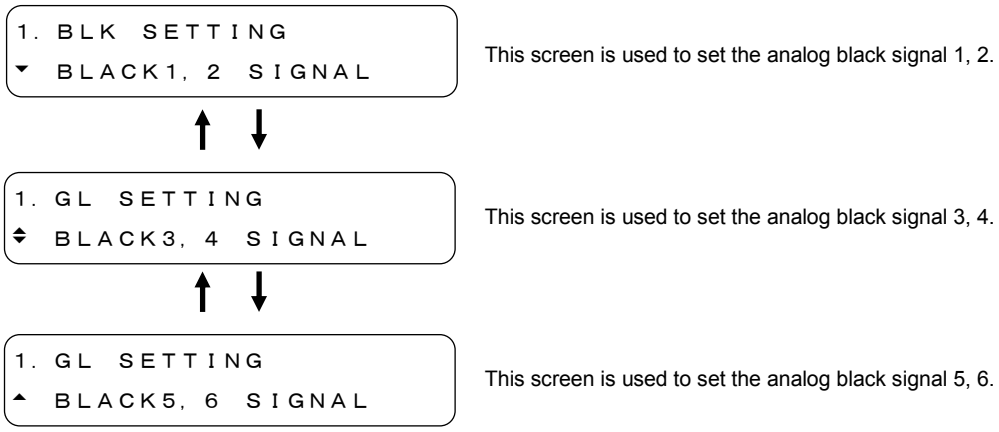
The one step (i.e., ±0.0741 μs) is divided into about ±100.

● Setting Procedure of Horizontal Timing



8 ANALOG BLACK SIGNAL SETTINGS (BLK SETTING)

The BLK SETTING is used to set the analog black output signal.
To display the BLK SETTING, press the MENU key repeatedly until BLK SETTING is displayed. After the BLK SETTING is displayed, select the item to be set by using the [▲] and [▼] keys.

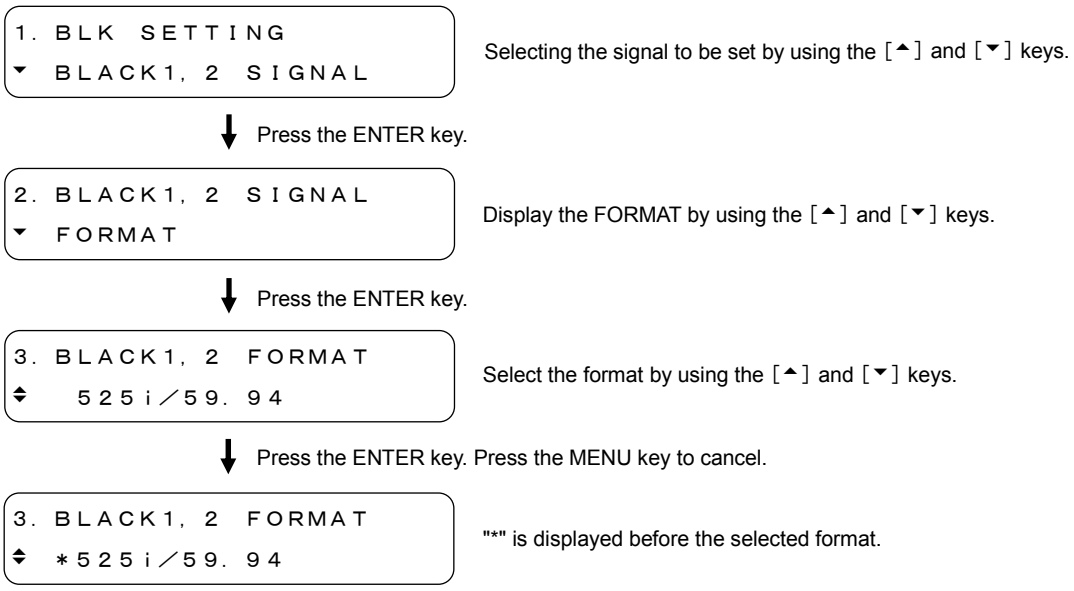


The following sections only describe the "BLACK 1, 2 SIGNAL", however, the same procedure can also be used for the "BLACK 3, 4 SIGNAL" and "BLACK 5, 6 SIGNAL".

8.1 Setting Format

The FORMAT is used to select the analog black signal format.
Table 4-1, "Format list" lists the selectable formats.

● Format Selecting Procedure



This format can also be selected by using the FORMAT key.
Refer to Section 4.4, “Format Key”.

8.2 Setting Timing

The TIMING is used to set the analog black signal timing with respect to the internal reference signal.

Three internal reference frequencies are provided: 2.997 MHz, 6.250 MHz, and 3.000 MHz.

8.2.1 Timing in Frame Steps

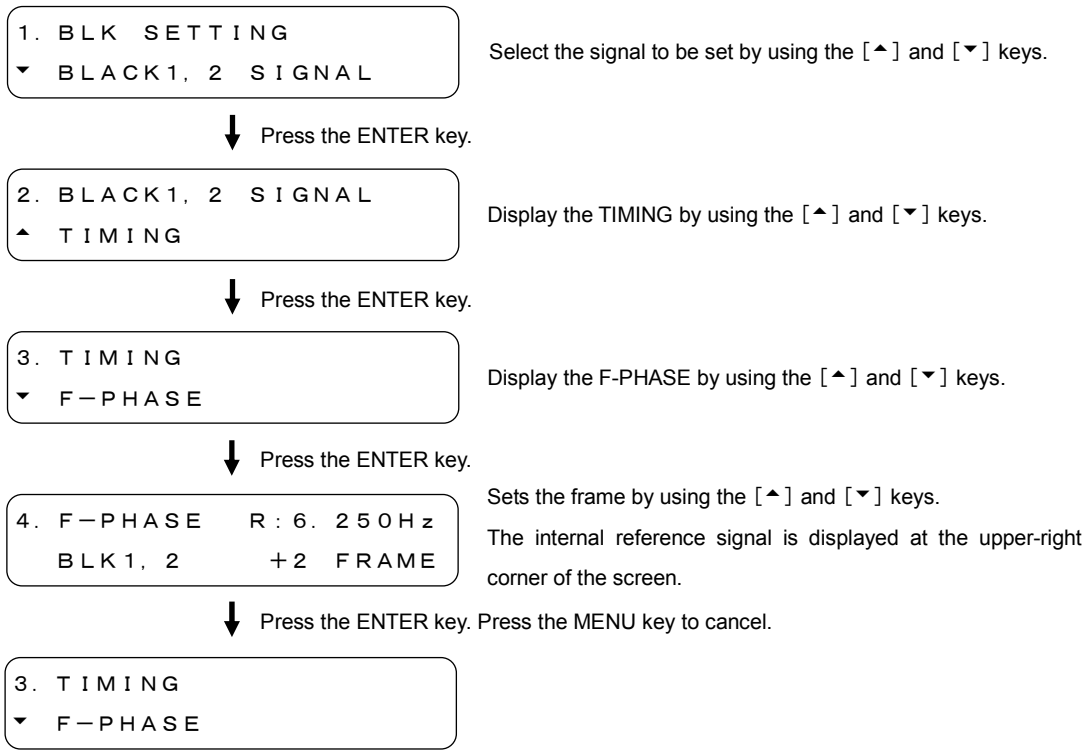
The F-PHASE is used to set the timing in frame steps. This menu is only displayed in NTSC and PAL formats. The settable range depends on the format.

● Settable Range

NTSC: ±5 frames, in 1 frame steps

PAL: ±2 frames, in 1 frame steps

● Setting Procedure of Timing in Frame Steps



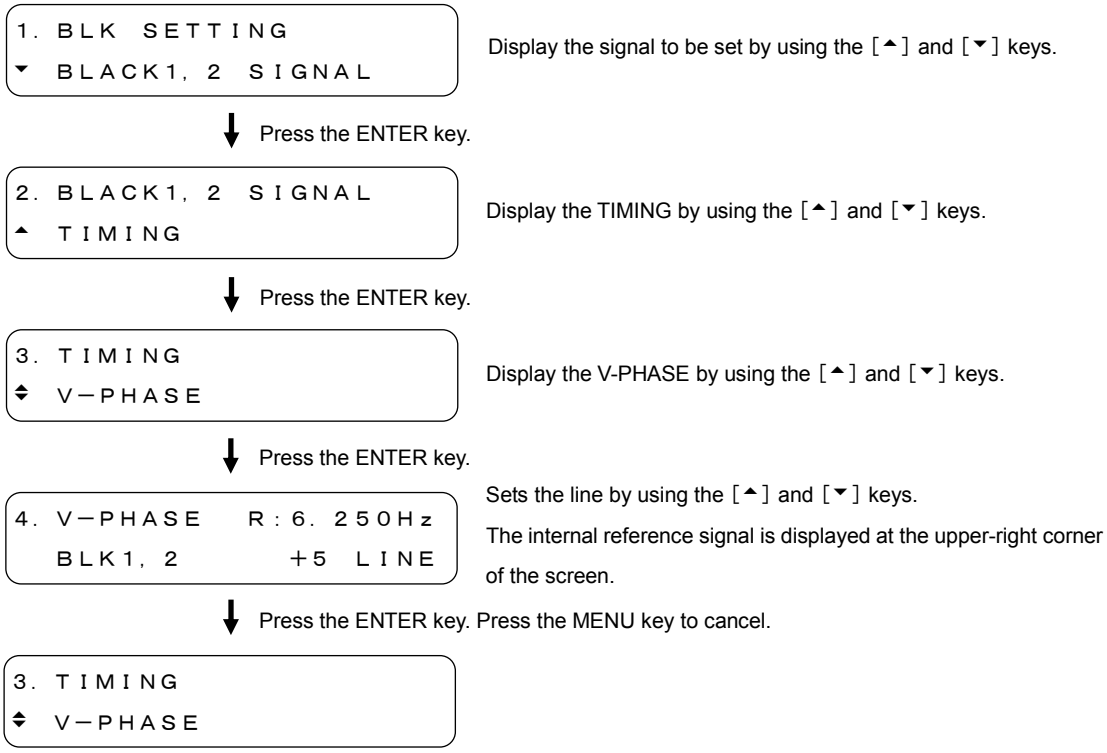
8.2.2 Vertical Timing

The V-PHASE is used to set the vertical timing.
The settable range depends on the format.

● Settable Range

1080i, 1080p, 1080PsF:	±1124 lines, in 1 line steps
720p:	±749 lines, in 1 line steps
525i, 525p for NTSC:	±524 lines, in 1 line steps
625i, 625p for PAL:	±624 lines, in 1 line steps

● Setting Procedure of Vertical Timing



8.2.3 Horizontal Timing (Dot)

The H-PHASE (DOT) is used to set the horizontal timing in dots. When the dot is changed, the time set in Section 8.2.4, "Horizontal Timing (Time)" is also changed. The settable range depends on the format.

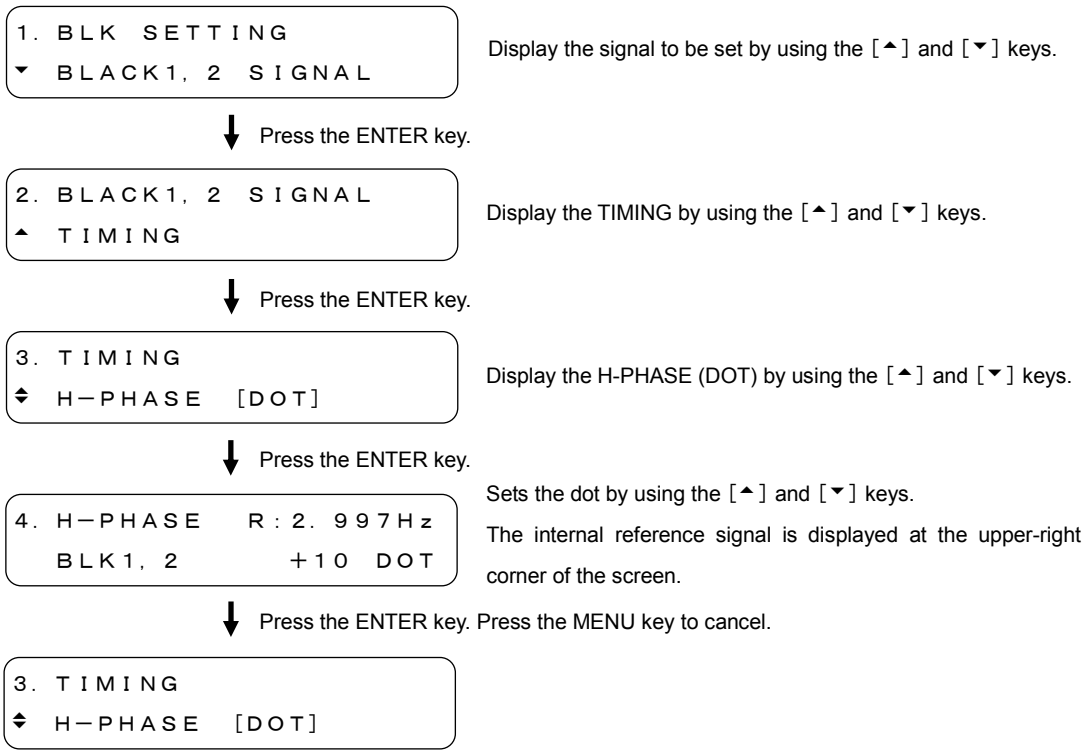
● Settable Range

Refer to Table 8-1. The step is 1 dot.

Table 8-1 Horizontal timing settable range

Format	H-PHASE (DOT)	H-PHASE (μs)
1080i/60	±2199	±29.6161
1080i/59.94	±2199	±29.6457
1080i/50	±2639	±35.5420
1080p/30	±2199	±29.6161
1080p/29.97	±2199	±29.6457
1080p/25	±2639	±35.5420
1080p/24	±2749	±37.0235
1080p/23.98	±2749	±37.0605
1080PsF/24	±2749	±37.0235
1080PsF/23.98	±2749	±37.0605
720p/60	±1649	±22.2087
720p/59.94	±1649	±22.2309
720p/50	±1979	±26.6531
720p/30	±3299	±44.4309
720p/29.97	±3299	±44.4754
720p/25	±3959	±53.3198
720p/24	±4124	±55.5420
720p/23.98	±4124	±55.5976
NTSC BB	±3431	±63.5370
NTSC BB+REF	±3431	±63.5370
NTSC BB+ID	±3431	±63.5370
NTSC BB+REF+ID	±3431	±63.5370
NTSC BB+SETUP	±3431	±63.5370
NTSC BB+S+REF	±3431	±63.5370
NTSC BB+S+ID	±3431	±63.5370
NTSC BB+S+R+ID	±3431	±63.5370
525i/59.94	±3431	±63.5370
525p/59.94	±1715	±31.7592
PAL BB	±3455	±63.9814
PAL BB+REF	±3455	±63.9814
625i/50	±3455	±63.9814
625p/50	±1727	±31.9814

● Setting Procedure of Horizontal Timing



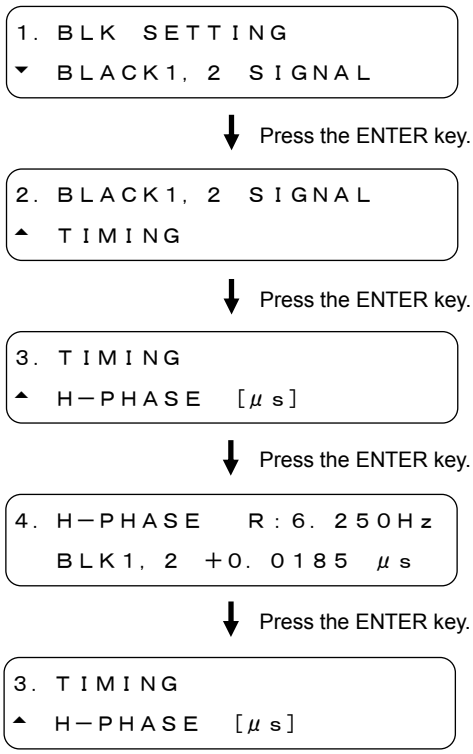
8.2.4 Horizontal Timing (Time)

The H-PHASE (μs) is used to set the horizontal timing in second. When the time is changed, the horizontal timing set in Section 8.2.3, "Horizontal Timing (Dot)" is also changed. The settable range depends on the format.

● Settable Range

Refer to Table 8-1. The step is about 0.0135 μs in HD format, 0.0185 μs in SD format.

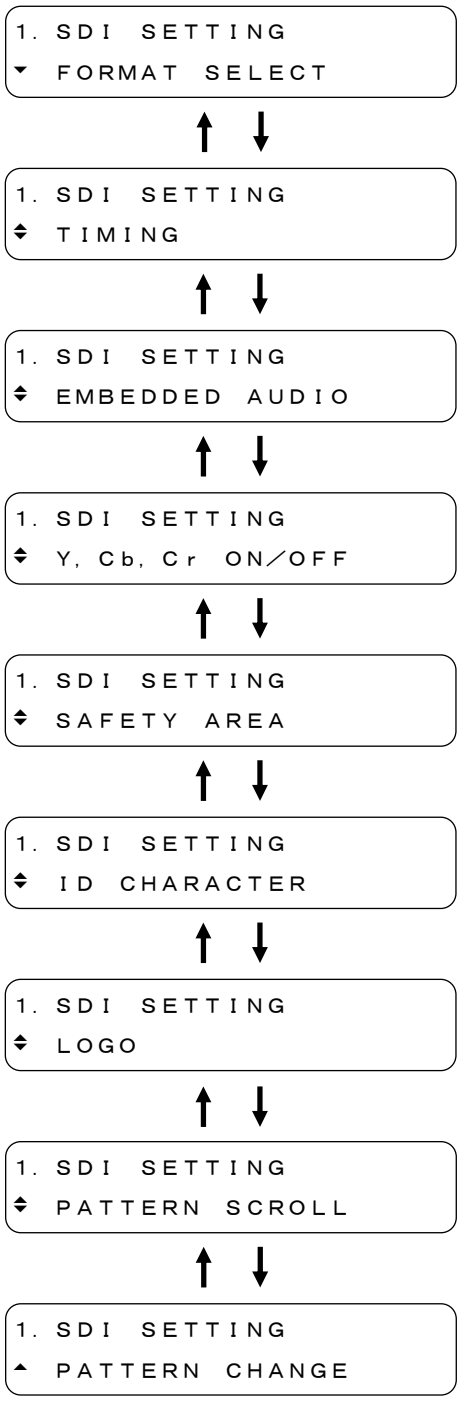
● Setting Procedure of Horizontal Timing



9 SDI SIGNAL SETTINGS (SDI SETTING)

The SDI SETTING is used to set the SDI output signal.

To display the SDI SETTING, press the MENU key repeatedly until SDI SETTING is displayed. After the SDI SETTING is displayed, select the item to be set by using the [▲] and [▼] keys.



Sets the format.
Refer to Section 9.1, “Setting Format”.

Sets the timing.
Refer to Section 9.2, “Setting Timing”.

Sets the embedded audio.
Refer to Section 9.3, “Setting Embedded Audio”.

Sets on/off of Y, Cb, and Cr respectively.
Refer to Section 9.4, “Setting ON/OFF of Y, Cb, and Cr.”.

Sets the marker.
Refer to Section 9.5, “Setting Safety Area Marker (to be supported in the future)”.

Sets the ID Character.
Refer to Section 9.6, “Setting ID Character”.

Sets the Logo.
Refer to Section 9.7, “Setting Logomark”.

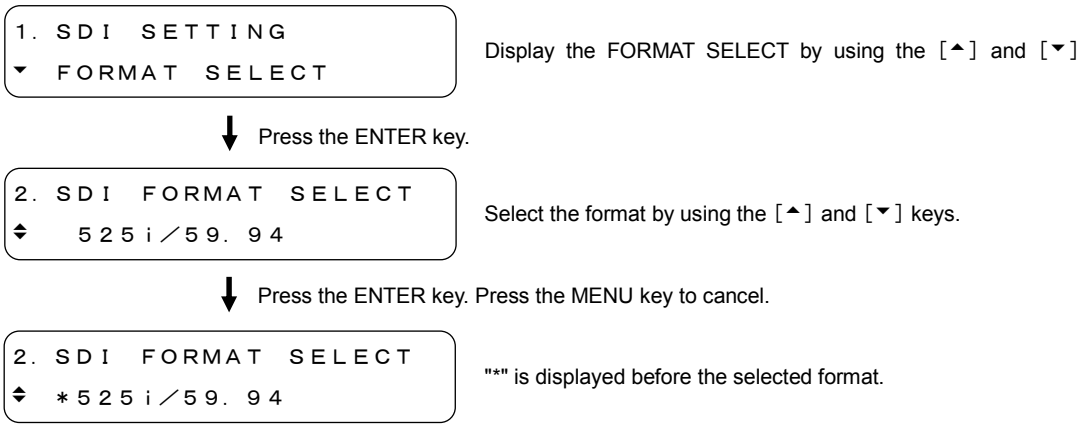
Sets the pattern scroll.
Refer to Section 9.8, “Setting Pattern Scroll”.

Sets the pattern changing automatically.
Refer to Section 9.9, “Setting of Automatic Pattern Changing”.

9.1 Setting Format

The FORMAT SELECT is used to set the SDI signal format.
Refer to Table 4-1, "Format list" for the selectable formats.

● Format Selecting Procedure



This format can also be selected by using the FORMAT key.
Refer to Section 4.4, “Format Key”.

9.2 Setting Timing

The TIMING is used to set the SDI signal timing with respect to the internal reference signal.

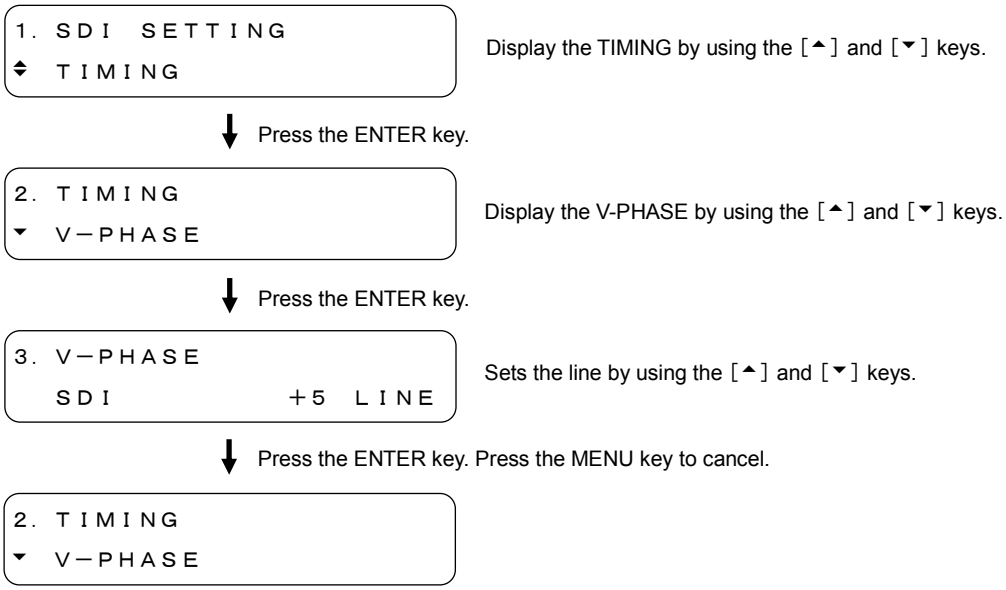
9.2.1 Vertical Timing.

The V-PHASE is used to set the vertical timing.
The settable range depends on the format.

● Settable Range

1080i, 1080p, 1080PsF:	±1124 lines, in 1 line steps
720p:	±749 lines, in 1 line steps
525i:	±524 lines, in 1 line steps
625i:	±624 lines, in 1 line steps

● Setting Vertical Timing



9.2.2 Horizontal Timing (Dot)

The H-PHASE (DOT) is used to set the horizontal timing in dots. When the dot is changed, the time set in Section 9.2.3, "Horizontal Timing (Time)" is also changed. The settable range depends on the format.

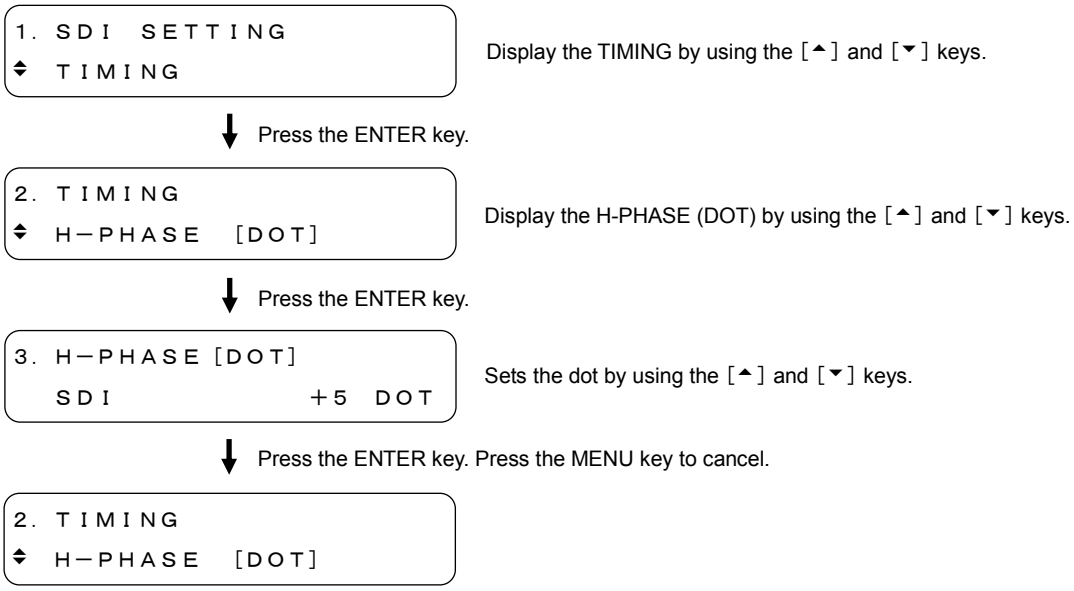
● Settable Range

Refer to Table 9-1. The step is 1 dot.

Table 9-1 Horizontal timing settable range

Format	H-PHASE (DOT)	H-PHASE (μs)
1080i/60	±2199	±29.6161
1080i/59.94	±2199	±29.6457
1080i/50	±2639	±35.5420
1080p/30	±2199	±29.6161
1080p/29.97	±2199	±29.6457
1080p/25	±2639	±35.5420
1080p/24	±2749	±37.0235
1080p/23.98	±2749	±37.0605
1080PsF/24	±2749	±37.0235
1080PsF/23.98	±2749	±37.0605
720p/60	±1649	±22.2087
720p/59.94	±1649	±22.2309
720p/50	±1979	±26.6531
720p/30	±3299	±44.4309
720p/29.97	±3299	±44.4754
720p/25	±3959	±53.3198
720p/24	±4124	±55.5420
720p/23.98	±4124	±55.5976
525i/59.94	±1715	±63.5185
625i/50	±1727	±63.9629

● Setting Procedure of Horizontal Timing



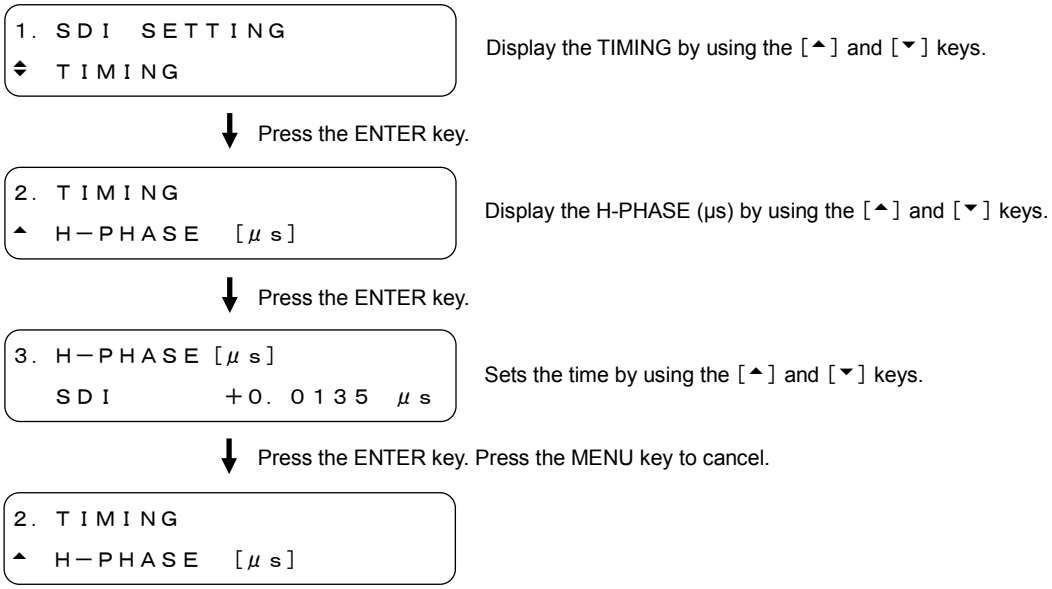
9.2.3 Horizontal Timing (Time)

The H-PHASE (μs) is used to set the horizontal timing in second. When the time is changed, the horizontal timing set in Section 9.2.2, "Horizontal Timing (Dot)" is also changed. The settable range depends on the format.

● Settable Range

Refer to Table 9-1. The step is about 0.0135 μs in HD format, 0.0370 μs in SD format.

● Setting Procedure of Horizontal Timing



9.3 Setting Embedded Audio

The EMBEDDED AUDIO is used to set the embedded audio for CH 1 to CH 16.
The embedded audio can be set for each group or for each channel.

- Setting Each Group Respectively

  The CH 1 to CH 4 are assigned to GROUP 1. Also assign remaining channels to GROUP 2 to GROUP 4 as listed in Table 9-2.

  Table 9-2 Relationship between the channel number and group number for Embedded Audio.

Channel Number	Group Number
CH 1 to CH 4	GROUP1
CH 5 to CH 8	GROUP2
CH 9 to CH12	GROUP3
CH13 to CH16	GROUP4

  The same procedure used to equal the setting of GROUP 2 to GROUP 1 can also be applied to equal the setting of GROUP 4 to GROUP 3.
  Refer to Section 9.3.1, "Sharing Settings Between Groups".

- Setting Each Channel Respectively

  Set each channel, CH 1 to CH 16

  The CH 2 to CH 4 can be set to equal the CH 1.
  The CH 6 to CH 8 can be set to equal the CH 5.
  The CH 10 to CH 12 can be set to equal the CH 9.
  The CH 14 to CH 16 can be set to equal the CH 13.
  Refer to Section 9.3.2, "Sharing Settings Between Channels".

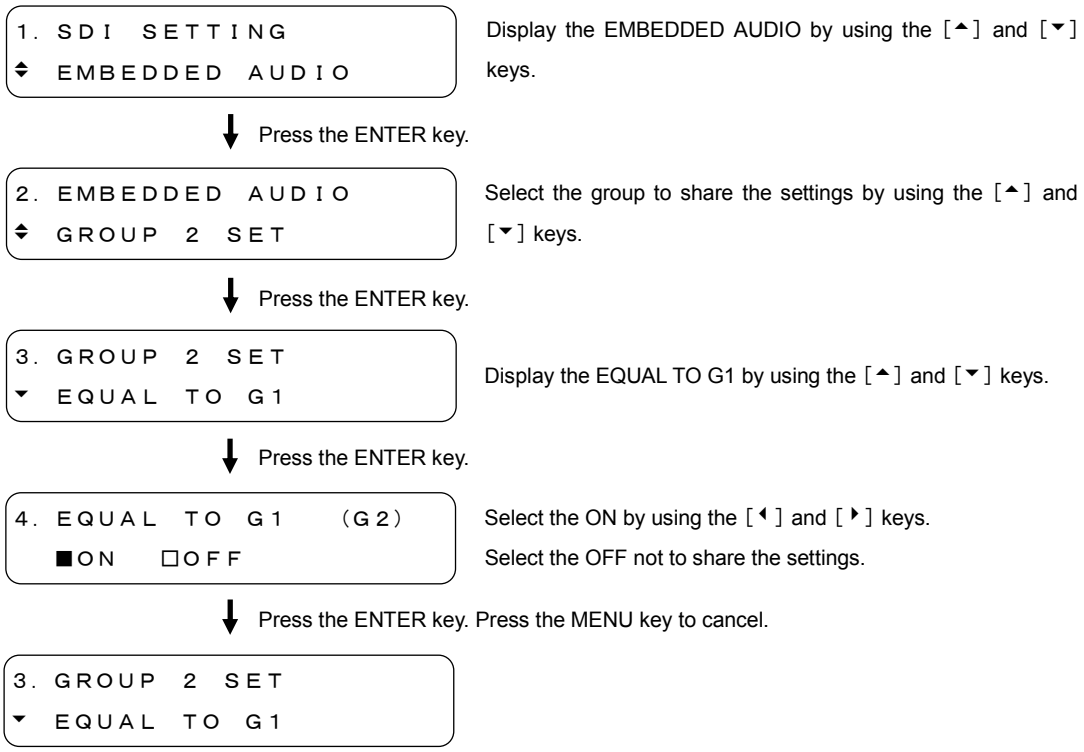
9.3.1 Sharing Settings Between Groups

The EQUAL TO G1 is used to equal the setting of GROUP 2 to GROUP 1.
The EQUAL TO G3 is used to equal the setting of GROUP 4 to GROUP 3.
The settings described in Section 9.3.3, "Audio Signal ON/OFF (in each group)" cannot be applied to this setting.
This section only describes the setting procedure of EQUAL TO G1 used to equal the setting of GROUP 2 to GROUP 1. This procedure can also be applied to EQUAL TO G3.

● Description of Setting Items

ON	Equals the setting of GROUP 2 to GROUP 1. The display contents of the GROUP 2 will not be changed; displayed as is.
OFF	The GROUP 1 and GROUP 2 do not share the settings. (initial setting)

● Sharing Procedure of Settings Between Groups



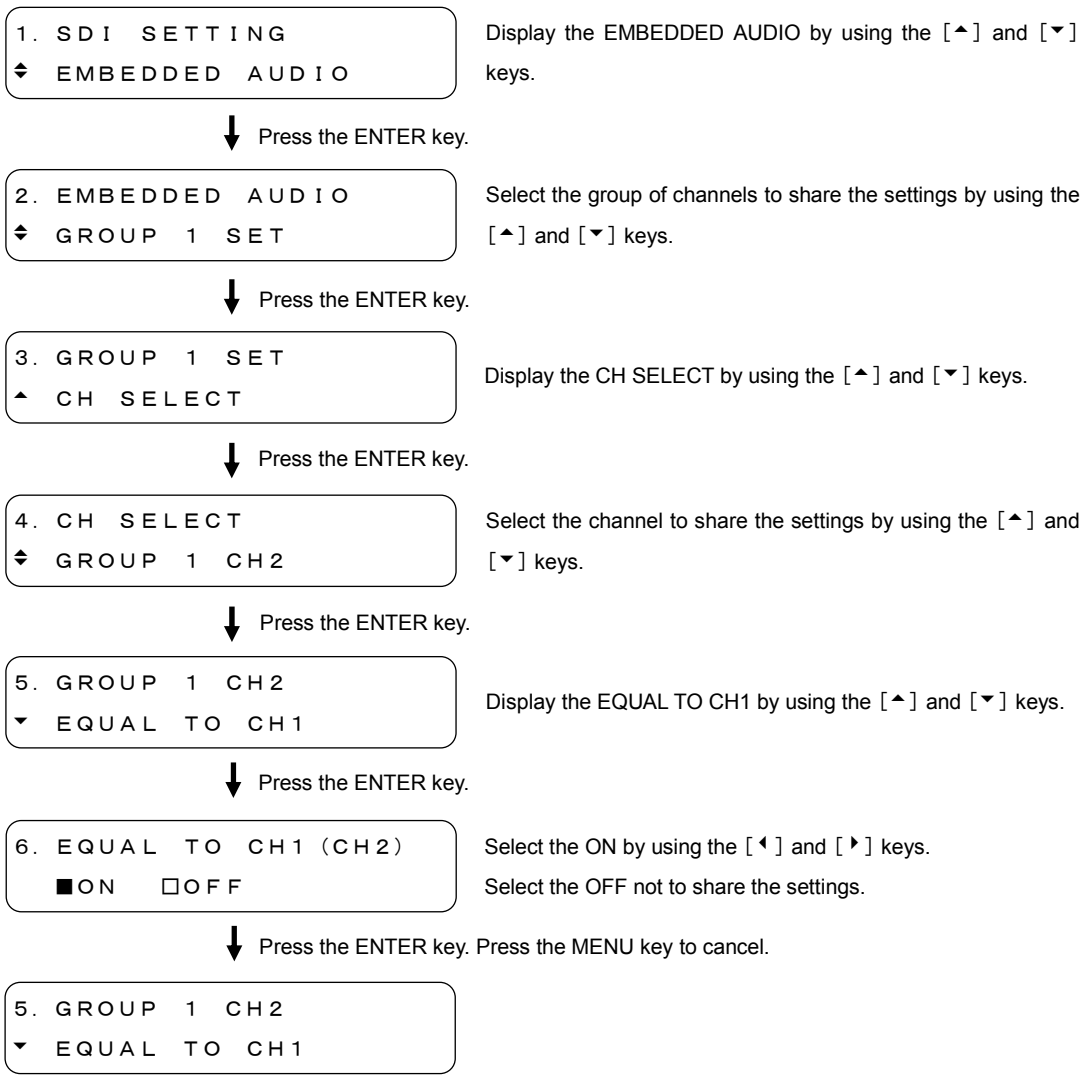
9.3.2 Sharing Settings Between Channels

The EQUAL TO CH 1 is used to make the setting of CH 2 through CH 4, respectively, equal to the setting of CH 1. (The CH 2 through CH 4 should be set respectively.)
The EQUAL TO CH 5 is used to equal the setting of CH 6 through CH 8 to CH 5.
The EQUAL TO CH 9 is used to equal the setting of CH 10 through CH 12 to CH 9.
The EQUAL TO CH 13 is used to equal the setting of CH 14 through CH 16 to CH 13.
This section only describes the setting procedure of EQUAL TO CH 1 used to equal the setting of CH 2 to CH 1, however, the same procedure can also be applied to EQUAL TO CH 5, EQUAL TO CH 9, and EQUAL TO CH 13.

● Description of Setting Items

ON: Equals the setting of CH 2 to CH 1.
The display contents of the CH 2 will not be changed; displayed as is.
OFF: The CH 1 and CH 2 do not share the settings. (initial setting)

● Sharing Procedure of Settings Between Channels



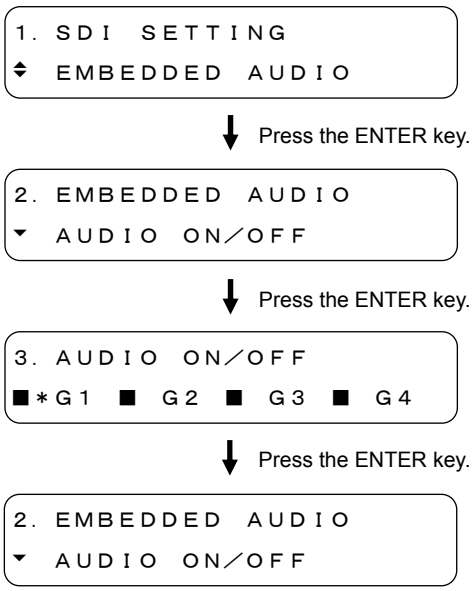
9.3.3 Audio Signal ON/OFF (in each group)

The AUDIO ON/OFF is used to set the embedded audio signal output on/off.

● Description of Setting Items

ON (■): Outputs the embedded audio signal. (initial setting)
OFF (□): Does not output the embedded audio signal.

● Setting Procedure of Output Signal



Display the EMBEDDED AUDIO by using the [▲] and [▼] keys.

Display the AUDIO ON/OFF by using the [▲] and [▼] keys.

Move the cursor (*) to the desired item by using the [◀] and [▶] keys, then select ON (■) by using the [▲] key, select OFF (□) by using the [▼] key.

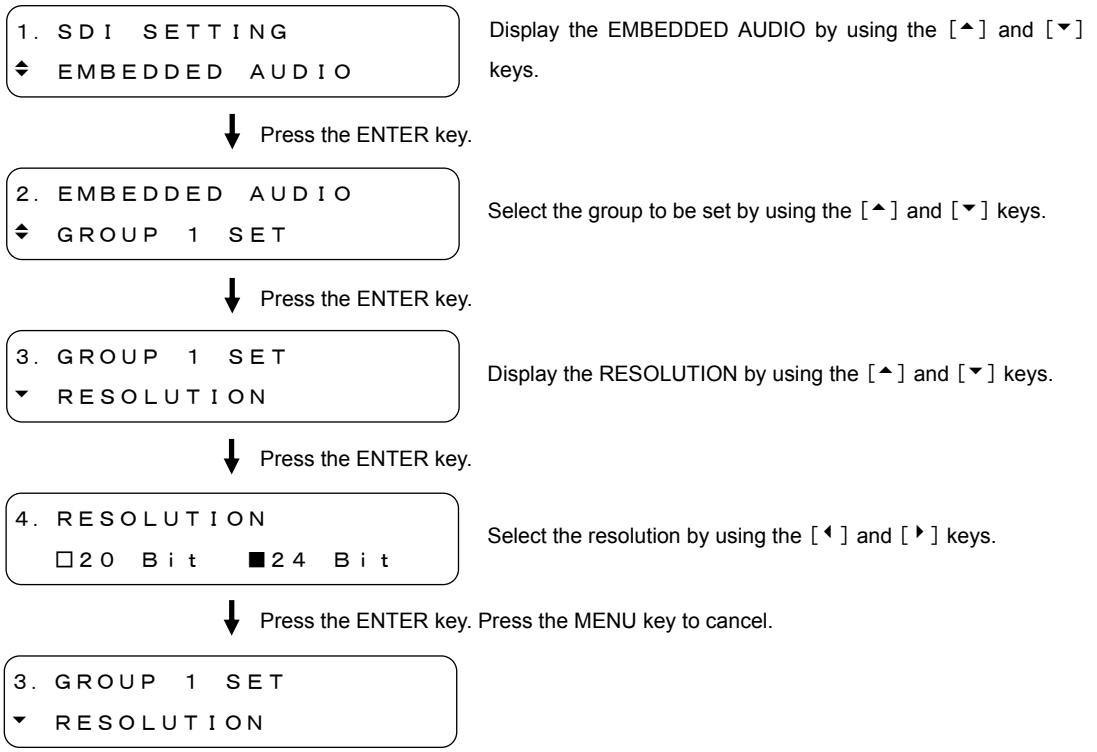
9.3.4 Setting Resolution (in each group)

The RESOLUTION is used to set the resolution of the digital data for each group.
When the output format is SD and the resolution of all groups is set to 24 bits, the group number of the output channels becomes up to 3 groups.
This section only describes the setting procedure of GROUP 1, however, the same procedure can also be applied to the GROUP 2 to GROUP 4.

● Description of Setting Items

20 Bit: Sets the resolution to 20 bits. (initial setting)
24 Bit: Sets the resolution to 24 bits.

● Resolution Setting Procedure



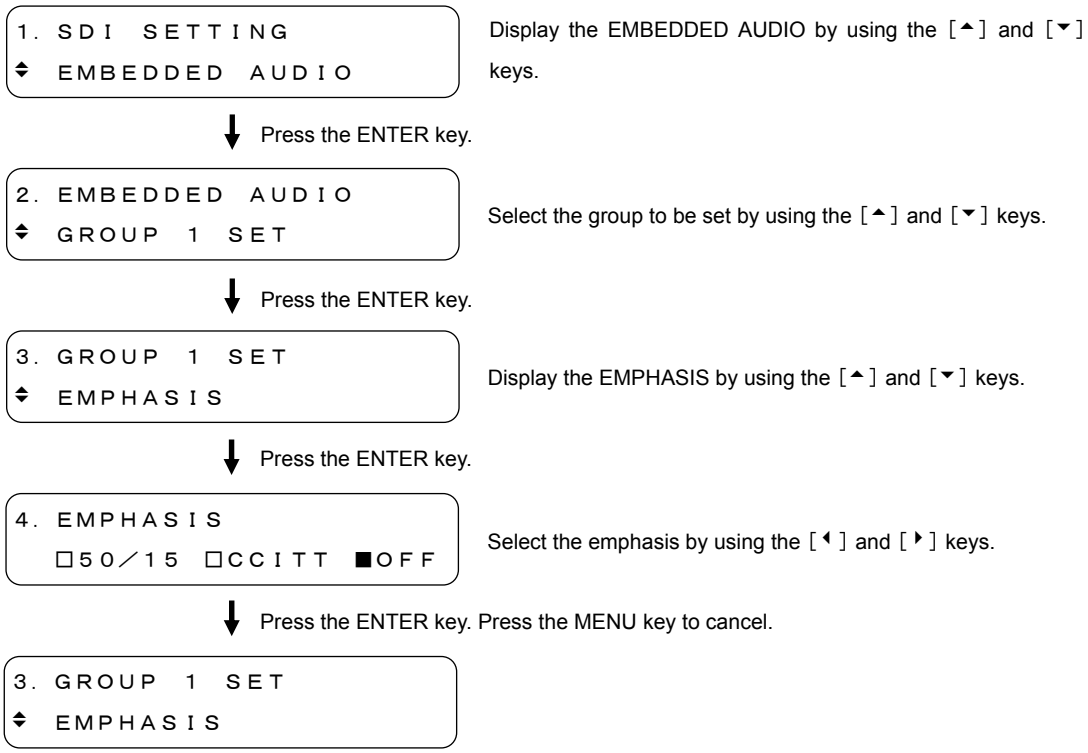
9.3.5 Setting Pre-Emphasis (in each group)

The EMPHASIS is used to set the pre-emphasis mode for each group.
This section only describes the setting procedure of GROUP 1, however, the same procedure can also be applied to GROUP 2 to GROUP 4.

● Description of Setting Items

50/15:	Sets the pre-emphasis mode to 50/15.
CCITT:	Sets the pre-emphasis mode to CCITT.
OFF:	Sets the pre-emphasis mode to OFF. (initial setting)

● Setting Procedure of Pre-Emphasis



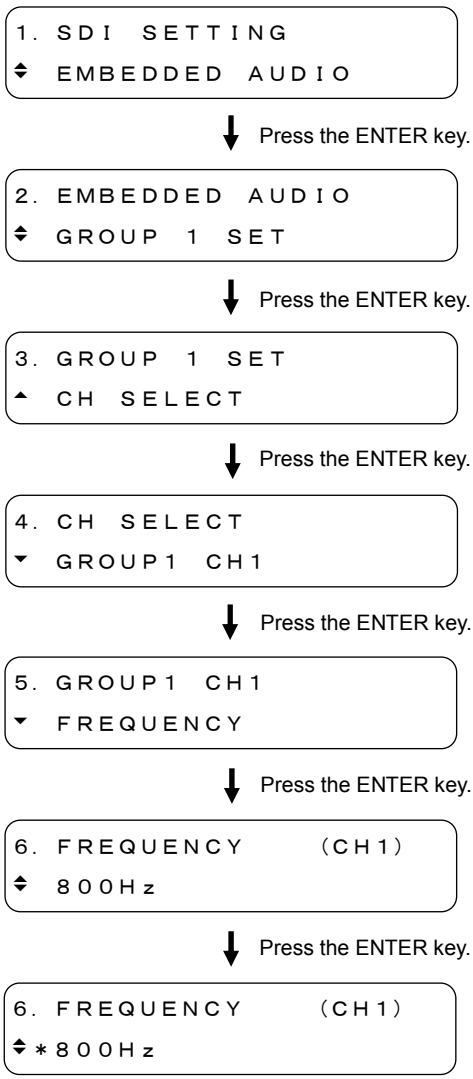
9.3.6 Setting Frequency (in each group)

The FREQUENCY is used to set the frequency for each channel.
This section only describes the setting procedure of CH 1, however, the same procedure can also be applied to CH 2 to CH 16.

● Description of Setting Items

SILENCE:	Does not set the frequency.
400Hz:	Frequency is set to 400Hz.
800Hz:	Frequency is set to 800Hz.
1kHz:	Frequency is set to 1kHz. (initial setting)

● Frequency Setting Procedure



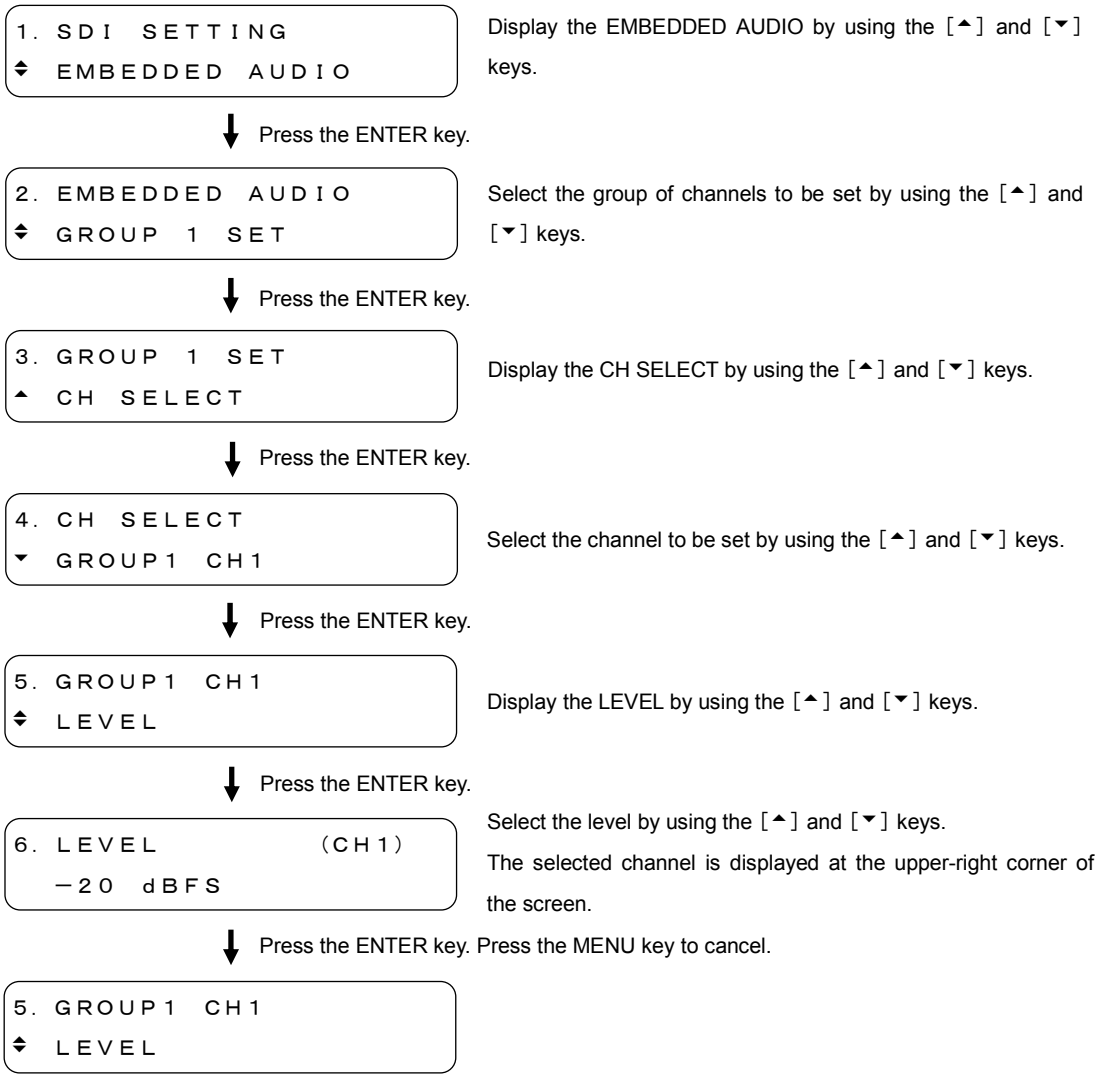
9.3.7 Setting Level (in each channel)

The LEVEL is used to set the level for each channel.
This section only describes the setting procedure of CH 1, however, the same procedure can also be applied to CH 2 to CH 16.

● Settable Range

-60 dBFS to 0 dBFS in 1 dBFS steps The initial setting is -20 dBFS

● Level Setting Procedure



9.3.8 Setting Click (in each channel)

The CLICK is used to set the click for each channel.
This section only describes the setting procedure of CH 1, however, the same procedure can also be applied to CH 2 to CH 16.

● Description of Setting Items

OFF	Does not insert the click. (initial setting)
1 sec:	Inserts the click in every 1 second.
2 sec:	Inserts the click in every 2 seconds.
3 sec:	Inserts the click in every 3 seconds.
4 sec:	Inserts the click in every 4 seconds.

● Click Setting Procedure

Display the EMBEDDED AUDIO by using the [▲] and [▼] keys.

Press the ENTER key.

Select the group of channels to be set by using the [▲] and [▼] keys.

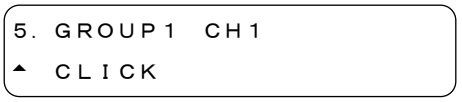
Press the ENTER key.

Display the CH SELECT by using the [▲] and [▼] keys.

Press the ENTER key.

Select the channel to be set by using the [▲] and [▼] keys.

Press the ENTER key.



Display the CLICK by using the [▲] and [▼] keys.

Press the ENTER key.

Select the click type by using the [▲] and [▼] keys.
The selected channel is displayed at the upper-right corner of the screen.

Press the ENTER key. Press the MENU key to cancel.

"*" is displayed before the selected setting.

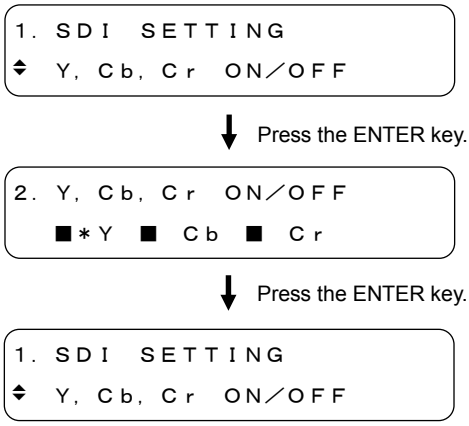
9.4 Setting ON/OFF of Y, Cb, and Cr

The "Y, Cb, Cr, ON/OFF" is used to set on/off for Y, Cb, and Cr respectively.

● Description of Setting Items

ON (■): Outputs the Y, Cb, or Cr signal selected. (initial setting)
OFF (□): Does not output the Y, Cb, or Cr signal selected.

● Setting Procedure of Output Signal



Display the “Y, Cb, Cr, ON/OFF” by using the [▲] and [▼] keys.

Position the cursor (*) to the desired item by using the [◀] and [▶] keys, then select ON (■) by using the [▲] key, select OFF (□) by using the [▼] key.

9.5 Setting Safety Area Marker

The SAFETY AREA is used to set the safety area marker and 4:3 aspect-ratio marker. No markers are superimposed when the CHECK FIELD pattern is selected.

9.5.1 Action Safety Area

The 90% AREA is used to determine whether to superimpose the marker on the action safety area (90%). The marker is superimposed at the 90-% position on the 4:3 aspect-ratio marker when the ON is selected in Section 9.5.3, "4:3 Aspect-Ratio Marker".

- Description of Setting Items

  ON: Superimposes the marker at the action safety area (90%).
  OFF: Does not superimpose the marker at the action safety area (90%). (initial setting)

- Displaying Procedure of Action Safety Area

```
1. SDI SETTING
▲▼ SAFETY AREA
```

Display the SAFETY AREA by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. SAFETY AREA
▼ 90% AREA
```

Display the 90% AREA by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. 90% AREA MARKER
  ■ON  □OFF
```

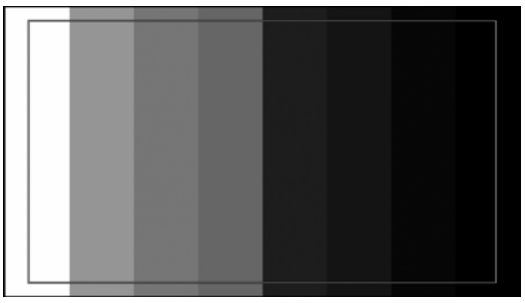
Select the ON by using the [◀] and [▶] keys.
Select the OFF not to display the marker.

↓ Press the ENTER key. Press the MENU key to cancel.

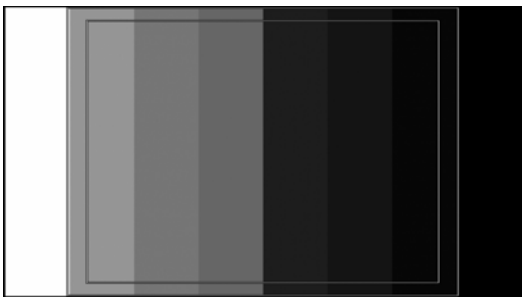
```
2. SAFETY AREA
▼ 90% AREA
```

- Example of screen display

90% AREA ON / 4:3 AREA OFF



90% AREA ON / 4:3 AREA ON



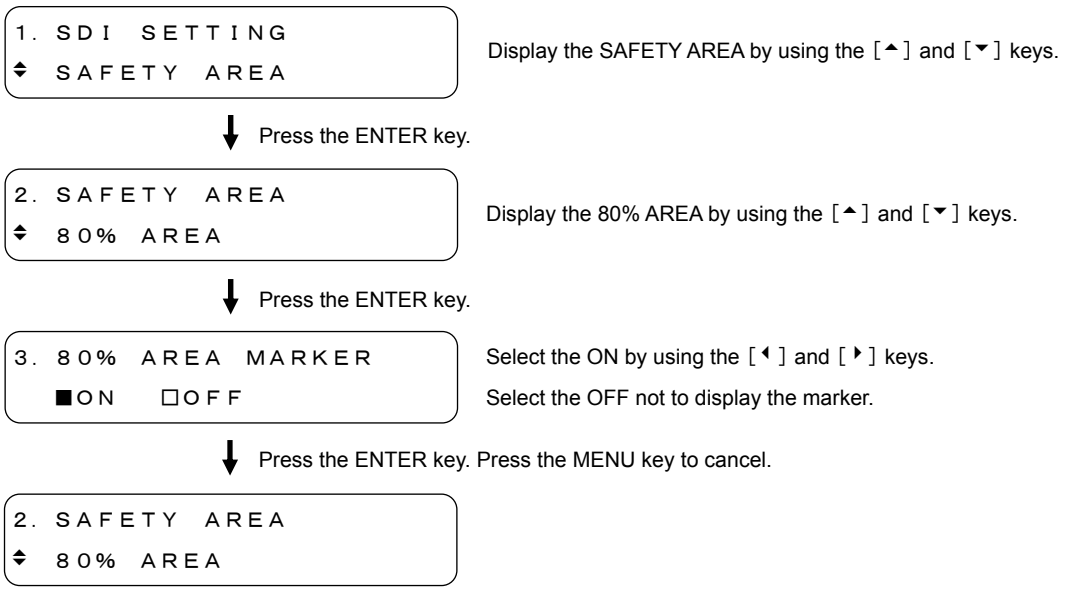
9.5.2 Title Safety Area

The 80% AREA is used to determine whether to superimpose the marker on the action safety area (80%). The marker is superimposed at the 80-% position on the 4:3 aspect-ratio marker when the ON is selected in Section 9.5.3, "4:3 Aspect-Ratio Marker".

● Description of Setting Items

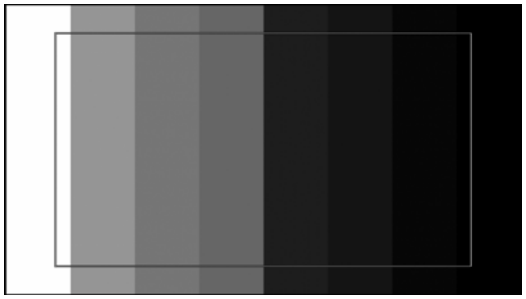
ON: Superimposes the marker at the title safety area (80%).
OFF: Does not superimpose the marker at the title safety area (80%). (initial setting)

● Displaying Procedure of Title Safety Area

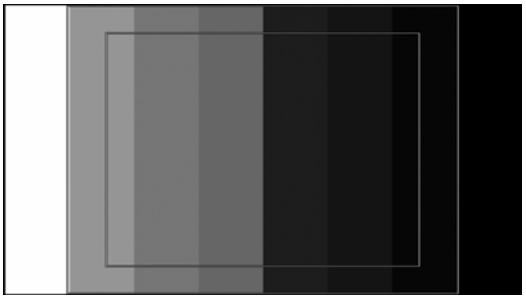


● Example of screen display

80% AREA ON / 4:3 AREA OFF



80% AREA ON / 4:3 AREA ON



9.5.3 4:3 Aspect-Ratio Marker

The 4:3 AREA is used to determine whether to superimpose the 4:3 aspect-ratio marker. This menu is only displayed in HD format.

● Description of Setting Items

ON: Superimposes the 4:3 aspect-ratio marker.
OFF: Does not superimpose the 4:3 aspect-ratio marker. (initial setting)

● Setting Procedure of 4:3 Aspect-Ratio Marker

```
1. SDI SETTING
◆ SAFETY AREA
```

Display the SAFETY AREA by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. SAFETY AREA
▲ 4:3 AREA
```

Display the 4:3 AREA by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. 4:3 AREA MARKER
  ■ON  □OFF
```

Select the ON by using the [◀] and [▶] keys.
Select the OFF not to display the marker.

↓ Press the ENTER key. Press the MENU key to cancel.

```
2. SAFETY AREA
▲ 4:3 AREA
```

● Example of screen display

4:3 AREA ON

9.6 Setting ID Character

The ID CHARACTER is used to set the ID character superimposed on the SDI signal. No ID is superimposed when the CHECK FIELD pattern is selected.

9.6.1 Creating ID Character

The CHARACTER SET is used to create the ID character. Up to 20 alphanumeric characters can be used for the ID character. To display the ID character, refer to Section 9.6.7, "Displaying ID Character" to select ON.

● Settable Range

The characters selectable from the space by pressing the [▲] and [▼] keys are shown below. The initial setting is "LT 4400◀ ".

[▲] key　　！”＃＄％＆’（）＊＋，－．／０１２３４５６７８９：；＜＝＞？＠Ａ
ＢＣＤＥＦＧＨＩＪＫＬＭＮＯＰＱＲＳＴＵＶＷＸＹＺ［￥］＾＿→←

[▼] key　　◀ (*1)

● Setting Procedure of ID Character

```
1. SDI SETTING
▲▼ ID CHARACTER
```

Display the ID CHARACTER by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. ID CHARACTER
▼ CHARACTER SET
```

Display the CHARACTER SET by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. CHARACTER SET
LT4400◀
```

Move the cursor to the desired item by using the [◀] and [▶] keys, then set the character by using the [▲] and [▼] keys.

↓ Press the ENTER key. Press the MENU key to cancel.

```
2. ID CHARACTER
▼ CHARACTER SET
```

*1 The background of 20-character area is displayed in black, however, the background of each character is displayed in black when the [◀] is entered at the end of the character. When the [◀] is entered between characters, the continued characters are deleted. When other character is entered instead, the display returns to the original conditions, however.

LT4400

LT4400◀

9.6.2 ID Character Position

The ID POSITION is used to set the display position of ID character.
The settable range depends on the format.

● Settable Range

H (horizontal)	The initial setting is 0 dot displayed at the left end of the screen.
1080i, 1080p, 1080PsF:	0 dot to 1919 dots, in 1 dot steps
720p:	0 dot to 1279 dots, in 1 dot steps
525i, 625i:	0 dot to 719 dots, in 1 dot steps
V (vertical)	The initial setting is 0 dot displayed at the top of the screen.
1080i, 1080p, 1080PsF:	0 dot to 1079 dots, in 1 dot steps
720p:	0 dot to 719 dots, in 1 dot steps
525i:	0 dot to 486 dots, in 1 dot steps
625i:	0 dot to 575 dots, in 1 dot steps

● Position Setting Procedure

```
1. SDI SETTING
▲▼ ID CHARACTER
```

Display the ID CHARACTER by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. ID CHARACTER
▲▼ ID POSITION
```

Display the ID POSITION by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. ID POSITION
■H:  10DOT□V:  10DOT
```

Move the cursor to the desired item by using the [◀] and [▶] keys, then set the position by using the [▲] and [▼] keys.

↓ Press the ENTER key. Press the MENU key to cancel.

```
2. ID CHARACTER
▲▼ ID POSITION
```

● Example of screen display

H : 0DOT / V : 0DOT

H : 750DOT / V : 500DOT

9.6.3 ID Character Size

The ID SIZE is used to set the ID character size in magnifying power with respect to the basic size. An ID character size is 32 x 32 dots.

● Settable Range

x1:	32 x 32 dots/ 1 character (initial setting)
x2:	64 x 64 dots/ 1 character
x4:	128 x 128 dots/ 1 character

● Size Setting Procedure

```
1. SDI SETTING
▲▼ ID CHARACTER
```

Display the ID CHARACTER by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. ID CHARACTER
▲▼ ID SIZE
```

Display the ID SIZE by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. ID SIZE
  ■X1 □X2 □X4
```

Select the size by using the[◀] and [▶] keys.

↓ Press the ENTER key. Press the MENU key to cancel.

```
2. ID CHARACTER
▲▼ ID SIZE
```

● Example of screen display (in case of 1080i/59.94)

×1

×2

×4

9.6.4 ID Character Brightness

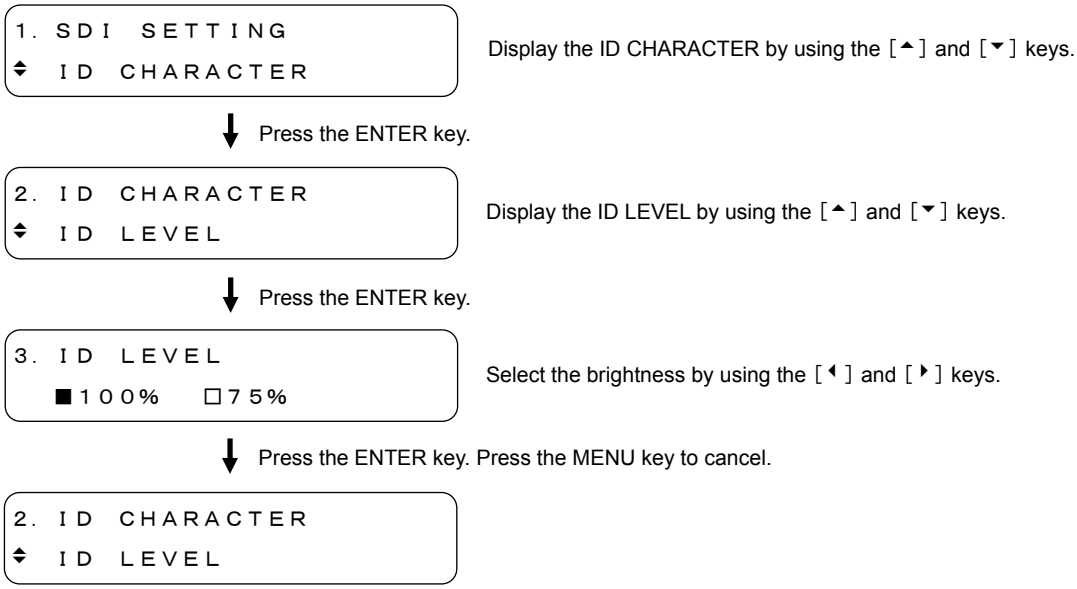
The ID LEVEL is used to set the brightness of the ID character.

● Description of Setting Items

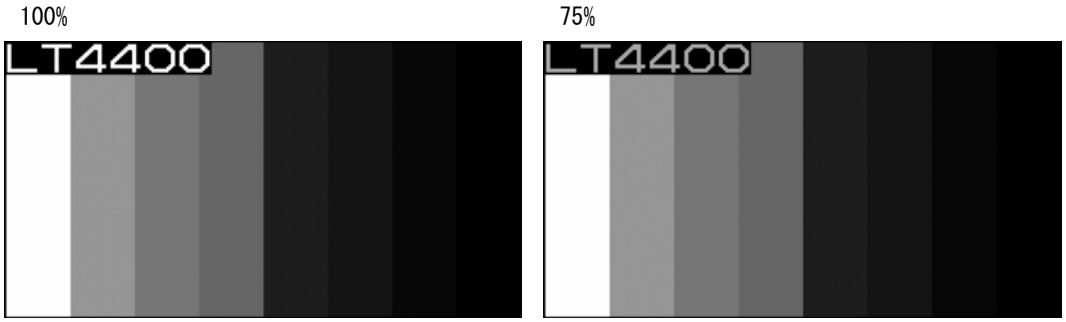
100%: Sets the brightness to 100%. A character color becomes white. (initial setting)

75%: Sets the brightness to 75%. A character color becomes gray.

● Brightness Setting Procedure



● Example of screen display



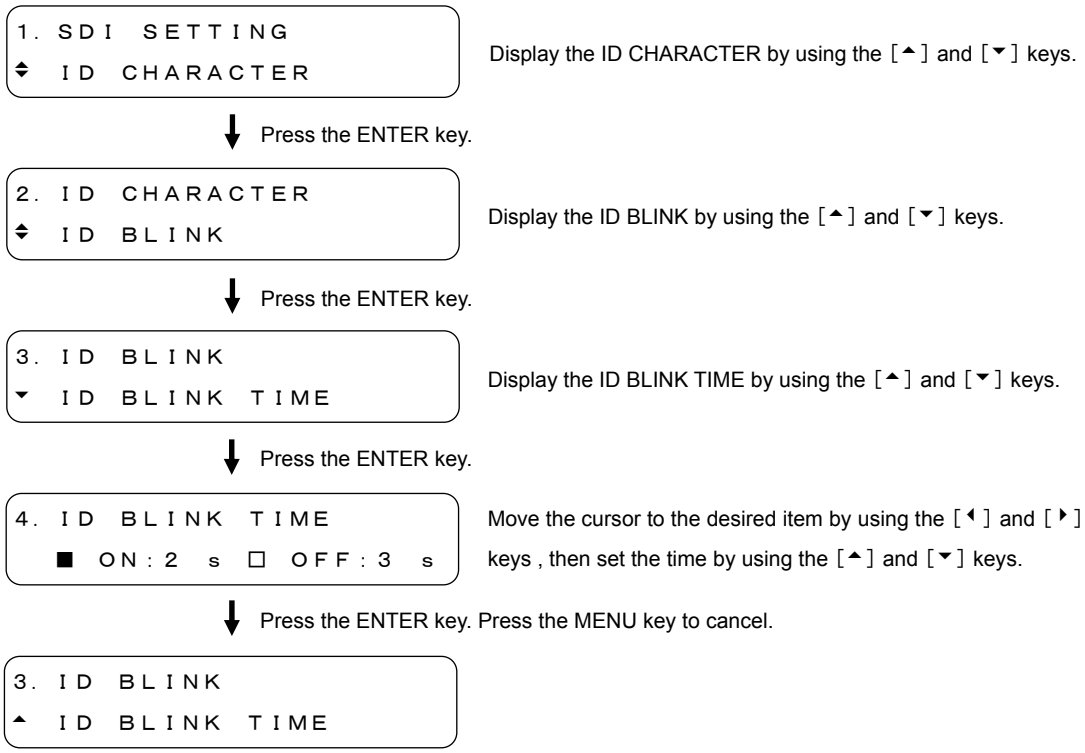
9.6.5 Blinking Time of ID Character

The ID BLINK TIME is used to set the blink interval of ID character. The On and Off intervals can be set respectively. To blink the ID character, refer to Section 9.6.6, "Blinking ID Character" to select ON.

● Description of Setting Items

ON (blinking on time): 1 to 9second, in 1second steps (initial setting is 1sec)
OFF (blinking off time): 1 to 9second, in 1second steps (initial setting is 1sec)

● Setting Procedure of Blinking Time



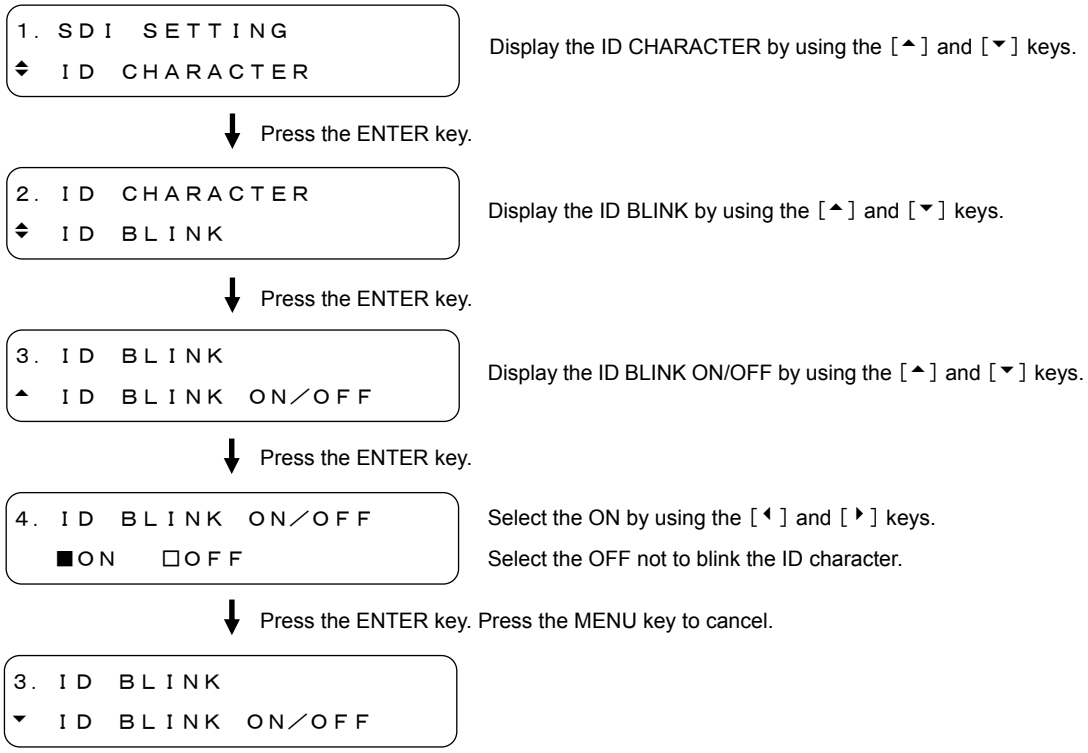
9.6.6 Blinking ID Character

The ID BLINK ON/OFF is used to determine whether the ID character blinks or not.

● Description of Setting Items

ON:	Blinks the ID character
OFF:	Does not blink the ID character (initial setting)

● Blinking Setting Procedure



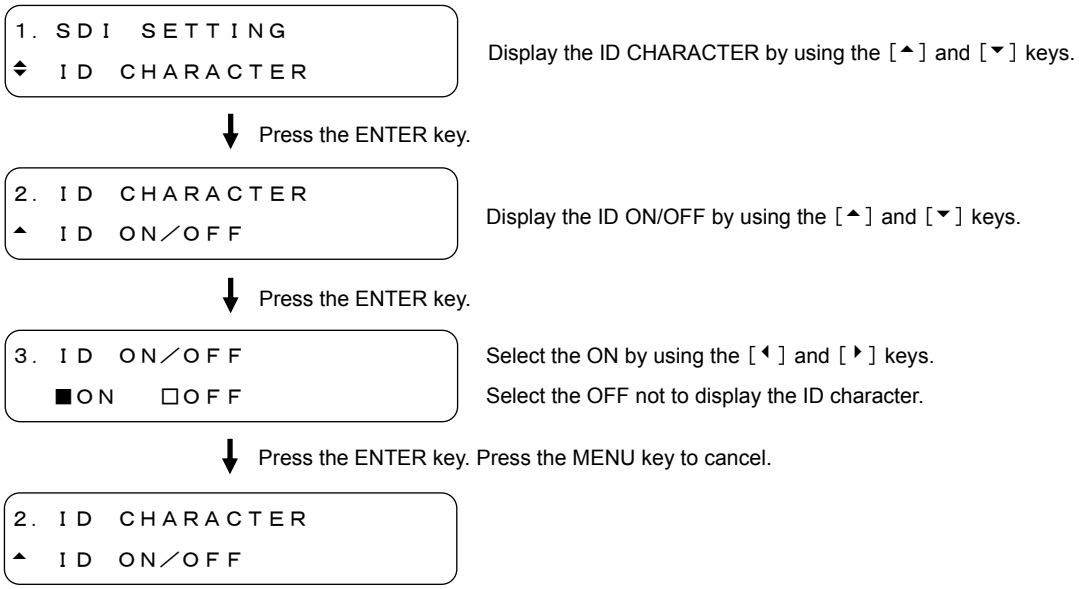
9.6.7 Displaying ID Character

The ID ON/OFF is used to determine whether the ID character displays.

● Description of Setting Items

ON:	Displays the ID character
OFF:	Does not display the ID character (initial setting)

● Displaying Procedure of ID Character



9.7 Setting Logomark

The LOGO is used to set the logomark.
The logomark up to 320 (dot) x 240 (line) in QVGA(*1) size can be superimposed to the SDI signal(*2). The logomark is converted from the 24-bit full color bit map to four-grade monochrome data. No logomark is superimposed when the CHECK FIELD pattern is selected. When converting the data into four-grade monochrome data, procure the application software.

To display the logomark, transfer the data form the memory card to the main frame. Create the "logo" folder on the memory card, then enter the file with arbitrary name (*. 1g) underneath. Refer to Figure 9-1.

The logomark created with the LEADER LT 443D can also be used for the LT 4000.

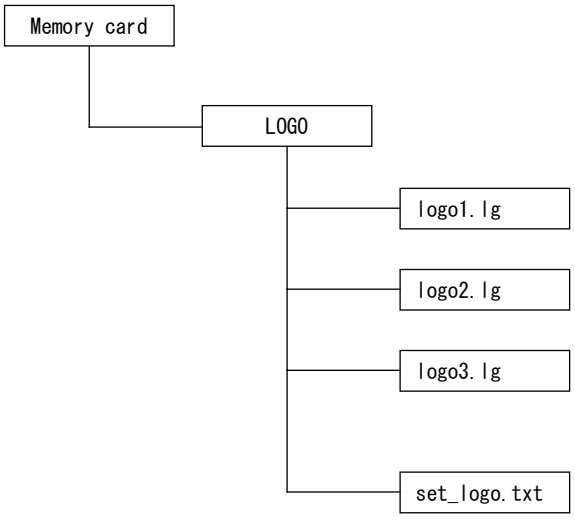


Figure 9-1 Structure of logomark file.

*1 Up to 1920 dots x 1080 lines can be displayed when the Option (LT 4400-70) is installed

*2 Logomark cannot be superimposed when the CHECK FIELD pattern is selected.

9.7.1 Logomark Position

The LOGO POSITION is used to set the logomark position on the screen.
The settable range depends on the format.

● Settable Range

H (horizontal)	The initial setting is 0 dot displayed at the left end of the screen.
1080i, 1080p, 1080PsF:	0 dot to 1919 dots, in 1 dot steps
720p:	0 dot to 1279 dots, in 1 dot steps
525i, 625i:	0 dot to 719 dots, in 1 dot steps
V (vertical)	The initial setting is 0 dot displayed at the top of the screen.
1080i, 1080p, 1080PsF:	0 dot to 1079 dots, in 1 dot steps
720p:	0 dot to 719 dots, in 1 dot steps
525i:	0 dot to 486 dots, in 1 dot steps
625i:	0 dot to 575 dots, in 1 dot steps

● Position Setting Procedure

```
1. SDI SETTING
▲▼ LOGO
```

Display the LOGO by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. LOGO
▼ LOGO POSITION
```

Display the LOGO POSITION by using the [▲] and [▼] keys.

↓ Press the ENTER key.

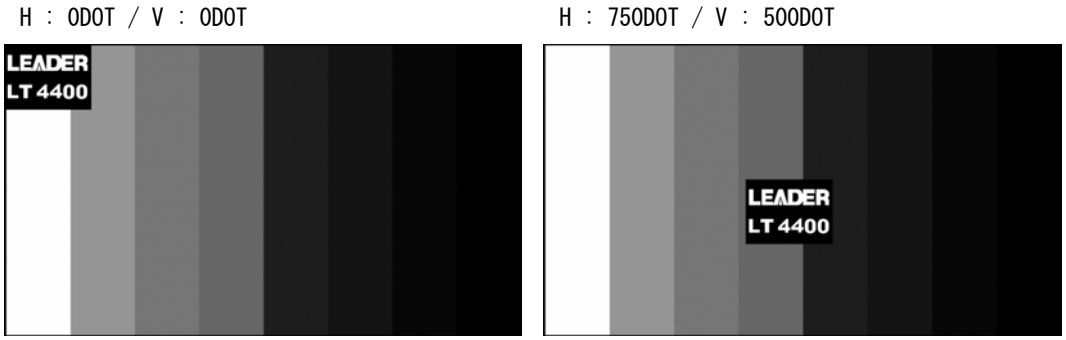
```
3. LOGO POSITION
■H:   10DOT□V:   10DOT
```

Move the cursor to the desired item by using the [◀] and [▶] keys, then set the position by using the [▲] and [▼] keys.

↓ Press the ENTER key. Press the MENU key to cancel.

```
2. LOGO
▼ LOGO POSITION
```

● Example of screen display



9.7.2 Logomark Brightness

The LOGO LEVEL is used to set the brightness of logomark.
The logomark can be displayed in four-grade monochrome data (LEVEL 3, LEVEL 2, LEVEL 1, LEVEL 0 - in high to low). The brightness can be set for each grade.
This section only describes the setting procedure of LEVEL 3, however, the same procedure can also be applied to LEVEL 2 to LEVEL 0.

● Settable Range

LEVEL 3: 040H (0%) to 3ACH (100%), 877 grades
The initial setting is 3ACH (100%).
LEVEL 2: 040H (0%) to 3ACH (100%), 877 grades
The initial setting is 288H (66%).
LEVEL 1: 040H (0%) to 3ACH (100%), 877 grades
The initial setting is 164H (33%).
LEVEL 0: 040H (0%) to 3ACH (100%), 877 grades
The initial setting is 040H (0%).

● Brightness Setting Procedure

```
1. SDI SETTING
▲▼ LOGO
```

Display the LOGO by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. LOGO
▲▼ LOGO LEVEL
```

Display the LOGO LEVEL by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. LOGO LEVEL
▼ LEVEL 3 3ACH (100%)
```

Select the grade to be set by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
4. LOGO LEVEL
  LEVEL 3  ▲▼3ABH (99%
```

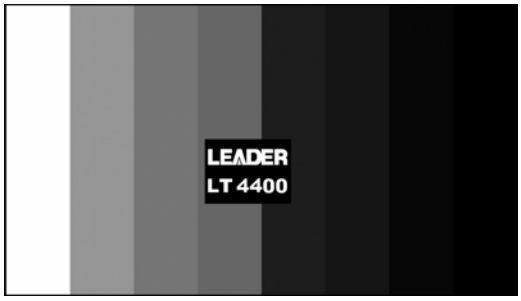
Set the brightness by using the [▲] and [▼] keys.

↓ Press the ENTER key. Press the MENU key to cancel.

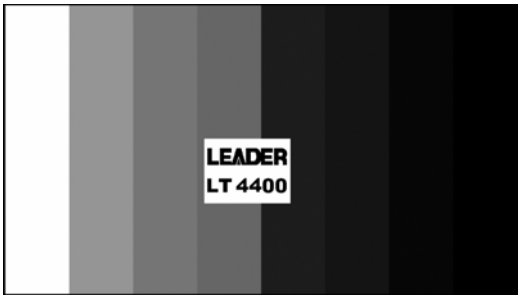
```
3. LOGO LEVEL
▼ LEVEL 3 3ABH (99%)
```

● Example of screen display

LEVEL 3 3ACH(100%) / LEVEL 0 040H(0%)



LEVEL 3 040H(0%) / LEVEL 0 3ACH(100%)



9.7.3 Penetrating Logomark

The LOGO BACKGROUND is used to select whether to display the LEVEL-0 logomark set in Section 9.7.2, "Logomark Brightness".
If this function set to ON, the background of the portion of the LEVEL 0 penetrates and can be seen.

● Settable Range

ON: Does not display the LEVEL 0. Therefore, the background can be seen.
OFF: Displays the LEVEL 0. Therefore, the background can not be seen. (initial setting)

● Setting Procedure of Penetrating Logomark

```
1. SDI SETTING
◆ LOGO
```

Display the LOGO by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
2. LOGO
◆ LOGO BACKGROUND
```

Display the LOGO BACKGROUND by using the [▲] and [▼] keys.

↓ Press the ENTER key.

```
3. LOGO BACKGROUND
  ■ON  □OFF
```

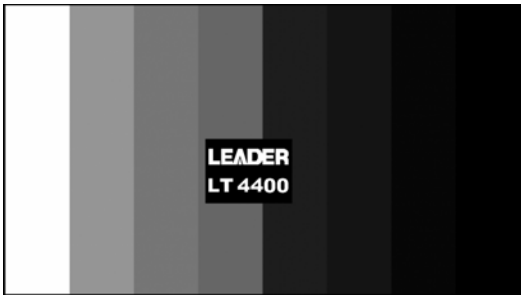
Select the ON by using the [◀] and [▶] keys.
Select the OFF to display the LEVEL 0.

↓ Press the ENTER key. Press the MENU key to cancel.

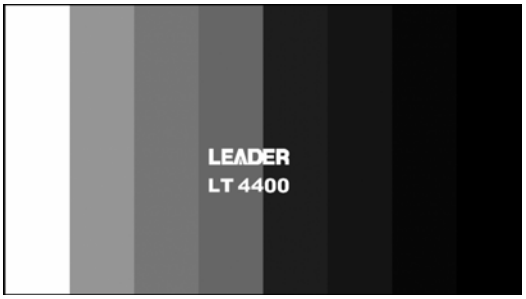
```
2. LOGO
◆ LOGO BACKGROUND
```

● Example of screen display

BACKGROUND OFF



BACKGROUND ON



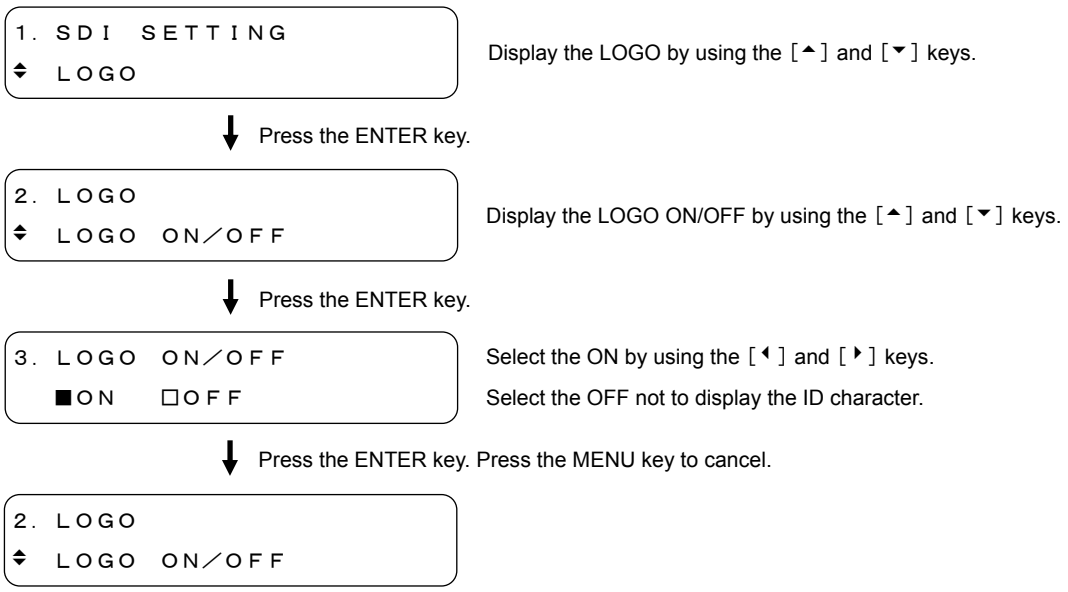
9.7.4 Displaying Logomark

The LOGO ON/OFF is used to select whether to display the logomark.

● Description of Setting Items

ON: Displays the logomark.
OFF: Does not display the logomark. (initial setting)

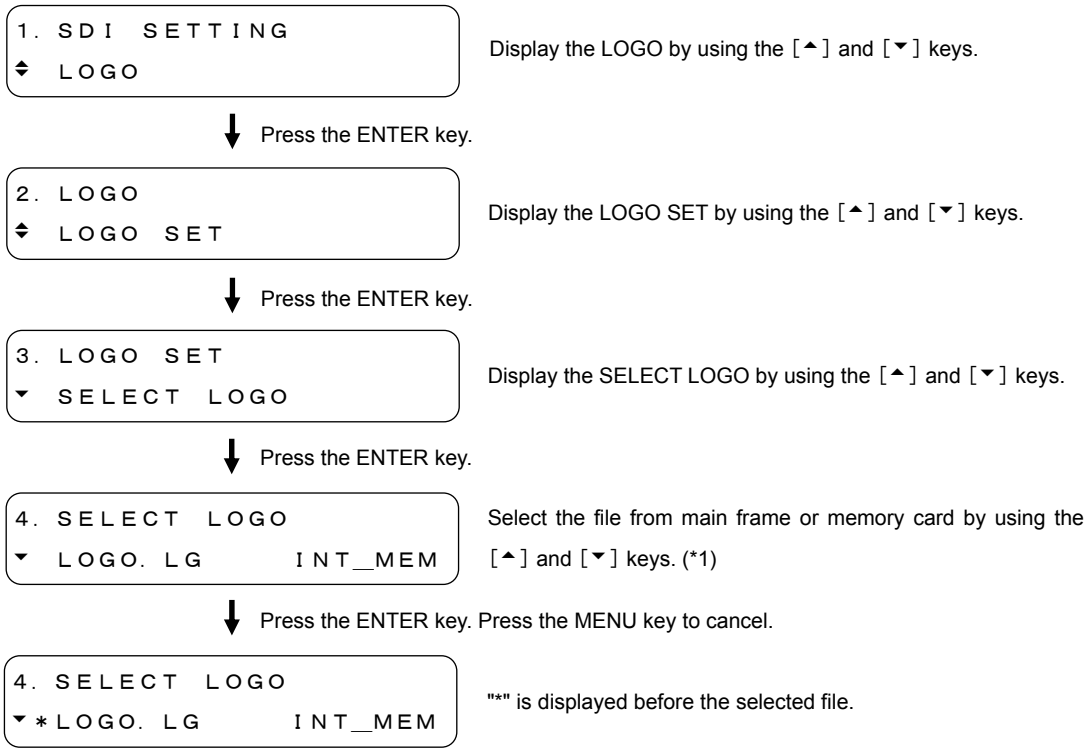
● Displaying Procedure of Logomark



9.7.5 Selecting Logomark

The SELECT LOGO is used to select the logomark to be transferred from the memory card to the main frame set in Section 9.7.6, "Transferring Logomark".
The logomark can be selected form the main frame or memory card.
To save the logomark, refer to Section 9.7.8, "Saving Logomark".

● Logomark Selecting Procedure

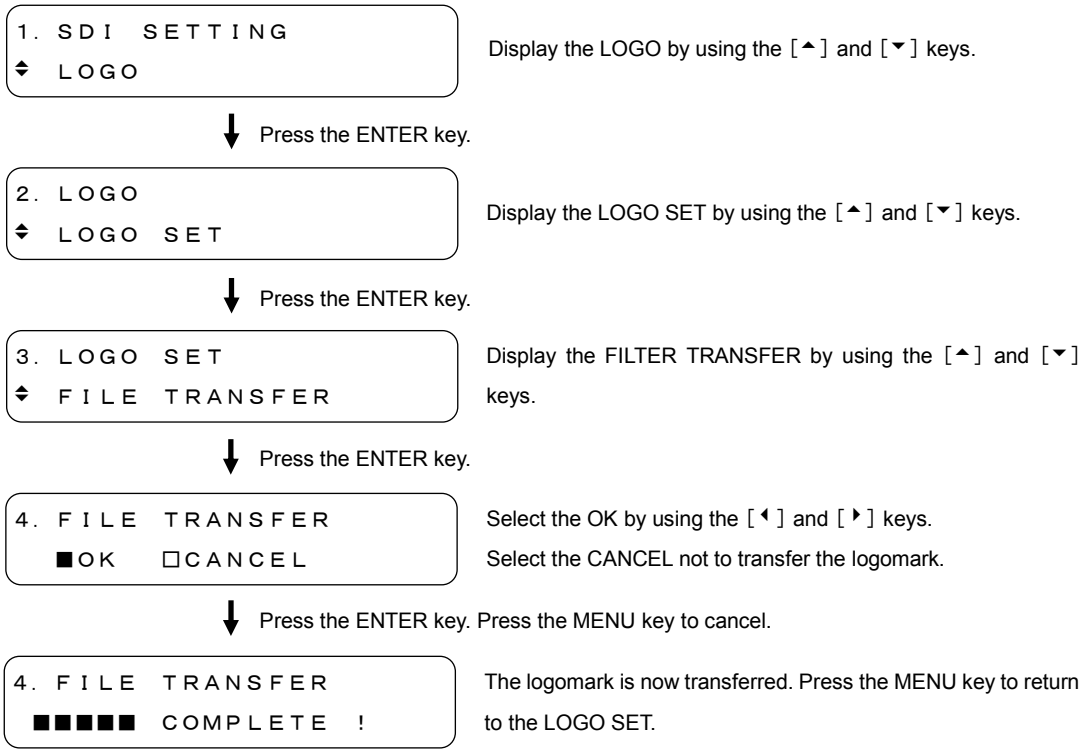


*1 The screen below is displayed when no logomark is saved in the main frame.

9.7.6 Transferring Logomark

The FILE TRANSFER is used to transfer the logomark selected in Section 9.7.5, "Selecting Logomark" to the main frame. To display the selected logomark, select ON in Section 9.7.4, "Displaying Logomark". The transferred logomark is retained while the instrument is powered on; turning power off deletes the logomark.

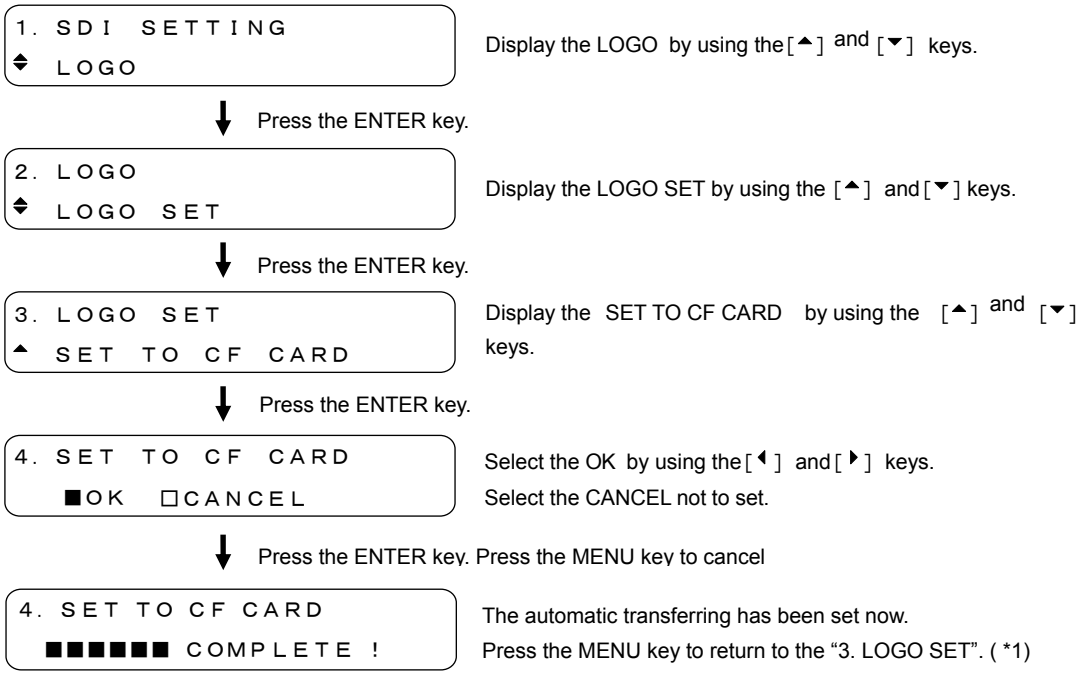
● Logomark Transferring Procedure



9.7.7 Automatic Transferring Logomark

The SET TO CF CARD is used to set the automatic logomark transfer mode when power is turned on. The logomark selected in Section 9.7.5, "Selecting Logomark" is automatically transferred. The setting condition is saved on the memory card named "set_logo.txt". (See Figure 9-1.) If "set_logo.txt" already exists on the memory card, it will be overwritten.

● Automatic Transferring Procedure of Logomark



*1 In case the transfer setting is already saved, it is displayed as shown in Figure below.

9.7.8 Saving Logomark

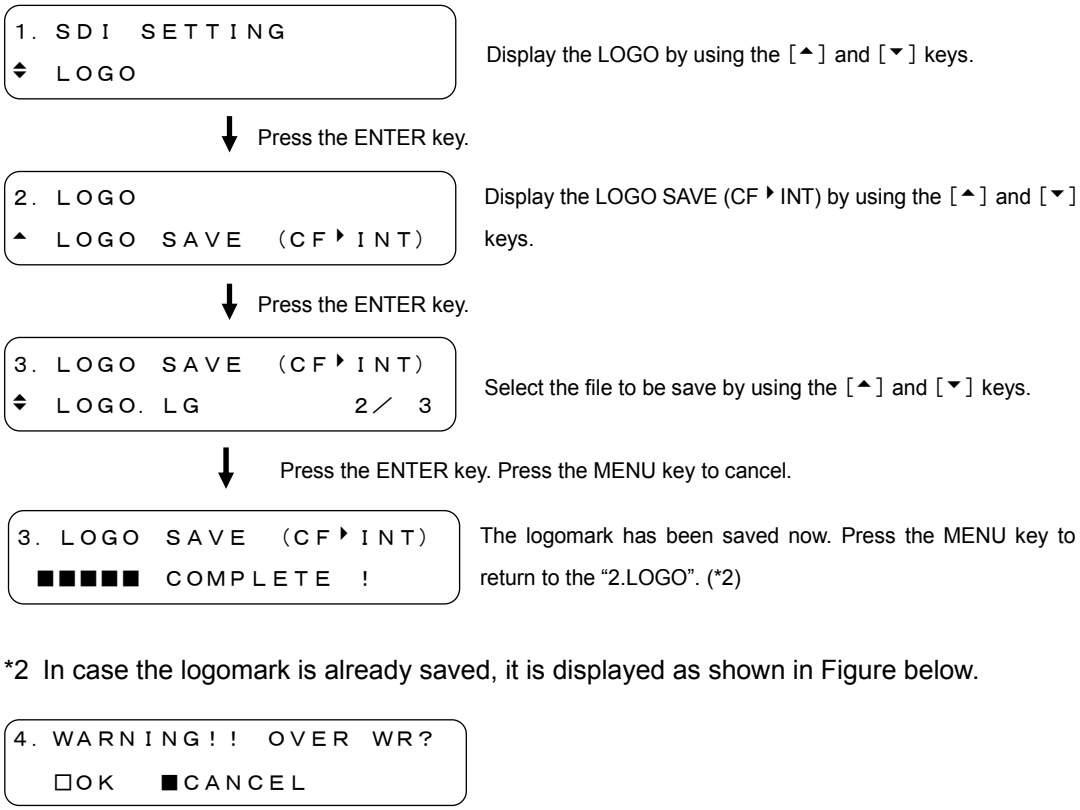
The "LOGO SAVE (CF ▸ INT)" is used to save the logomark transferred from the memory card to the main frame.
The saved logomark is retained even when the power is turned off.

● Savable Contents

Number of Savable Items:	1 Overwritten with new data
Capacity:	512 k bytes, max (Version 1.30 and later)
Size:	1920 dots x 1080 lines (Version 1.30 and later)(*1)

※1 Displayable size is up to 320 dots x 240 lines (QVGA). However, up to 1920 dots x 1080 lines can be displayed when Option (LT4400-70) is installed.

● Logomark Saving Procedure



*2 In case the logomark is already saved, it is displayed as shown in Figure below.

9.8 Setting Pattern Scroll

The PATTERN SCROLL is used to set the pattern scroll mode.
The pattern scroll mode is disabled when the CHECK FIELD pattern is selected.

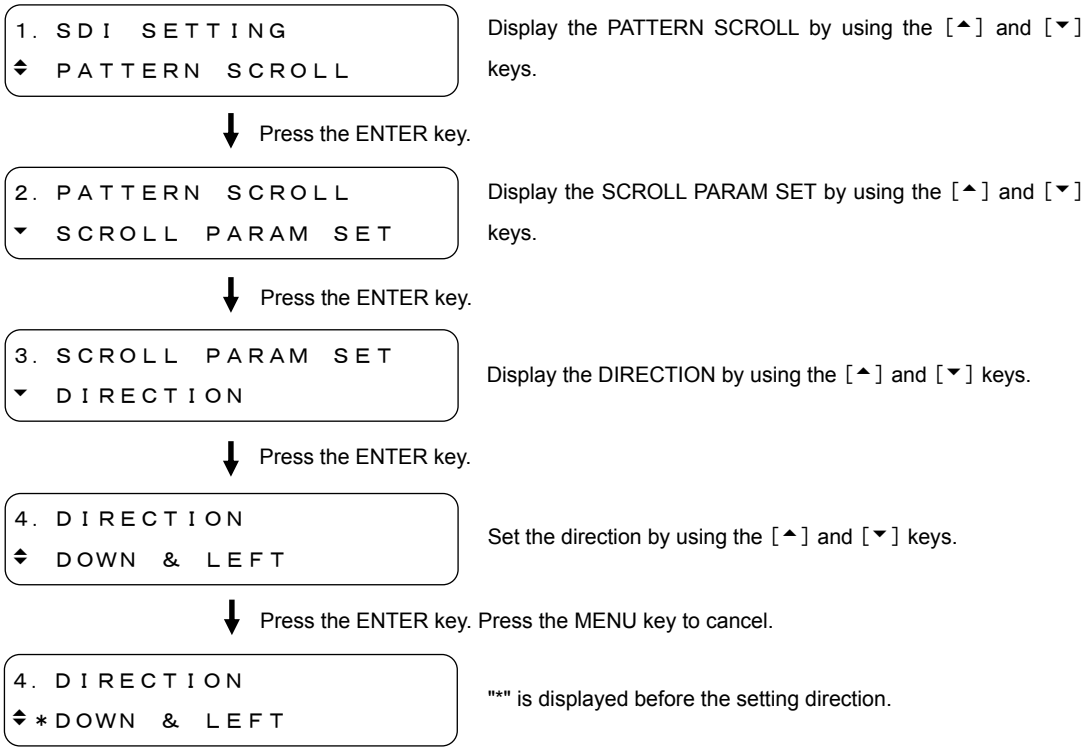
9.8.1 Pattern Scroll Direction

The DIRECTION is used to set the pattern scroll direction.

● Description of Setting Items

UP & RIGHT:	The pattern is scrolled up and right. (initial setting)
UP:	The pattern is scrolled up.
UP & LEFT:	The pattern is scrolled up and left.
LEFT	The pattern is scrolled left.
DOWN & LEFT:	The pattern is scrolled down and left.
DOWN:	The pattern is scrolled down.
DOWN & RIGHT:	The pattern is scrolled down and right.
RIGHT:	The pattern is scrolled right.

● Direction Setting Procedure



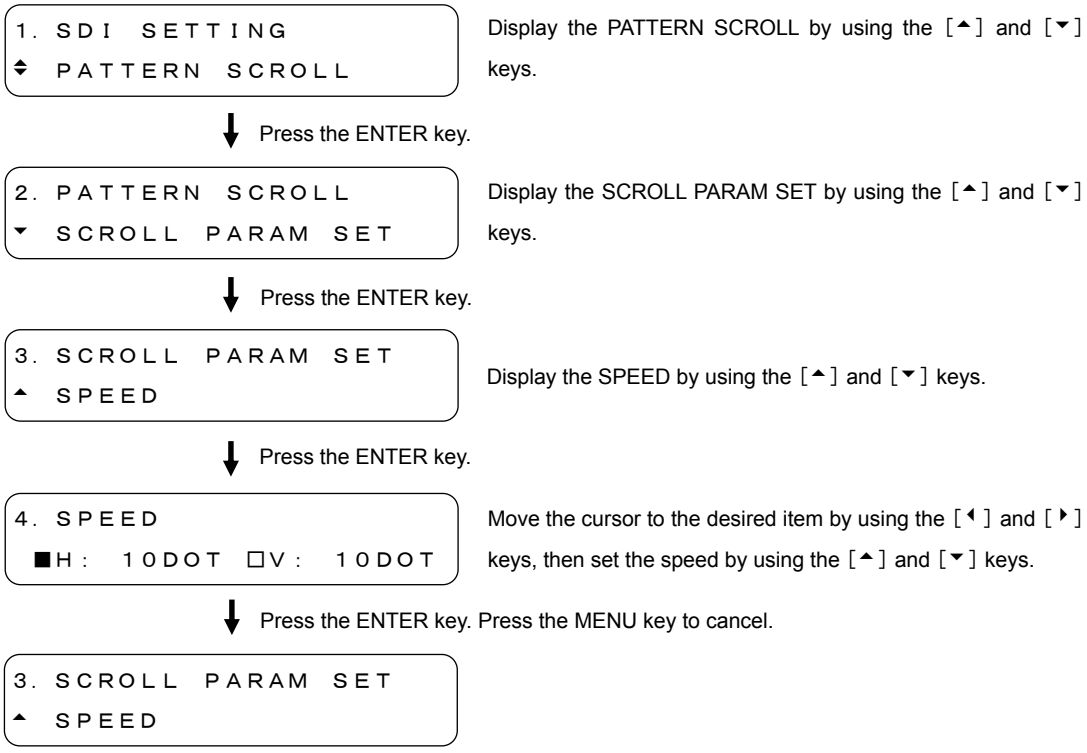
9.8.2 Pattern Scroll Speed

The SPEED is used to set the pattern scroll speed.

● Settable Range

H (horizontal): 0 to 254 dots in 2 dots steps The initial setting is 0 dot.
V (vertical): 0 to 255 dots in 1 dot steps The initial setting is 0 dot.

● Speed Setting Procedure



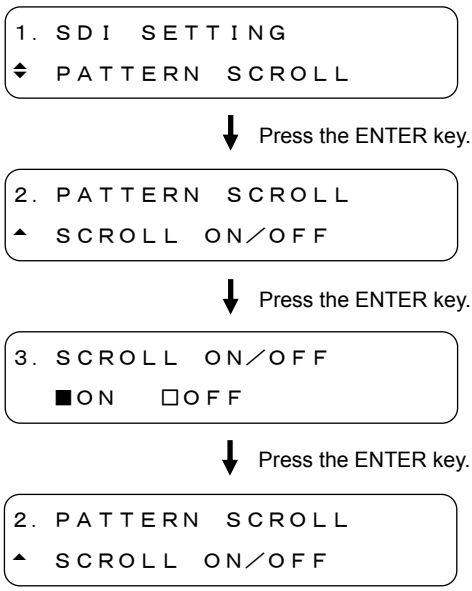
9.8.3 Pattern Scroll Mode ON/OFF

The SCROLL ON/OFF is used to determine whether the pattern scrolls or not.

● Description of Setting Items

ON: The pattern scroll mode is enabled.
OFF: The pattern scroll mode is disabled. (initial setting)

● Setting Procedure of Pattern Scroll



9.9 Setting of Automatic Pattern Changing

The PATTERN CHANGE is used to set the automatic pattern change mode. When ON is selected in Section 9.9.2, "Automatic Pattern Changing ON/OFF", patterns listed in Table 4-2 is automatically changed from the left.

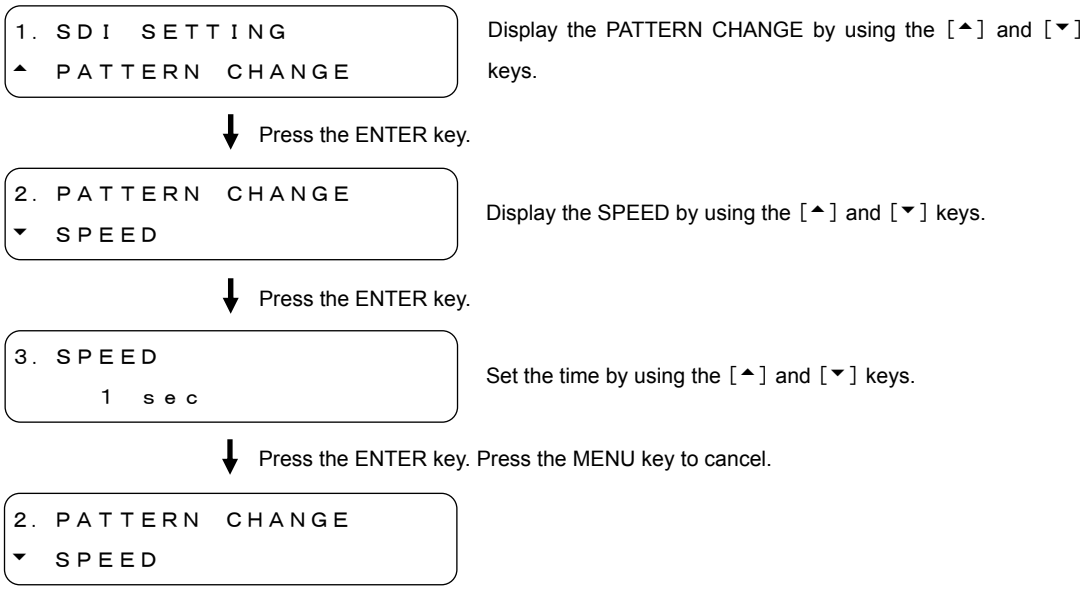
9.9.1 Setting of Changing Time

The SPEED is used to set the pattern change speed in seconds.

● Settable Range

1 to 255 seconds, in 1 second steps. The initial setting is 1 second.

● Setting Procedure of Changing Time



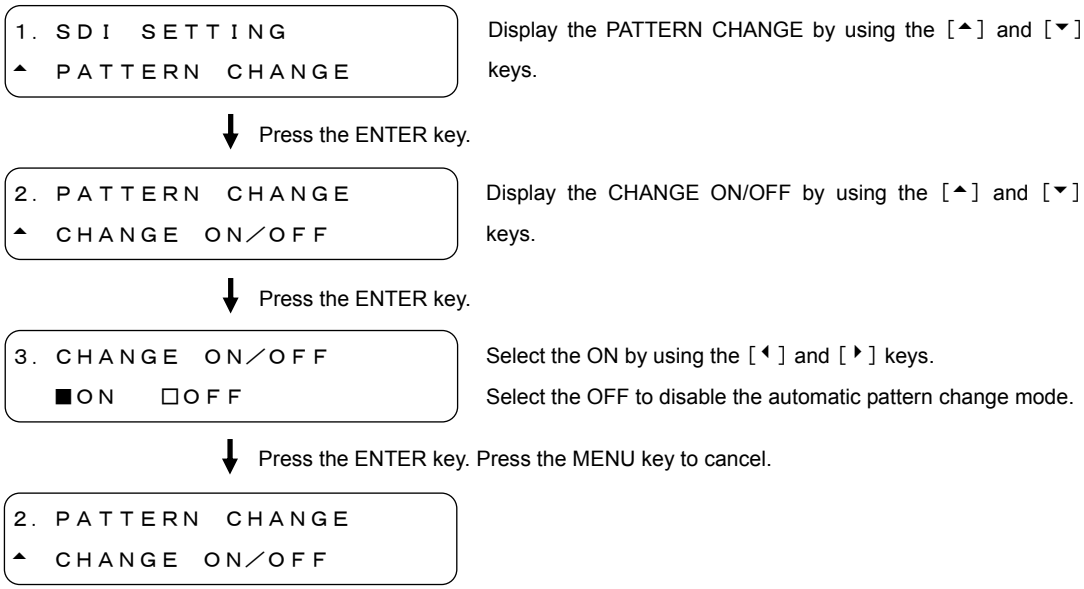
9.9.2 Automatic Pattern Changing ON/OFF

The CHANGE ON/OFF is used to determine whether to change the patterns automatically.

● Description of Setting Items

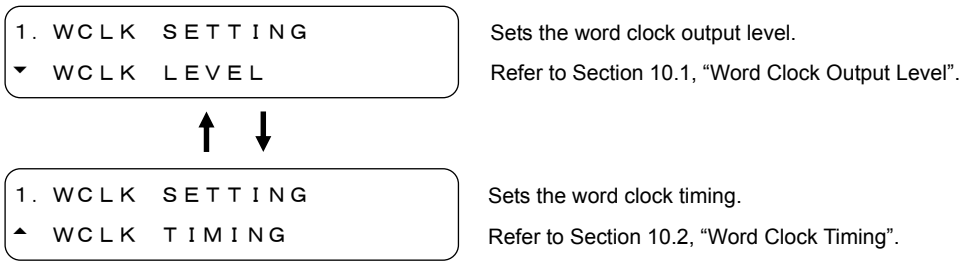
ON: Automatically changes the patterns.
OFF: Does not change automatically the patterns. (initial setting)

● Setting Procedure of Automatic Pattern Changing



10 WORD CLOCK SETTINGS (WCLK SETTING)

The WCLK SETTING is used to set the 48-kHz word clock output. To display the WCLK SETTING, press the MENU key repeatedly until WCLK SETTING is displayed.
After the WCLK SETTING is displayed, select the item to be set by using the [▲] and [▼] keys.



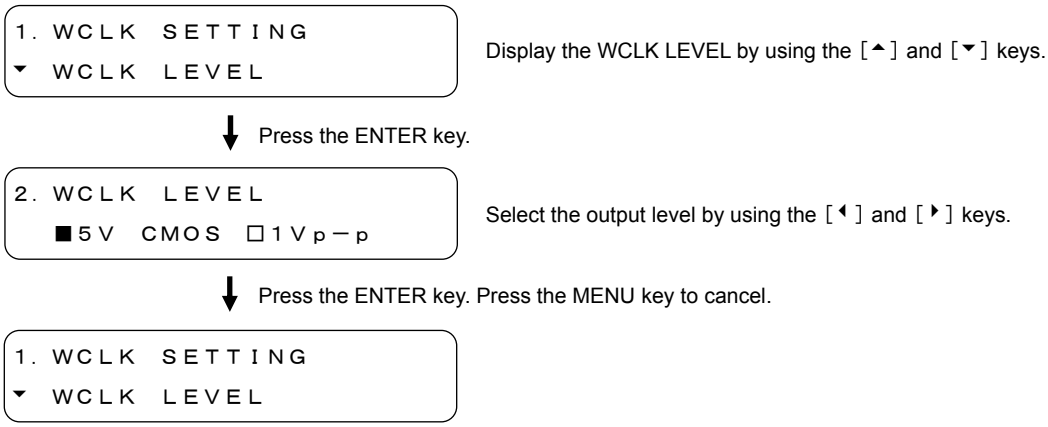
10.1 Word Clock Output Level

The WCLK LEVEL is used to set the word clock output level.

● Description of Setting Items

5V CMOS: The output level is 5 V. (initial setting)
1Vp-p: The output level is 1 V.

● Setting Procedure of Output Level



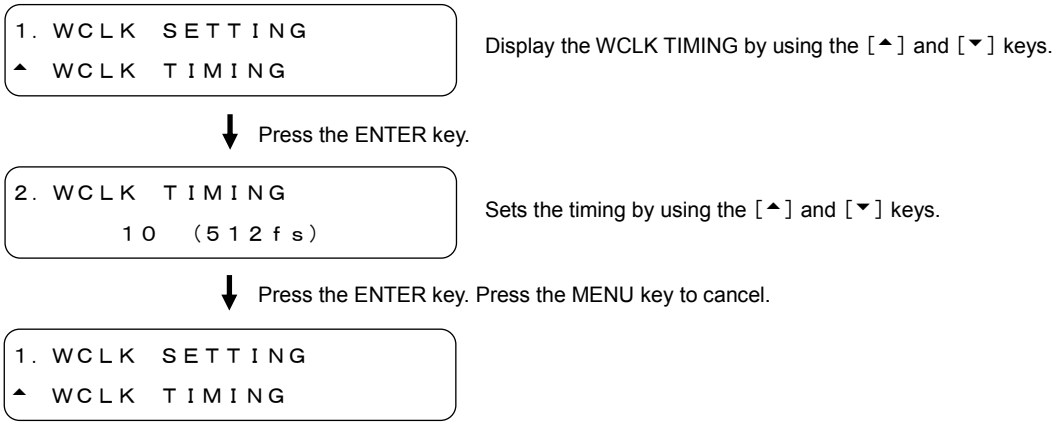
10.2 Word Clock Timing

The WCLK TIMING is used to set the word clock timing.

● Settable Range

±511 (±1 AES/EBU frame), in 1 steps. The initial setting is 0.

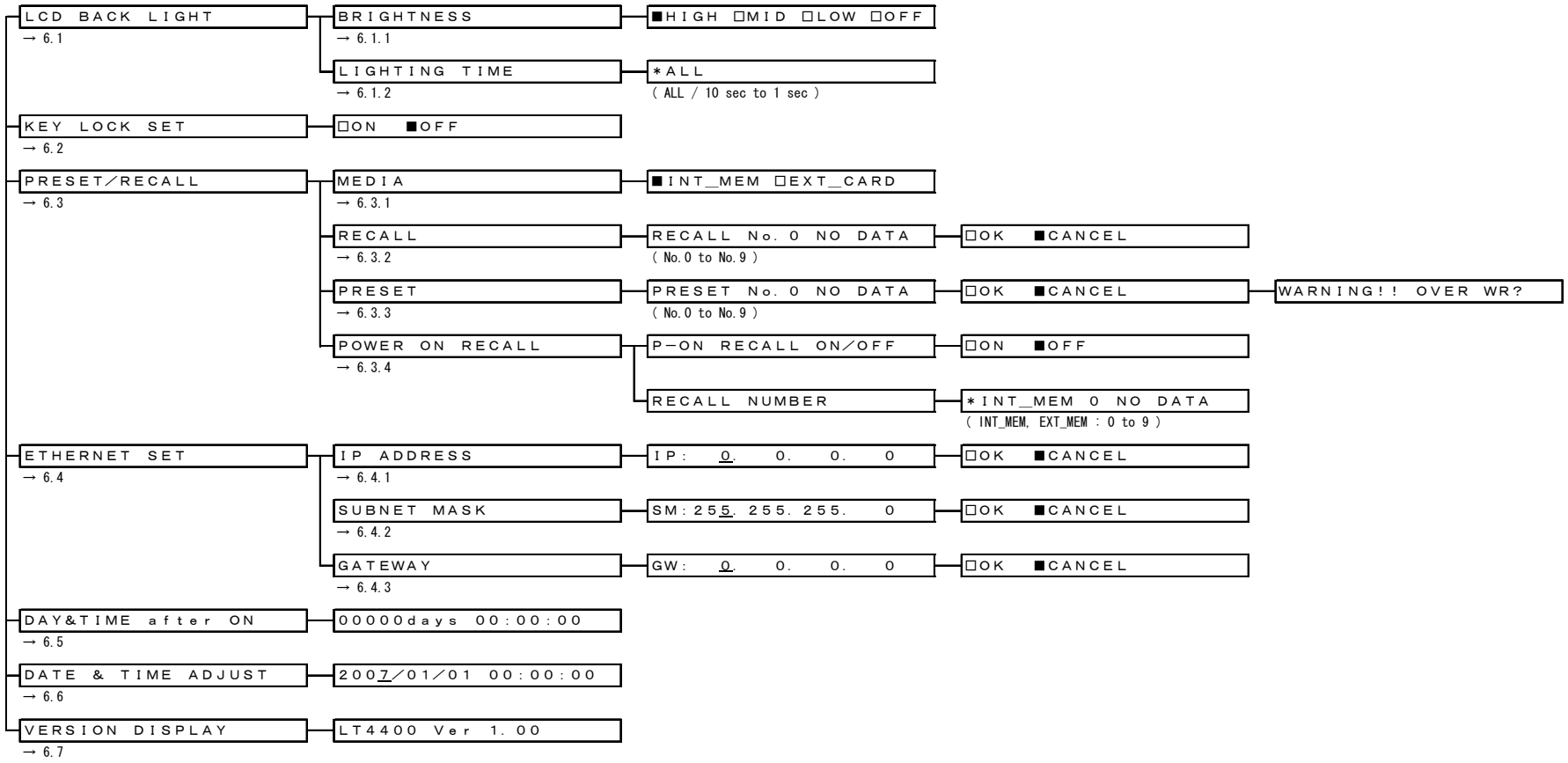
● Timing Setting Procedure



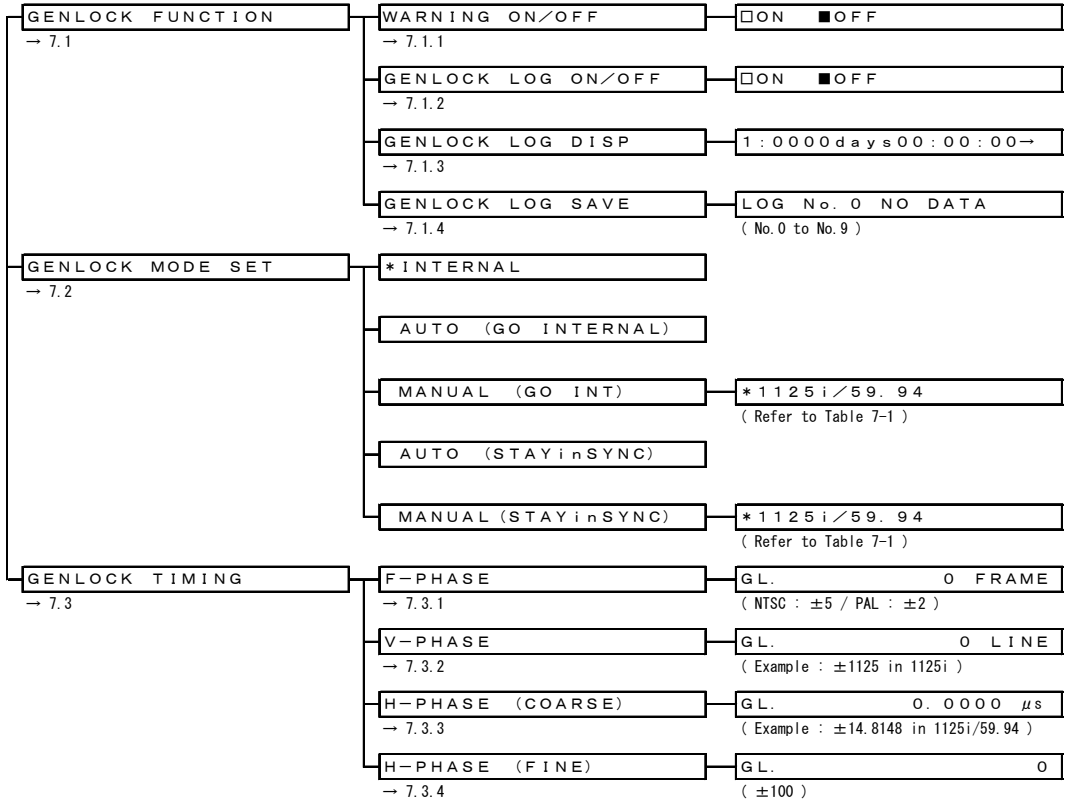
11 MENU TREE

The screen shows the initial settings.

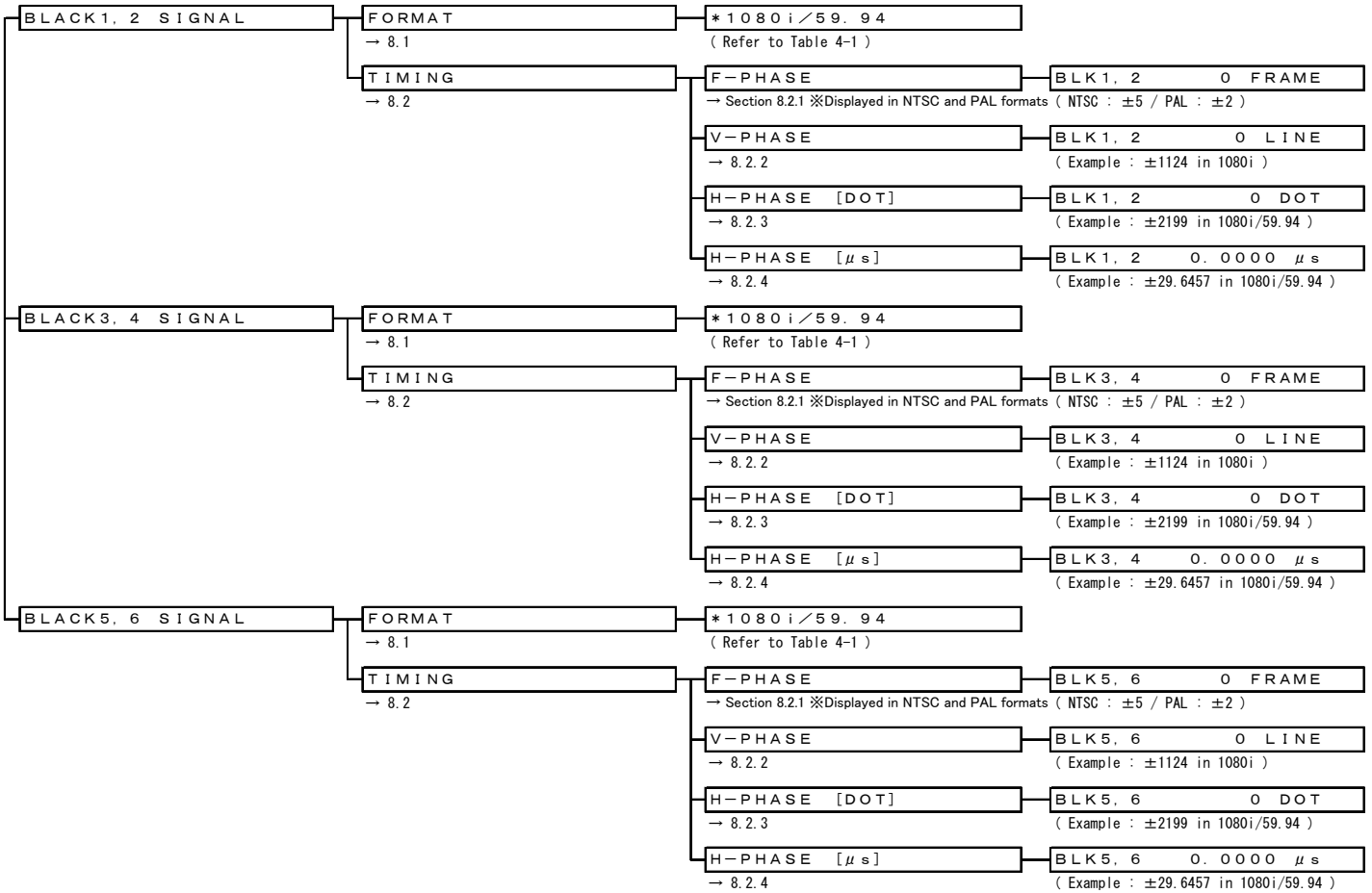
11.1 Utility Menu



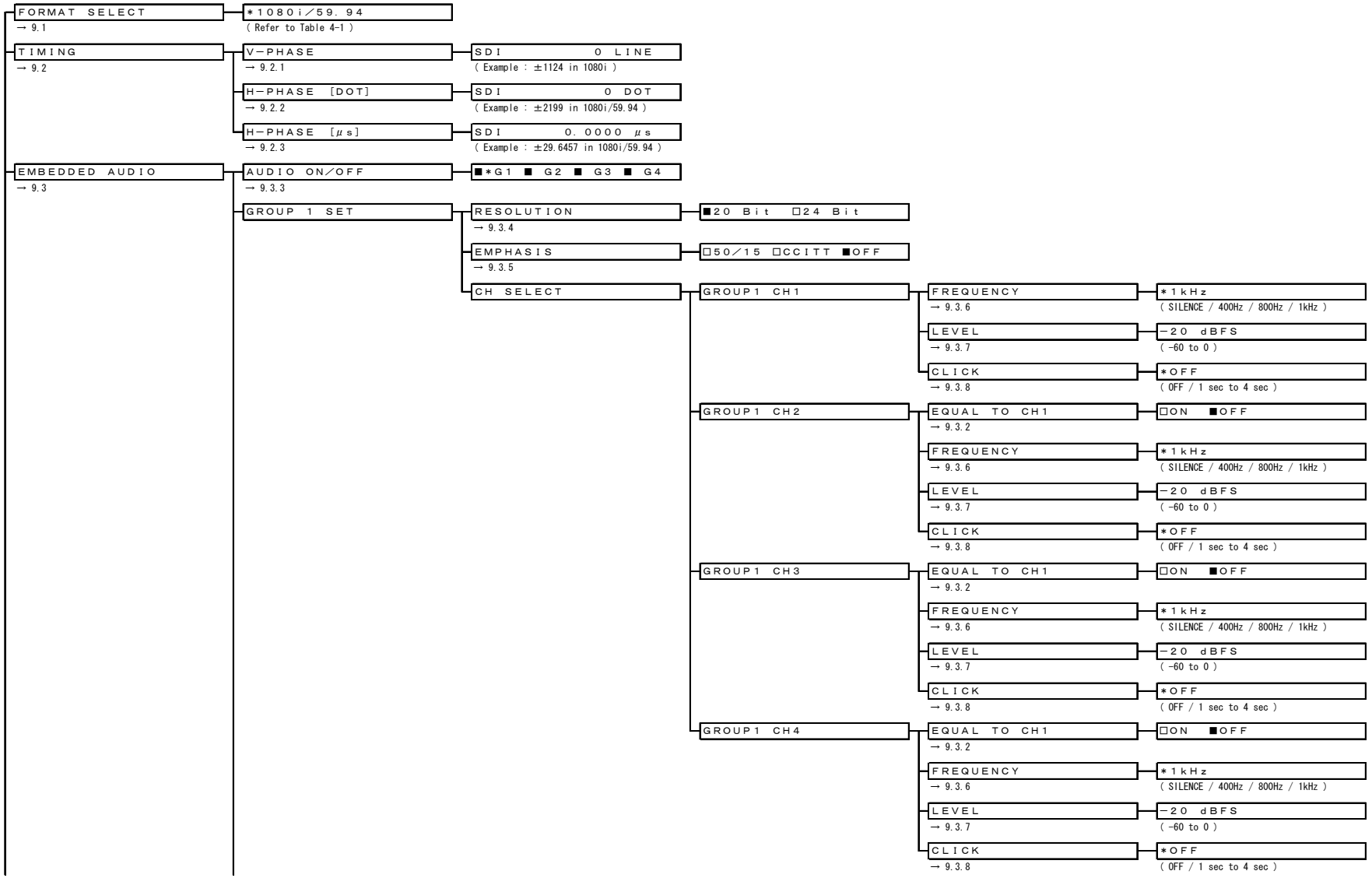
11.2 GL Setting

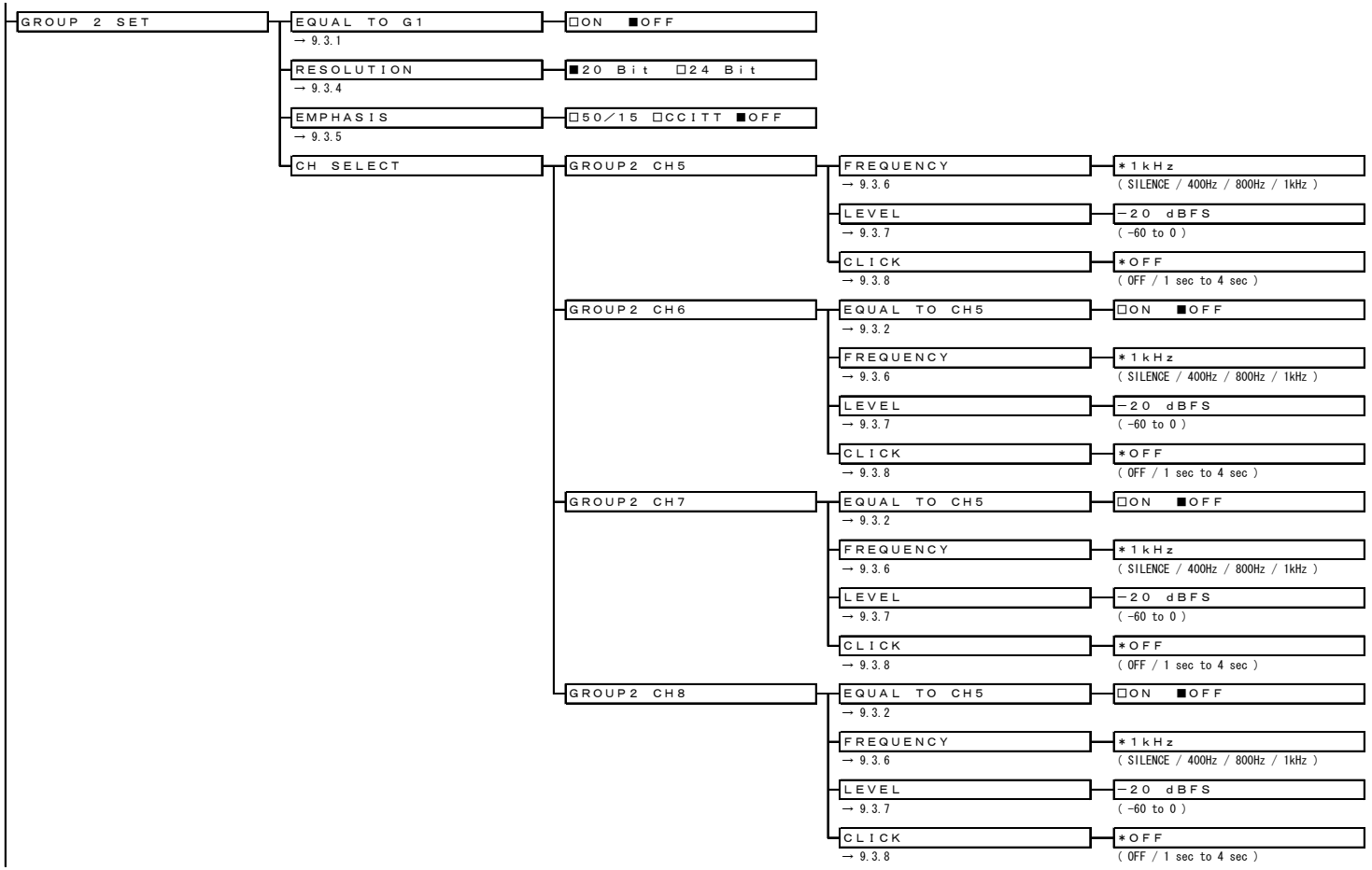


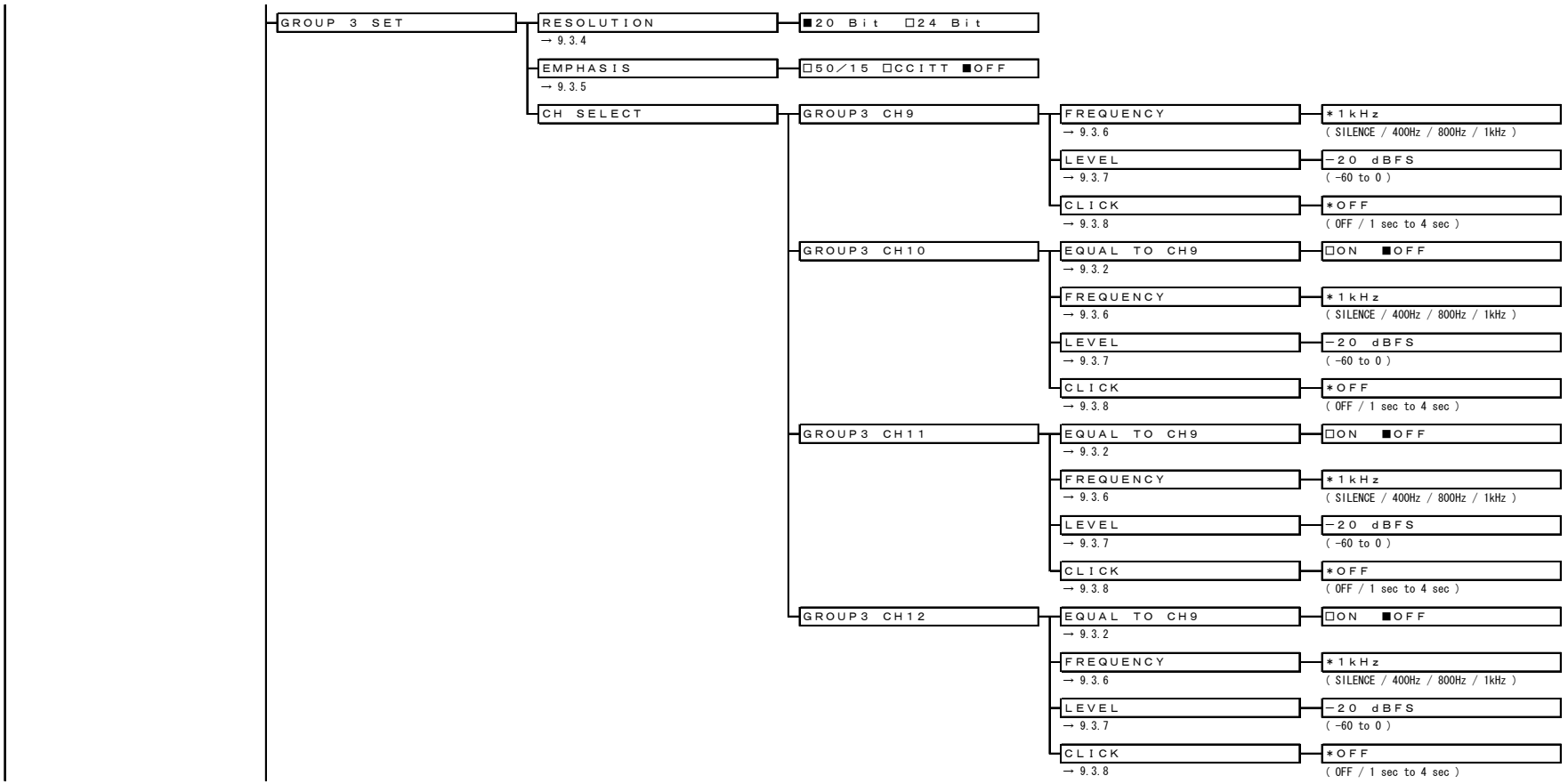
11.3 BLK Setting

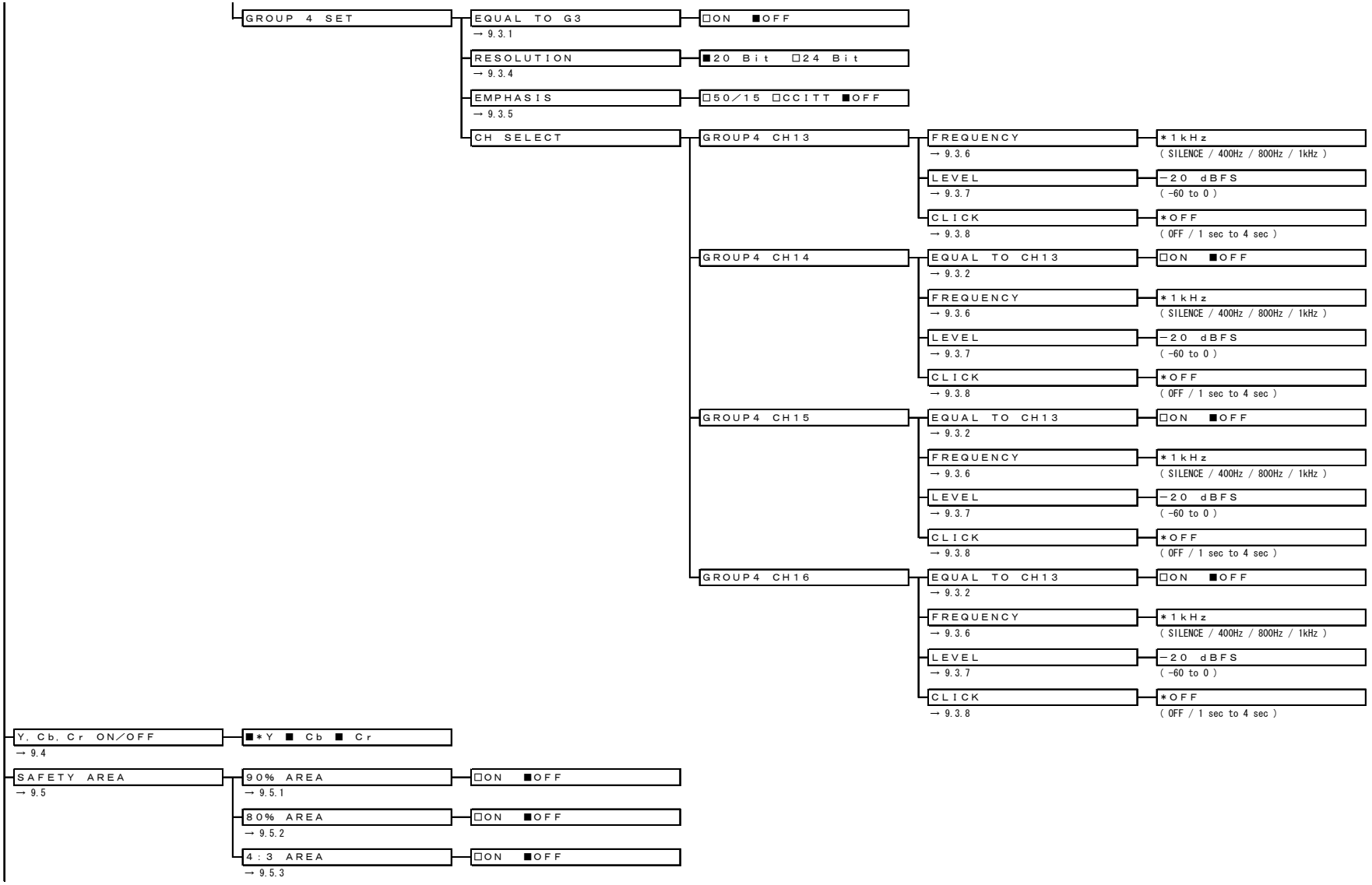


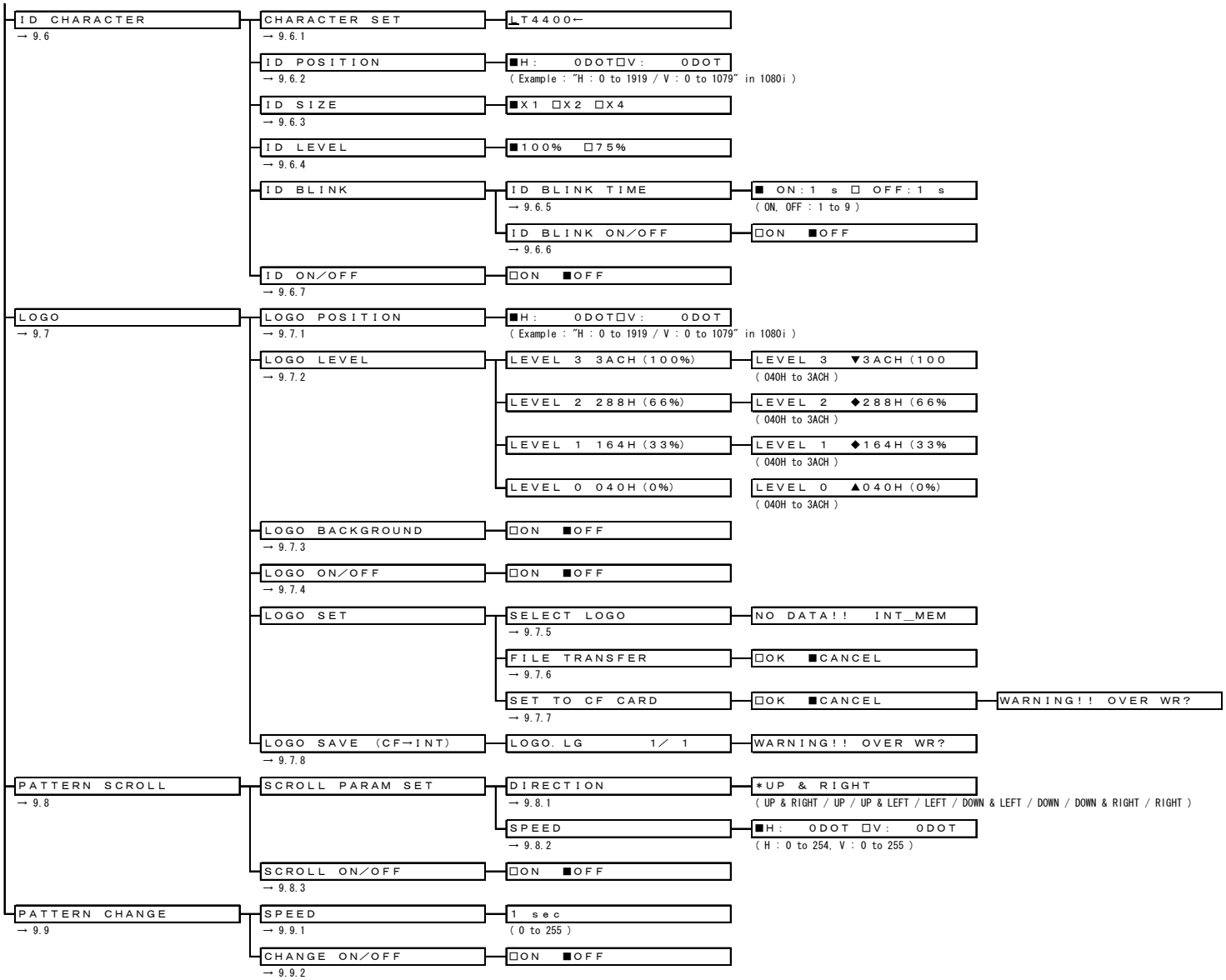
11.4 SDI Setting



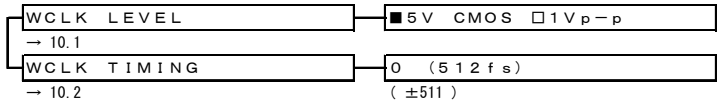

GROUP 2 SET
EQUAL TO G1
→ 9.3.1
□ON ■OFF
RESOLUTION
→ 9.3.4
■20 Bit □24 Bit
EMPHASIS
→ 9.3.5
□50／15 □CCITT ■OFF
CH SELECT
GROUP2 CH5
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP2 CH6
EQUAL TO CH5
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP2 CH7
EQUAL TO CH5
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP2 CH8
EQUAL TO CH5
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)


GROUP 3 SET
RESOLUTION
→ 9.3.4
■20 Bit □24 Bit
EMPHASIS
→ 9.3.5
□50／15 □CCITT ■OFF
CH SELECT
GROUP3 CH9
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP3 CH10
EQUAL TO CH9
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP3 CH11
EQUAL TO CH9
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)
GROUP3 CH12
EQUAL TO CH9
→ 9.3.2
□ON ■OFF
FREQUENCY
→ 9.3.6
＊1kHz
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
→ 9.3.7
－20 dBFS
(-60 to 0)
CLICK
→ 9.3.8
＊OFF
(OFF / 1 sec to 4 sec)


GROUP 4 SET
EQUAL TO G3
□ON ■OFF
→ 9.3.1
RESOLUTION
■20 Bit □24 Bit
→ 9.3.4
EMPHASIS
□50／15 □CCITT ■OFF
→ 9.3.5
CH SELECT
GROUP4 CH13
FREQUENCY
＊1kHz
→ 9.3.6
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
－20 dBFS
→ 9.3.7
(-60 to 0)
CLICK
＊OFF
→ 9.3.8
(OFF / 1 sec to 4 sec)
GROUP4 CH14
EQUAL TO CH13
□ON ■OFF
→ 9.3.2
FREQUENCY
＊1kHz
→ 9.3.6
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
－20 dBFS
→ 9.3.7
(-60 to 0)
CLICK
＊OFF
→ 9.3.8
(OFF / 1 sec to 4 sec)
GROUP4 CH15
EQUAL TO CH13
□ON ■OFF
→ 9.3.2
FREQUENCY
＊1kHz
→ 9.3.6
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
－20 dBFS
→ 9.3.7
(-60 to 0)
CLICK
＊OFF
→ 9.3.8
(OFF / 1 sec to 4 sec)
GROUP4 CH16
EQUAL TO CH13
□ON ■OFF
→ 9.3.2
FREQUENCY
＊1kHz
→ 9.3.6
(SILENCE / 400Hz / 800Hz / 1kHz)
LEVEL
－20 dBFS
→ 9.3.7
(-60 to 0)
CLICK
＊OFF
→ 9.3.8
(OFF / 1 sec to 4 sec)
Y, Cb, Cr ON／OFF
■＊Y ■ Cb ■ Cr
→ 9.4
SAFETY AREA
→ 9.5
90% AREA
□ON ■OFF
→ 9.5.1
80% AREA
□ON ■OFF
→ 9.5.2
4：3 AREA
□ON ■OFF
→ 9.5.3


ID CHARACTER
→ 9.6
CHARACTER SET
→ 9.6.1
_T4400←
ID POSITION
→ 9.6.2
■H: 0DOT□V: 0DOT
(Example : "H : 0 to 1919 / V : 0 to 1079" in 1080i)
ID SIZE
→ 9.6.3
■X1 □X2 □X4
ID LEVEL
→ 9.6.4
■100% □75%
ID BLINK
ID BLINK TIME
→ 9.6.5
■ ON:1 s □ OFF:1 s
(ON, OFF : 1 to 9)
ID BLINK ON/OFF
→ 9.6.6
□ON ■OFF
ID ON/OFF
→ 9.6.7
□ON ■OFF
LOGO
→ 9.7
LOGO POSITION
→ 9.7.1
■H: 0DOT□V: 0DOT
(Example : "H : 0 to 1919 / V : 0 to 1079" in 1080i)
LOGO LEVEL
→ 9.7.2
LEVEL 3 3ACH(100%)
LEVEL 3 ▼3ACH(100
(040H to 3ACH)
LEVEL 2 288H(66%)
LEVEL 2 ◆288H(66%
(040H to 3ACH)
LEVEL 1 164H(33%)
LEVEL 1 ◆164H(33%
(040H to 3ACH)
LEVEL 0 040H(0%)
LEVEL 0 ▲040H(0%)
(040H to 3ACH)
LOGO BACKGROUND
→ 9.7.3
□ON ■OFF
LOGO ON/OFF
→ 9.7.4
□ON ■OFF
LOGO SET
SELECT LOGO
→ 9.7.5
NO DATA!! INT_MEM
FILE TRANSFER
→ 9.7.6
□OK ■CANCEL
SET TO CF CARD
→ 9.7.7
□OK ■CANCEL
WARNING!! OVER WR?
LOGO SAVE (CF→INT)
→ 9.7.8
LOGO. LG 1/ 1
WARNING!! OVER WR?
PATTERN SCROLL
→ 9.8
SCROLL PARAM SET
DIRECTION
→ 9.8.1
*UP & RIGHT
(UP & RIGHT / UP / UP & LEFT / LEFT / DOWN & LEFT / DOWN / DOWN & RIGHT / RIGHT)
SPEED
→ 9.8.2
■H: 0DOT □V: 0DOT
(H : 0 to 254, V : 0 to 255)
SCROLL ON/OFF
→ 9.8.3
□ON ■OFF
PATTERN CHANGE
→ 9.9
SPEED
→ 9.9.1
1 sec
(0 to 255)
CHANGE ON/OFF
→ 9.9.2
□ON ■OFF

11.5 WCLK Setting



12 MAINTENANCE

This instrument is produced under the strictest quality controls at the factory, but accuracy may gradually deteriorate due to worn components.
Therefore, periodic calibration should be performed.
Moreover, if troubles etc. are found in operation, the repair is needed.
When service or calibration is required, contact your local LEADER agent.