Presentation Switcher
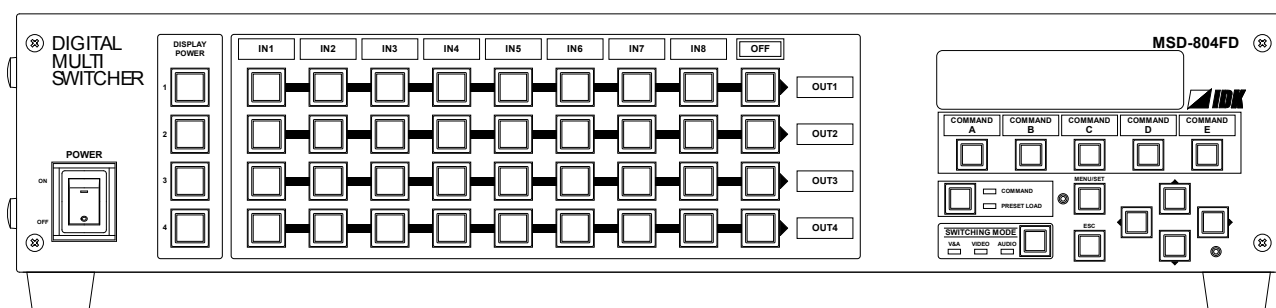
MSD-804FD

＜User's Guide＞

Ver. 1.0.0

- Thank you for choosing our presentation switcher.
- To ensure the best performance of this product, please read this Users Guide and Command Guide fully and carefully before using your switcher and keep this manual beside the product.

IDK Corporation

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Before reading this manual

- All rights reserved.
- Some of the contents in this user's guide such as appearance diagrams, menu operations, communication commands, and so on may differ from the MSD depending on the version.
- This Users guide is subject to change without notice. You can download the latest version from IDK's website at: http://www.idk.co.jp/en/index.html

The reference manual for the MSD consists of the following two volumes:

■ User's guide (this document):
  Provides explanations and procedures for operations, installation, connections among devices, I/O adjustment and settings.

■ Command guide: Please download the command guide from the website above.
  Provides explanations and procedures for external control using RS-232C and LAN communications.

FCC STATEMENT
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

CE MARKING
This equipment complies with the essential requirements of the relevant European health, safety and environmental protection legislation.

WEEE MARKING
Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC
(This directive is only valid in the EU.)
This equipment complies with the WEEE Directive (2002/96/EC) marking requirement.
The left marking indicates that you must not discard this electrical/electronic equipment in domestic household waste.

Safety instructions

Read and understand all safety and operating instructions before using this product. Follow all instructions and cautions as detailed in this document.

Enforcement Symbol	Description
⚠️ **Warning**	Indicates the presence of a hazard that may result in death or serious personal injury if the warning is ignored or the equipment is handled incorrectly.
⚠️ **Caution**	Indicates the presence of a hazard that may cause minor personal injury or property damage if the caution is ignored or the equipment is handled incorrectly.

Symbol	Description	Example
Caution	This symbol is indicated to alert the user. (Warning and caution)	**Electrical Hazard**
Prohibition	This symbol is intended to prohibit the user from actions.	**Do not disassemble**
Instruction	This symbol is intended to instruct the user.	**Unplug**

⚠️Warning

Prohibition	**Do not place the product in any unstable place.** Install the product to a horizontal and stable place. Otherwise, it may fall/turn over and lead to injury.
	Do not place the product in any environment with vibration. Otherwise, it may move/fall and lead to injury.
	Keep out any foreign objects. In order to avoid fire or electric shock, do not allow foreign objects, such as metal and paper, to enter the product from the vent holes.
	For power cable/ plug: • **Do not scratch, heat, or modify, including extending them.** • **Do not pull, put heavy stuff on them, or pinch them.** • **Do not bend, twist, or tie them together forcefully.** If they are used in those states continuously, it may cause fire or electric shock. If power cables/plugs become damaged, contact IDK.
Do not disassemble	**Do not repair, modify or disassemble.** Since the product includes high-voltage part, those actions may cause fire or electric shock. For internal inspections or repairs, contact IDK.
Do not touch	**In the event of lighting or thunder, do not touch the main unit and cables such as power cable and LAN cable.** Contact may cause electric shock
Instruction	**For installation:** The product is intended to be installed by skilled technicians. For installation, please contact a system integrator or IDK. Otherwise, it may cause fire, electric shock, injury, or property damage.
	Set the power plug in a convenient place to unplug easily. You can easily unplug in case of any extraordinary failure or abnormal situation, and it also helps for unplugging when you do not use it for a long period.
	Plug the power plug into appropriate outlet completely. If the plug is plugged incompletely, it may overheat which causes electrical shock or fire. Do not use damaged plug or loosened outlet.
	Clean the power plug regularly. If the plug is covered in dust, it may cause fire due to reduced insulating power.
Unplug	**Unplug immediately if the product smokes, makes unusual noise, or smells.** If you continue to use the product under those situations, it may cause electric shock or fire. After confirming that the product stops smoking, contact IDK.
	Unplug immediately if you drop the product or if the cabinet is damaged. If you continue to use the product under those situations, it may cause electrical shock or fire. For maintenance and repair, contact IDK.
	Unplug immediately if water or other objects are directed inside. If you continue to use it under those situations, it may cause electrical shock or fire. For maintenance and repair, contact IDK.

For connection	
Instruction	Differences in ground potential among the product and peripheral devices may cause electric shock or damage of the devices. When using cables to connect devices, including connection of long-distance transmission, unplug the power cables of all related devices. After connecting signal/control cables of each device, plug in the power cables of each device.

⚠Caution

Prohibition	**Do not place the product in any place where it will be subjected to high temperatures.** If the product is subjected to direct sunlight or high temperatures, it may cause fire.
	Do not place the product in humid, oil smoke, or dusty place. If the product is placed near humidifiers or dusty area, it may cause fire or electric shock.
	Do not block the vent holes. If ventilation slots are blocked, it may cause fire or failure due to internal heat.
	Do not put heavy items on the product. It may fall/turn over and lead to injury.
	Do not exceed ratings of outlet and wiring devices. If several plugs are put in an outlet, it may cause fire and electric shock.
	Use only the provided AC adapter and power cable. If non-compliant adapter or power cables is used, it may cause fire or electrical shock. Use the provided AC power connection cable. If you want to use your product in other countries that use different AC power cables, contact IDK.
No wet hands	**Do not plug or unplug with wet hands.** It may cause electrical shock.
Instruction	**Use and store the product within the specified temperature/humidity range.** If the product is used outside the range continuously, it may cause fire or electric shock.
	Turn off devices when they are connected to another device. It may cause fire or electric shock.
Unplug	**Unplug the power plug if you do not use the product for a long period.** In case of defect, it may cause fire.
	Unplug the power plug before cleaning. It may cause electric shock.

For installation

For rack mount devices:

Instruction	Mount the product to the rack meeting EIA standards, and maintain spaces above and below for air cooling. For your safety, attach an L-shape bracket in addition to the mount bracket kit for the front panel to balance the weight.

For devices with rubber feet:

Instruction	Never insert only the screws into the holes after removing the rubber feet. It may lead to damage when the screws contact electrical circuit or parts inside of the product. To put the rubber feet back on, use only provided rubber feet and screws.

Altitude:

Instruction	Do not place the product at elevations of 2,000 meters (6562 feet) or higher above sea level. Failure to do so may shorten the life of the internal parts and result in malfunctions.

Table of Contents

1 Product outline

MSD-804FD (hereafter referred to as "the MSD") is a presentation switcher having a built-in scan converter.

For video output, 8 digital inputs are mounted, and HDMI and DVI signals are supported. Input video signal is converted up to QWXGA or 1080p and HDMI/DVI signal can be output. HDBaseT output (Cat6 output) is prepared as an optional extra. When the HDBaseT output is mounted, signal is output to HDMI and HDBaseT.

For audio input, 8 digital and 8 analog inputs are mounted, and selected audio signal is output to digital audio (HDMI) and analog audio. Audio level of each input and each output can be set separately. The MSD also has the Lip Sync function to correct gaps between video and audio signals.

The MSD has RS-232C (2 ports) and LAN as communication ports for external control, which enables remote operation of settings. External devices that are connected to the MSD from RS-232C, LAN, or CEC can be controlled through RS-232C, LAN, or HDBaseT output by registering control commands. For control commands, the wait function is available to switch the contact after cooling-down time passes for power control of projectors and other devices.

You can execute control commands using front panel keys, RS-232C, and LAN, and you can also execute them when operating the input switching keys and turning on the MSD.
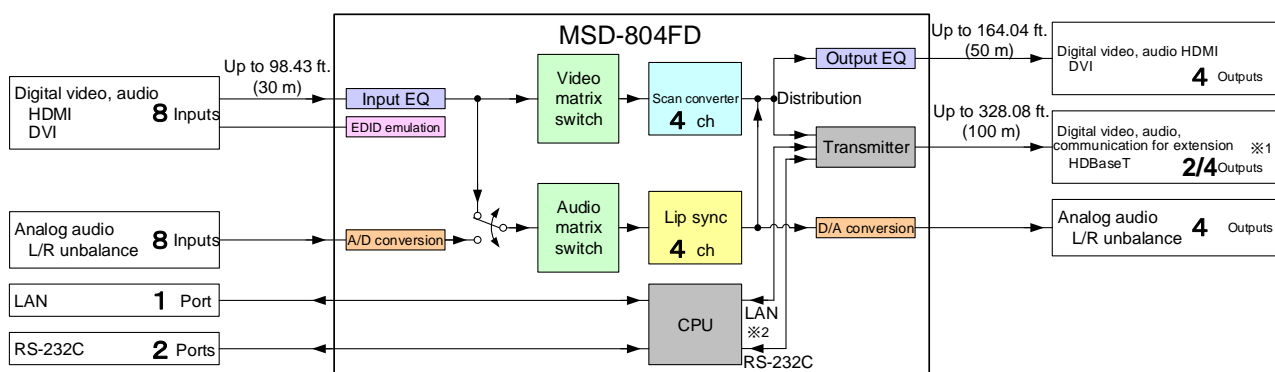
※1 HDBaseT output is optional extra.
※2 RS-232C and LAN of HDBaseT output supports only control command output.
   Bidirectional communication with a PC via MSD's RS-232C and LAN connector is not supported.

[Fig. 1.Fig. 1.1] I/O diagram of video and audio

2 Features

■ Video

- ・ Up to QWXGA(Reduced Blanking), 1080p
- ・ Digital cable EQ
  Input: up to 32.8 ft. to 98.43 ft. approx. (10 m to 30 m)
  Output: up to 32.8 ft. to 164 ft. approx. (10 m to 50 m)
- ・ Extending signal up to 328.08 ft. (100 m) over a Cat6 cable (optional extra)
- ・ Scan converter
- ・ Aspect ratio control
- ・ Seamless switching
- ・ Anti-snow[1]

■ Audio

- ・ A/D, D/A conversion
- ・ Audio level adjustment
- ・ Lip sync

■ Control input

- ・ RS-232C, LAN

■ Control output

- ・ Control command output (such as controlling projectors)
- ・ PJLink
- ・ Power control of sink device over CEC[2]

■ Others

- ・ EDID emulation
- ・ Video and audio can be switched separately
- ・ Preset memory
- ・ Cross point memory
- ・ Last memory
- ・ Connection reset[3]
- ・ Key lock

[1] The anti-snow function automatically fixes snowy noise that is a specific symptom of HDCP-compliant signals and mainly occurs at start-up. This feature does not work when snowy noise has already been occurred during startup or when it occurs due to bad condition of the transmission line.

[2] The display device needs to support CEC to enable this function. Some display devices cannot be controlled by CEC.

[3] For digital systems, some problems, such as an HDCP authentication error, can be recovered by physically disconnecting and reconnecting the digital cables. However, the Connection Reset function will fix these problems automatically without the need to physically plug and unplug the cables, by creating the same condition as if the cable were physically disconnected and reconnected. This function works only for the MSD's output.

3 Application example
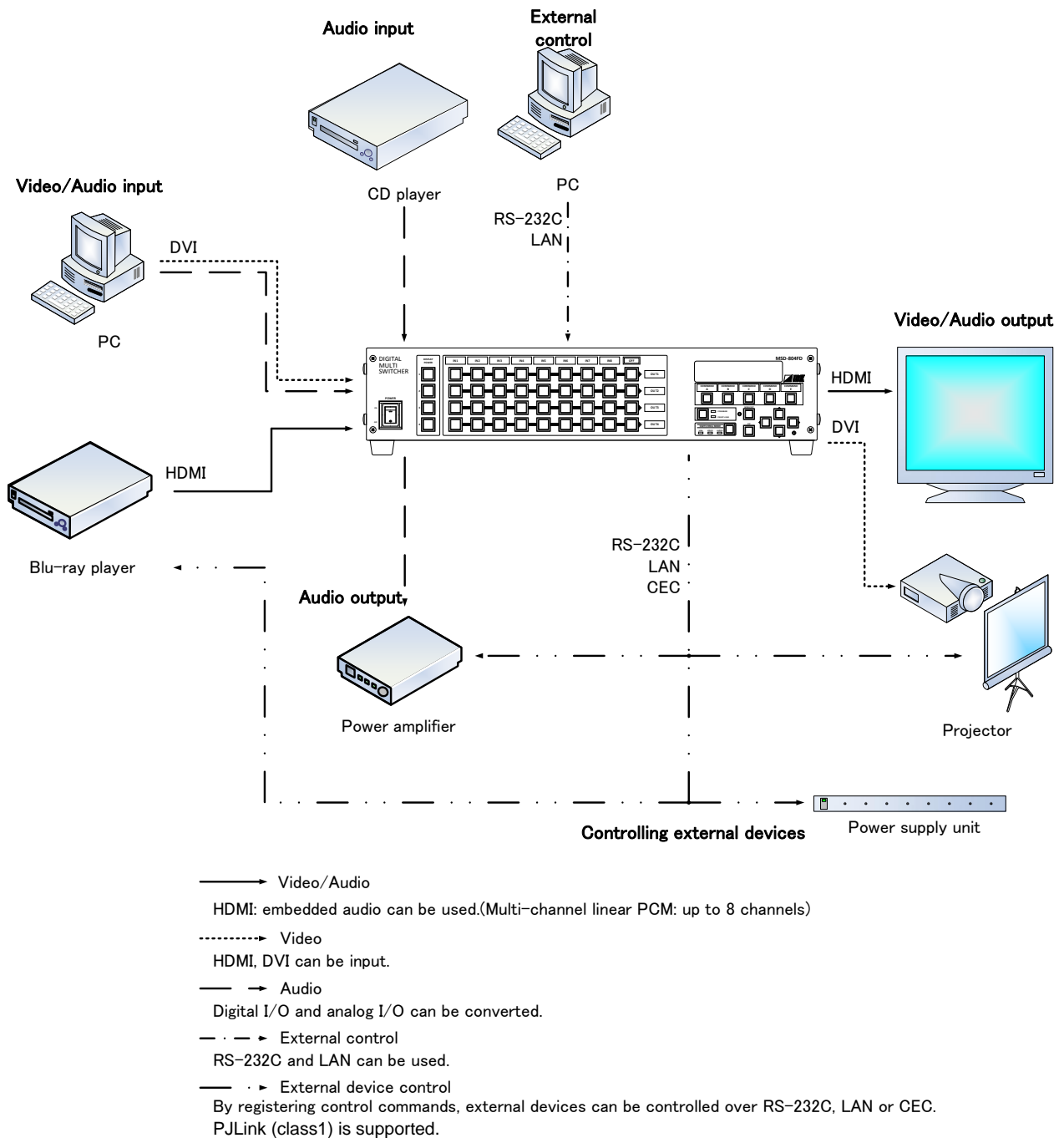
[Fig. 3.1] System configuration example

4 Panels

4.1 Front panel
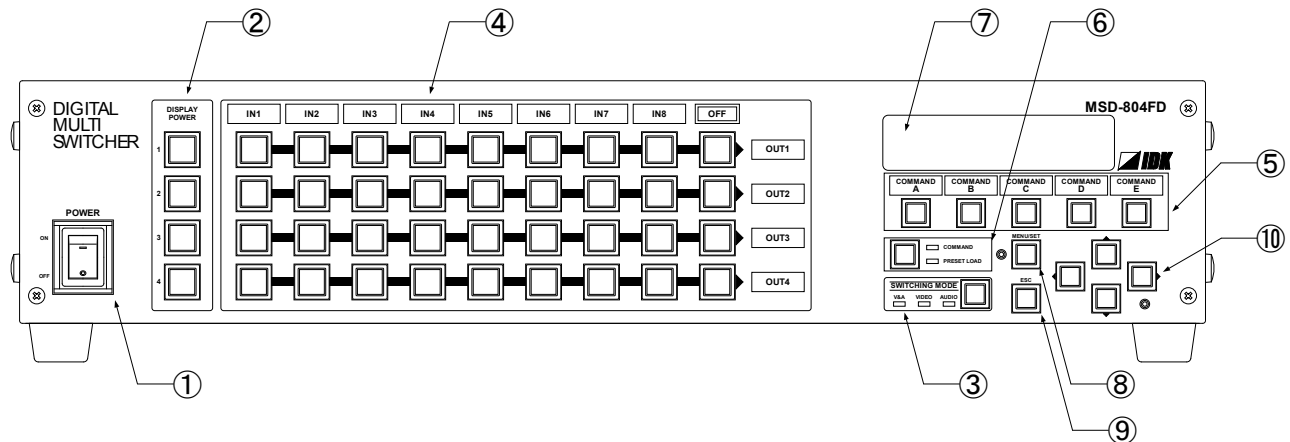
[Fig. 4.1] Front panel

① Power supply switch (POWER)
　　Turns on/off the MSD.

② Power supply keys of display device (DISPLAY POWER 1 to 4)
　　Turns on/off connected display devices.

③ SWITCHING MODE key (V&A, VIDEO, 　AUDIO)
　　Selects switching mode (V&A, VIDEO,AUDIO) if an input is selected.

④ Input channel selection keys (IN1 to IN8, OFF)
　　Selects video and audio outputs.

⑤ Control command execution/Cross point loading keys (COMMAND A to E)
　　Executes registered commands A to E and loads the registered cross point settings.

⑥ Operation mode selection key (COMMAND, PRESET LOAD)
　　COMMAND: Executes the registered control command.
　　PRESET LOAD: Loads the registered cross point.
　　Key lock is enabled/ disabled by pressing this key for 2 seconds or longer.

⑦ VFD screen
　　Displays menus and settings.

⑧ MENU/SET key (MENU/SET)
　　Displays menus and edits/controls settings.

⑨ ESC key (ESC)
　　Finishes the current menu setting.

⑩ Arrow keys (▲ ,▼ ,◀ , ▶)
　　Switches menu, moves cursor, and changes set values.

4.2 Rear panel
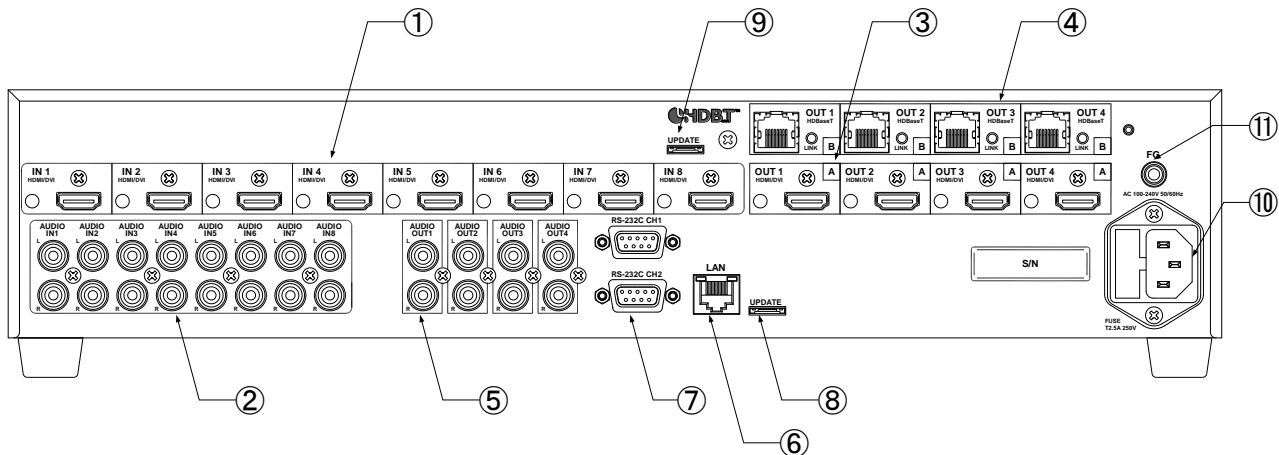
[Fig. 4.2] Rear panel

① HDMI input connectors (HDMI/DVI IN1 to IN8)*
   DVI signals can be input using an HDMI-DVI conversion cable.

② Audio input connectors (AUDIO IN1 to IN8)
   Input connectors for stereo audio signal. Input connectors for stereo audio signals.
   Cannot be used with embedded audio signals of HDMI input connector simultaneously.

③ HDMI output connectors (HDMI/DVI OUT1 A to OUT4 A)*
   When a DVI display device is connected, DVI signals are output automatically.

④ HDBaseT output connectors (HDBaseT OUT1 B to OUT4 B)
   Output connectors for extension (for receivers of HDC series, IDK's twisted pair cable).
   HDBaseT output is an optional extra.

⑤ Audio output connectors (AUDIO OUT1 to OUT4)
   Output connectors for stereo audio signals.

⑥ LAN connector (LAN)
   For external control by communication commands or web browsers.

⑦ RS-232C connector (RS-232C CH1, CH2)
   For external control by communication commands using serial connector.

⑧,⑨ Maintenance port (UPDATE)
   Not used.
   Keep this connector free.

⑩ AC power connector (AC100-240V)
   For the provided power cable.

⑪   Frame ground (FG)

     For indoor ground terminal.

*The HDMI I/O connectors support HDCP (High-bandwidth Digital Content Protection), which is a copy protection technique developed by Intel. If DVDs or other contents with copyright protection are played, both source devices (such as DVD players connected to input connectors) and display devices (connected to output connectors) are required to be HDCP compliant.

5 Installation

Since the MSD has various types of I/O connectors, make sure that shapes of the cables and connectors match when connecting cables. If you try to connect them forcibly to an unmatched cable and connector, they might be damaged. If turning on the MSD in that situation, the MSD and display devices may be damaged. Be sure to plug cables completely and install them without any stress on the cables.

5.1 Connecting digital input/output devices

For digital input, HDMI connector is used while HDMI connecter and RJ-45 connector are employed for digital output. These connectors can input/output HDMI signals and DVI signals.

HDBaseT output: connected to IDK's twisted pair cable receiver (HDC series) and can be extended up to 328 ft. approx. (100 m).
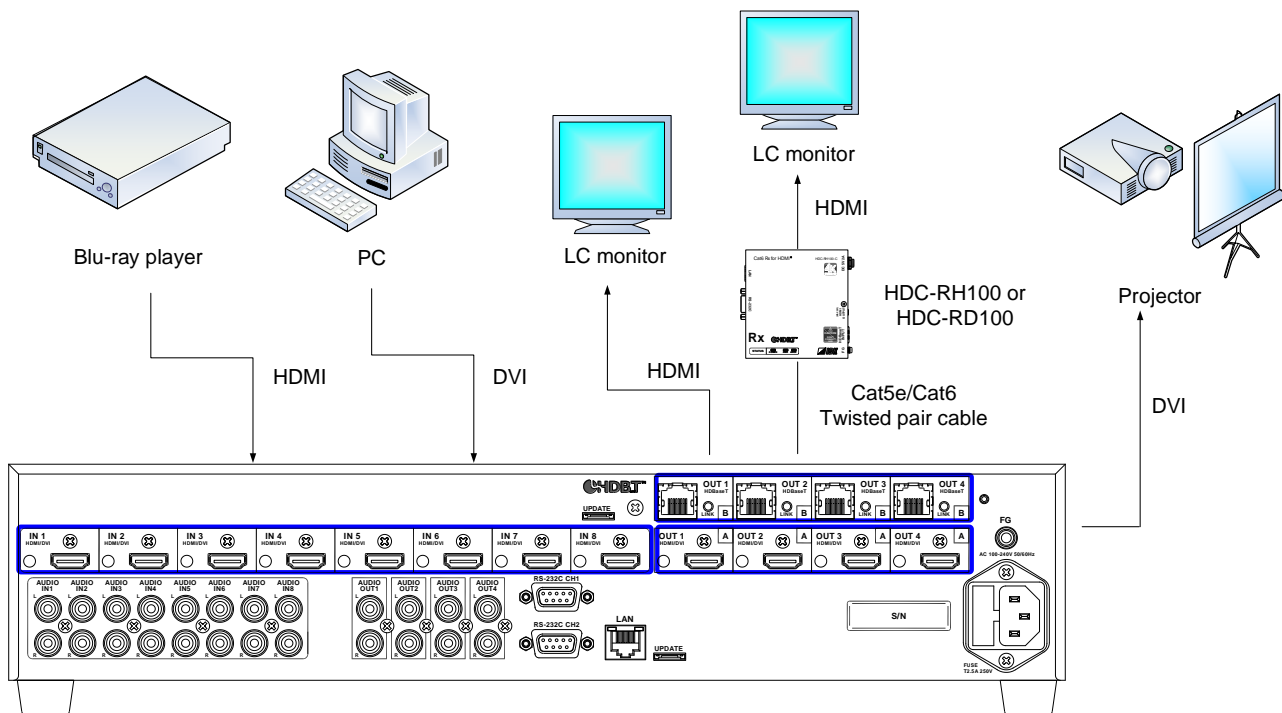
[Fig.5.1] Connecting digital devices

For digital I/O, the MSD has the cable equalizing circuit (for output, only OUT A) to correct distorted signals when a long cable is connected. The amount of equalization for the input side is set automatically, but do set the amount for the output side using the following menu settings: "**7.7.1 Output equalizer [OUTPUT EQUALIZER]**"

[Table 5.1] Maximum extension distance

Digital input	Up to 32.8 ft. to 98.4 ft. approx. (10 m to 30 m)*
Digital output	32.8 ft. to 164 ft. approx. (10 to 50 m)*

*Extension distance depends on the connected I/O devices. The range mentioned above is the maximum extension range acquired when IDK's AWG24 cable is used and signals of 1080p 60 Hz, 24 bit/pixel (8bit/component) is input or output. For some I/O combinations, and if you use cables of other manufacturer, video may be disturbed or may not be output even if signals are within the range mentioned above.

If connecting to HDBaseT output (RJ-45 connector), follow the following notes. If the transmission line has a problem, video and audio may be interrupted.

Connectors for a long-distance transmission are the same as eight-core modular connector that is used in Ethernet. However, since the transmission method is not the same, it cannot be connected to Ethernet.
To ensure the best performance, select the appropriate cable and connect it correctly.

1. We recommend a Cat5e/Cat6 UTP/STP cable for the twisted pair cable.
2. For pin assignments, apply T568A or T568B standards for straight through wiring.
3. Keep the twisted pair cable as straight as you can. If you coil the cable, it is easily affected by noise.
4. Do not place this product in an electrically noisy environment, since high-speed signal is transmitted
5. If the distance between the transmitter and receiver is 100 m/328.08 feet or less, cables can be joined using an RJ-45 plug coupler or wall outlet.
6. For transmission longer than 164 ft. (50 m), Cat6 cable is recommended.

If the problem still cannot be solved, shorten the length of the twisted pair cable. Problems may be solved by the action.

Note: HDBaseT output does not support DVI signals whose content is protected by HDCP. If you need to extend DVI signal with HDCP, please use the IDK's HDC-RD100 as a receiver.

For HDMI I/O, please use the cable with HDMI Type A (male) connector. For cables longer than 16.4 ft. (5 m), use our recommended cable, AWG24*.
*AWG(American Wire Gauge)

Recommended cables:

		Flexible model	Standard model
10 m	:	HDSS-10	HDMI/HDMI24-10
15 m	:	HDSS-15	HDMI/HDMI24-15
20 m	:	HDSS-20	HDMI/HDMI24-20
30 m	:	-	HDMI/HDMI24-30
40 m	:	-	HDMI/HDMI24-40
50 m	:	-	HDMI/HDMI24-50

Notes:
If you use a cable other than the recommended cable above, the extension distance may be shorten.
Those model number would be changed. Please contact us.

The HDMI cable does not have lock mechanism, but the provided cable clamp prevents the cable from falling off.
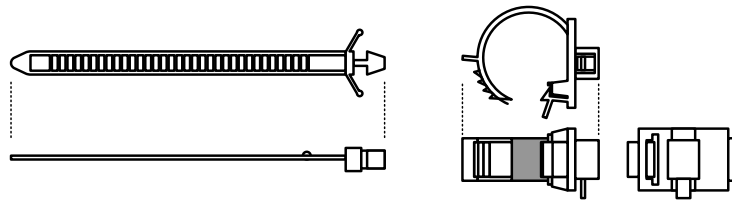
[Fig. 5.2] Cable clamp

■ Attaching cable clamp

1. Remove the ring from the clamp and pass it through the clamp as indicated below.
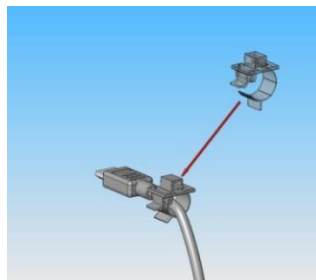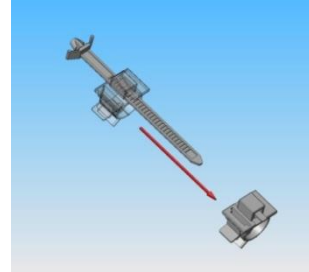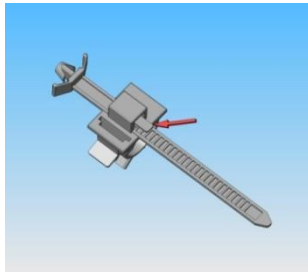
2. Plug the clamp bar into the hole of the main unit.
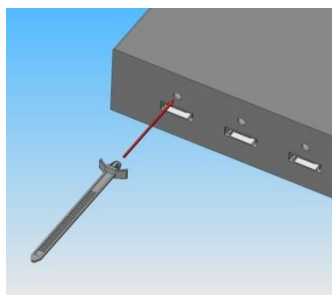
3. Attach the HDMI cable and ring to the bar and plug the cable.
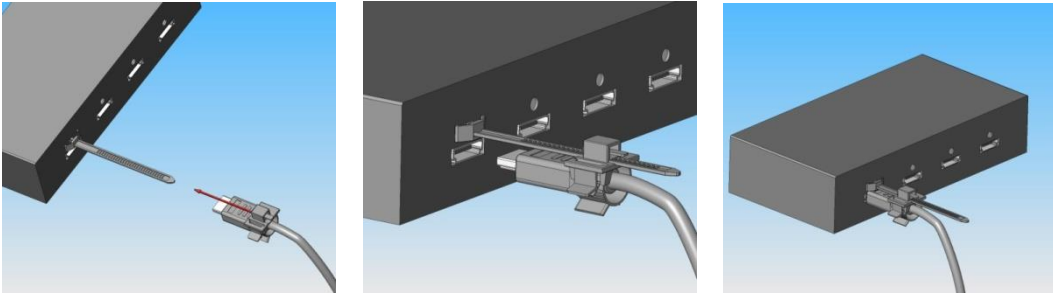
5.2 RS-232C communication specification

External control via RS-232C is available. Connect control devices such as PCs and the MSD with a serial communication cable, and then control the MSD and acquire status using commands. For character notations of commands and configuring communication of serial terminal, see ASCII codes and "**7.10 RS-232C**", respectively.

[Table 5.1] RS-232C communication specification

Compliance standard	RS-232C
Baud rate	4800, 9600, 19200, 38400 [bps]
Data bits	8, 7 [bit]
Parity check	None, even, odd
Stop bit	1, 2 [bit]
X parameter	Invalid
Flow control	None
Delimiter	*CR LF* (Carriage return and line feed, 0D and 0A in hex)
Communication pattern	Full duplex
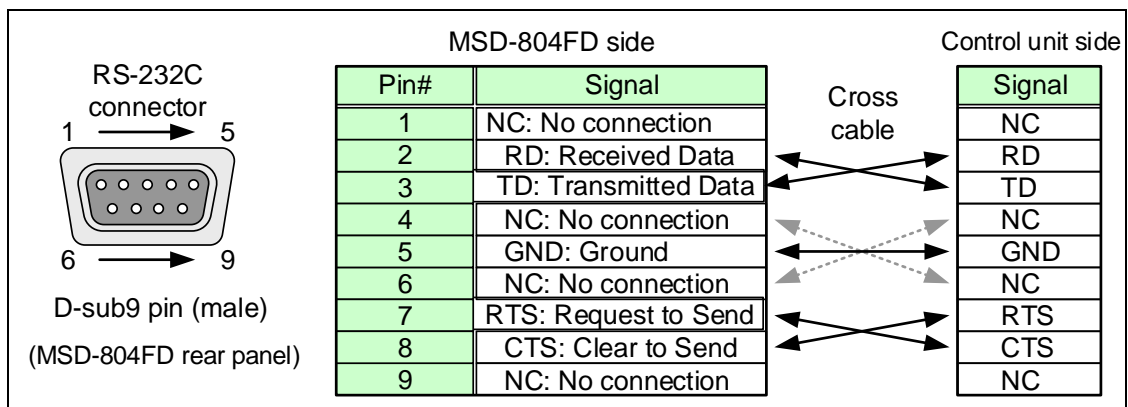
[Fig. 5.4] RS-232C connector/cable specification

5.3 LAN communication specification

External control via LAN is available. Use a serial communication cable to connect control devices such as PCs and the MSD, and then control the MSD and get its status using commands. For character notation of commands, refer to the ASCII codes or control using commands, use ports 6000 to 6999, 1100, and 23. Connection will be disconnected if no communication for 30 seconds or longer after connection. For setting of LAN, see section "**7.11 LAN settings**".

[Table 5.2] LAN communication

Physical layer	10BASE-T (IEEE802.3i)/100Base-TX (IEEE802.3u)
Network layer	ARP, IP, ICMP
Transport layer	TCP Port used for command control: 23, 1100, 6000 to 6999 Port used for WEB browser control (HTTP): 80, 5000 to 5999
Application layer	HTTP, TELNET

Turns green when a connection between the MSD and hub or switch is established.

The orange LED blinks when data is transmitted or receivd.

LAN connector

1 → 8

8 pin RJ-45 connector
(MSD rear panel)

Pin #	Signal name	
	MDI	MDI-X
1	TX+: Transmitted Data+	RX+: Received Data+
2	TX-: Transmitted Data-	RX-: Received Data-
3	RX+: Received Data+	TX+: Transmitted Data+
4	NC: Not connected	NC: Not connected
5	NC: Not connected	NC: Not connected
6	RX-: Received Data-	TX-: Transmitted Data-
7	NC: Not connected	NC: Not connected
8	NC: Not connected	NC: Not connected

The MSD supports Auto MDI/MDI-X, which distinguishes and switches straight/cross cables automatically.

[Fig.5.5] LAN connector

5.3.1 The number of TCP-IP connections

The MSD can connect up to eight connections (8 ports) simultaneously. If the MSD is controlled from nine or more PCs, they may not be connected to the MSD.
For nine or more connections, use your software to establish and close TCP-IP connections for each sending and receiving communication commands. By doing so, connections are occupied and released in the MSD side so that logically eight or more connections (eight or more ports) can be connected.

Your PC software		MSD-804FD
TCP-IP connection	→	**(1 port is occupied → 7 ports free)**
Sending command (@xxx)	→	
	←	Sending reply command (@xxx)
Closing TCP-IP	→	**(1 port is released → 8 ports are free)**

[Table 5.3] Increasing connections

Note:

If any command is not sent from the PC side to the MSD for 30 seconds, the MSD disconnects the connection to avoid the limitation problem on the number of connections. As a result, the connection needs to be established again from the PC side after the current connection of the PC is disconnected. (Since the number of ports in the MDS series is eight, if the PC is turned off while it is connected, ports are occupied permanently. To prevent this, the connection is disconnected if no communication command is sent from the PC side.)

6 Basic operations

6.1 Selecting input channels

Step 1:

Select the desired mode by the SWITCHING MODE key.

Every time you press the key, the mode changes sequentially as follows:

V&A (video & audio simultaneously; set by default)

VIDEO (only video)

AUDIO (only audio)

The LED of the selected mode illuminates.
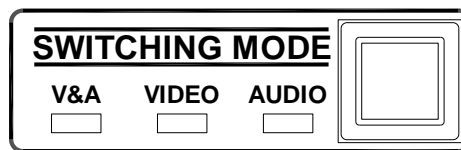
[Fig. 6.1] SWITCHING MODE selection key

Step 2:

Press the desired input channel selection key (IN1 to IN8, or OFF) to set a channel to output video or audio.

The LEDs of the selected video/audio inputs illuminate.

Command control: Switching video and audio channel simultaneously: @SSW/@GSW
Switching video channel: @SSV/@GSV
Switching audio channel: @SSA/@GSA

6. 2　**Menu operation**
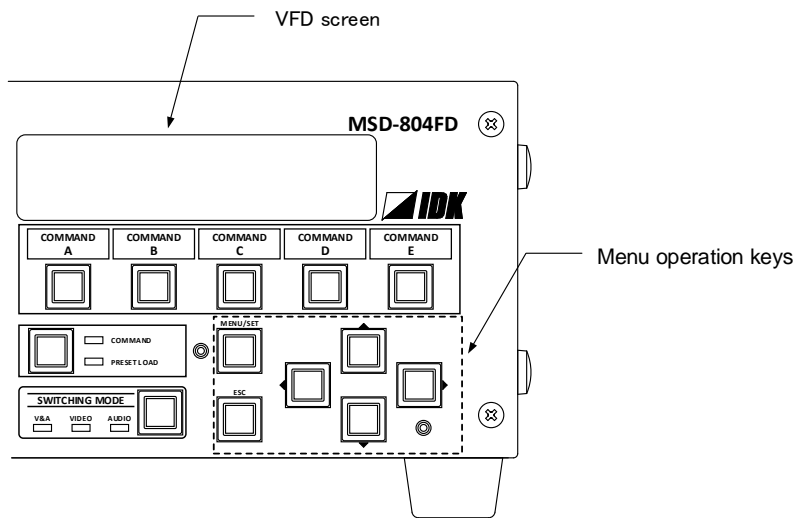
[Fig. 6.2] Menu operation keys

MENU/SET key: Displays menus and sets values
"ESC" key: Escapes from menu
▲/▼　Keys: Switches menus and sets values
◄►keys: Moves the cursor and selects the item to be set
VFD screen: Displays menus and settings
See "**7.1 Menu list**" if necessary.

If you need a front panel cover (optional extra) to prevent erroneous operations, please contact us.

6.3 Turning ON/OFF display devices

Use the "DISPLAY POWER" keys to turn on/off the connected display devices.
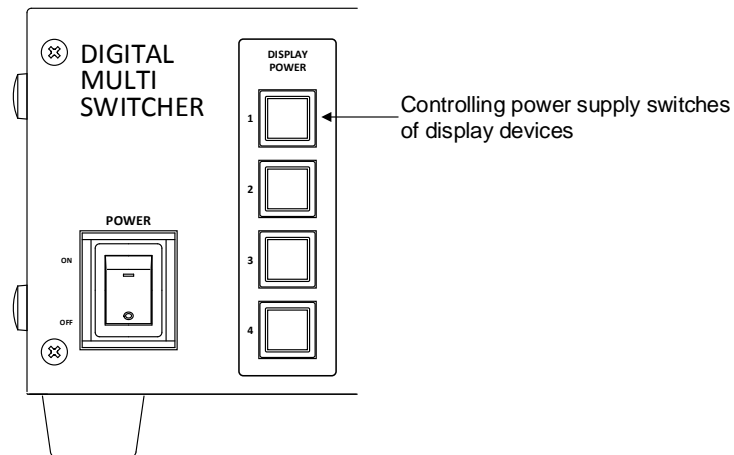
[Fig.6.3] DISPLAY POWER keys for display devices

Since no values are registered at the factory, in order to use the front panel DISPLAY POWER keys, the settings for those keys must be first registered into system memory ("**7.12.3 Control command association [COMMAND LINK]**"). If you press the keys accidentally, the display device may be turned off. This can be avoided by pressing and holding the DISPLAY POWER keys for the registered number of seconds set in "**7.16.4 DISPLAY POWER key pressing time length [POWER SWITCH ON]**".

When a command for turning on or off is sent to the display device and the reply command for normal transmission is received from the display device, the LED of the key turns orange (Power ON) or is turned off (power OFF). However, if the reply command is not checked, the actual power status of the display device and LED of DISPLAY POWER key sometimes do not match.

Command control: Setting for display device power switch @SDS /@GDS

6.4   Command control

You can register up to nine control commands in MSD (COMMANDs A to I), but you can execute only five commands (COMMANDs A to E) with control front panel command execution keys. To execute COMMANDs F to I, perform "**7.12.4 Command execution [COMMAND EXECUTION]**" or use RS-232C, or LAN.
For COMMANDs A to I, nothing is registered by the factory default, so those keys will not work until their commands are registered in "**7.12.3 Control command association [COMMAND LINK]**".

Command control: Controlling command execution: @EXC

Operation mode key   Control command keys
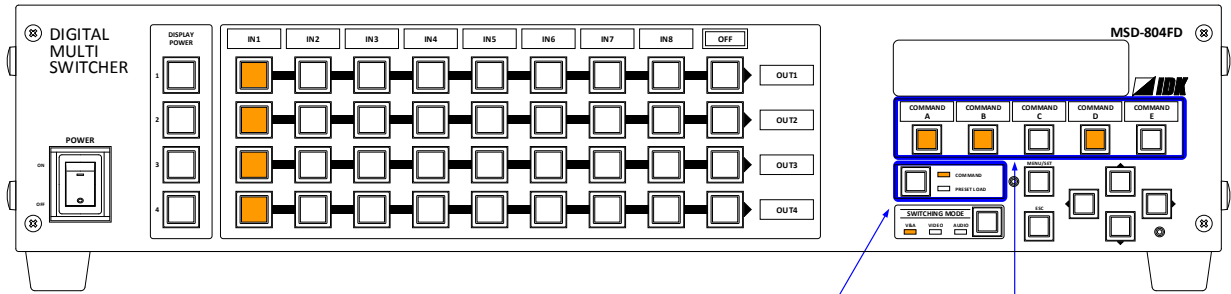
[Fig. 6.4] Keys for command execution

6.5 Loading cross point

You can register up to eight cross points in the MSD, but the MSD can only load cross points 1 to 5 by cross point load keys. To load cross points 6 to 8, use menu settings in the "Load cross point" section ("**7.13.1 Loading cross point [LOAD CROSS POINT]**") or use RS-232C, or LAN.

Since nothing is registered by factory default, cross point is not valid until they are registered. To load them, register cross points in advance.

Command control:

- ▪ Loading V&A input selection setting from cross point memory: @RCM
- ▪ Loading video input selection setting from cross point memory: @RCV
- ▪ Loading audio input selection setting from cross point memory: @RCA

Step 1.
Select "PRESET LOAD" using the Operation Mode selection key.

Step 2.
Press the cross point command keys to load the cross point settings.

Commands A to E correspond to cross points 1 to 5.

Operation mode selection keys   Cross point load key
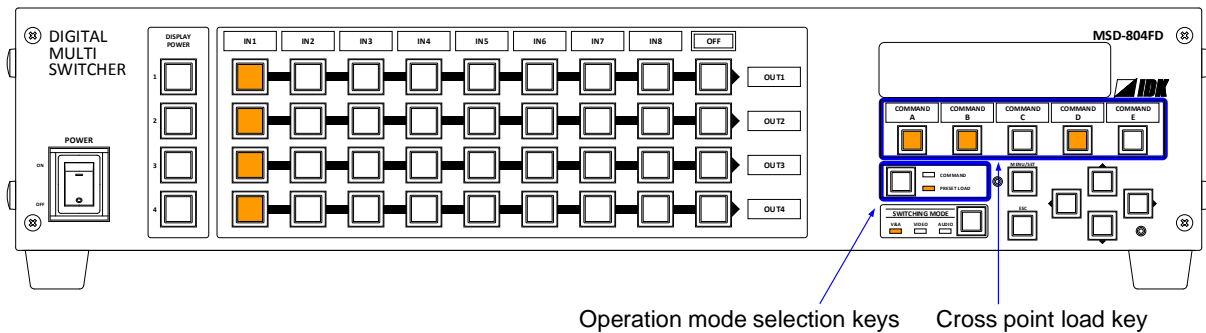
[Fig. 6.5] Loading cross point

6.6 Locking/unlocking front keys

To lock the front panel keys, press and hold the Operation Mode selection key for 2 seconds or longer until hearing the buzzer sound. To release the key lock, do the same operation again. When the setting is changed, the status will be displayed for 1 second.

```
KEY LOCK !
```
Locked

```
KEY LOCK RELEASE !
```
Unlocked
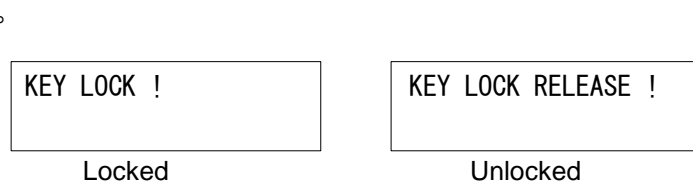
Command control: Setting and releasing key lock: @SLS/@GLS

6.7 Web browser control

The MSD connected through LAN can be controlled from a WEB browser such as Microsoft Internet Explorer. To open the operation window, open a WEB browser in the PC through the same LAN network and enter the MSD's IP address into the address bar. For LAN settings, see "**7.11 LAN settings**".

Note:

We tested the MSD using Microsoft Internet Explorer 6.0, 7.0 and 8.0 for Windows. The MSD may possibly operate incorrectly on other versions and/or browsers.

If the port number of the browser control port is set to 80 (normal setting):
Use the following format: http://192.168.1.199
If the port number of the browser control port is set to a number other than 80 (5000 to 5999):
(Example: No. 5000)
Use the following format: http://192.168.1.199:5000
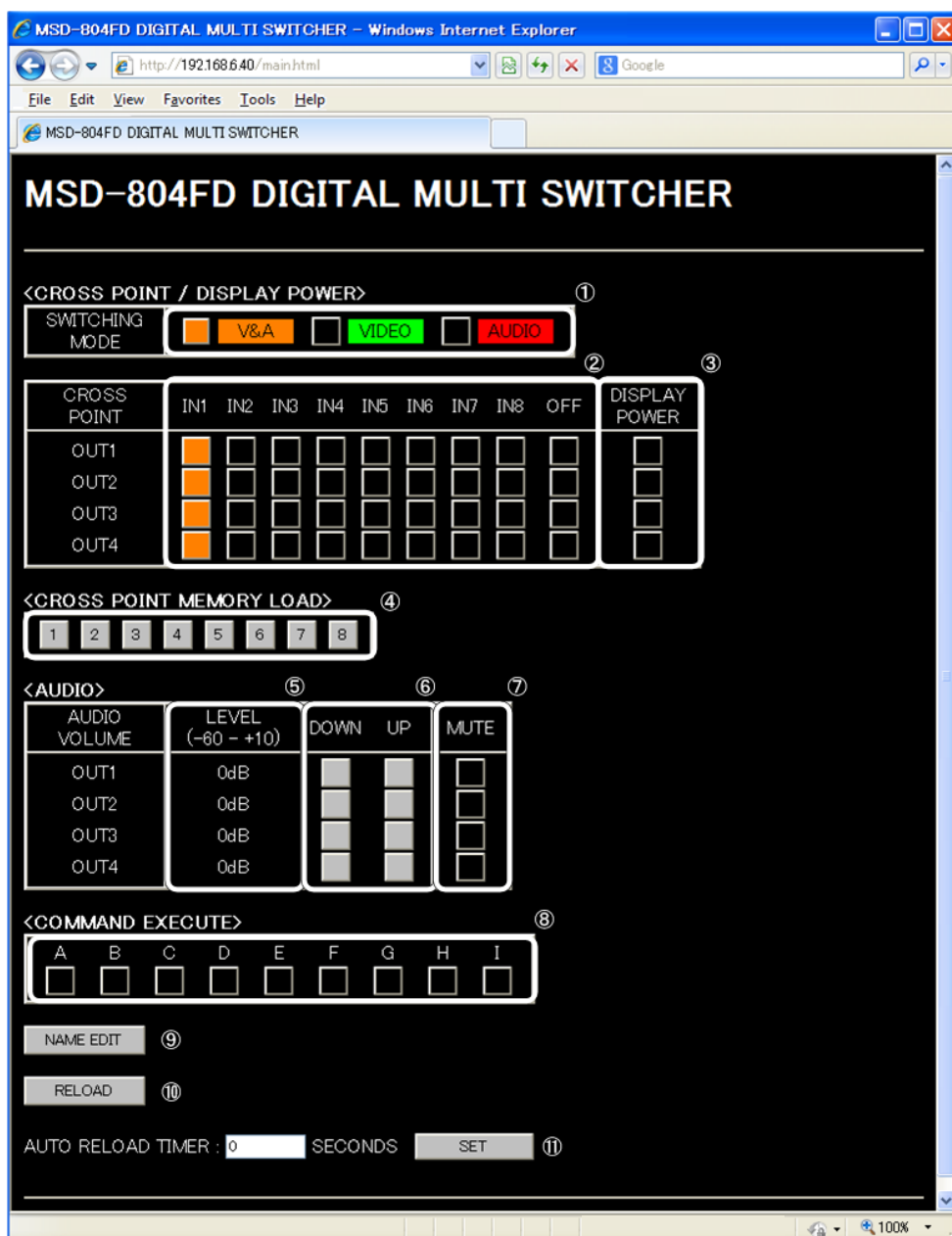
[Fig. 6.6] WEB browser control window

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① SWITCHING MODE
  Sets and displays channel switching mode. Does not affect switching mode of the front panel.
  V&A (switching video & audio simultaneously), VIDEO (switching only video), AUDIO (switching only audio)

② Selecting input channel (OFF, IN1 to IN8)
  Selects video and audio output.
  Orange: Video & Audio; Green: Only Video; Red: Only audio

DISPLAY POWER

Turns on/off connected display devices. No command is registered by factory default. To operate display's power, register the command to this switch in "**7.12.3 Control command association [COMMAND LINK]**".

③ Cross point
  Loads registered cross point.

④ Audio output level
  Displays the current audio output level.

⑤ Audio output level (UP, DOWN)
  Turns up/down the volume 1 [dB] per click.

⑥ MUTE
  Turns on and off the mute function.
  Red: MUTE ON; Black: MUTE OFF

⑦ COMMAND EXECUTE
  Executes control commands assigned to COMMAND A to I. No command is registered by factory as default. To execute control commands, register them to COMMAND A to I in advance by following instructions in section "**7.12.3 Control command association [COMMAND LINK]**".
  Buttons in which control command is registered are displayed in green. However, as each command (A to I) has two planes (PLANE A and B), two commands are executed alternately if two different commands are registered to plane A and B. If PLANE B is executed, the button is displayed in green (PLANE A will be executed at the next click); if PLANE A is executed, the button displayed in orange (PLANE B will be executed at the next click).

⑧ NAME EDIT
  Edits names of "CROSS POINT", "AUDIO VOLUME," and "COMMAND EXECUTE". Click this button, to open the window of "**Window for editing names**".

⑨ RELOAD
  Acquires the latest information of the MSD from the MSD. (It can also be updated automatically by setting "AUTO RELOAD TIMER", 11, below.)

⑩ AUTO RELOAD TIMER
  Sets time interval to receive the latest information periodically and to refresh WEB browser window. You can set the interval from 10 to 65535 seconds by 1 second. If you do not use this function, set the interval to 0 second (factory default).
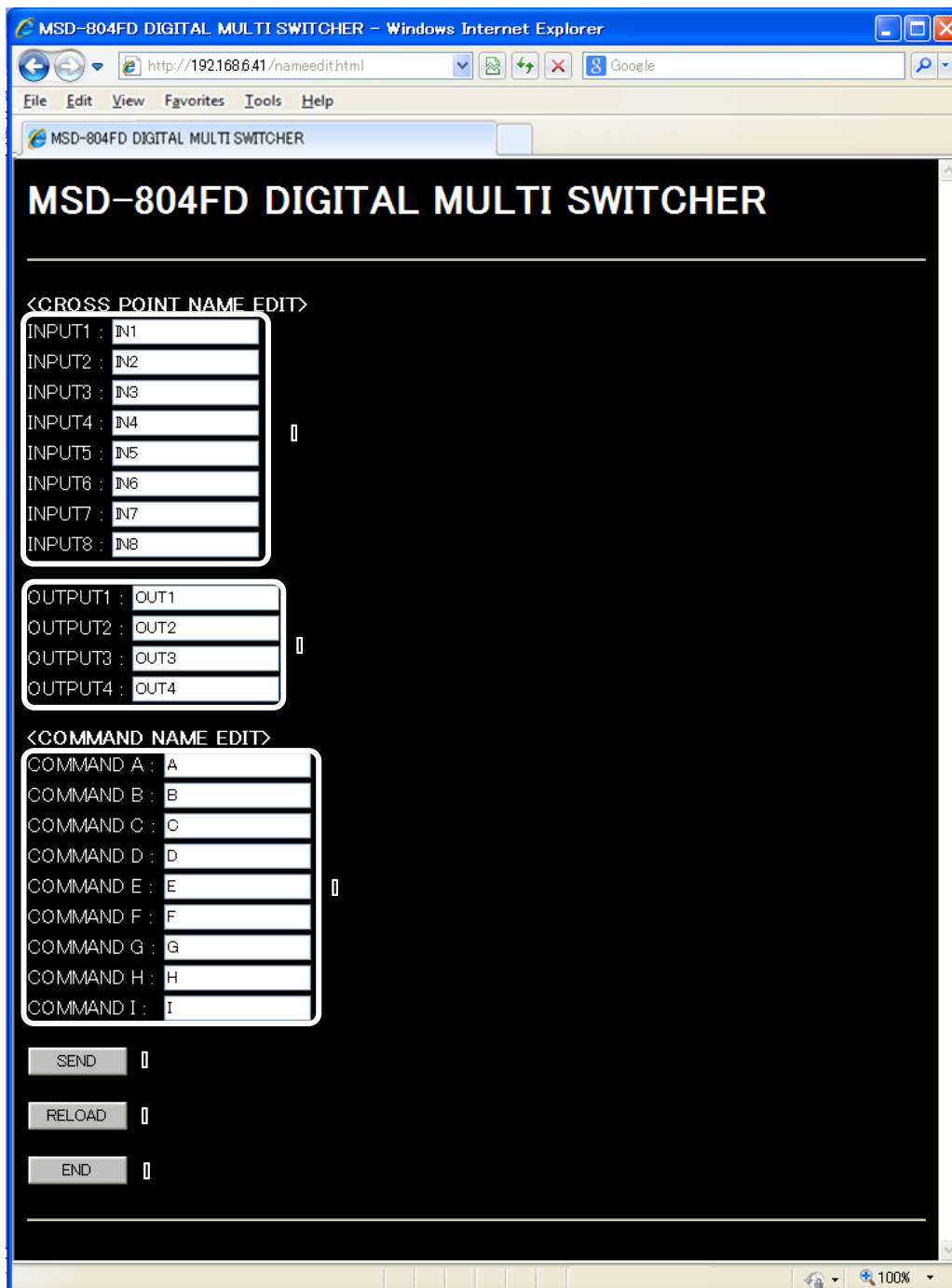
[Fig.6.7] Window for editing names

① Input channel name (INPUT1 to INPUT8)

Enter the desired input names which will be displayed in "CROSS POINT" on **"WEB browser control window"**. IN1 to 9 are set by factory default.

② Output name (OUTPUT1 to OUTPUT4)

Enter the desired output names which will be displayed in "CROSS POINT" and "AUDIO VOLUME" on "**WEB browser control window**" Web browser control window. OUT1 to 4 are set by factory default.

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③ Control command name (COMMAND A to COMMAND I)

Enter the desired input names which will be displayed in "COMMAND EXECUTE" on "**WEB browser control window**". "A" to "I" are set by factory default.

④ SEND

Saves the names entered above (1 to 3).

⑤ RELOAD

Restores to the current settings. Use this button to enter the names again.

⑥ END

Finishes editing names. Click this button to open "**WEB browser control window**"

For 1 to 3 above, only the first 10 one-byte characters are valid even if you enter 11 or more characters. (You can use two-byte characters, but they are counted as two characters.)

6. 8 Factory reset

You can restore settings of "**6.1 Selecting input channels**", "**6.6 Locking/unlocking front keys**", and "**7 Settings**" to the factory default by turning on the MSD while pressing the ESC key.
Hold the ESC key until you hear long-tone buzzer sound. The sound stops when the initialization is completed, and the MSD starts its normal operation.

Note:
Once you restore the settings to the factory default, you cannot put them back to the previous (user) settings

[Table 6.1] Factory default (1/5)

*1: Set for each output (common to OUTA/OUTB); 2: Set for each output;

3 Set for each output (only OUTA); 4: Set for each input port/input signal;

5: Set for each input; 6: Set for each output/bitmap;

7: Set for each digital input/analog input, each input signals (only digital input)

Function	Factory default	Set for each I/O/bmp*
INPUT CHANNEL	Channel selection: INPUT OFF SWITCHING MODE: V&A	1
RESOLUTION	AUTO(Set automatically from EDID)	1
MONITOR ASPECT	RESOLUTION (Aspect ratio of output resolution)	1
INPUT ASPECT	AUTO-1	4
ASPECT PROCESS	LETTER BOX or SIDE PANEL	4
INPUT OVER SCAN	NTSC: 105% HDTV/VESA(PC): 100%	4
INPUT POSITION	Horizontal/Vertical: 0	4
INPUT SIZE	Horizontal/Vertical: The number of pixels of output resolution	4
INPUT MASKING	Left/Top: 0 Right/Bottom: The number of pixels of output resolution (without masking)	4
OUTPUT POSITION	Horizontal/Vertical: 0	1
OUTPUT SIZE	Horizontal/Vertical: The number of pixels of output resolution	1
OUTPUT MASKING	Left/Top: 0 Right/Bottom: The number of pixels of output resolution (without masking)	1
BACKGROUND COLOR	R/G/B: 0 (black)	1
TEST PATTERN	Pattern output: OFF Scroll: OFF	1
MULTI DISPLAY	OFF	-
INPUT BRIGHTNESS	100%	4
INPUT CONTRAST	R/G/B: 100%	4
INPUT HUE	0°	4
INPUT SATURATION	100%	4
SETUP LEVEL	0.0%	4
OUTPUT BRIGHTNESS	100%	1
OUTPUT CONTRAST	R/G/B: 100%	1

[Table 6.2] Factory default (2/5)

Function	Factory default	Set for each I/O/bmp*
INPUT VIDEO DETECT	10000 ms. (10 seconds)	5
HDCP INPUT ENABLE	ENABLE	5
INPUT EQUALIZER	ON	5
INPUT OFF CHECK	ON	5
H START	0 (when signals are detected, it is set automatically)	4
H DISPLAY	0 (when signals are detected, it is set automatically)	4
V START	0 (when signals are detected, it is set automatically)	4
V DISPLAY	0 (when signals are detected, it is set automatically)	4
OUTPUT EQUALIZER	OFF	3
OUTPUT MODE	HDMI YCbCr4:4:4 MODE (outputs with the most suitable mode depending on the connected display device)	2
SYNC OUTPUT	ON	1
VIDEO OUTPUT	BLUE	1
VIDEO SWITCHING	FREEZE→FADE OUT-IN	1
SWITCHING SPEED	350 ms.	1
WIPE COLOR	R/G/B: 0 (black)	1
OUTPUT CONNECTOR	ON	2
HDCP OUTPUT MODE	ALWAYS	2
HDCP ERROR RETRY	ETERNITY (Retrying continuously until HDCP authentication succeeds)	2
DEEP COLOR OUTPUT	24-BIT COLOR	2
CEC CONNECTION	NOT CONNECTED	2
FRAME LOCK	OFF	-

[Table 6.3] Factory default (3/5)

Function	Factory default	Set for each I/O/bmp*
OUTPUT LEVEL	±0 dB	1
OUTPUT MUTE	OFF	1
AUDIO INPUT SELECT	AUTO (For HDMI signals, digital audio is effective; for other signals, analog audio is effective)	5
INPUT OFFSET	±0 dB	7
OUTPUT LIP SYNC	0	1
INPUT LIP SYNC	0	4
SAMPLING FREQUENCY	AUTO(Set automatically from EDID)	1
OUTPUT CONNECTOR	ANALOG & DIGITAL	1
DIGITAL OUTPUT	ON	2
MULTI AUDIO	DOWN MIX	1
TEST TONE	Test tone : OFF Speaker : ALL	1
EDID DATA	INTERNAL EDID	5
PC RESOLUTION	1080p (1920x1080)	5
AV RESOLUTION	AUTO	5
DEEP COLOR INPUT	24-BIT COLOR	5
AUDIO FORMAT	Linear PCM 48 kHz	5
SPEAKER	2 ch (Front Left/Front Right)	5
MONITOR EDID COPY	All 8 data is not registered.	-
PARAMETERS	Baud rate: 9600 bps Data length: 8 bit Parity: None Stop bit: 1 bit	-
FUNCTION	RECEIVER	-
LAN IP ADDRESS	192.168.1.199	-
OUTB IP ADDRESS	192.168.1.200	-
SUBNET MASK	255.255.255.0	-
OUTB SUBNET MASK	255.255.255.0	-
GATEWAY ADDRESS	192.168.1.201	-
OUTB GATEWAY ADDRESS	192.168.1.201	-
FUNCTION	Connection 1 to 8: RECEIVER OUT1B to OUT4B: TRANSMITTER	-
PORT NUMBER	Connection 1 to 3: 1100 Connection 4 to 6: 23 Connection 7 to 8: 80	-

[Table 6.4] Factory default (4/5)

Function	Factory default	Set for each I/O/bmp*
COMMAND EDIT	All 32 commands are not registered.	-
RECV COMMAND EDIT	All 32 commands are not registered.	-
COMMAND LINK	All 90 commands are not registered.	-
INVALID TIME	0 ms.	-
COMMAND TALLY	Lights if control command is registered.	-
FLASH TIME	For control command execution key: OFF (does not blink) For display device power switch: EXECUTION (blinks while control command is executed)	-
CROSS POINT MEMORY	All eight memories are not controlled channel.	-
PRESET MEMORY	All eight memories are not registered.	-
STARTUP	LAST CHANNEL (Starts up with settings, which are set at the time of turns off the MSD last time.)	-

[Table 6.4] Factory default (5/5)

Function	Factory default	Set for each I/O/bmp*
BITMAP OUTPUT	OFF	1
BACKGROUND COLOR	R/G/B: 255 (white)	6
ASPECT	AUTO	6
POSITION	CENTER	6
CHANNEL ASSIGN	NONE (Not assigned)	1
POWER ON BITMAP	OFF	1
DIVIDE MEMORY	Divide: None Memory size: Assigns 128 blocks to 1 bitmap	-
DISPLAY POWER	OFF	1
COMMAND KEY	AUTO (Starts up with settings which were set on the MSD before the last power down.)	-
KEY LOCK	AUTO (Starts up with settings which were set on the MSD before the last power down)	-
KEY LOCK MODE	OFF	-
	For all keys	-
BUZZER	ON	-
COMMAND AUTO LOCK	ON	-
POWER SWITCH ON	0ms (0 second)	-
INPUT CHANNEL LINK	VIDEO/AUDIO: OFF	-
TOP DISPLAY	NORMAL	

6.9　Startup Time

The MSD can receive communication commands about 3 seconds after it is turned on. It can output video and audio and can be operated from the front panel about 7 seconds after it is turned on. However, if "POWER ON BITMAP" ("**7.14.7 Bitmap output at startup [POWER ON BITMAP]**") is set to ON, it may take longer.

7 Settings

7.1 Menu list

[Fig.7.1] Menu list (1/7)

```
[FUNCTION SELECT]    SET  [IMAGE EFFECT]      SET  [IN1 BRIGHTNESS]
IMAGE EFFECT    ⬍  ←──→ INPUT BRIGHTNESS ⬍  ←──→ 100%         ◄⬍►      →Input brightness [INPUT BRIGHTNESS]
SET              ESC      ▲ ▼               ESC
                         [IMAGE EFFECT]      SET  [IN1 CONT]  LINK:ON
                         INPUT CONTRAST  ⬍  ←──→ R:100 G:100 B:100◄⬍►  →Input contrast [INPUT CONTRAST]
                          ▲ ▼               ESC
                         [IMAGE EFFECT]      SET  [IN1 HUE]
                         INPUT HUE        ⬍  ←──→ 0°           ◄⬍►      →Hue [INPUT HUE]
                          ▲ ▼               ESC
                         [IMAGE EFFECT]      SET  [IN1 SATURATION]
                         INPUT SATURATION ⬍  ←──→ 100%         ◄⬍►      →Saturation [INPUT SATURATION]
                          ▲ ▼               ESC
                         [IMAGE EFFECT]      SET  [IN1 SETUP LEVEL]
                         INPUT SETUP LEVEL ⬍ ←──→ 0.0%         ◄⬍►      →Black level [INPUT SETUP LEVEL]
                          ▲ ▼               ESC
                         [IMAGE EFFECT]      SET  [IN1 DEFAULT COLOR]
                         IN DEFAULT COLOR ⬍  ←──→ SURE? = NO   ◄⬍►      →Input default color [IN DEFAULT
                          ▲ ▼               ESC                          COLOR]
   ▲ ▼                  [IMAGE EFFECT]      SET  [OUT1 BRIGHTNESS]
                         OUTPUT BRIGHTNESS ⬍ ←──→ 100%         ◄⬍►      →Output brightness [OUTPUT
                          ▲ ▼               ESC                          BRIGHTNESS]
                         [IMAGE EFFECT]      SET  [OUT1 CONT] LINK:ON
                         OUTPUT CONTRAST ⬍  ←──→ R:100 G:100 B:100◄⬍►  →Output contrast [OUTPUT
                          ▲ ▼               ESC                          CONTRAST]
                         [IMAGE EFFECT]      SET  [OUT1 DEFAULT COLOR]
                         OUT DEFAULT COLOR ⬍ ←──→ SURE? = NO   ◄⬍►      →Output default color [OUT
                          ▲ ▼               ESC                          DEFAULT COLOR]

[FUNCTION SELECT]    SET  [INPUT SETTING]     SET  [IN1 VIDEO DETECT]
INPUT SETTING   ⬍  ←──→ INPUT VIDEO DETECT  ←──→ 10000ms      ◄⬍►      →No-signal input monitoring
SET              ESC      ▲ ▼               ESC                          [INPUT VIDEO DETECT]
                         [INPUT SETTING]     SET  [IN1 HDCP INPUT]
                         HDCP INPUT ENABLE ←──→ ENABLE         ◄⬍►      →HDCP input enabled/disabled
                          ▲ ▼               ESC                          [HDCP INPUT ENABLE]
                         [INPUT SETTING]     SET  [IN1 EQUALIZER]
                         INPUT EQUALIZER ⬍  ←──→ ON            ◄⬍►      →Input equalizer [INPUT
   ▲ ▼                    ▲ ▼               ESC                          EQUALIZER]
                         [INPUT SETTING]     SET  [IN1 OFF CHECK]
                         INPUT OFF CHECK ⬍  ←──→ ON            ◄⬍►      →Automatic detection of input video
                          ▲ ▼               ESC                          interruption [INPUT OFF CHECK]

[FUNCTION SELECT]    SET  [INPUT TIMING]      SET  [IN1 H TOTAL DOTS]
INPUT TIMING    ⬍  ←──→ H TOTAL DOTS    ⬍  ←──→ 1344DOT       ◄⬍►      →The total number of horizontal dots
SET              ESC      ▲ ▼               ESC                          [H TOTAL DOTS]
                         [INPUT TIMING]      SET  [IN1 H START]
                         H START         ⬍  ←──→ 296DOT        ◄⬍►      →Horizontal start position
                          ▲ ▼               ESC                          [H START]
                         [INPUT TIMING]      SET  [IN1 H DISPLAY]
                         H DISPLAY       ⬍  ←──→ 1024DOT       ◄⬍►      →Horizontal display
                          ▲ ▼               ESC                          period [H DISPLAY]
   ▲ ▼                  [INPUT TIMING]      SET  [IN1 V START]
                         V START         ⬍  ←──→ 35LINE        ◄⬍►      →Vertical start position [V START]
                          ▲ ▼               ESC
                         [INPUT TIMING]      SET  [IN1 V DISPLAY]
                         V DISPLAY       ⬍  ←──→ 768LINE       ◄⬍►      →Vertical display period [V DISPLAY]
                          ▲ ▼               ESC
                         [INPUT TIMING]      SET  [IN1 INITIALIZE]
                         INITIALIZE      ⬍  ←──→ 1920x1080     ◄►       →Initialization [INITIALIZE]
                          ▲ ▼               ESC
```

[Fig.7.2] Menu list (2/7)

40

[FUNCTION SELECT]
OUTPUT SETTING

[OUTPUT SETTING]
OUTPUT EQUALIZER

[OUT1A EQUALIZER]
OFF

→Output equalizer [OUTPUT EQUALIZER]

[OUTPUT SETTING]
OUTPUT MODE

[OUT1A MODE]
HDMI YCbCr4:4:4 MODE

→Output mode [OUTPUT MODE]

[OUTPUT SETTING]
SYNC OUTPUT

[OUT1 SYNC OUTPUT]
ON

→Synchronous signal output with no input video [SYNC

[OUTPUT SETTING]
VIDEO OUTPUT

[OUT1 VIDEO OUTPUT]
BLUE

→Output video with no input video [VIDEO OUTPUT]

[OUTPUT SETTING]
VIDEO SWITCHING

[OUT1 SWITCHING]
FREEZE→FADE OUT-IN

→Window transition effect [VIDEO SWITCHING]

[OUTPUT SETTING]
SWITCHING SPEED

[OUT1 SPEED]
350ms

→Window transition speed [SWITCHING SPEED]

[OUTPUT SETTING]
WIPE COLOR

[OUT1 WIPE] LINK:ON
R: 0 G: 0 B: 0

→Wipe color [WIPE COLOR]

※

[OUTPUT SETTING]
OUTPUT CONNECTOR

[OUT1A VIDEO]
ON

→Video output connector [OUTPUT CONNECTOR]

[OUTPUT SETTING]
HDCP OUTPUT MODE

[OUT1A HDCP MODE]
ALWAYS

→HDCP output [HDCP OUTPUT MODE]

[OUTPUT SETTING]
HDCP ERROR RETRY

[OUT1A HDCP RETRY]
ETERNITY

→The number of HDCP retries [HDCP ERROR RETRY]

[OUTPUT SETTING]
DEEP COLOR OUTPUT

[OUT1A DEEP COLOR]
24-BIT COLOR

→Deep Color [DEEP COLOR OUTPUT]

[OUTPUT SETTING]
CEC CONNECTION

[OUT1A CEC]
NOT CONNECTED

→CEC (Consumer Electronics Control) [CEC CONNECTION]

[OUTPUT SETTING]
HDCP AUTHORIZATION

[OUT1A AUTH]
SURE? = NO

→HDCP re-authentication [HDCP AUTHORIZATION]

[OUTPUT SETTING]
FRAME LOCK

[FRAME LOCK]
OFF

→Frame lock mode [FRAME LOCK]

*Displayed only if HDBaseT output option is mounted.

[Fig.7.3] Menu list (3/7)

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| [FUNCTION SELECT]
AUDIO | SET
ESC | [AUDIO]
OUTPUT LEVEL
▲ ▼ | SET
ESC | [OUT1 AUDIO VOLUME]
0dB | →Audio output level [OUTPUT LEVEL] |

[AUDIO]
OUTPUT MUTE — SET / ESC → [OUT1 MUTE]
OFF → Mute [OUTPUT MUTE]

[AUDIO]
AUDIO INPUT SELECT — SET / ESC → [IN1 AUDIO SELECT]
AUTO(DIGITAL) → Audio input selection [AUDIO INPUT SELECT]

[AUDIO]
INPUT OFFSET — SET / ESC → [IN1 AUDIO OFFSET]
0dB → Audio input level [INPUT OFFSET]

[AUDIO]
OUTPUT LIP SYNC — SET / ESC → [OUT1 LIP SYNC]
0FRAME → Output lip sync [OUTPUT LIP SYNC]

[AUDIO]
INPUT LIP SYNC — SET / ESC → [IN1 LIP SYNC]
0FRAME → Input lip sync [INPUT LIP SYNC]

[AUDIO]
SAMPLING FREQUENCY — SET / ESC → [OUT1 FREQUENCY]
AUTO(48kHz) → Sampling frequency of analog audio input [SAMPLING FREQUENCY]

[AUDIO]
OUTPUT CONNECTOR — SET / ESC → [OUT1 AUDIO OUTPUT]
ANALOG&DIGITAL → Audio output connector [OUTPUT CONNECTOR]

※

[AUDIO]
DIGITAL OUTPUT — SET / ESC → [OUT1A D-AUDIO]
ON → Digital audio output connector [DIGITAL OUTPUT]

[AUDIO]
MULTI AUDIO — SET / ESC → [OUT1 MULTI AUDIO]
DOWN MIX → Multi-channel audio output [MULTI AUDIO]

[AUDIO]
TEST TONE — SET / ESC → [OUT1 TEST TONE]
OFF → Test tones [TEST TONE]

[FUNCTION SELECT]
EDID — SET / ESC → [EDID]
EDID DATA — SET / ESC → [IN1 EDID]
INTERNAL EDID → EDID setting [EDID DATA]

[EDID]
PC RESOLUTION — SET / ESC → [IN1 PC FORMAT]
1080p(1920x1080) → PC resolutions [PC RESOLUTION]

[EDID]
AV RESOLUTION — SET / ESC → [IN1 AV FORMAT]
AUTO → Input resolution for AV devices [AV RESOLUTION]

[EDID]
DEEP COLOR INPUT — SET / ESC → [IN1 DEEP COLOR]
24-BIT COLOR → Deep Color [DEEP COLOR INPUT]

[EDID]
AUDIO FORMAT — SET / ESC → [IN1 PCM]
MAX FREQ:48kHz → Audio format [AUDIO FORMAT]

[EDID]
SPEAKER — SET / ESC → [IN1 SPEAKER]
MODE:AUTO NUMBER:2 → Speaker configuration [SPEAKER]

[EDID]
MONITOR EDID COPY — SET / ESC → [MONITOR EDID COPY]
OUT1 No.1 COPY DATA1 → EDID Copy [MONITOR EDID COPY]

*Displayed only if HDBaseT output option is mounted.

[Fig.7.4] Menu list (4/7)

[FUNCTION SELECT]
COM PORT

[COM PORT]
PARAMETERS → [CH1 PARAMETERS]
9600 8 NONE 1 →RS-232C communication settings [PARAMETERS]

[COM PORT]
FUNCTION → [CH1 FUNCTION]
RECIEVER →RS-232C operation mode [FUNCTION]

[FUNCTION SELECT]
LAN

[LAN]
IP ADDRESS → [LAN IP ADDRESS]
192.168. 1.199 →IP address [IP ADRESS]

[LAN]
SUBNET MASK → [LAN SUBNET MASK]
255.255.255. 0 →Subnet mask [SUBNET MASK]

[LAN]
GATEWAY ADDRESS → [LAN GW ADDRESS]
192.168. 1.200 →Gateway address [GATEWAY ADDRESS]

[LAN]
FUNCTION → [CONNECTION1]
FUNC:RECIEVER →LAN operation mode [FUNCTION]

[LAN]
PORT NUMBER → [CONNECTION1 PORT]
1100 →TCP port number [PORT NUMBER]

[LAN]
MAC ADDRESS → [LAN MAC ADDRESS]
00-08-E5-5A-00-00 →Displaying MAC address [MAC ADDRESS]

[FUNCTION SELECT]
PRESET COMMAND

[PRESET COMMAND]
COMMAND EDIT → [COMMAND EDIT]
CMD 1 →Editing control commands [COMMAND EDIT]

[PRESET COMMAND]
RECV COMMAND EDIT → [RECV COMMAND EDIT]
CMD 1 →Reply commands [RECV COMMAND

[PRESET COMMAND]
COMMAND LINK → [COMMAND LINK]
COMMAND A →Control command association [COMMAND LINK]

[PRESET COMMAND]
COMMAND EXECUTION → [COMMAND EXECUTION]
COMMAND A →Command execution [COMMAND EXECUTION]

[PRESET COMMAND]
INVALID TIME → [INVALID TIME]
0s000ms →Invalid time [INVALID TIME]

[PRESET COMMAND]
INITIALIZE → [PRESET INITIALIZE]
CMD 1 →Initializing registered commands and associations [INITIALIZE]

[PRESET COMMAND]
COMMAND TALLY → [COMMAND A] LINK:ON
REGISTERED →Command execution key: Lighting condition [COMMAND TALLY]

[PRESET COMMAND]
FLASH TIME → [COMMAND A]
OFF →Flash time (Control command keys) [FLASH TIME]

[Fig. 7.5] Menu list (5/7)

[FUNCTION SELECT]
PRESET MEMORY

[PRESET MEMORY]
LOAD CROSS POINT

[LOAD CROSS POINT]
No. 1

→Loading cross point
[LOAD CROSS POINT]

[PRESET MEMORY]
SAVE CROSS POINT

[SAVE CROSS POINT]
No. 1

→Saving cross point
[SAVE CROSS POINT]

[PRESET MEMORY]
EDIT CROSS POINT

[EDIT CROSS POINT]
No. 1

→Editing cross point
[EDIT CROSS POINT]

※

[PRESET MEMORY]
LOAD ALL SETTING

[LOAD ALL SETTING]
No. 1

→ Loading all settings
[LOAD ALL SETTING]

[PRESET MEMORY]
SAVE ALL SETTING

[SAVE ALL SETTING]
No. 1

→Saving all settings
[SAVE ALL SETTING]

[PRESET MEMORY]
STARTUP

[STARTUP]
LAST CHANNEL

→Startup settings [STARTUP]

[FUNCTION SELECT]
BITMAP

[BITMAP]
BITMAP OUTPUT

[OUT1 BITMAP OUTPUT]
OFF

→Bitmap output [BITMAP OUTPUT]

[BITMAP]
BACKGROUND COLOR

[OUT1 COLOR]LINK:ON
R:255 G:255 B:255

→Background color
[BACKGROUND COLOR]

[BITMAP]
ASPECT

[OUT1 ASPECT]
AUTO

→Aspect ratio [ASPECT]

[BITMAP]
POSITION

[OUT1 POSITION]
CENTER

→Display position [POSITION]

[BITMAP]
CHANNEL ASSIGN

[OUT1 ASSIGN]
IN2 OFF

→Input bitmap channel assignment
[CHANNEL ASSIGN]

[BITMAP]
POWER ON BITMAP

[OUT1 POWER ON]
ON

→Bitmap output at startup
[POWER ON BITMAP]

[BITMAP]
DIVIDE MEMORY

[DIVIDE MEMORY]
MODE:RESIZE NUMBER:1

→Dividing memory area
[DIVIDE MEMORY]

[BITMAP]
VIDEO CAPTORE

[VIDEO CAPTER]
OUT1

→Input image capture
[VIDEO CAPTURE]

[FUNCTION SELECT]
POWER ON SETTING

[POWER ON SETTING]
DISPLAY POWER

[DISPLAY1 POWER]
OFF

→DISPLAY POWER keys
[DISPLAY POWER]

[POWER ON SETTING]
COMMAND KEY

[COMMAND KEY]
AUTO

→Control command keys
[COMMAND KEY]

[POWER ON SETTING]
KEY LOCK

[KEY LOCK]
AUTO

→Key lock [KEY LOCK]

*Not displayed if the setting is not saved.

[Fig. 7.6] Menu list (6/7)

```
              ┌──→
              │      ┌────────────────────┐ SET ┌────────────────────┐ SET ┌────────────────────┐
              │      │[FUNCTION SELECT]   │←────│[OTHERS]            │←────│[KEY LOCK MODE]  ◄▲▼►│   →Setting key lock mode [KEY LOCK MODE]
          SET │ SET  │OTHERS            ↕ │────→│KEY LOCK MODE     ↕ │────→│CHANNEL       :LOCK │
              │      └────────────────────┘ ESC └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[BUZZER]            │   →Key buzzer [BUZZER]
                                                 │BUZZER            ↕ │────→│ON                ↕ │
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[COMMAND AUTO LOCK] │   →Automatic key lock for control command
                                                 │COMMAND AUTO LOCK ↕ │────→│ON                ↕ │    keys [COMMAND AUTO LOCK]
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[FRONT POWER SW]    │   →DISPLAY POWER key pressing time
                                                 │POWER SWITCH ON   ↕ │────→│0ms            ◄▲▼► │    length [POWER SWITCH ON]
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[INPUT CHANNEL LINK]│   →Input channel automatic linking
                                                 │INPUT CHANNEL LINK↕ │────→│VIDEO:OFF      ◄▲▼► │    [INPUT CHANNEL LINK]
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[TOP DISPLAY]       │   →Top VFD screen [TOP DISPLAY]
                                                 │TOP DISPLAY       ↕ │────→│NORMAL            ↕ │
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│IN1 2 3 4 5 6 7 8   │   →Input signal status [INPUT STATUS]
                                                 │INPUT STATUS      ↕ │────→│↕  H*  D   H H D    │
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│OUTA1 2 3 4B1 2 3 4 │   →Display device status [MONITOR STATUS]
                                                 │MONITOR STATUS    ↕ │────→│↕  S  S    S S      │
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[OUT1A]MSD-804FD    │   →EDID of display device
                                                 │EDID STATUS       ↕ │────→│1920x1080 148.50MHz↕│    [EDID STATUS]
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
                                                 ┌────────────────────┐ SET ┌────────────────────┐
                                                 │[OTHERS]            │←────│[VERSION]           │   →Version information [VERSION]
                                                 │VERSION           ↕ │────→│MSD-804FD 1.00      │
                                                 └────────────────────┘ ESC └────────────────────┘
                                                     ┌──┐┌──┐
                                                     │▲ ││▼ │
                                                     └──┘└──┘
```

[Fig.7.7] Menu list (7/7)

Some menus can be set separately as follows, and those setting units are shown on the top right of each section in this manual.

For each output (common to OUTA and OUTB)	You can set the menu for OUTA and OUTB. The setting will apply both OUTA and OUTB.
For each output (OUTA and OUTB separately)	You can set the menu for each OUTA and OUTB separately.
For each output (only OUTA)	You can set the menu only for OUTA.
For each input port/input signal	You can set the menu for each input and input signals separately. (For details, see "**7.2 Input Signal Automatic Detection**")
For each input	You can set the menu for each input separately.
For each output/bitmap	You can set the menu for each output and bitmap separately.

For each digital input/analog input/input signals only digital input) You can set the menu for each digital input and analog input separately.

Menus which can be set for each OUTA and OUTB separately, is displayed differently depending on whether HDBaseT output (optional extra) is mounted or not.

    With HDBaseT output optional extra

```
[OUT1A MODE]      ◄↕►
HDMI YCbCr4:4:4 MODE
```
```
[OUT1B MODE]      ◄↕►
HDMI YCbCr4:4:4 MODE
```

    Without HDBaseT output optional extra

```
[OUT1 MODE]       ◄↕►
HDMI YCbCr4:4:4 MODE
```

7.2 Input Signal Automatic Detection

The MSD continuously monitors input signals. If input signals that have been input before, they are output with the same size and quality of view used previously. If input signals are not matched with any signal settings that have been input before, only settings of input timing is initialized and other settings are not changed. Adjust the size and quality of view as necessary.
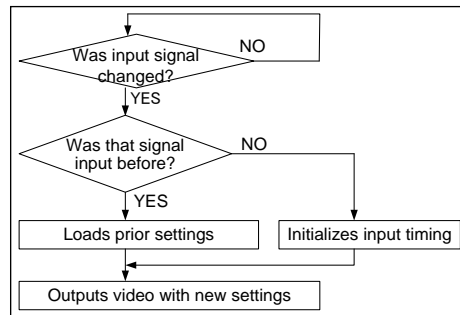
[Fig. 7.8] How signals are recognized

The MSD saves data of 50 input devices for each channel, and the data is used to check whether the input signals have been input before or not. To save the data of the 51st device, the oldest data that have not been input recently will be deleted, instead.

	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9
1	1080i	1080i	UXGA	UXGA	WXGA	NTSC	NTSC	WXGA	UXGA
2	720p	480i	WXGA	VGA	SVGA	XGA	WXGA	720p	720p
3	480i		SXGA+						
4	XGA								
5	SXGA								
6	UXGA								
49	VGA								
50	1080p								

Memory area for 50 devices per channel

When new signals are input, the oldest data will be overwritten.

[Fig. 7.9] Memory table per channel

The data of the following settings are stored for each input signal.

・7.3 Setting position, size, and Masking	・7.6 Input Timing Settings
・7.3.3 Aspect ratio control of input video	・7.6.2 Horizontal start position
・7.3.4 Aspect ratio restoration	・7.6.3 Horizontal display period
・7.3.5 Overscan	・7.6.4 Vertical start position
・7.3.6 Input position	・7.6.5 Vertical display period
・7.3.7 Input size	・7.8 Audio Setting*
・7.3.8 Input masking	・7.8.4 Input level
・7.4 Video correction	・7.8.6 Input lip sync
・7.4.1 Input brightness	
・7.4.2 Input contrast	
・7.4.3 Hue	
・7.4.4 Saturation	
・7.4.5 Black level	

* Only if digital audio input is selected, settings of Input level and lip sync will be saved.

7.3 Setting Position, Size, and Masking

Position, size, and masking can be set for each input and output. Normally, set them for each input. If edges are cut off due to enlarged display in the display device side or if enlarging output video for all inputs at once, set them for the output side.

[Normally, set the position, size, and masking for each input in the input side.]
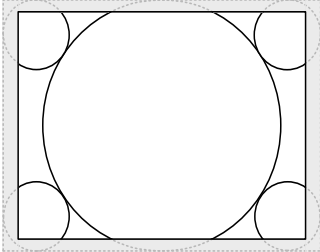
Video is enlarged according to the setting of input side and top/bottom/right/left sides are cut off slightly.
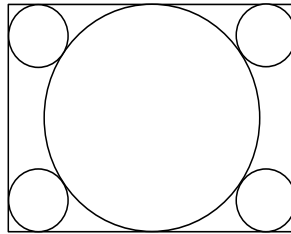
Default values of output side is not changed. Position and size are not changed.
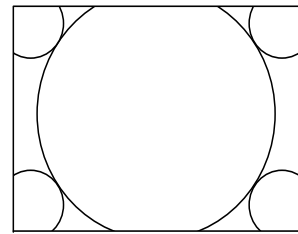
Settings set in the input side are applied to output video.

[Set the position, size, and masking in the output side if edges are cut off due to enlarged display in the display device side.]
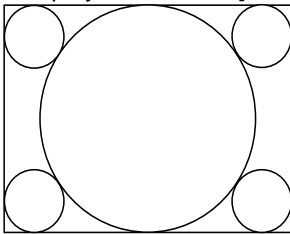
Default values of input side is not changed. Position and size are not changed.
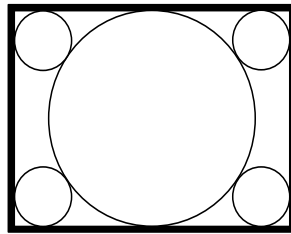
Video size is reduced in the output side and black bars are displayed at top/bottom/right/left.
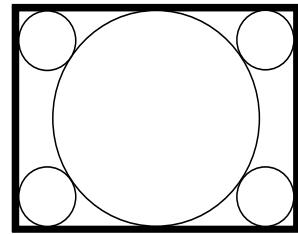
Settings set in the output side are applied to output video.

[You can enlarge video for each input and output side separately.]
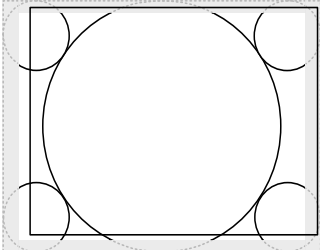
Video is enlarged according to the setting of input side and top/bottom/right/left sides are cut off slightly.
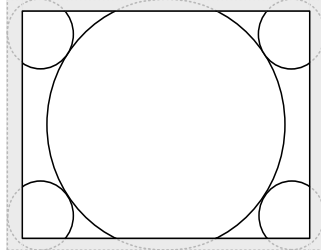
Video is enlarged according to the setting of output side and top/bottom/right/left sides are cut off slightly.
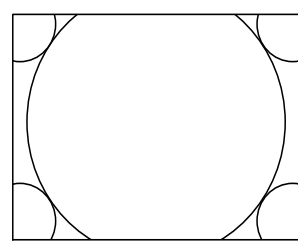
Video enlarged in the input side is enlarged again in the output side.

[Fig.7.10] Setting position, size, and masking of I/O

[If edges are cut off due to enlargement in the display device side]

If video is input to a wide TV or the like, the video is automatically enlarged and displayed, and sometimes edges are cut off. In this case, change the display size (such as "Full display", "Wide display"). If the problem is still not resolved, set "**7.3.10 Output position [OUTPUT POSITION]**" and "**7.3.11 Output size [OUTPUT SIZE]**".

With HDBaseT output option:

If OUTA and OUTB are connected and their maximum input resolutions are not the same, apply the smaller input resolution. By doing so, the video of the smaller resolution is not cut off, but the background color set in "**7.3.14 Background color [BACKGROUND COLOR]**" is displayed on the edges for the video of the larger input resolution.

To set output position and size:

■	Steps
1	Select "OUTPUT FRAME" in "**7.3.15 Test pattern [TEST PATTERN]**".
2	Set the display position by following "**7.3.10 Output position [OUTPUT POSITION]**" to match the upper left of the display device and test pattern.
3	Reduce the test pattern by following "**7.3.11 Output size [OUTPUT SIZE]**" to match the lower right of the display device and the test pattern.
4	Set the test pattern to "OFF".

Test pattern

Edges of the top, bottom, right, and left are cut off due to enlarged display in the display device side.

Match the upper left of the test pattern with the upper left of the display device.

Match the upper right of the test pattern with the upper right of the display device.
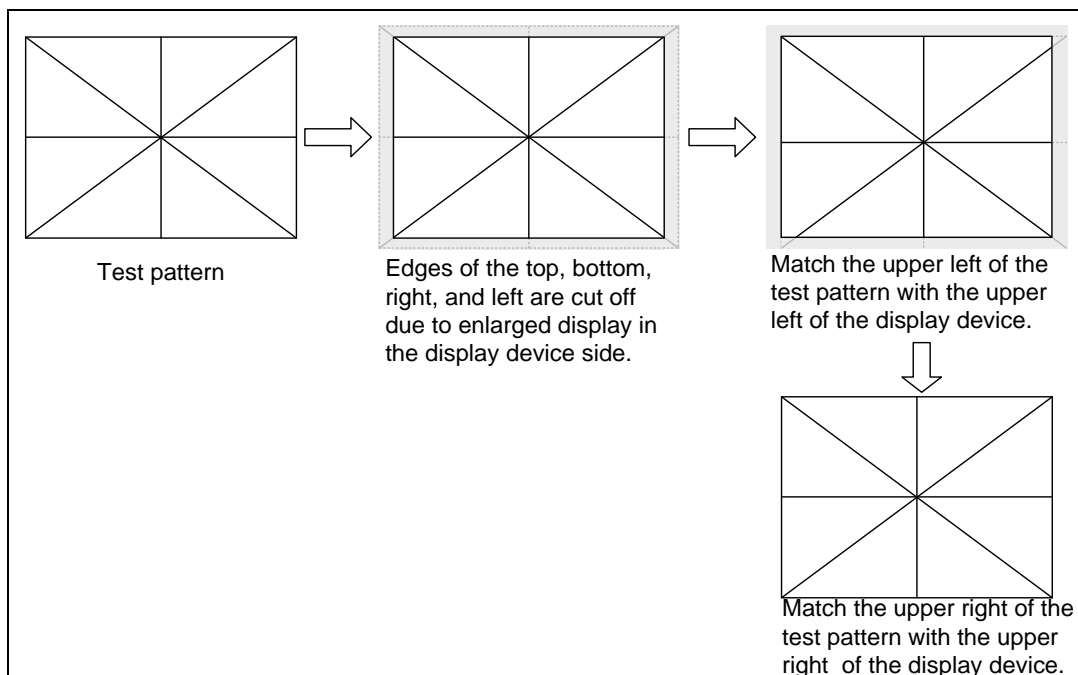
[Fig. 7.11] Setting position, size, and masking of output side

7.3.1　Output resolution [RESOLUTION]

For each output (common to OUTA and OUTB)

If you select "AUTO-A" or "AUTO-B", the optimum resolution is automatically applied.*
If you want to select a resolution other than "AUTO", select the same resolution as the display device so that the video is displayed more clearly.
If you change the output resolution, relative display position and size of the output video are not changed.

* If you select "AUTO-A" or "AUTO-B", the MSD finds the optimal resolution from EDID (see section "**7.9 EDID (Extended Display Identification Data)**" for details) of the display device and displays the current resolution in brackets on the VFD screen. If the MSD cannot load EDID from the display device, it outputs the video with the resolution used the last time and displays a "*" after the current output resolution. Available output resolutions of The MSD are as follows and they can only be selected manually. If the resolution of the display device is not found, the closest resolution is used and a "*" is displayed after the resolution as well.

```
[RESOLUTION]
AUTO(1080p59.94)        ⬍
```

```
[RESOLUTION]
AUTO(1080p59.94)*       ⬍
```
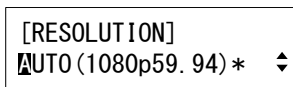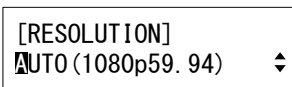
[With the optimum resolution]　　　[EDID cannot be load or without identical optimum resolution]

AUTO-A　[Default]	SXGA+@60 (1400x1050)	576p@50 (720x576)
AUTO-B*	WXGA+@60 (1440x900)	720p@50 (1280x720)
VGA@60 (640x480)	WXGA++@60 (1600x900)	720p@59.94 (1280x720)
SVGA@60 (800x600)	UXGA@60 (1600x1200)	720p@60 (1280x720)
XGA@60 (1024x768)	WSXGA+@60 (1680x1050)	1080i@50 (1920x1080)
WXGA@60 (1280x768)	VESAHD@60 (1920x1080)	1080i@59.94 (1920x1080)
WXGA@60 (1280x800)	WUXGA@60 (1920x1200)	1080i@60 (1920x1080)
Quad-VGA@60 (1280x960)	QWXGA@60 (2048x1152)	1080p@50 (1920x1080)
SXGA@60 (1280x1024)	480i@59.94 (720x480)	1080p@59.94 (1920x1080)
WXGA@60 (1360x768)	480p@59.94 (720x480)	1080p@60 (1920x1080)
WXGA@60 (1366x768)	576i@50 (720x576)	

　　　*"AUTO-B" is displayed only if HDBaseT output option is mounted.
　　Numbers following "@" are vertical synchronous frequency. For outputting high definition, 50Hz/59.94Hz/60Hz can be selected.
　　480i/480p/576i/576p/720p/1080i/1080p are the timings of CEA-861E standard. Others are timings meeting VESA DMT standard or VESA CVT standard. VESAHD@60, WUXGA@60, and QWXGA@60 are output with Reduced Blanking.

Note 1:

If connecting an IDK's distribution amplifier between the MSD and display device and set the resolution to "AUTO", set the EDID of the distribution amplifier to "EXTERNAL" which enables the MSD to load the EDID from the display device.

Note 2:

If "**7.7.14 Frame lock mode [FRAME LOCK]**" is set to ON, the same resolution is applied to all outputs. You cannot select output.

```
[OUT1 RESOLUTION]◄⬍►
AUTO-A(1080i 59.94)
```

```
[RESOLUTION]            ⬍
AUTO-A(1080i 59.94)
```
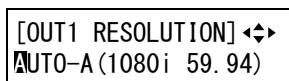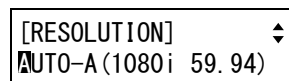
["FRAME LOCK" is set to OFF]　　　["FRAME LOCK" is set to ON]

1. **To set output resolution using menu:**

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "OUTPUT TIMING".
│ [FUNCTION SELECT]   │
│ OUTPUT TIMING    ⬍  │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "RESOLUTION".
│ [OUTPUT TIMING]     │
│ RESOLUTION       ⬍  │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼keys: Select the desired resolution.
│ [OUT1 RESOLUTION]◄⬍►│   ◄►keys: Select the desired output (OUT1 to OUT4).
│ AUTO-A(1080i 59.94) │
└─────────────────────┘
        ↓ ESC key: Returns to the previous screen
```
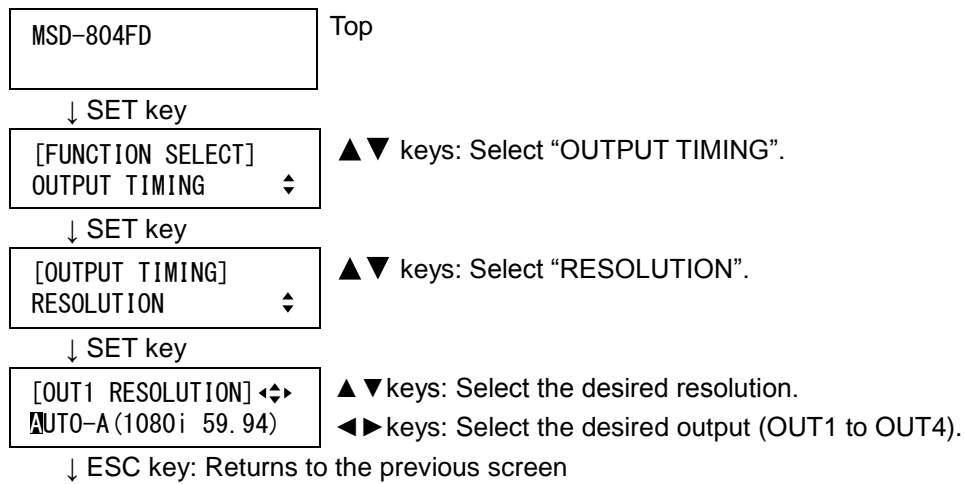
2. To set output resolutions using commands:

@SOT Set output resolution

@GOT Get output resolution

@GTD Get actual output resolution

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7.3.2   Aspect ratio control of output video [MONITOR ASPECT]

For each output (common to OUTA and OUTB

This setting will be used to restore the aspect ratio to the normal ratio in "**7.3.3 Aspect ratio control of input video [INPUT ASPECT]**".

```
・RESOLUTION   [Default]      ・5:3
・4:3                          ・16:9
・5:4                          ・16:10
```

If you select "RESOLUTION", the aspect ratio of the resolution selected in "**7.3.1 Output resolution [RESOLUTION]**" is applied.

[Table 7.1] Output resolution and aspect ratio

Output resolution	Aspect ratio	Output resolution	Aspect ratio	Output resolution	Aspect ratio
VGA(640×480)	4:3	WXGA(1360×768)	16:9	VESAHD(1920×1080)	16:9
SVGA(800×600)	4:3	WXGA(1366×768)	16:9	WUXGA(1920×1200)	16:10
XGA(1024×768)	4:3	SXGA+(1400×1050)	4:3	QWXGA(2048x1152)	16:9
WXGA(1280×768)	5:3	WXGA+(1440×900)	16:10	480i,p(720×480)	4:3
WXGA(1280×800)	16:10	WXGA++(1600×900)	16:9	576i,p(720×576)	4:3
Quad-VGA(1280×960)	4:3	UXGA(1600×1200)	4:3	720p(1280×720)	16:9
SXGA(1280×1024)	5:4	WSXGA+(1680×1050)	16:10	1080i,p(1920×1080)	16:9

If aspect ratio of the target display device and the ratio set in "**7.3.1 Output resolution [RESOLUTION]**" differ, you can select an aspect ratio of the display device from "4:3", "5:4", "5:3", "16:9", and "16:10".

1. To select aspect ratio of the display device to be connected using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING      ⬍
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
MONITOR ASPECT     ⬍
```
▲▼ keys: Select "MONITOR ASPECT".

↓ SET key

```
[OUT1 MONITOR]
RESOLUTION        ⬌⬍
```
▲▼ keys: Select the desired monitor aspect.
(RESOLUTION, 4:3, 5:4, 5:3, 16:9, 16:10)
◀▶ keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen
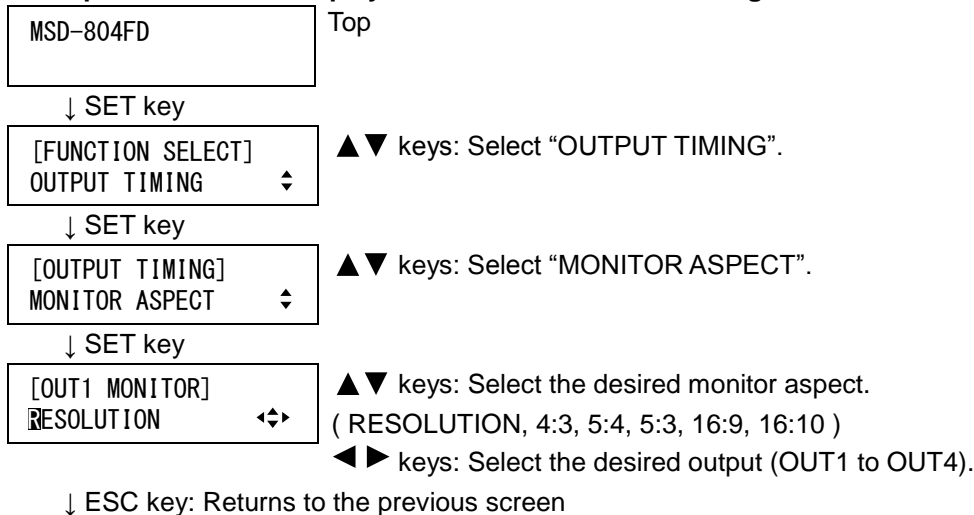
2. To select aspect ratio of the display device to be connected using commands:

@SUM: Set display aspect ratio
@GUM: Get display aspect ratio

7.3.3 Aspect ratio control of input video [INPUT ASPECT]

For each input port/input signal

- ・AUTO-1 [Default]
- ・AUTO-2
- ・4:3
- ・16:9
- ・14:9
- ・16:9 LETTER BOX
- ・14:9 LETTER BOX
- ・4:3 SIDE PANEL
- ・14:9 SIDE PANEL
- ・FULL
- ・THROUGH

If you select "AUTO-1" or "AUTO-2", the aspect ratio will be restored automatically to the original ratio according to the settings of "**7.3.2 Aspect ratio control of output video [MONITOR ASPECT]**" and "**7.3.4 Aspect ratio control [ASPECT PROCESS]**".

"AUTO-1" and "AUTO-2" work differently only when letter box signals are input. "AUTO-1" processes them as video signals of 16:9 or 14:9 while "AUTO-2" sets them as 4:3. Normally, no problem occurs if you set the aspect ratio to "AUTO-1", but some DVD players and other devices display subtitles or setup menus on the area that does not have letter box signal video, which may not be displayed within the screen. In such case, set the aspect to "AUTO-2" to display the whole video.
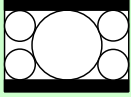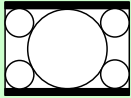
[Selecting "LETTER BOX/SIDE PANEL" for aspect ratio restoration processing]

Input signal	Aspect ratio of connected display device*				
	4:3	5:4	5:3	16:9	16:10
4:3 video signal		BC: top&bottom	BC: right&left	BC: right&left	BC: right&left
5:4 video signal	BC: right&left		BC: right&left	BC: right&left	BC: right&left
5:3 video signal	BC: top&bottom	BC: top&bottom		BC: right&left	BC: top&bottom
16:9 video signal	BC: top&bottom	BC: top&bottom	BC: top&bottom		BC: top&bottom
16:10 video signal	BC: top&bottom	BC: top&bottom	BC: right&left	BC: right&left	
14:9 video signal	BC: top&bottom	BC: top&bottom	BC: right&left	BC: right&left	BC: right&left

*The aspect ratio selected for the display device will be the base.   BC=Background color (Default: black)

[Fig. 7.2] Restoring aspect ratio -1(1/2)
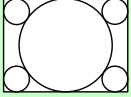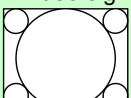
[Selecting "LETTER BOX/SIDE PANEL" for aspect ratio restoration processing]

Input signal	Aspect ratio of destination display device*				
	4:3	5:4	5:3	16:9	16:10
16:9 letter box	AUTO-1				
	Cut: top&bottom BC: top&bottom	Cut: top&bottom BC: top&bottom	Cut: top&bottom BC: top&bottom	Cut: top&bottom	Cut: top&bottom BC: top&bottom
	AUTO-2				
		BC: top&bottom	BC: right&left	BC: right&left	BC: right&left
14:9 letter box	AUTO-1				
	Cut: top&bottom BC: top&bottom	Cut: top&bottom BC: top&bottom	CUT: top&bottom BC: right&left	CUT: top&bottom BC: right&left	CUT: top&bottom BC: right&left
	AUTO-2				
		BC: top&bottom	BC: right&left	BC: right&left	BC: right&left

*The aspect ratio selected for the display device will be the base.

[Fig. 7.3] Restore aspect ratio -1(2/2)
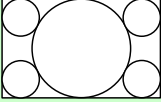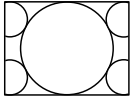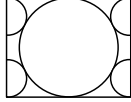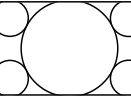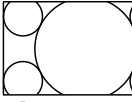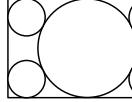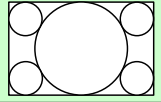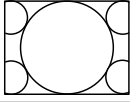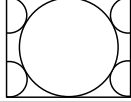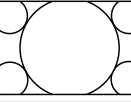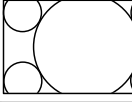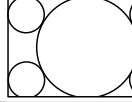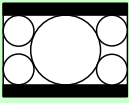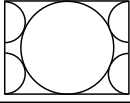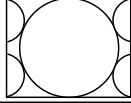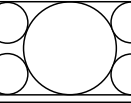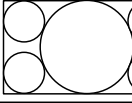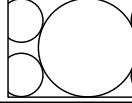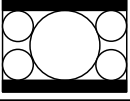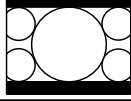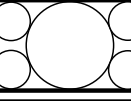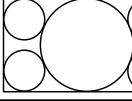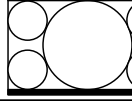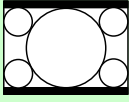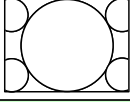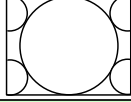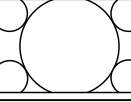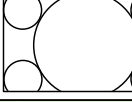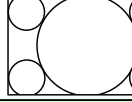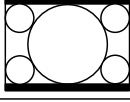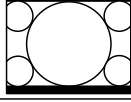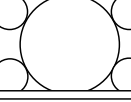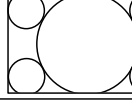
[Selecting "SIDE CUT/TOP BOTTOM CUT" for aspect ratio restoration processing]

Input signal	Aspect ratio of destination display device*				
	4:3	5:4	5:3	16:9	16:10
4:3 video signal		Cut:right&left	Cut:top&bottom	Cut:top&bottom	Cut:top&bottom
5:4 video signal	Cut:top&bottom		Cut:top&bottom	Cut:top&bottom	Cut:top&bottom
5:3 video signal	Cut:right&left	Cut:right&left		Cut:top&bottom	Cut:right&left
16:9 video signal	Cut:right&left	Cut:right&left	Cut:right&left		Cut:right&left

*The aspect ratio selected for the display device will be the base.

[Fig. 7.4] Restore aspect ratio -2(1/2)

[Selecting "SIDE CUT/TOP BOTTOM CUT" for aspect ratio restoration processing]

Input signal	Aspect ratio of destination display device*				
	4:3	5:4	5:3	16:9	16:10
16:10 video signal	Cut: right&left	Cut: right&left	Cut: top&bottom	Cut: top&bottom	
14:9 video signal	Cut: right&left	Cut: right&left	Cut:top&bottom	Cut:top&bottom	Cut:top&bottom
16:9 letter box signal	AUTO-1				
	Cut:top&bottom, right&left	Cut:top&bottom, right&left	Cut:top&bottom, right&left	Cut:top&botto	Cut:top&bottom, right&left
	AUTO-2				
		Cut: right&left	Cut:top&bottom	Cut:top&bottom	Cut:top&bottom
14:9 letter box signal	AUTO-1				
	Cut:top&bottom, right&left	Cut:top&bottom, right&left	Cut:top&bottom	Cut:top&bottom	Cut:top&bottom
	AUTO-2				
		Cut: right&left	Cut:top&bottom	Cut:top&bottom	Cut:top&bottom

*The aspect ratio selected for the display device will be the base.

[Fig. 7.5] Restore aspect ratio -2(2/2)
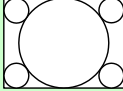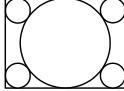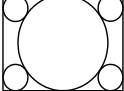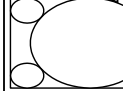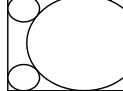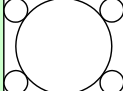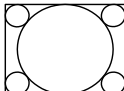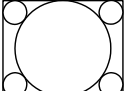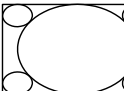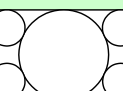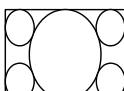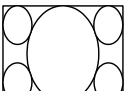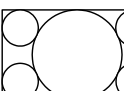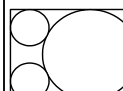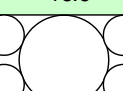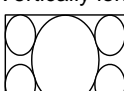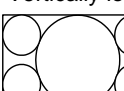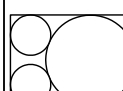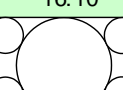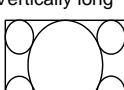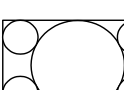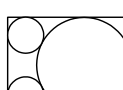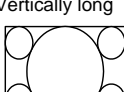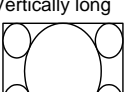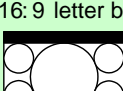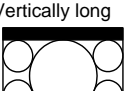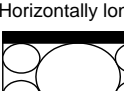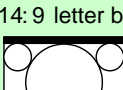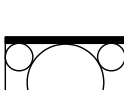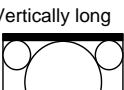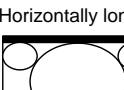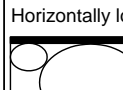
The aspect ratio of HDMI signals is restored based on packets called InfoFrame, which is the data of signals to be transmitted. The identification information of aspect ratio is also included in InfoFrame.

Even with "AUTO-1" or "AUTO-2", the aspect ratio is not restored if recognition signals with valid aspect ratio is not input. If HDMI signals (SDTV) is input, the MSD performs in the same way as when the input aspect ratio is 4:3; if HDMI signals (SDTV) is input, it performs as when the input aspect ratio is 16:9.

If no recognition signals with valid aspect ratio is input or if you use the fixed aspect ratio, you can select "4:3", "16:9", "14:9", "16:9 LETTER BOX", "14:9 LETTER BOX", "4:3 SIDE PANEL", or "14:9 SIDE PANEL".

Settings of "4:3", "16:9", "14:9", "16:9 LETTER BOX", "14:9 LETTER BOX", "4:3 SIDE PANEL" and "14:9 SIDE PANEL" are valid only if TV signals are input. If PC signals are input and even if you select "AUTO-1", "AUTO-2", "4:3", "16:9", "14:9", "16:9 letter box", "14:9 letter box", "4:3 side panel", or "14:9 side panel", the aspect ratio will be selected automatically based on the aspect ratio of the input signals.

If you select "FULL", video is displayed in full screen at all times regardless of input video signals, settings of "**7.3.2 Aspect ratio control of output video [MONITOR ASPECT]**" and "**7.3.4 Aspect ratio control [ASPECT PROCESS]**".

Input signal	Aspect ratio of destination display device				
	4:3	5:4	5:3	16:9	16:10
4:3		Vertically long	Horizontally	Horizontally	Horizontally
5:4	Horizontally long		Horizontally long	Horizontally long	Horizontally long
5:3	Vertically long	Vertically long		Horizontally long	Vertically long
16:9	Vertically long	Vertically long	Vertically long		Vertically long
16:10	Vertically long	Vertically long		Horizontally long	
14:9	Vertically long	Vertically long	Horizontally long	Horizontally long	Horizontally long
16: 9 letter box		Vertically long	Horizontally long	Horizontally long	Horizontally long
14: 9 letter box		Vertically long	Horizontally long	Horizontally long	Horizontally long

*   Aspect ratio set for the display device refereed

[Table 7.6] Full screen display

Note:

If you select "THROUGH", the input video is displayed with pixel ratio of 1:1 regardless of settings of "**7.3.2 Aspect ratio control of output video [MONITOR ASPECT]**" and "**7.3.4 Aspect ratio control [ASPECT PROCESS]**".

1. To set the aspect ratio control using menu:

| MSD-804FD | Top |

↓ SET key

| [FUNCTION SELECT] |
| OUTPUT TIMING ⬍ |

▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

| [OUTPUT TIMING] |
| INPUT ASPECT ⬍ |

▲▼ keys: Select "INPUT ASPECT".

↓ SET key

| [IN1 ASPECT] |
| AUTO-1 ⬌⬍ |

▲▼ keys: Select the desired aspect ratio.
◄ ► keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen
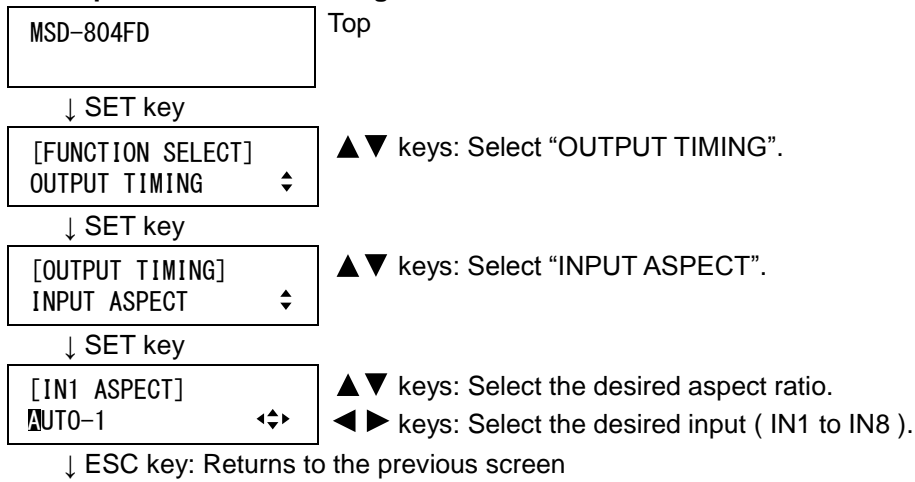
2. To set the aspect ratio control using commands:

@SAP: Set aspect ratio
@GAP: Get aspect ratio

7.3.4　Aspect ratio control [ASPECT PROCESS]

For each input port/input signal

You can select a processing of aspect ratio control.

> ·Letter box/Side panel: L-BOX/S-PANEL　[Default]
> ·Side cut/Top bottom cut: S-CUT/TB-CUT

"L-BOX/S-PANEL": The input video is displayed in the center, and the background color set in "**7.3.14 Background color [BACKGROUND COLOR]**" is displayed on the blank areas (top/bottom and right/left).

"S-CUT/TB-CUT": Part of the top/bottom or right/left is cut off, and the background color is not displayed. Also if you select "S-CUT/TB-CUT", part of the input video is not displayed.

Input signal	Output signal	
	L-BOX/S-PANEL	S-CUT/TB-CUT
16:9 input video is output to a 4:3 display device.	Letter box	Side cut
4:3 input video is output to a 16:9 display device.	Side panel	Top/bottom cut
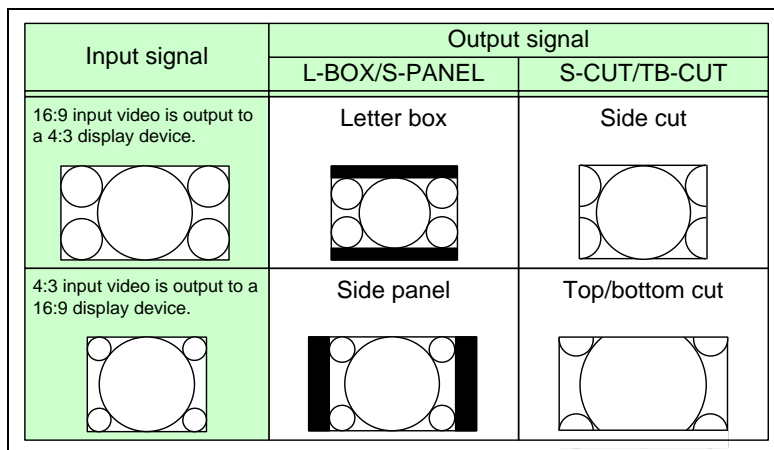
[Fig. 7.7] Restoring aspect ratio

1. To set processing for restoring aspect ratio using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING      ↕
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
ASPECT PROCESS     ↕
```
▲▼ keys: Select "ASPECT PROCESS".

↓ SET key

```
[IN1 PROCESS]
L-BOX/S-PANEL    ⟐
```
▲▼ keys: Select " L-BOX/S-PANEL" or "S-CUT/TB-CUT".
◀ ▶ keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen
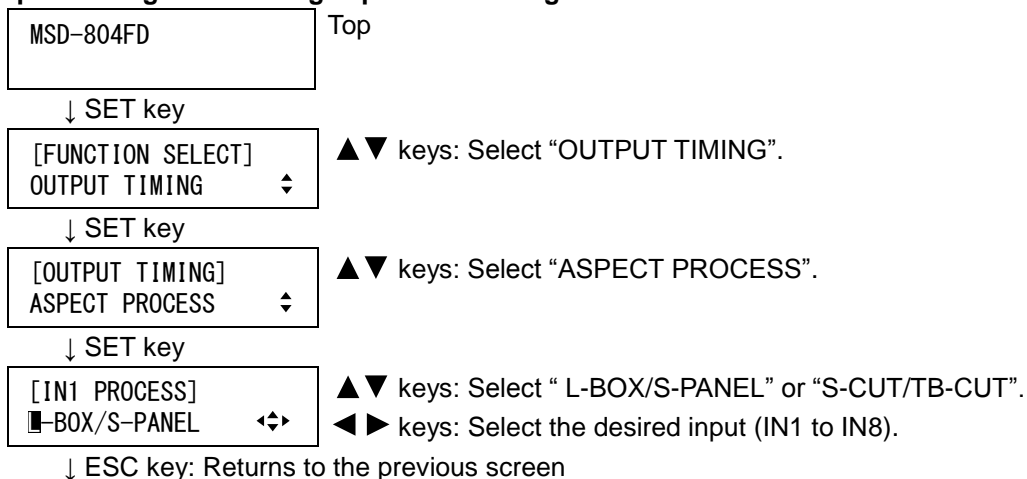
2. To set processing for restoring aspect ratio using commands:

@SAR: Set aspect ratio restoration
@GAR: Get aspect ratio restoration

7.3.5 Overscan [INPUT OVER SCAN]

・The enlargement rate: 100% to 115%
    [Default values]:
      105% for SDTV
      100% for HDTV/VESA: On the full screen

The effective display areas of SDTV are narrowed slightly during edit. If they are displayed without any change, areas without videos (usually black bars) are displayed on edges. To avoid this problem, input videos are enlarged slightly, called Overscan.

HDTV and VESA are displayed on the full effective display area. (Some HDTV signals include areas which display black bars on the edges depending on sources.)

1. To set the overscan using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "OUTPUT SETTING".
│ [FUNCTION SELECT]   │
│ OUTPUT TIMING     ◆ │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "INPUT OVER SCAN".
│ [OUTPUT TIMING]     │
│ INPUT OVER SCAN   ◆ │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select the desired overscan rate (100% to 115%).
│ [IN1 OVER SCAN]     │   ◀ ▶ keys: Select the desired input (IN1 to IN8).
│ 105%            ◄◆► │
└─────────────────────┘
        ↓ ESC key: Returns to the previous screen
```
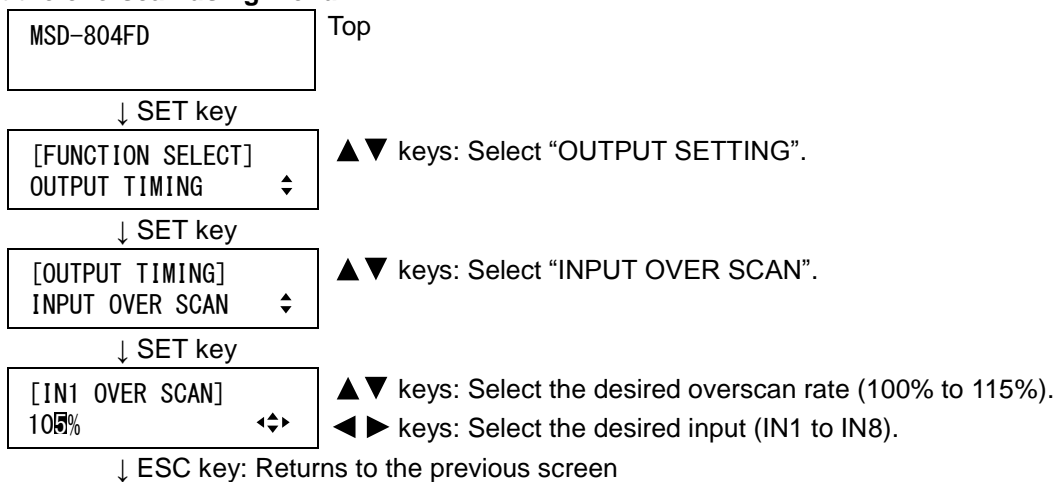
2. To set the overscan using commands:

    @SOV: Set overscan
    @GOV: Get overscan

7. 3. 6   Input position [INPUT POSITION]

For each input port/input signal

You can set the position for each input video by using this menu or for each output by following "**7.3.10 Output position [OUTPUT POSITION]**". Normally, set the position, size, and masking of each input in settings of each input. If edges are cut off due to enlarged display in the display device or if you want to change positions of output videos for all channels at once, set the position for each output.

▪ Horizontal position: Changed in a unit of pixel   [Default]: 0
▪ Vertical position: Changed in a unit of line   [Default]: 0

Note:

If the resolutions of each output are not the same, the resolution of OUT1 will be the standard.

[Horizontal position]   [Vertical position]
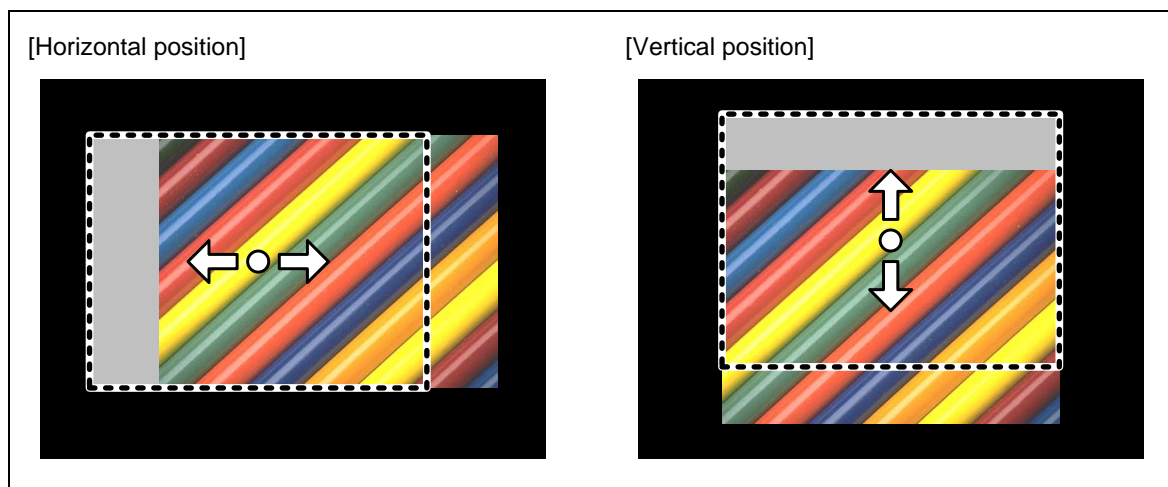
[Fig. 7.8] Input position

The range depends on "**7.3.1 Output resolution [RESOLUTION]**" and "**7.3.7 Input size [INPUT SIZE]**", and the minimum settable values of the top, bottom, right and left are the values to disappear from the screen.
If the display position exceeds the settable range by changing display size, the display position will be set to the maximum value automatically.
Default is 0, and the video is displayed starting from the upper left of the display device.

1. To set the input video position (pixel position) using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING        ⬍
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
INPUT POSITION       ⬍
```
▲▼ keys: Select "INPUT POSITION".

↓ SET key

```
[IN1 POSITION]
H:    0  V:      0  ⬌⬍▸
```
▲▼ keys: Set the horizontal position of IN1.

↓ ◄ ► keys

60
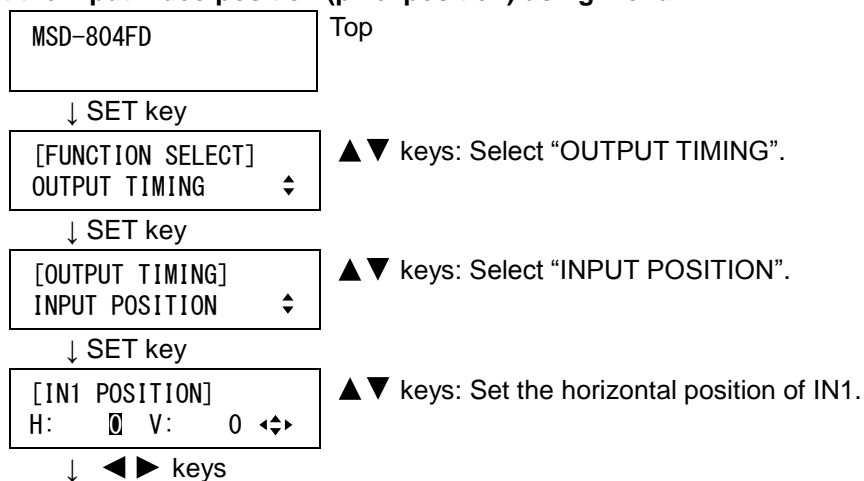
```
[IN1 POSITION]
H:   0  V:   0 ◄◆►
```

▲▼ Keys: Set the vertical position of IN1.

↓ ESC key: Returns to the previous screen

2. To set the input video position (pixel position) using commands:

@SNP: Set input position

@GNP: Get input position

For each input port/input signal

7.3.7   Input size [INPUT SIZE]

You can set the display size of input video by the number of pixels. The video size is scaled based on the upper left of the input video set in "**7.3.6 Input position [INPUT POSITION]**".

You can set the size for each input by using this menu or for each output by following "**7.3.11 Output size [OUTPUT SIZE]**". Normally, set the position, size, and masking of each input separately by using the settings of each input. If edges are cut off due to enlarged display in the display device or if you want to enlarge output video of all channels at once, set the position for each output.

▪ Horizontal size: Scaled in a unit of pixel   [Default]: Horizontal output resolution
▪ Vertical size: Scaled in a unit of line   [Default]: Vertical output resolution

Note:

If the resolutions of each output are not the same, the resolution of OUT1 will be the standard.
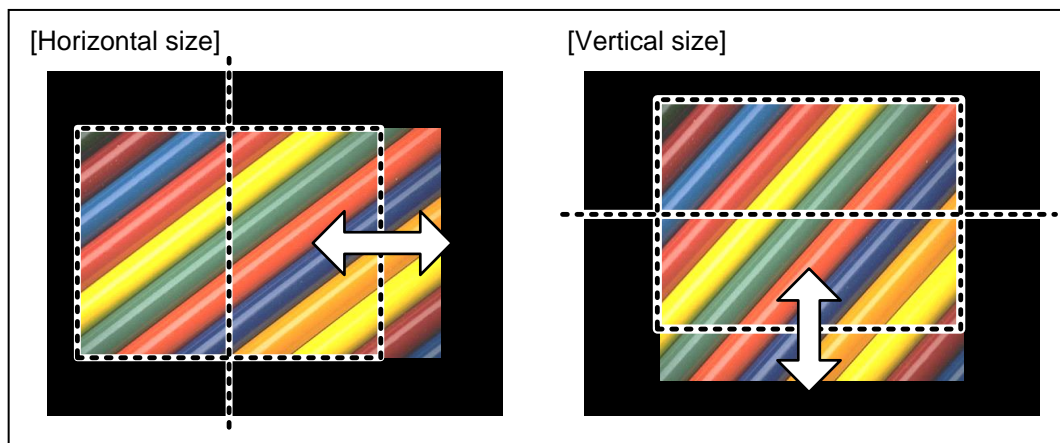
[Fig. 7.9] Input size

The set range and default value depend on settings of "**7.3.1 Output resolution [RESOLUTION]**", and the range is quarter to quadruple of the output resolution.

Default is the same as the resolution setting, and the video is displayed on the full screen of the display device.

1. To set the input size (the number of pixels) using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
│                         │
└─────────────────────────┘
```

↓ SET key

```
┌─────────────────────────┐
│ [FUNCTION SELECT]       │      ▲▼ keys: Select "OUTPUT TIMING".
│ OUTPUT TIMING        ▼▲ │
└─────────────────────────┘
```

↓ SET key

```
┌─────────────────────────┐
│ [OUTPUT TIMING]         │      ▲▼ keys : Select "INPUT SIZE".
│ INPUT SIZE           ▼▲ │
└─────────────────────────┘
```

↓ SET key

```
┌─────────────────────────┐
│ [IN1SIZE]H:1920/1920    │      ▲▼ keys: Set "LINK" to "OFF" or "ON" for H and V.[*1]
│ LINK:ON  V:1080/1080    │
└─────────────────────────┘
```

↓ ◄ ► keys

```
┌─────────────────────────┐
│ [IN1SIZE]H:1920/1920    │      ▲▼ keys: Set horizontal size of IN1. Numbers following "/" mean
│ LINK:ON  V:1080/1080    │      horizontal output resolution.
└─────────────────────────┘
```

↓ ◄ ► keys

```
┌─────────────────────────┐
│ [IN1SIZE]H:1920/1080    │      ▲▼ keys: Set vertical size of IN 1. Numbers following "/" mean
│ LINK:OFF V:1080/1080    │      vertical output resolution.[*2]
└─────────────────────────┘
```

↓ ESC key: Returns to the previous screen

[*1] If you set "LINK" to ON", only horizontal size can be set. If you set the horizontal size, the current aspect ratio is kept and the vertical size is also set. If either horizontal or vertical size reaches the limit, you cannot set the larger values.

[*2] Only if you set "LINK" to "OFF", you can set the vertical size.

2. To set the input size (the number of pixels) using commands:

@SNS: Set input size

@GNS: Get input size

7.3.8 Input masking [INPUT MASKING]

For each input port/input signal

Any unnecessary area (top/bottom and right/left) can be hidden by using the masking setting.

You can set the masking amount for each input by using this menu or for each output by following "**7.3.12 Output masking [OUTPUT MASKING]**". Normally, set the masking of each input in settings of each input. If you want to limit the display area on the output screen, set the masking for each output.

- ▪ Left side masking: Masked in a unit of pixel   [Default]: 0
- ▪ Right side masking: Masked in a unit of pixel   [Default]: Horizontal input size
- ▪ Top side masking: Masked in a unit of line   [Default]: 0
- ▪ Bottom side masking: Masked in a unit of line   [Default]: Vertical input size

(0, 0)

(Horizontal size, Vertical size)
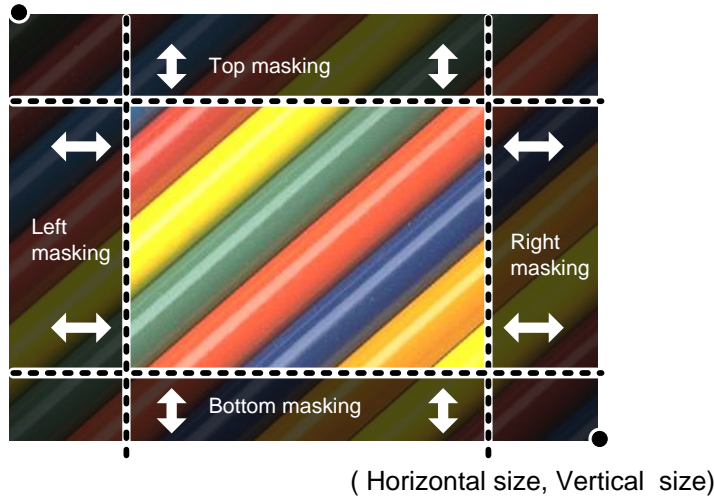
[Fig. 7.10] Input masking

The range of set values depends on settings of "**7.3.6 Input position [INPUT POSITION]**", "**7.3.7Input size [INPUT SIZE]**" and masking. If you change the display position or display size, the display range before changing is kept and settings of masking are automatically changed. Default value (no masking) of the left/top sides is 0 while that of the right/bottom sides is the input size setting.

1. To set the input masking (the number of pixels) using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING      ⬍
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
INPUT MASKING      ⬍
```
▲▼ keys: Select "INPUT MASKING".

↓ SET key

```
[IN1 MASKING] L:    0
R:1920 T:   0 B:1080
```
▲▼ keys: Set the left side masking of IN1.

↓ ◀▶ keys

```
[IN1 MASKING] L:    0
R:1920 T:   0 B:1080
```
▲▼ keys: Set the right side masking of IN1.

↓ ◀▶ keys

63

```
[IN1 MASKING] L:    0
R:1920 T:   0 B:1080
```
▲▼ keys: Set the top side masking of IN1.

↓ ◀ ▶ keys

```
[IN1 MASKING] L:    0
R:1920 T:   0 B:1080
```
▲▼ keys : : Set the bottom side masking of IN1.

↓ ESC key: Returns to the previous screen

2. To set the input masking (the number of pixels) using commands:

@SNM: Set input masking
@GNM: Get input masking

7.3.9 Input automatic sizing [INPUT AUTO SIZING]

For each input port/input signal

This function adjusts input signals optimally, and as a result the following settings will be initialized automatically: "**7.3.3 Aspect ratio control of input video [INPUT ASPECT]**", "**7.3.5 Overscan [INPUT OVER SCAN]**", "**7.3.6 Input position [INPUT POSITION]**", "**7.3.7 Input size [INPUT SIZE]**", and "**7.3.8 Input masking [INPUT MASKING]**". It may not work if aspect ratios of the input signal and display device do not match or depending on some settings.

1. To set the input automatic sizing using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING       ⬍
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
INPUT AUTO SIZING ⬍
```
▲▼ keys: Select "INPUT AUTO SIZING".

↓ SET key   ↑ ESC key: Returns to the previous screen without changing settings.

```
[IN1 AUTO SIZING]
SURE? = NO          ⬌⬍
```
▲▼ keys: Select "YES" or "NO".
◀ ▶ keys: Select the desired input (IN1 toIN8).

↓To apply the setting: Select "YES" and press the "SET" key.
To return to the menu without any change: Select "NO" and press the "SET" key.

```
[OUTPUT TIMING]
INPUT AUTO SIZING ⬍
```

2. To set the input automatic sizing using commands:

@IAS: Input automatic sizing

7.3.10 Output position [OUTPUT POSITION]

For each output (common to OUTA and OUTB)

You can set the display position of the output video by the pixel position of on the output screen.
You can set the position for each input channel in "**7.3.6 Input position [INPUT POSITION]**", in this menu you can set the position for each output. Normally, set the position, size, and masking of each input in settings of each input. If edges are cut off due to enlargement display in the display device or if you want to move output video for all channels at a time, set the position for each output.

▪ Horizontal position: Changed in a unit of pixel   [Default]: 0
▪ Vertical position: Changed in a unit of line   [Default]: 0
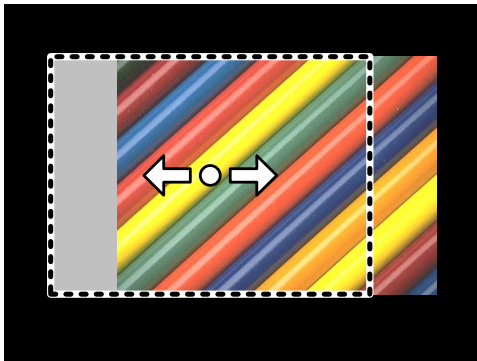
[Horizontal position]   [Vertical position]
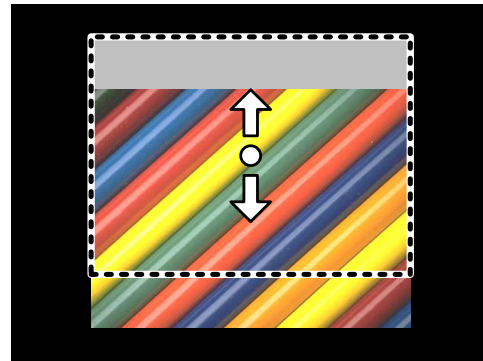
[Fig. 7.11] Output size

The settable range depends on settings of "**7.3.1 Output resolution [RESOLUTION]**" and "**7.3.11 Output size [OUTPUT SIZE]**". Values can be set unless video disappears from the top, bottom and right, left of the screen. If the display position exceeds the settable range by changing display size, the display position will be set to the maximum value automatically. Default is 0, and the video is displayed from the upper left of the display device.

1. To set the output position on the output screen (pixel position) using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING      ↕
```
▲▼keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
OUTPUT POSITION    ↕
```
▲▼keys: Select "OUTPUT POSITION".

↓ SET key

```
[OUT1 POSITION]
H:   0  V:    0  ⟷↕▸
```
▲▼keys: Set horizontal display position of OUT1.

↓ ◀▶keys

```
[OUT1 POSITION]
H:    0  V:   0  ⟷↕▸
```
▲▼keys: Set vertical display position of OUT1.

↓ ESC key: Returns to the previous screen.
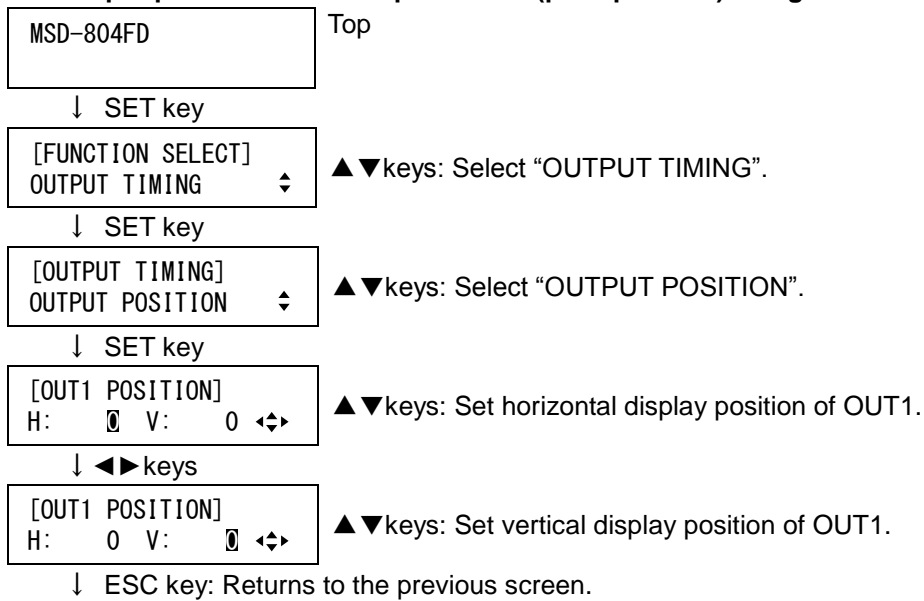
2. To set the output position on the output screen (pixel position) using commands:

@SOP: Set output position

@GOP: Get output position

7.3.11 Output size [OUTPUT SIZE]

For each output (common to OUTA and OUTB)

Output video size is scalable in reference to the upper left of video set in "**7.3.10 Output position [OUTPUT POSITION]**".

You can set the size for each output by using this menu or for each input by using "**7.3.7 Input size [INPUT SIZE]**". Normally, set position, size, and masking for each input in the settings of each input. If edges are cut off due to enlargement display in the display device or if you want to enlarge output video of all channels at a time, set the position for each output.

- ▪ Horizontal size: Scaled in a unit of pixel [Default]: Horizontal output resolution
- ▪ Vertical size: Scaled in a unit of line [Default]: Vertical output resolution

[Horizontal size]　　　　　　　　　　　　　[Vertical size]
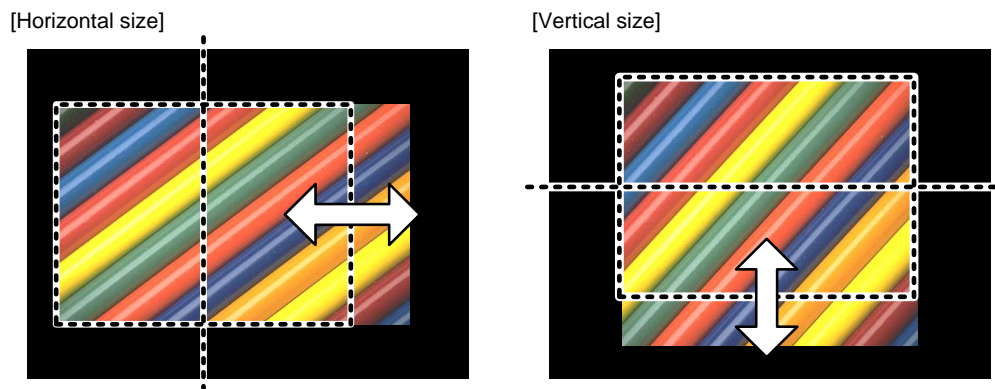
[Fig. 7.12] Output size

The set range and default varies depending on settings of **"7.3.1 Output resolution [RESOLUTION]"**, and the range is quarter to quadruple of output resolution. Default is the same as the resolution setting, and the video is displayed on the full screen of the display device.

1. To set the output size (the number of pixels) using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING        ↕
```
▲▼keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
OUTPUT SIZE          ↕
```
▲▼keys: Select "OUTPUT SIZE".

↓ SET key

```
[OUT1SIZ]H:1920/1920
LINK:ON  V:1080/1080
```
▲▼keys: Set "LINK" to "OFF" or "ON" for H and V.[*1]

↓ ◀▶keys

```
[OUT1SIZ]H:1920/1920
LINK:ON  V:1080/1080
```
▲▼keys: Set horizontal display size of OUT1. Numbers following "/" mean horizontal output resolution.

↓ ◀▶keys

```
[OUT1SIZ]H:1920/1920
LINK:OFF V:1080/1080
```
▲▼keys: Set vertical display size of OUT1. Numbers following "/" mean vertical output resolution.[*2]

↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to ON", only horizontal size can be set. If you set the horizontal size, the current aspect ratio is kept and vertical size is also set. If either horizontal or vertical size reaches the limit, you cannot set the larger values.

[*2] Only if you set "LINK" to "OFF", you can set the vertical size.

2. To set the output size (the number of pixels) using commands:

@SOS: Set output size

@GOS: Get output size

7.3.12 Output masking [OUTPUT MASKING]

For each output (common to OUTA and OUTB)

Unnecessary part (top/bottom and right/left) can be hidden by setting masking.

You can set masking for each input by following the "**7.3.8 Input masking [INPUT MASKING]**" menu or for each output using this menu. Normally, set masking of each input in the settings of each input. If you want to limit the display area on the output screen, set the masking for each output.

- ▪ Left side masking: Masked in a unit of pixel   [Default]: 0
- ▪ Right side masking: Masked in a unit of pixel   [Default]: Horizontal output resolution
- ▪ Top side masking: Masked in a unit of line   [Default]: 0
- ▪ Bottom side masking: Masked in a unit of line   [Default]: Vertical output resolution

(0, 0)

(Horizontal size, Vertical size)
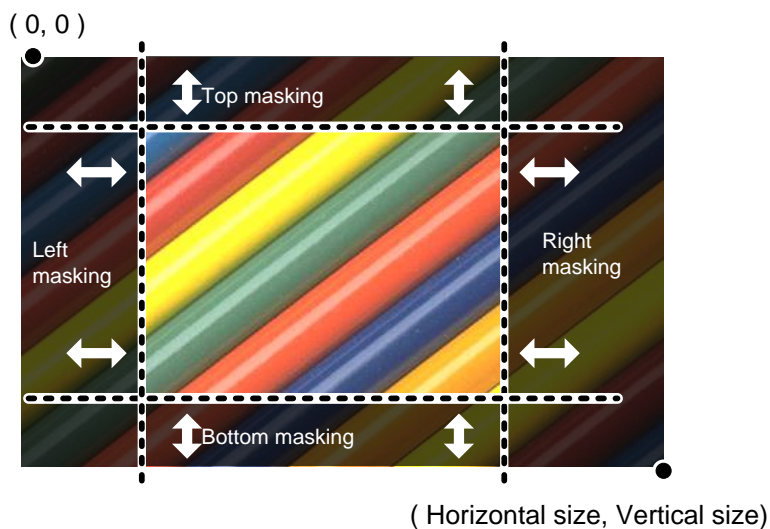
[Fig. 7.13] Output masking

The range of set values depends on settings of "**7.3.1 Output resolution [RESOLUTION]**", "**7.3.10 Output position [OUTPUT POSITION]**", "**7.3.11 Output size [OUTPUT SIZE]**", and masking. If you change the output resolution, position or size, the display range before that change is kept and the settings of masking are automatically changed. Default values (no masking) of the left and top sides are 0 while that of the right and bottom sides are the input size.

1. To set the output masking (the number of pixels) using menu:

MSD-804FD

Top

↓ SET key

[FUNCTION SELECT] OUTPUT TIMING ↕

▲▼keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
OUTPUT MASKING      ↕
```
▲▼keys: Select "OUTPUT MASKING".

↓ SET key

```
[OUT1 MASKING]L:    0
R:1920 T:   0 B:1080
```
▲▼keys: Set the left side masking of OUT1.

↓ ◄►keys

```
[OUT1 MASKING]L:    0
R:1920 T:   0 B:1080
```
▲▼keys: Set the right side masking of OUT1.

↓ ◄►keys

```
[OUT1 MASKING]L:    0
R:1920 T:   0 B:1080
```
▲▼keys: Set the top side masking of OUT1.

↓ ◄►keys

```
[OUT1 MASKING]L:    0
R:1920 T:   0 B:1080
```
▲▼keys: Set the bottom side masking of OUT1.

↓ ESC key: Returns to the previous screen.

2. To set the output masking (the number of pixels) using commands:

@SOM: Set output masking
@GOM: Get output masking

7.3.13 Output automatic sizing [OUTPUT AUTO SIZING]

For each output (common to OUTA and OUTB)

This function adjusts output signals optimally to display video on the full screen, and as a result, the following settings will be initialized automatically: "**7.3.10 Output position [OUTPUT POSITION]**", "**7.3.11 Output size [OUTPUT SIZE]**", and "**7.3.12 Output masking [OUTPUT MASKING]**". It may not work depending on some settings.

1. To set the output automatic sizing using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING       ↕
```
▲▼keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
OUTPUT AUTO SIZING ↕
```
▲▼keys: Select "OUTPUT AUTO SIZING".

↓ SET key   ↑ ESC key: Returns to the previous screen without changing settings.

```
[IN1 AUTO SIZING]
SURE? = NO         ◄↕►
```
▲▼keys: Select "YES" or "NO".
▲▼keys: Select the desired output (OUT1 to OUT4).

↓ To apply the setting: Select "YES" and press the "SET" key.
   To return to the menu without any change: Select "NO" and press the "SET" key.

```
[OUTPUT TIMING]
OUTPUT AUTO SIZING ↕
```

2. To set the output automatic sizing using commands:

@IAS: Input automatic sizing

7.3.14 Background color [BACKGROUND COLOR]

For each output (common to OUTA and OUTB)

You can select a color from an approximately 16.7-million combinations of Red, Green, and Blue.

▪ Background color: Red, Green, and Blue: 0 to 255   [Default]: all colors: 0

1. Set the background color using menu:
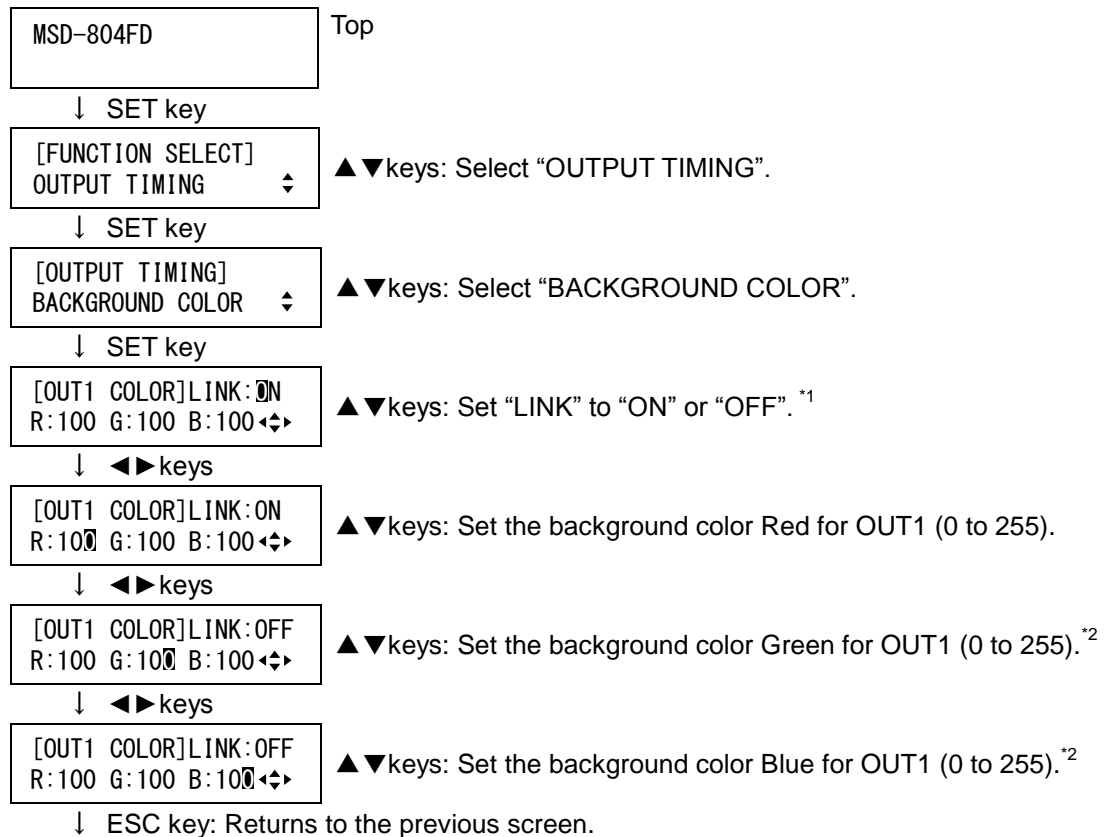
```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING        ▲▼
```
▲▼keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
BACKGROUND COLOR     ▲▼
```
▲▼keys: Select "BACKGROUND COLOR".

↓ SET key

```
[OUT1 COLOR]LINK:ON
R:100 G:100 B:100◄▲▼►
```
▲▼keys: Set "LINK" to "ON" or "OFF". [*1]

↓ ◄►keys

```
[OUT1 COLOR]LINK:ON
R:100 G:100 B:100◄▲▼►
```
▲▼keys: Set the background color Red for OUT1 (0 to 255).

↓ ◄►keys

```
[OUT1 COLOR]LINK:OFF
R:100 G:100 B:100◄▲▼►
```
▲▼keys: Set the background color Green for OUT1 (0 to 255). [*2]

↓ ◄►keys

```
[OUT1 COLOR]LINK:OFF
R:100 G:100 B:100◄▲▼►
```
▲▼keys: Set the background color Blue for OUT1 (0 to 255). [*2]

↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) are also changed associated with the settings of the Red (R). For example, if you increase Red (R) +2, Green (G) and Blue (B) are also increased (+2).

[*2] Only if you set "LINK" to "OFF", you can set the background colors Green and Blue.

2. Set the background color using commands:

@SBC: Set background color

@GBC: Get background color

7.3.15 Test pattern [TEST PATTERN]

> For each output (common to OUTA and OUTB)

You can scroll at a speed of 3 to 30 pixels/a frame by using "COLOR BAR", "GRAY SCALE", "LAMP", and "ZEBRA".

- ・OFF　[Default]
- ・V-COLOR BAR
- ・H-COLOR BAR
- ・V-GRAY SCALE
- ・H-GRAY SCALE
- ・VERTICAL LAMP
- ・HORIZONTAL LAMP

- ・100% WHITE RASTER
- ・50% WHITE RASTER
- ・RED RASTER
- ・GREEN RASTER
- ・BLUE RASTER
- ・CROSS HATCH

- ・OUTPUT FRAME
- ・VERTICAL STRIPE
- ・HORIZONTAL STRIPE
- ・VERTICAL ZEBRA
- ・HORIZONT ZEBRA

OFF
(Normal video output) V-COLOR BAR H-COLOR BAR V-GRAY SCALE H-GRAY SCALE VERTICAL LAMP

HORIZONTAL LAMP 100% WHITE RASTER 50% WHITE RASTER RED RASTER GREEN RASTER BLUE RASTER

CROSS HATCH OUTPUT FRAME VERTICAL STRIPE HORIZONTAL STRIPE VERTICAL ZEBRA HORIZONTAL ZEBRA
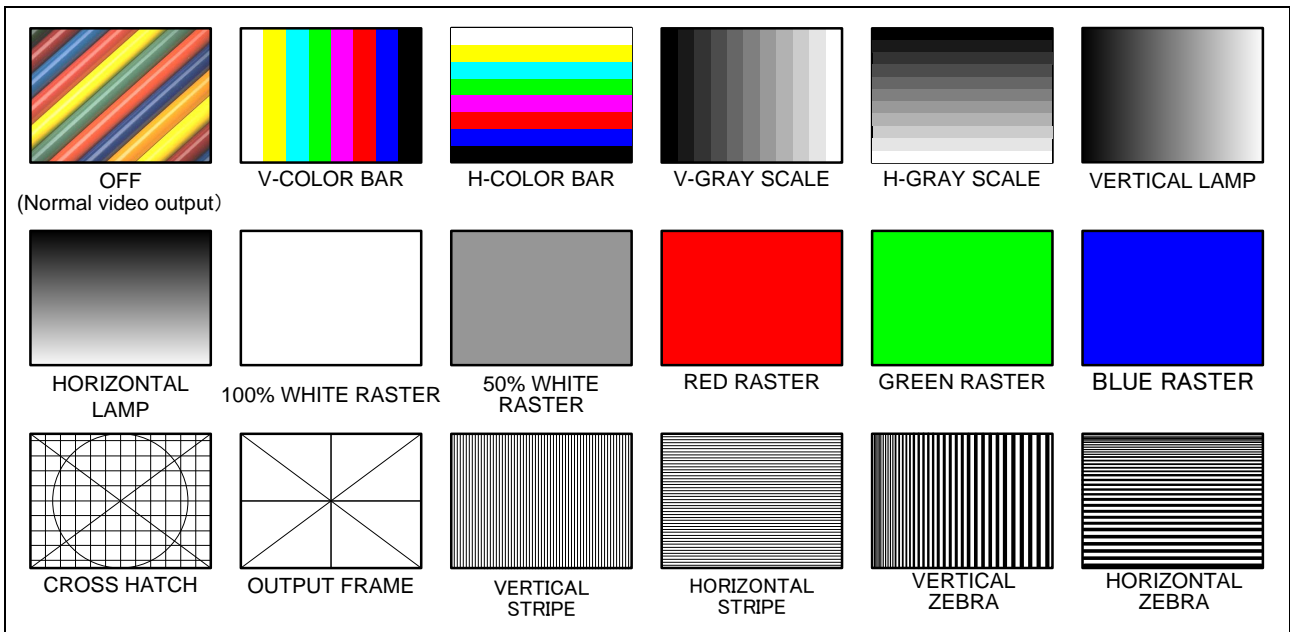
[Fig. 7.14] Test patterns

- ・Scroll: OFF　[Default]
  - 3 pixel per frame to 30 pixel per frame (by 3 pixels per frame)

Note:

For test patterns other than "OUTPUT FRAME": Video is output on the full screen with the resolution set in "**7.3.1 Output resolution [RESOLUTION]**" and the display position and display size will be invalid.

For "OUTPUT FRAME": Use this pattern if edges are cut off due to enlargement display on the display device, and settings of "**7.3.10 Output position [OUTPUT POSITION]**" and "**7.3.11 Output size [OUTPUT SIZE]**" will be applied.

When a test pattern is displayed, all settings of "**7.4 Video Correction**" will be invalid.

1. To set the test pattern using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
│                         │
└─────────────────────────┘
          ↓  SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │      ▲▼keys: Select "OUTPUT TIMING".
│ OUTPUT TIMING       ▲▼  │
└─────────────────────────┘
          ↓  SET key
┌─────────────────────────┐
│ [OUTPUT TIMING]         │      ▲▼keys: Select "TEST PATTERN".
│ TEST PATTERN        ▲▼  │
└─────────────────────────┘
          ↓  SET key
┌─────────────────────────┐
│ [OUT1 PATTERN]          │      ▲▼keys: Select the desired test pattern for OUT1.
│ OFF              ◄▲▼►   │
└─────────────────────────┘
          ↓  ◄►keys
┌─────────────────────────┐
│ [OUT1 SCROLL]           │      ▲▼keys: Select the desired scroll speed for OUT1.*
│ OFF               ◄▲►   │
└─────────────────────────┘
          ↓  ◄►keys
          ↓  ESC key: Returns to the previous screen.
```
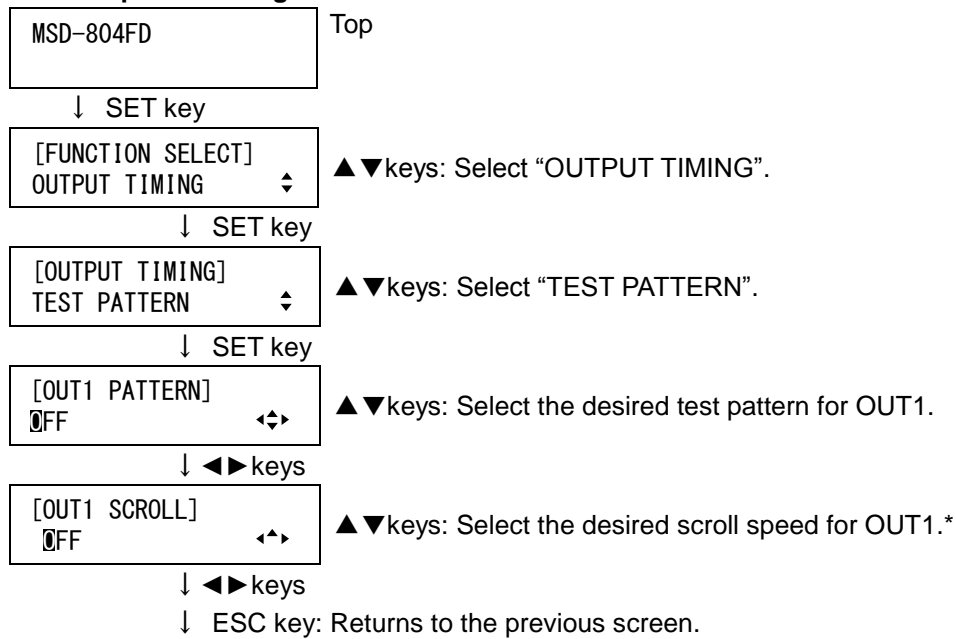
* You can select SCROLL only if selecting "V-COLOR BAR", "H-COLOR BAR", "V-GRAY SCALE", "H-GRAY SCALE", "VERTICAL LAMP", "HORIZONTAL LAMP", "VERTICAL ZEBRA", or "HORIZONTAL ZEBRA".

2. To set the test pattern using commands:

@STP: Set test pattern
@GTP: Get test pattern

7.3.16 Multi display mode [MULTI DISPLAY]

You can set Multi display mode.

Once this mode is set to ON, settings of the following menus will be applied to all outputs; they cannot be set separately.

⎧ ・Multi display mode: OFF　[Default]
⎩ ・Multi display mode: ON

Note:

If you enable this mode, set "**7.7.14 Frame lock mode [FRAME LOCK]**" to ON as well.

Once this mode is set to ON, settings of the following menus will be applied to all outputs:
7.3, 7.3.1, 7.3.2, 7.3.10, 7.3.11, 7.3.12, 7.3.13, 7.3.14,7.4, 7.4.7, 7.4.8, 7.4.9, 7.7,3, 7.7,4, 7.7,5, 7.7,6, 7.7,7, 7.7,8, 7.14, 7.14.1, 7.14.2, 7.14.3, 7.14.4, 7.14.5, 7.14.6, 7.14.7, and 7.14.9

Input signals

Multi display mode output video
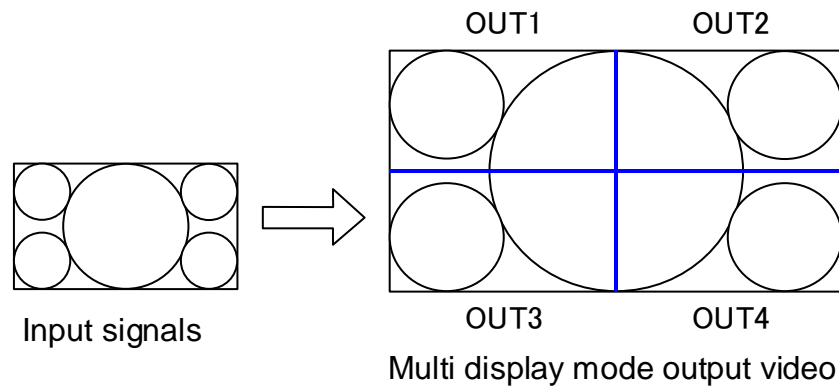
[Fig. 7.14] Multi display mode output

1. To set the multi display mode using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT TIMING          ↕
```
▲▼ keys: Select "OUTPUT TIMING".

↓ SET key

```
[OUTPUT TIMING]
MULTI DISPLAY          ↕
```
▲▼ keys: Select "MULTI DISPLAY".

↓ SET key

```
[MULTI DISPLAY]
OFF                    ↕
```
▲▼ keys: Set "MULTI DISPLAY" to "OFF" or "ON".

↓ ESC key: Returns to the previous screen
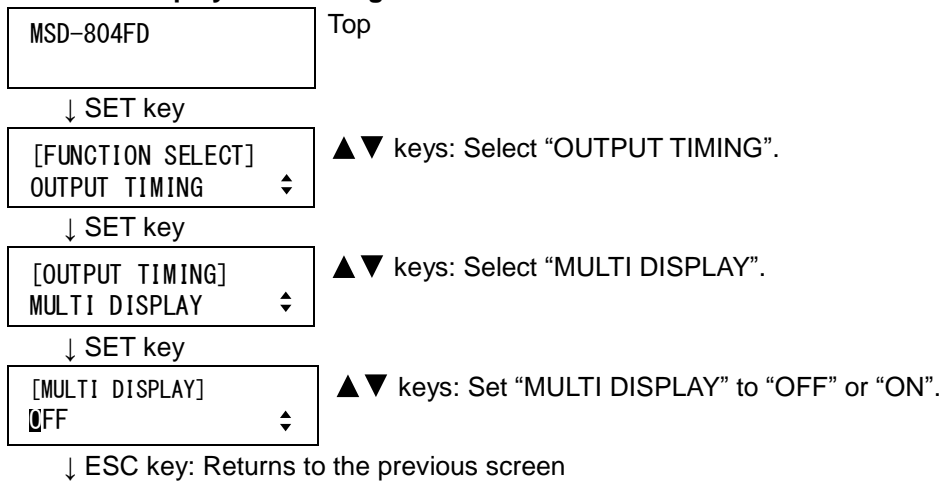
2. To set the multi display mode using menu:

@SML: Set multiple display mode

@GML: Get multiple display mode

7.4 Video Correction

You can set output video quality.

Items that are set for each input: Correct deviation in color and others.

Items that are set for each output: Correct brightness according to the connected display device and others.
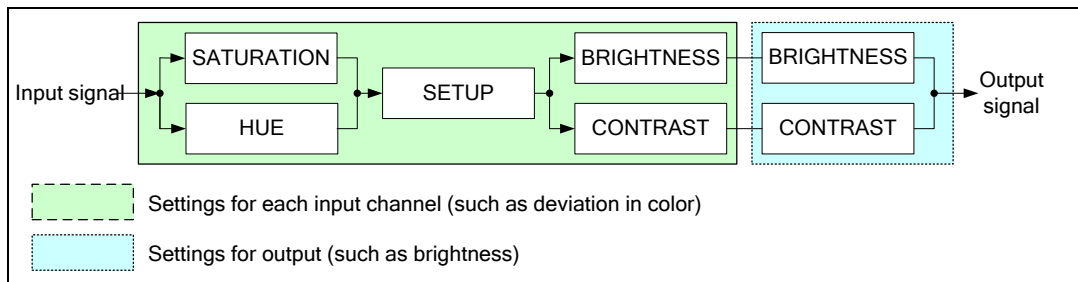
[Fig. 7.15] Video quality settings

7.4.1 Input brightness [INPUT BRIGHTNESS]

For each input port/input signal

▪ Brightness: 80% to 120%   [Default]: 100%

If you increase the value, the whole level will be increased as well; if you reduce the value, the whole level will be reduced.

1. To set the input brightness using menu:

```
MSD-804FD                Top
```
↓ SET key
```
[FUNCTION SELECT]
IMAGE EFFECT        ⇕
```
▲▼keys: Select "IMAGE EFFECT".

↓ SET key
```
[IMAGE EFFECT]
INPUT BRIGHTNESS    ⇕
```
▲▼keys: Select "INPUT BRIGHTNESS".

↓ SET key
```
[IN1 BRIGHTNESS]
100%                ⬖⇕⮞
```
◀▶keys: Set the brightness (80% to 120%).

◀▶keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.
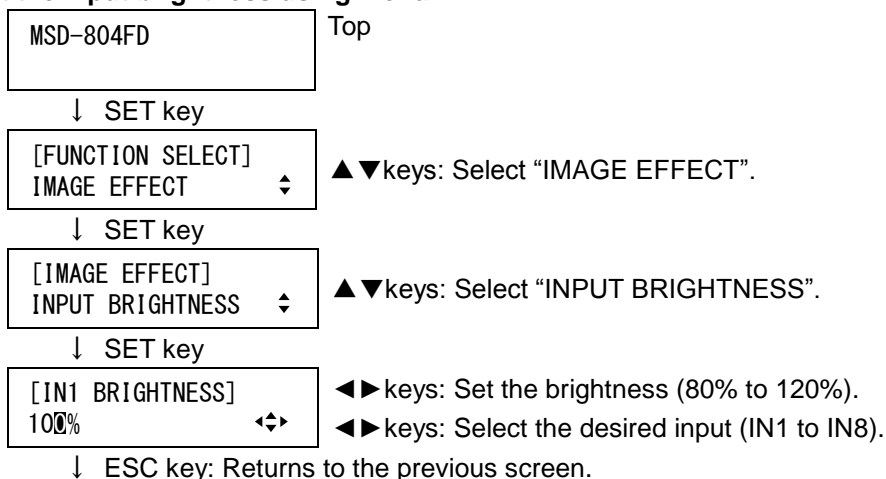
2. To set the input brightness using commands:

@SBR: Set input brightness

@GBR: Get input brightness

7.4.2 Input contrast [INPUT CONTRAST]

For each input port/input signal

You can set the contrast (Red, green, blue can be set separately) for input contrast.

▪ Contrast Red: 0% to 200%   [Default]: 100%

▪ Contrast Green: 0% to 200%   [Default]: 100%

▪ Contrast Blue: 0% to 200%   [Default]: 100%

If you increase the value, the amplitude will be increased as well; if you reduce the value, the amplitude will be reduced.

1. To set the input contrast using menu:
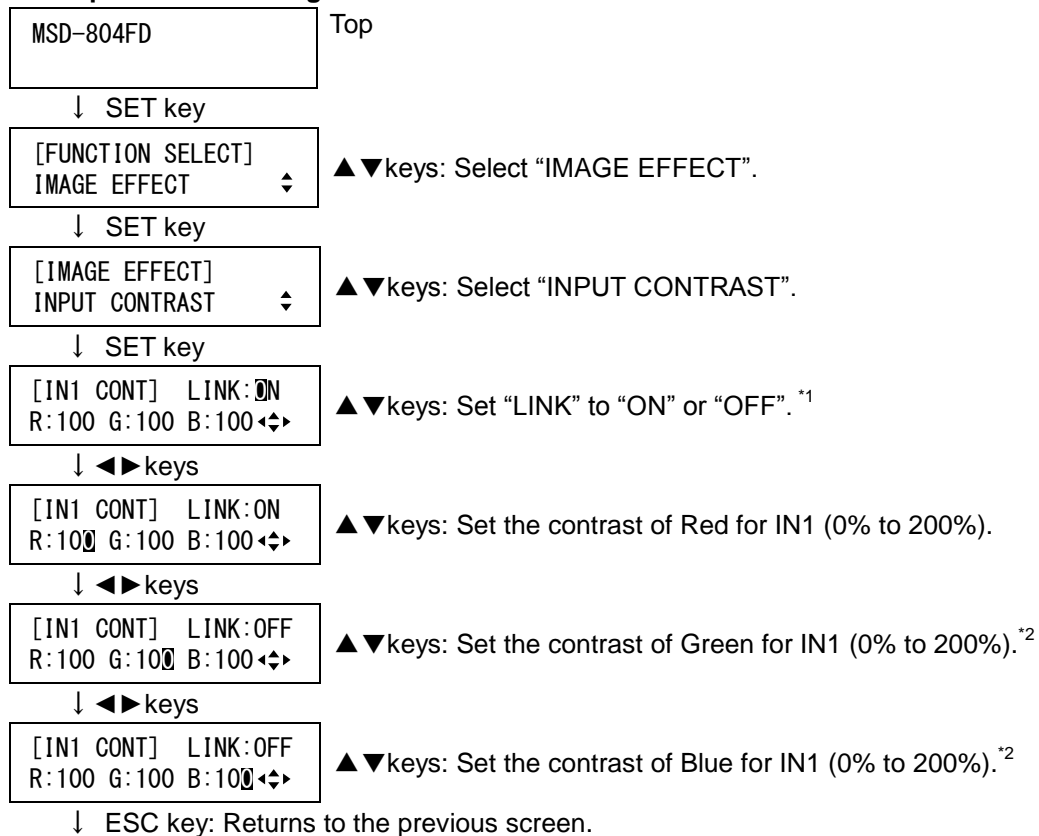
| MSD–804FD | Top |

↓ SET key

| [FUNCTION SELECT]
 IMAGE EFFECT ⬍ | ▲▼keys: Select "IMAGE EFFECT". |

↓ SET key

| [IMAGE EFFECT]
 INPUT CONTRAST ⬍ | ▲▼keys: Select "INPUT CONTRAST". |

↓ SET key

| [IN1 CONT] LINK:ON
 R:100 G:100 B:100◄⬍► | ▲▼keys: Set "LINK" to "ON" or "OFF". [*1] |

↓ ◄►keys

| [IN1 CONT] LINK:ON
 R:100 G:100 B:100◄⬍► | ▲▼keys: Set the contrast of Red for IN1 (0% to 200%). |

↓ ◄►keys

| [IN1 CONT] LINK:OFF
 R:100 G:100 B:100◄⬍► | ▲▼keys: Set the contrast of Green for IN1 (0% to 200%). [*2] |

↓ ◄►keys

| [IN1 CONT] LINK:OFF
 R:100 G:100 B:100◄⬍► | ▲▼keys: Set the contrast of Blue for IN1 (0% to 200%). [*2] |

↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) are also changed associated with the settings of the Red (R). For example, if you increase Red (R) +2, Green (G) and Blue (B) are also increased (+2). If one of these three colors reaches the limiting value, it cannot be changed any further.

[*2] Only if you set "LINK" to "OFF", you can set the contrasts of Green and Blue.

2. To set the input contrast using commands:

@SCO: Set input contrast
@GCO: Get input contrast

7.4.3 Hue [INPUT HUE]

You can set the hue of input video:

▪ HUE: 0° to 359°   [Default]: 0°

1. To setting the hue using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐
│ [FUNCTION SELECT]   │        ▲▼keys: Select "IMAGE EFFECT".
│ IMAGE EFFECT     ♦  │
└─────────────────────┘
        ↓  SET keys
┌─────────────────────┐
│ [IMAGE EFFECT]      │        ▲▼keys: Select "INPUT HUE".
│ INPUT HUE        ♦  │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐        ▲▼keys: Set the hue (0° to 359°).
│ [IN1 HUE]           │
│ 0°             ◄♦►  │        ◄►keys: Select the desired input (IN1 to IN8)
└─────────────────────┘
      ↓  ESC key: Returns to the previous screen.
```
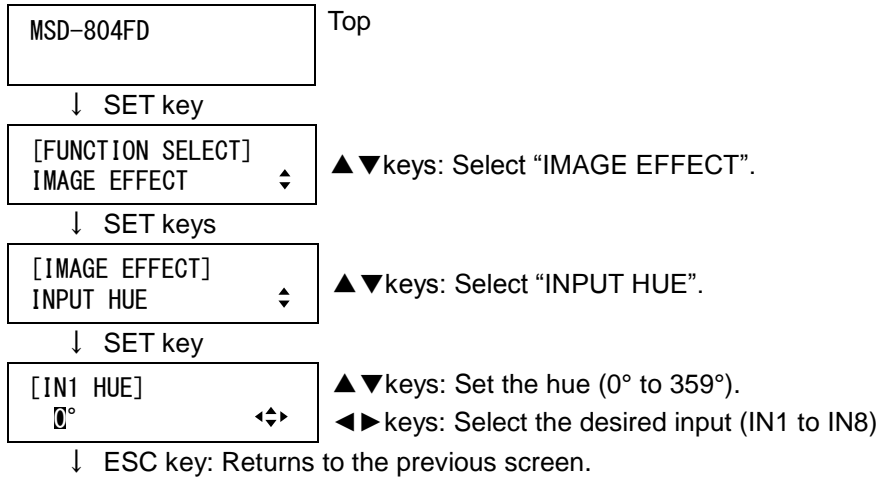
2. To set the hue using commands:

@SHU: Set hue
@GHU: Get hue

7.4.4   Saturation [INPUT SATURATION]

For each input port/input signal

You can set the saturation of input video:

▪ Saturation: 0% to 200%   [Default]: 100%
  If you reduce the value, the color becomes weaker and goes to monochrome. (0%: full
  monochrome) If you increase the value, the color becomes more vivid.

1. To set the saturation using menu:

```
MSD-804FD
```
Top

   ↓ SET key

```
[FUNCTION SELECT]
IMAGE EFFECT       ⬍
```
▲▼keys: Select "IMAGE EFFECT".

   ↓ SET key

```
[IMAGE EFFECT]
INPUT SATURATION   ⬍
```
▲▼keys: Select "INPUT SATURATION".

   ↓ SET key

```
[IN1 SATURATION]
100%              ⬍
```
▲▼keys: Set the saturation (0% to 200%).
▲▼keys: Select the desired input (IN1 to IN8).

   ↓ ESC key: Returns to the previous screen.
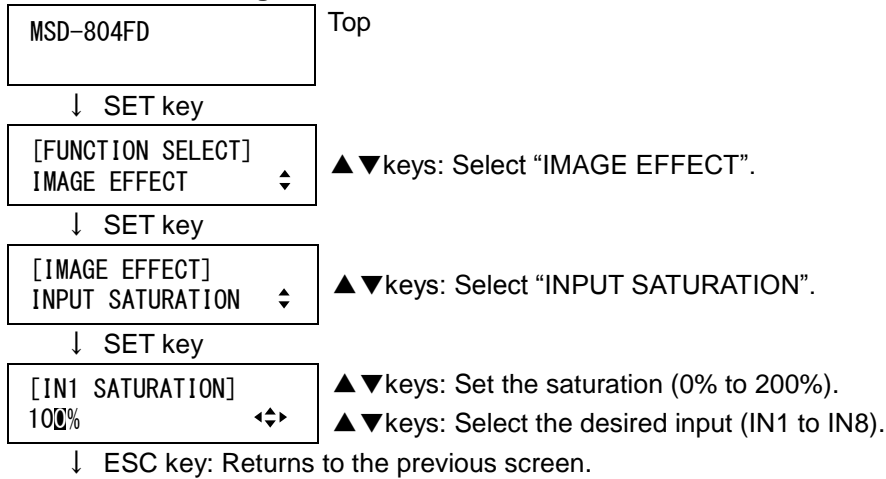
2. To set the saturation using commands:
   @SST: Set saturation
   @GST: Get saturation

7.4.5 Black level [INPUT SETUP LEVEL]

For each input port/input signal

You can set the black level of the input video:

　　　　・ Setup level: -10.0% to +10.0% by 0.5% step　　[Default]: ±0.0%

　　　　　If black level of output video is low (light black), set the level toward the minus direction.

　　　　　If black level is high (dark black), set the level toward the plus direction.

　　　　　Even if you change the black level, the white level is not changed.

1. To set the setup level using menu:

```
MSD-804FD                 Top


   ↓ SET key                      ↓ SET key

[FUNCTION SELECT]          ▲▼keys: Select "IMAGE EFFECT".
IMAGE EFFECT        ↕
   ↓ SET key

[IMAGE EFFECT]            ▲▼keys: Select "INPUT SETUP LEVEL".
INPUT SETUP LEVEL   ↕
   ↓ SET key

[IN1 SETUP LEVEL]         ▲▼keys: Set the black level (-10.0% to +10.0%).
 0. 0%              ◄↕►     ▲▼keys: Select the desired input (IN1 to IN8).
   ↓ ESC key: Returns to the previous screen.
```
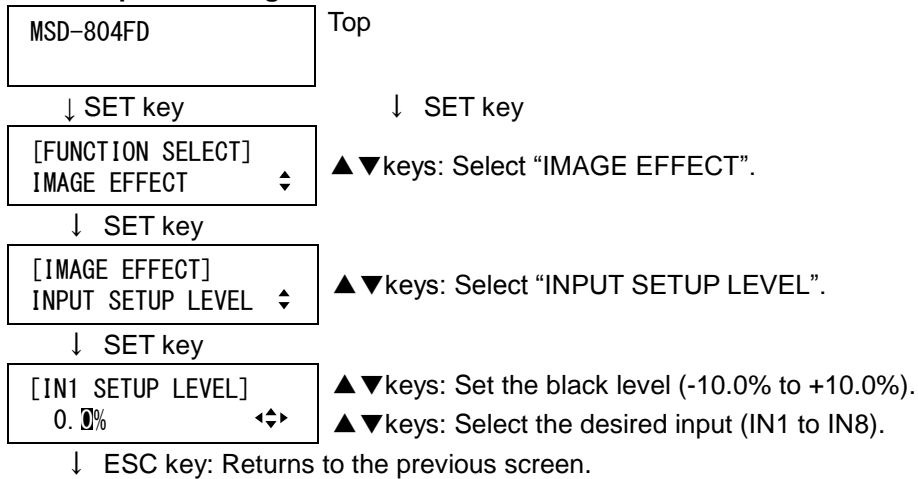
2. To set the setup level using commands:

　　　@SSU: Set black level

　　　@GSU: Get black level

7.4.6　Input default color [IN DEFAULT COLOR]

For each input port/input signal

You can initialize settings of the following menus: "**7.4.1 Input brightness [INPUT BRIGHTNESS]**",
"**7.4.2Input contrast [INPUT CONTRAST]**", "**7.4.3 Hue [INPUT HUE]**", "**7.4.4 Saturation [INPUT SATURATION]**", and "**7.4.5 Black level [INPUT SETUP LEVEL]**".

1. To initialize the settings of input default color using menu:

```
MSD-804FD
```
Top

↓　SET keys

```
[FUNCTION SELECT]
IMAGE EFFECT        ▲▼
```
▲▼keys: Select "IMAGE EFFECT".

↓　SET keys

```
[IMAGE EFFECT]
IN DEFAULT COLOR    ▲▼
```
▲▼keys: Select "IN DEFAULT COLOR".

↓　SET key　　　↑　ESC key: Returns to menu without changing settings

```
[IN1 DEFAULT COLOR]
SURE? = NO          ◄▲▼►
```
▲▼keys: Select "YES" or "NO".
▲▼keys: Select the desired input (IN1 to IN8).

↓　To apply the setting: Select "YES" and press the "SET" key.
　　To return to the menu without any change: Select "NO" and press the "SET" key.

```
[IMAGE EFFECT]
IN DEFAULT COLOR    ▲▼
```
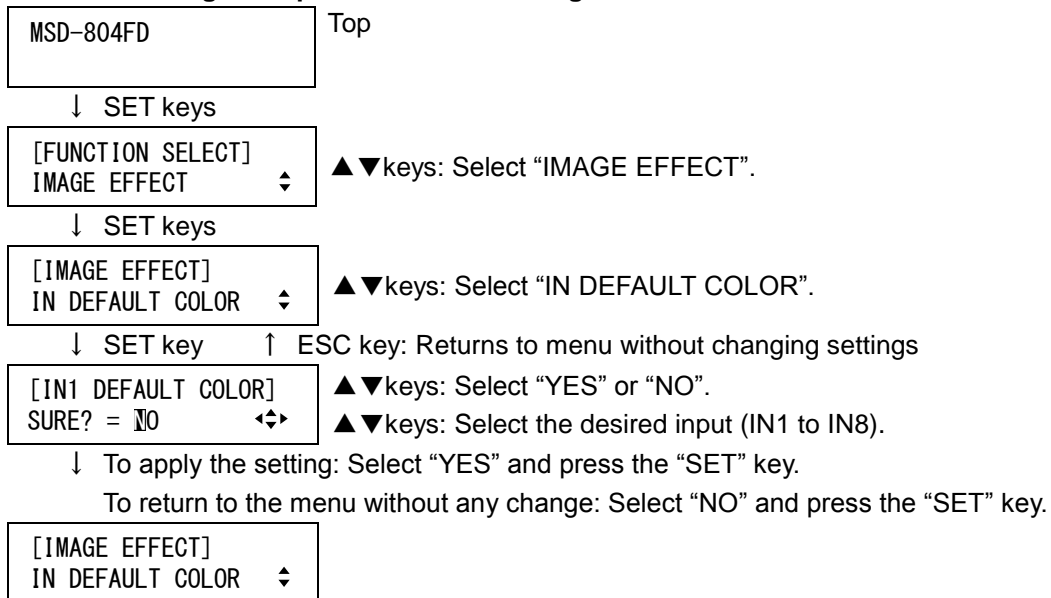
2. To initialize the settings of input default color using commands:
　　　@IDC: Input default color

7.4.7 Output brightness [OUTPUT BRIGHTNESS]

For each output (common to OUTA and OUTB)

▪ Brightness: 80% to 120%　[Default]: 100%

If you increase the value, the whole level will be increased as well; if you reduce the value, the whole level will be reduced.

1. To set the output brightness using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
IMAGE EFFECT      ↕
```
▲▼keys: Select "IMAGE EFFECT".

↓ SET key

```
[IMAGE EFFECT]
OUTPUT BRIGHTNESS ↕
```
▲▼keys: Select "OUTPUT BRIGHTNESS".

↓ SET key

```
[OUT1 BRIGHTNESS]
100%              ⟷↕▸
```
▲▼keys: Set the output brightness (80% to 120%).
▲▼keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen.
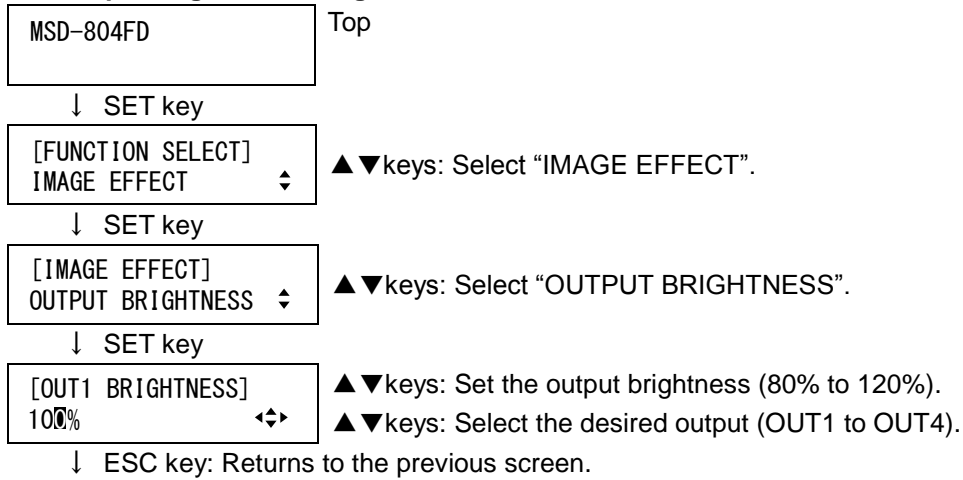
2. To set the output brightness using commands:

@SOB: Set output brightness
@GOB: Get output brightness

7. 4. 8   Output contrast [OUTPUT CONTRAST]

For each output (common to OUTA and OUTB)

You can set Red, Green, and Blue separately.

・Contrast (Red): 0% to 200%   [Default]: 100%
・Contrast (Green): 0% to 200%   [Default]: 100%
・Contrast (Blue): 0% to 200%   [Default]: 100%
    If you reduce the set value, the amplitude decreases and if you increase the value, the amplitude increases.

1. To set the output contrast using menu:
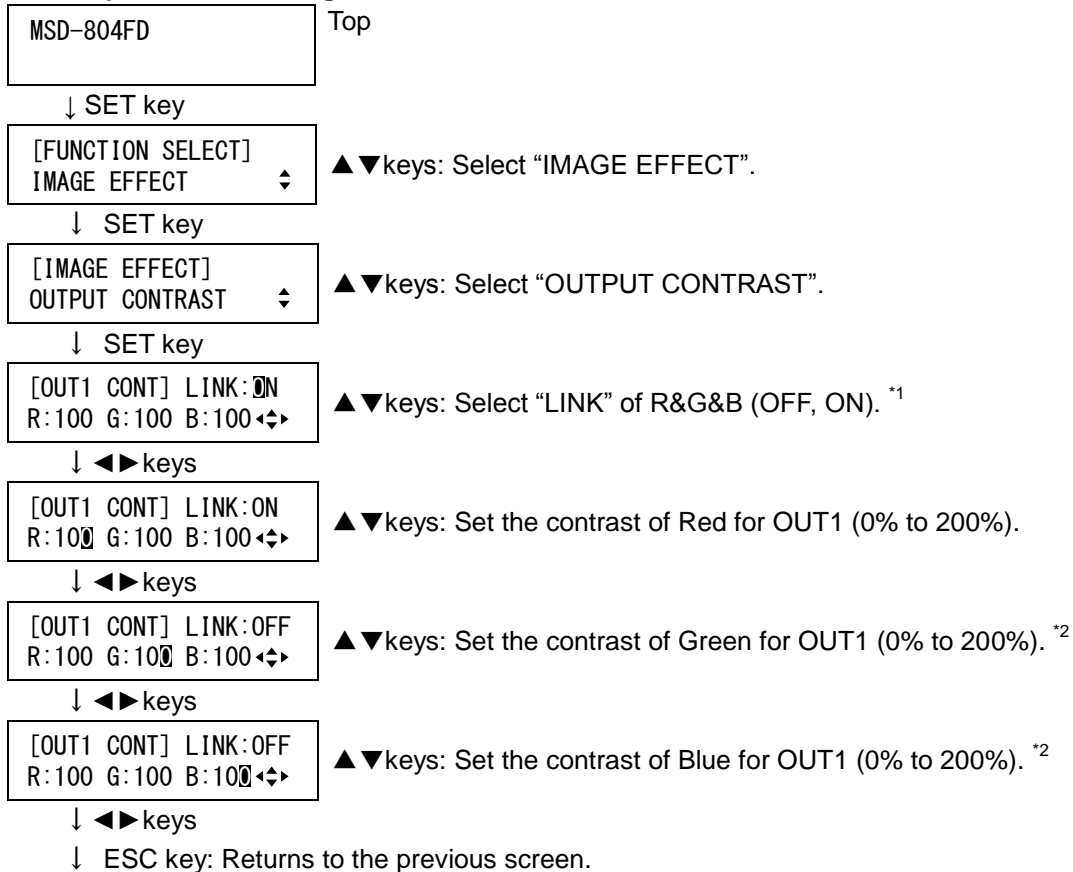
```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
IMAGE EFFECT      ↕
```
▲▼keys: Select "IMAGE EFFECT".

↓ SET key

```
[IMAGE EFFECT]
OUTPUT CONTRAST   ↕
```
▲▼keys: Select "OUTPUT CONTRAST".

↓ SET key

```
[OUT1 CONT] LINK:ON
R:100 G:100 B:100 ◄↕►
```
▲▼keys: Select "LINK" of R&G&B (OFF, ON). [*1]

↓ ◄►keys

```
[OUT1 CONT] LINK:ON
R:100 G:100 B:100 ◄↕►
```
▲▼keys: Set the contrast of Red for OUT1 (0% to 200%).

↓ ◄►keys

```
[OUT1 CONT] LINK:OFF
R:100 G:100 B:100 ◄↕►
```
▲▼keys: Set the contrast of Green for OUT1 (0% to 200%). [*2]

↓ ◄►keys

```
[OUT1 CONT] LINK:OFF
R:100 G:100 B:100 ◄↕►
```
▲▼keys: Set the contrast of Blue for OUT1 (0% to 200%). [*2]

↓ ◄►keys
↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) are also changed associated with the settings of the Red (R). For example, if you increase Red (R) +2, Green (G) and Blue (B) are also increased (+2). If one of these three colors reaches the limiting value, it cannot be changed any further.
[*2] Only if you set "LINK" to "OFF", you can set the contrasts of Green and Blue.

2. To set the output contrast using commands:
    @SOC: Set output contrast
    @GOC: Get output contrast

7.4.9　Output default color [OUT DEFAULT COLOR]

For each output (common to OUTA and OUTB)

You can initialize the settings of "**7.4.7 Output brightness [OUTPUT BRIGHTNESS]**" and "**7.4.8 Output contrast [OUTPUT CONTRAST]**".

1. To initialize the settings of output default color using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │      ▲▼keys: Select "IMAGE EFFECT".
│ IMAGE EFFECT         ◆  │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [IMAGE EFFECT]          │      ▲▼keys: Select "OUT DEFAULT COLOR".
│ OUT DEFAULT COLOR    ◆  │
└─────────────────────────┘
        ↓ SET key        ↑ ESC key: Return to previous screen without changing settings.
┌─────────────────────────┐      ▲▼keys: Select "YES" or "NO".
│ [OUT1 DEFAULT COLOR]    │
│ SURE? = NO        ◄◆►   │      ▲▼keys: Select the desired output (OUT1 to OUT4).
└─────────────────────────┘
        ↓ To apply the setting: Select "YES" and press the "SET" key.
          To return to the menu without any change: Select "NO" and press the "SET" key.
┌─────────────────────────┐
│ [IMAGE EFFECT]          │
│ OUT DEFAULT COLOR    ◆  │
└─────────────────────────┘
```
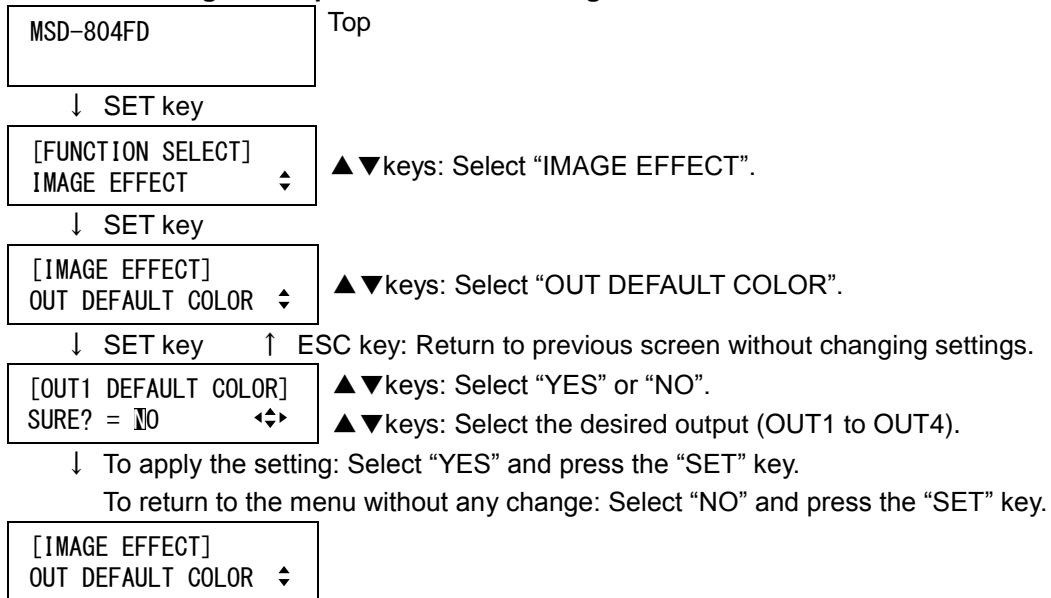
2. To initialize the settings of output default color using commands:

　　　@ODC: Output default color

7.5 Input Settings

7.5.1 No-signal input monitoring [INPUT VIDEO DETECT]

For each input

If you change the settings of EDID or turn off/on the MSD while HDMI or DVI devices (hereafter referred to as "source devices") that are connected to the MSD are turned on, only a few source devices stop outputting signals. In this case, the MSD repeatedly requests the source devices to output signal data.
Use this menu to set the monitoring time which is from when a source device stops outputting signals to when the MSD requests the source device to output video signals.

·Monitoring time: OFF, 2000ms (2 seconds) to 15000 ms. (15 seconds) by100 ms.
[Default]: 10000 ms. (10 seconds)
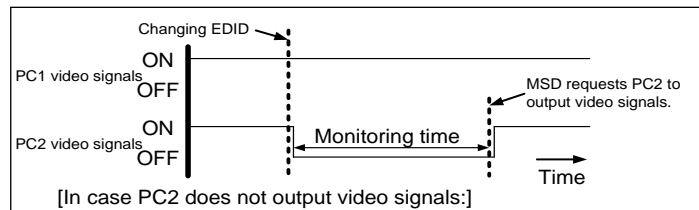
[Fig. 7.16] Monitoring absence of input

Note 1:

If the MSD requests a PC to output video signals, the PC resets the output of video signals. If the set value is too short, the PC may not output video because it keeps resetting repeatedly.
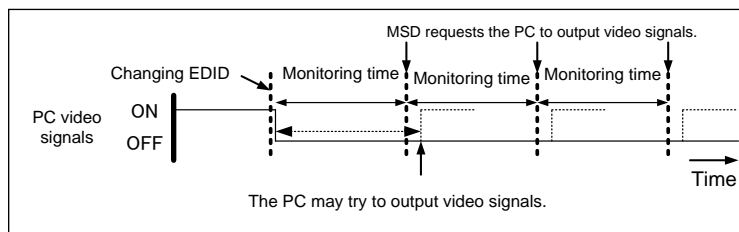
[Fig. 7.17] Repeating reset

Note 2:

If you use this input monitoring function and the power-saving function of the PC's monitor simultaneously, the PC may output video again only after the time set in this menu passes following that the monitor power save function works. If you enable the monitor power save function, set this menu to "OFF".

Note 3:

If this function works with the Dual monitor function simultaneously, the PC may determine there is no monitor connection and it may reset the Dual monitor function. In this case, set this menu to "OFF".

1. To set the No-signal input monitoring time using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
INPUT SETTING      ↕
```
▲▼ keys: Select "INPUT SETTING".

↓ SET key

```
[INPUT SETTING]
INPUT VIDEO DETECT ↕
```
▲▼ keys: Select "INPUT VIDEO DETECT".

↓ SET key

```
[IN1 VIDEO DETECT]
10000ms          ◄↕►
```
▲▼keys: Set the monitoring time (OFF, 2000 to 15000).

◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.
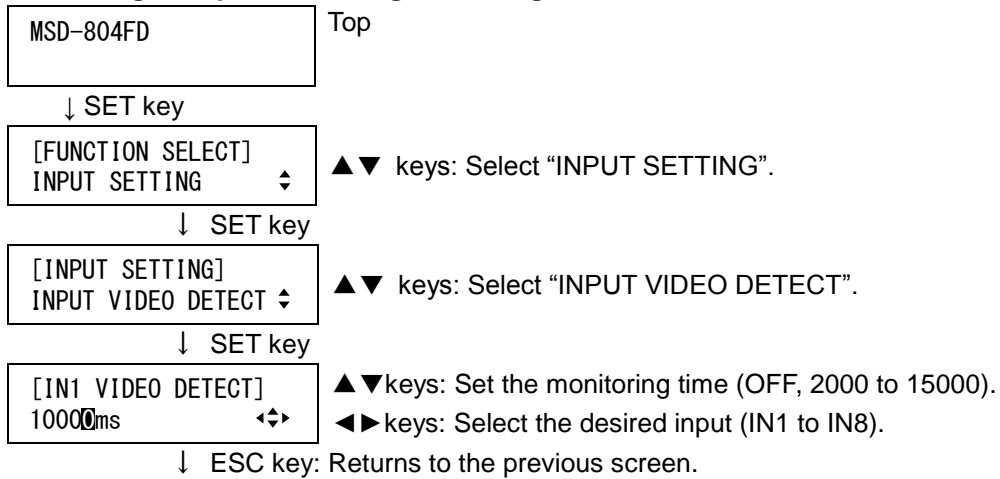
2. To set the No-signal input monitoring time using commands:

　　　@SDT: Set no-signal-input monitoring

　　　@GDT: Get no-signal-input monitoring

7.5.2 HDCP input enabled/disabled [HDCP INPUT ENABLE]

For each input

Some source devices check whether the connected device supports HDCP and then determine whether they encrypt HDCP signals or not. Since the MSD is HDCP compliant, if it is connected to a display device that is not HDCP compliant, the display device may not display video.

With this menu, you can set whether the MSD encrypts HDCP to the source device. "ENABLE" is set by default, but if you want to connect the MSD to a display device that is not HDCP compliant, select "DISABLE" to disable the encryption of HDCP output from the source device.
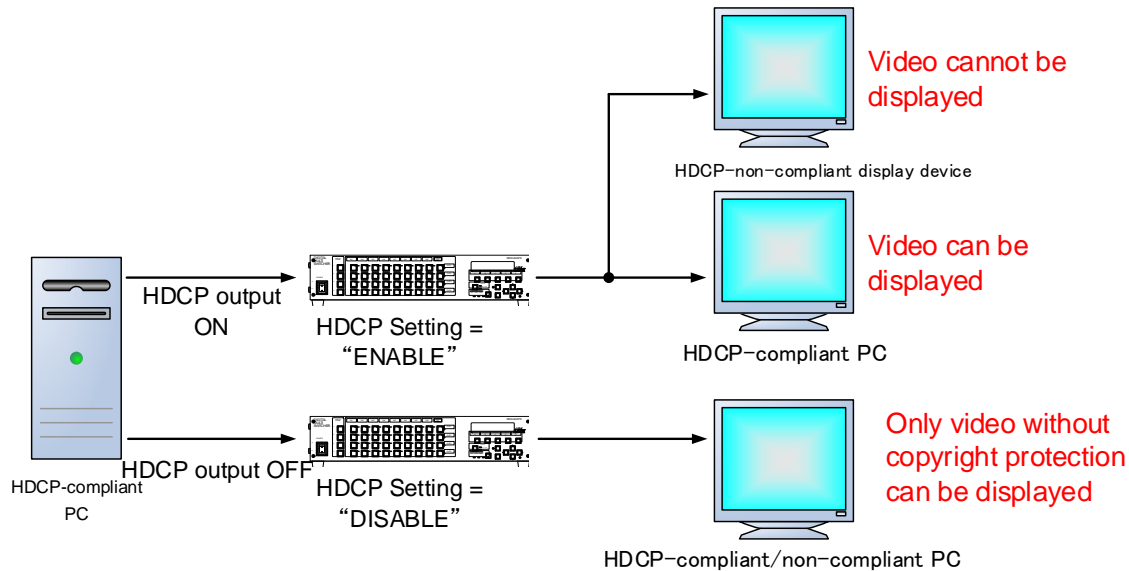
[Fig. 7.18] Enabling/disabling HDCP input

Note:

If you select "DISABLE" and connect a Blu-ray disc player or the like to the MSD, all video signals may not be output. This is because Blu-ray disc players do not allow connection with any device that is not HDCP compliant. In such a case, select "ENABLE" and connect an HDCP-compliant display device. Even if you select "DISABLE" and video can be output, protected contents (movie, music video, and the like) still cannot be played.

1. To enable/disable the HDCP input using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
└─────────────────────────┘
         ↓ SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼keys: Select "INPUT SETTING".
│ INPUT SETTING        ↕  │
└─────────────────────────┘
         ↓ SET key
┌─────────────────────────┐
│ [INPUT SETTING]         │   ▲▼keys: Select "HDCP INPUT ENABLE".
│ HDCP INPUT ENABLE    ↕  │
└─────────────────────────┘
         ↓ SET key
┌─────────────────────────┐   ▲▼keys: select "DISABLE" or "ENABLE".
│ [IN1 HDCP INPUT]        │   ◄►keys: Select the desired input (IN1 to IN8).
│ ENABLE            ↔↕↔   │
└─────────────────────────┘
         ↓ ESC key: Returns to the previous screen.
```
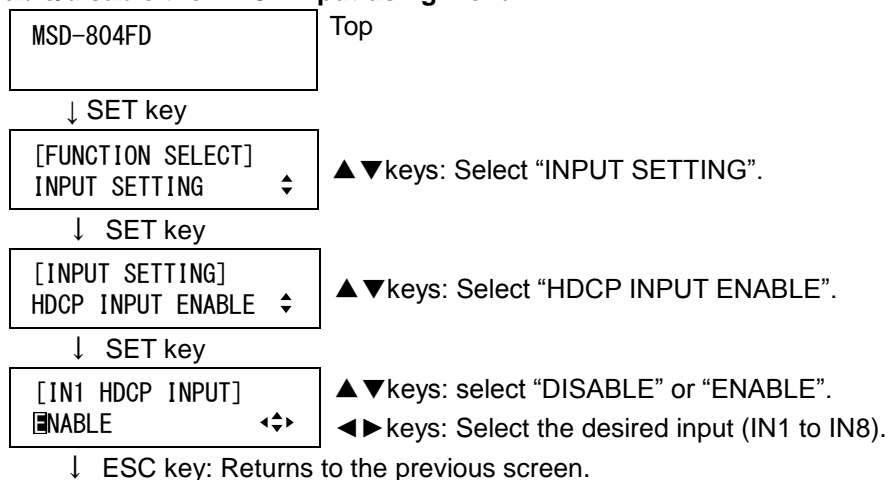
2. To enable/disable the HDCP input using commands:

@SHE: Set HDCP input enabled/disabled
@GHE: Get HDCP input enabled/disabled

7.5.3 Input equalizer [INPUT EQUALIZER]

HDMI input connector has an equalizer circuit to correct attenuated signals caused when a long cable is connected. If you set this menu to "ON", signals are corrected automatically according to the amount of the attenuation. However, if you connect a cable booster or the like for input of the MSD, compensatory functions may sometimes conflict and signals cannot be corrected appropriately. In such a case, set this menu to "OFF".

$$\begin{cases} \text{・Enable input equalizer: ON \quad [Default]} \\ \text{・Disable input equalizer: OFF} \end{cases}$$

1. To enable/Disable the input equalizer using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
INPUT SETTING        ⬍
```
▲▼keys: Select "INPUT SETTING".

↓ SET key

```
[INPUT SETTING]
INPUT EQUALIZER      ⬍
```
▲▼keys: Select "INPUT EQUALIZER".

↓ SET key

```
[IN1 EQUALIZE]
ON                   ◄⬍►
```
▲▼keys: Select "ON" or "OFF".
◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.
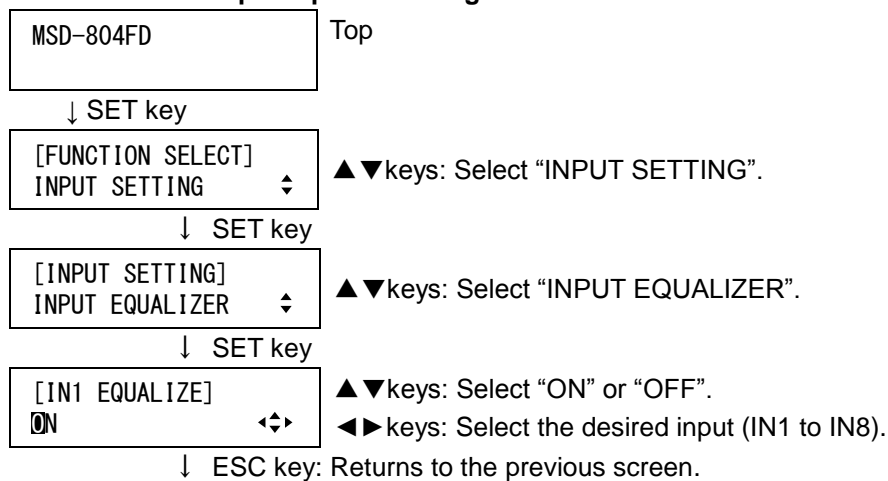
2. To enable/disable the input equalizer using commands:

@SIQ: Set input equalizer
@GIQ: Get input equalizer

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7.5.4   Automatic detection of input video interruption [INPUT OFF CHECK]

For each input

The MSD can stop outputting video immediately after input video signals are disconnected for a moment. Use this function to reduce distorted output video occurred at the time of switching if an external switcher is connected for input of the MSD. The processing of this function is the same as that of switching input. (Settings of the following menus are applied automatically: "**7.7.5 Window transition effect [VIDEO SWITCHING]**", "**7.7.6 Window transition speed [SWITCHING SPEED]**", and "**7.7.7 Wipe color [WIPE COLOR]**".

⎧ ・ Not detect automatically: OFF
⎨
⎩ ・ Detect automatically: ON   [Default]

Note 1:
Even if you set this item to "ON", distorted video cannot be corrected completely when input video signals are lost. Especially if you set "**7.7.5 Window transition effect [VIDEO SWITCHING]**" to an option other than "CUT", noises or black bars may be output at the time of fading out or wiping out.

1. To enable/disable the automatic detection using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐
│ [FUNCTION SELECT]   │ ⬍   ▲▼keys: Select "INPUT SETTING".
│ INPUT SETTING       │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐
│ [INPUT SETTING]     │ ⬍   ▲▼keys: Select "INPUT OFF CHECK".
│ INPUT OFF CHECK     │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐     ▲▼keys: Select "ON" or "OFF".
│ [IN1 OFF CHECK]     │ ⬌⬍   ◀▶keys: Select the desired input (IN1 to IN8).
│ ON                  │
└─────────────────────┘
      ↓ ESC key: Returns to the previous screen.
```
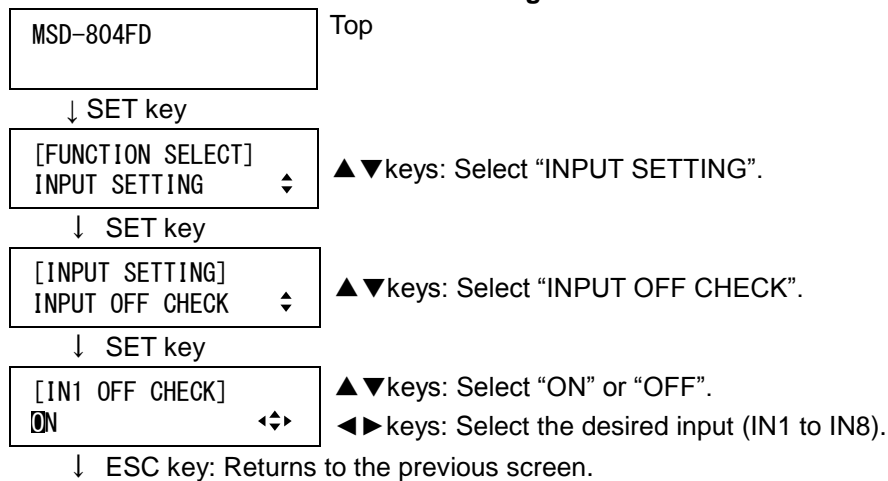
2. To enable/disable the automatic detection using commands:

   @SID: Set automatic detection of input video interruption
   @GID: Get automatic detection of input video interruption

7.6 Input Timing Settings

The MSD monitors signals at all times and sets the input timing automatically. Only if part of the video is cut off, adjust the input timing finely by using this menu.

7.6.1 The total number of horizontal dots [H TOTAL DOTS]

> For each input port/input signal

You can set the total number of horizontal dots of analog RGB/analog YPbPr input video videos.

・The total number of horizontal dots: 400 to 4125 (Within sampling clock 13M Hz to 162M Hz)
  [Default]: Depends on input signals
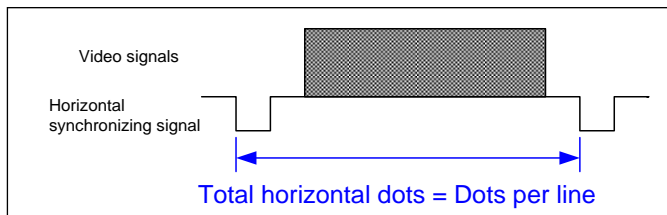
[Fig. 7.19] Total number of horizontal dots

1. To set the total number of horizontal dots using menu:

```
[FUNCTION SELECT]
INPUT TIMING        ↕
```
▲▼keys: Select "INPUT TIMING".

↓ SET key

```
[INPUT TIMING]
H TOTAL DOTS        ↕
```
▲▼keys: Select "H TOTAL DOTS".

↓ SET key

```
[IN6 H TOTAL DOTS]
134█DOT           ⬍
```
▲▼keys: Set the total number of horizontal dots.
◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.

Note:

You can set the total number of horizontal dots only if analog RGB or analog YPbPr signals are input. You can only display the set value for input analog video signals or digital input signals, and you cannot change the setting. If no signal is input, you cannot set the function and the message is displayed.

```
[IN6 H TOTAL DOTS]
NOT AVAILABLE NOW ◄►
```

2. To set the total number of horizontal dots using commands:

@GHT: Get the total number of horizontal dots

7.6.2 Horizontal start position [H START]

・Starting position of horizontal reading:

64 to 2900 (Must be equal or less than [The total number of horizontal dots - Horizontal display period])

[Default]: Depends on input signals
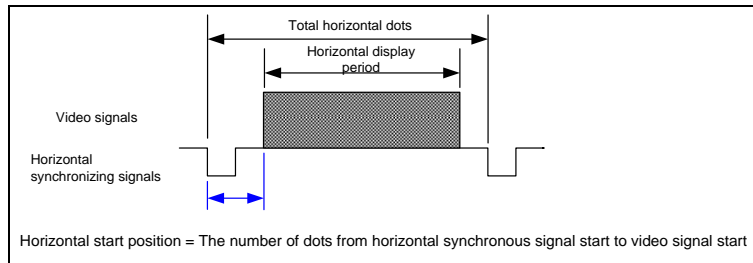
[Fig. 7.20] Horizontal start position

The settable range depends on settings of "**7.6.1 The total number of horizontal dots [H TOTAL DOTS]**" and "**7.6.3 Horizontal display period [H DISPLAY]**". If the set value is [Total number of horizontal dots > Horizontal display period > Horizontal start position] and the set value of the horizontal start position exceeds the limit value by changing the total number of horizontal dots or horizontal display period, set the horizontal start position to the limit value automatically.

1. To set the horizontal start position using menu:
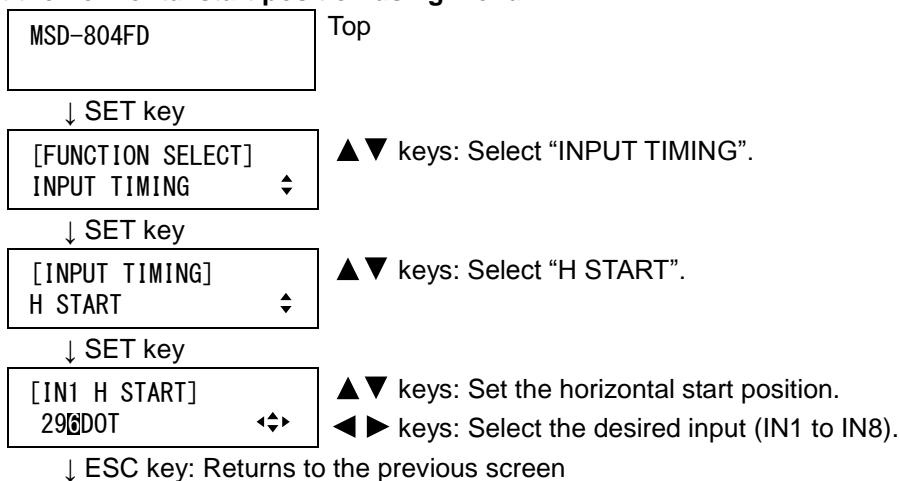
```
┌─────────────────────────┐   Top
│  MSD-804FD              │
│                         │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Select "INPUT TIMING".
│ [FUNCTION SELECT]       │
│ INPUT TIMING        ↕   │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Select "H START".
│ [INPUT TIMING]          │
│ H START             ↕   │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Set the horizontal start position.
│ [IN1 H START]           │   ◄► keys: Select the desired input (IN1 to IN8).
│  296DOT            ◄↕►  │
└─────────────────────────┘
        ↓ ESC key: Returns to the previous screen
```

Note:

You can set the horizontal start position only if there is an input signal. If no signal is input, you cannot set the position, and the message shown right is displayed.

```
┌──────────────────────────┐
│ [IN1 H START]            │
│ NOT AVAILABLE NOW  ◄►    │
└──────────────────────────┘
```

2. To set the horizontal start position using commands:

@SHS: Set horizontal start position

@GHS: Get horizontal start position

7.6.3 Horizontal display period [H DISPLAY]

For each input port/input signal

・Horizontal display period: 64 to 2900 (Equal or less than [The total number of horizontal dots - 64])
[Default]: Depends on input signals

Total horizontal dots

Video signals

Horizontal
synchronizing signal

Horizontal display period = The number of dots displaying video
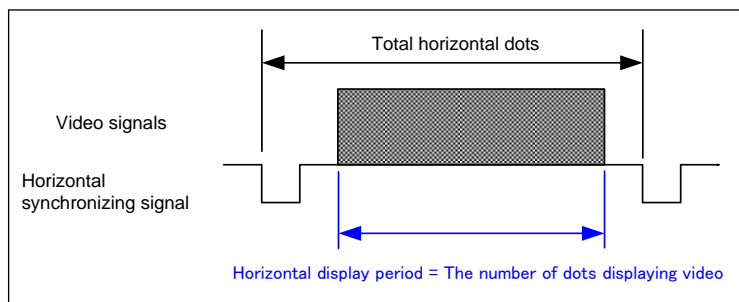
[Fig. 7.21] Horizontal display period

The settable range depends on setting of "**7.6.1 The total number of horizontal dots [H TOTAL DOTS]**".
The set value is [Total number of horizontal dots >Horizontal displaying period].

1. To set the horizontal display period using menu:
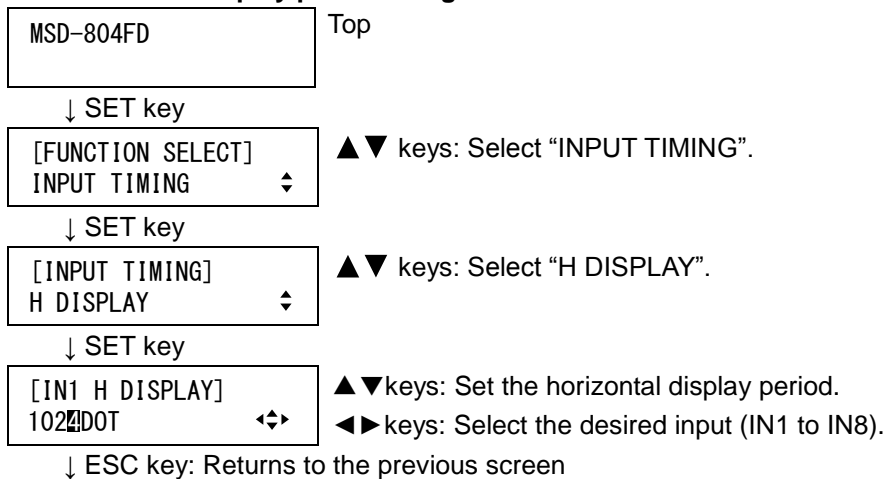
```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
INPUT TIMING        ⬍
```
▲▼ keys: Select "INPUT TIMING".

↓ SET key

```
[INPUT TIMING]
H DISPLAY           ⬍
```
▲▼ keys: Select "H DISPLAY".

↓ SET key

```
[IN1 H DISPLAY]
1024DOT            ⬌
```
▲▼keys: Set the horizontal display period.
◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen

Note:
You can set the horizontal display period only if there is an input signal. If no signal is input, you cannot set the period, and the message shown right is displayed.

```
[IN1 H DISPLAY]
NOT AVAILABLE NOW ◄►
```

2. To set the horizontal display period using commands:

@SHD: Set horizontal display period
@GHD: Get horizontal display period

91

7.6.4　Vertical start position [V START]

For each input port/input signal

･Vertical start position: 10 to 2048 (Equal or less than [Total vertical lines-vertical display period])
　[Default]: Depends on input signals
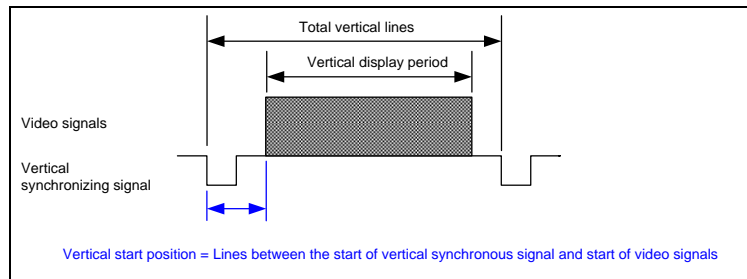
[Fig. 7.22] Vertical start position

The settable range depends on the total number of lines of input signals (the MSD counts automatically) and "**7.6.5 Vertical display period [V DISPLAY]**". If the set value is [Total number of vertical lines > Vertical displayed period > Vertical start position] and the set value of vertical start position exceeds the limit value by changing the vertical display period, the vertical start position is set to the limit value automatically.

1. To set the vertical start position using menu:
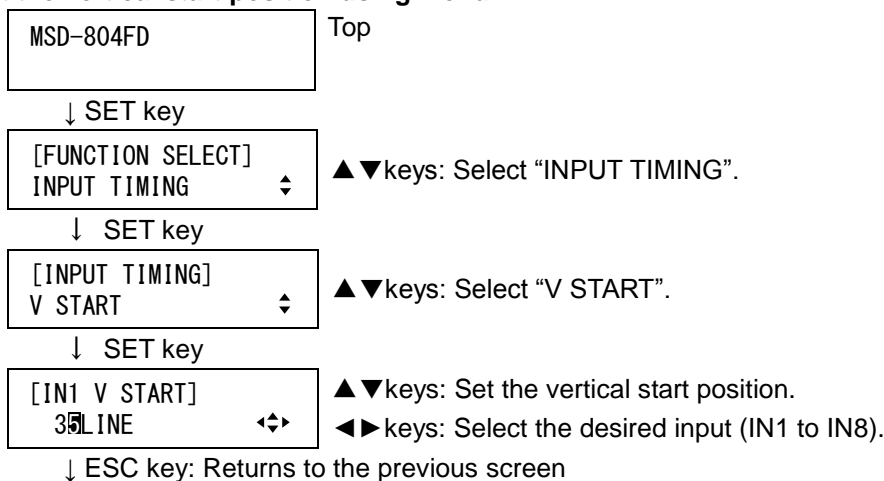
```
MSD-804FD              Top

  ↓ SET key

[FUNCTION SELECT]      ▲▼keys: Select "INPUT TIMING".
INPUT TIMING    ↕

  ↓  SET key

[INPUT TIMING]         ▲▼keys: Select "V START".
V START         ↕

  ↓ SET key

[IN1 V START]          ▲▼keys: Set the vertical start position.
 35LINE        ⟷↕▸    ◀▶keys: Select the desired input (IN1 to IN8).

  ↓ ESC key: Returns to the previous screen
```

Note:
You can set the vertical start position only if there is an input signal. If no signal is input, you cannot set the position, and the message shown right is displayed.

```
[IN1 V START]
NOT AVAILABLE NOW ⟷
```

2. To set the vertical start position using commands:

　　@SVS: Set vertical start position
　　@GVS: Get vertical start position

7.6.5   **Vertical display period [V DISPLAY]**

For each input port/input signal

・Vertical display period: 10 to 2048 (Equal or less than [The total number of vertical lines – 10])
    [Default]: Depends on input signals
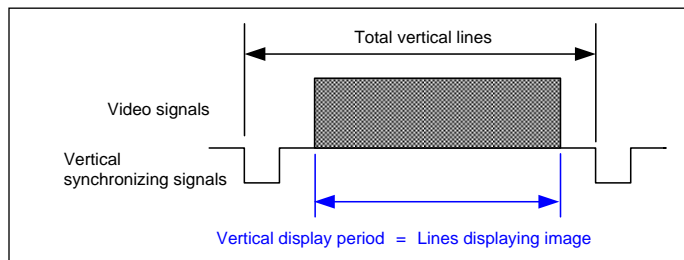
[Fig. 7.23] Vertical display period

1. To set the vertical display period using menu:

| MSD-804FD | Top |

↓ SET key

| [FUNCTION SELECT]
INPUT TIMING   ↕ | ▲▼ keys: Select "INPUT TIMING". |

↓ SET key

| [INPUT TIMING]
V DISPLAY   ↕ | ▲▼ keys: Select "V DISPLAY". |

↓ SET key

| [IN1 V DISPLAY]
 768LINE   ⬥ | ▲▼keys: Set the vertical display period.
◀▶keys: Select the desired input (IN1 to IN8). |

↓ ESC key: Returns to the previous screen
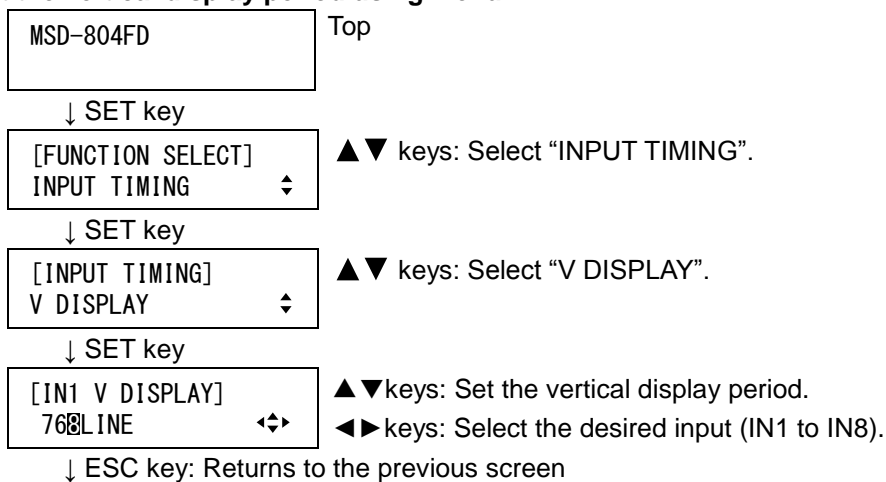
Note:

You can set the vertical display period only if there is an input signal. If no signal is input, you cannot set the period, and the message shown right is displayed.

| [IN1 V DISPLAY]
NOT AVAILABLE NOW ⬥ |

2. To set the vertical display period using commands:

    @SVD: Set vertical display period
    @GVD: Get vertical display period

7.6.6 Initialization [INITIALIZE]

<div style="float:right; border:1px solid; padding:8px;">For each input port/input signal</div>

The MSD initializes the input timing that were set manually.

1. To initialize the input timing using menu:

```
┌────────────────────┐   Top
│ MSD-804FD          │
└────────────────────┘
```

↓ SET key

```
┌────────────────────┐   ▲▼ keys: Select "INPUT TIMING".
│ [FUNCTION SELECT]  │
│ INPUT TIMING     ↕ │
└────────────────────┘
```

↓ SET key

```
┌────────────────────┐   ▲▼ keys: Select "INITIALIZE".
│ [INPUT TIMING]     │
│ INITIALIZE       ↕ │
└────────────────────┘
```

↓ SET key   ↑ ESC key: Returns to menu without initialization.

```
┌────────────────────┐   ◄► keys: Select the desired input. (IN1 to IN8).
│ [IN1 INITIALIZE]   │
│ ▯920x1080        ↔ │
└────────────────────┘
```

↓ SET key: Loading

```
┌────────────────────┐   Displays the message for 1 second before automatically returning to
│ [IN1 INITIALIZE]   │   the previous screen.
│ NOW INITIALIZATION..│
└────────────────────┘
```

↓

```
┌────────────────────┐
│ [INPUT TIMING]     │
│ INITIALIZE       ↕ │
└────────────────────┘
```

Note:

You can initialize the input timing only if there is an input signal.

```
┌────────────────────┐
│ [IN1 INITIALIZE]   │
│ NOT AVAILABLE NOW ↔│
└────────────────────┘
```

2. To initialize the input timing using commands:

@RTT: Initialize input timing

7.7   Output Settings

7.7.1   Output equalizer [OUTPUT EQUALIZER]

> For each output (only OUTA)

HDMI input connector has an equalizer circuit to correct attenuated signals caused when a long cable is connected. Set the output equalizer according to the cable length.

- ·No correction: OFF   [Default]
- ·Modest correction: LOW
- ·Middle correction: MIDDLE
- ·Significant correction: HIGH

[Table 7.1] Output equalizer

Cable length	Shorter than 32.8 ft./10 m	32.8 ft./10 m or longer
Setting	"OFF" to "MIDDLE"	"LOW" to "HIGH"

STP : Shielded Twist Pair cable(AWG24)

If you use other manufacturers' cable, use this table only as a reference.

If a display device that is in a significantly bad condition is connected, the video may be distorted.

[Table 7.2] Amount of corrections

Setting of output equalizer	Amount of corrections
OFF	0.0 dB
LOW	1.5 dB
MIDDLE	3.5 dB
HIGH	6.0 dB

1. To set the output equalizer using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
OUTPUT EQUALIZER  ↕
```
▲▼ keys: Select "OUTPUT EQUALIZER".

↓ SET key

```
[OUT1A EQUALIZER]
OFF            ◄▲▼►
```
▲▼ keys: Select the desired output equalizer mode (OFF, LOW, MIDDLE, HIGH).

◄ ► keys: Select the desired output (OUT1A to OUT4A).

↓ ESC key: Returns to the previous screen.
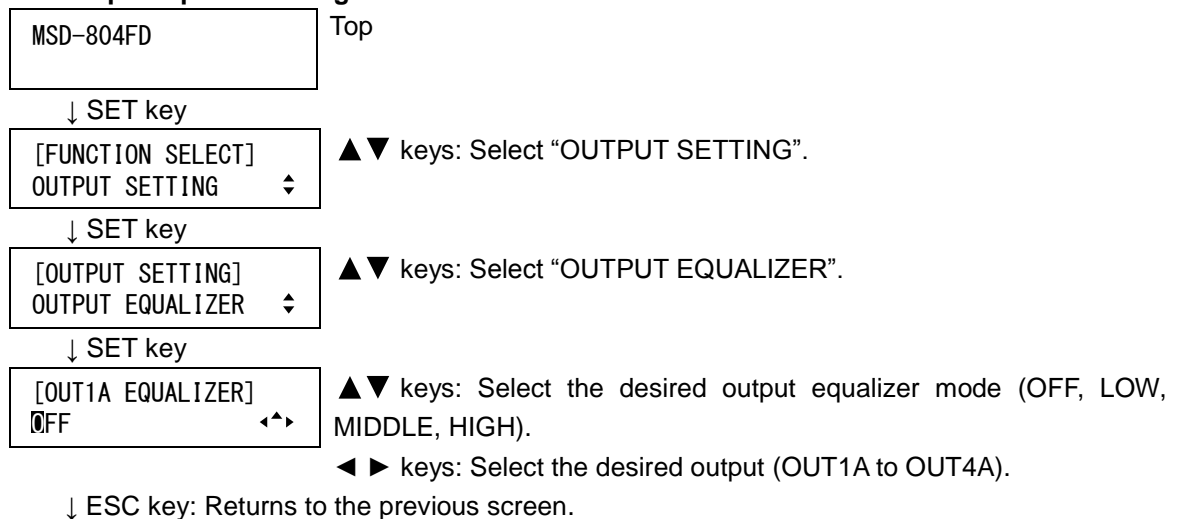
2. To set the output equalizer using commands:

@SEQ: Set output equalizer
@GEQ: Get output equalizer

7.7.2 Output mode [OUTPUT MODE]

For each output (OUTA and OUTB separately)

You can select the output mode of HDMI output connectors manually.

Set the mode to "HDMI YCbCr4:4:4 MODE" to output video with the optimal mode automatically even if a display device that does not support HDMI component signals or DVI signals is connected. If you want to output video with HDMI RGB signals or DVI signals forcibly, set the desired mode.

"HDMI YCbCr4:4:4 MODE" > "HDMI YCbCr4:2:2 MODE" > "HDMI RGB MODE" > "DVI MODE"

- ・DVI MODE   ・HDMI YCbCr4:2:2 MODE
- ・HDMI RGB MODE   ・HDMI YCbCr4:4:4 MODE   [Default]

Notes:

- ● "DVI MODE": digital audio is not output.
- ● "YCbCr MODE": used only for TV output resolutions (480i, 576i, 720p, 1080i, 1080p)
- ● "HDMI RGB MODE" and "DVI MODE": used for PC resolutions.

[Table 7.3] Output mode priority

Signals supported by display device / Output mode	DVI	HDMI RGB	HDMI YCbCr4:2:2	HDMI YCbCr4:4:4
DVI MODE	1st	-	-	-
HDMI RGB MODE	2nd	1st	-	-
HDMI YCbCr4:2:2 MODE	3rd	2nd	1st	-
HDMI YCbCr4:4:4 MODE	4th	3th	2nd	1st

1. To set the output mode using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING        ⬍
```
▲▼keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
OUTPUT MODE           ⬍
```
▲▼keys: Select "OUTPUT MODE".

↓ SET key

```
[OUT1A MODE]        ⬌⬍
HDMI YCbCr4:4:4 MODE
```
▲▼ keys: Select the desired mode.
◄ ► keys: Select the desired output (OUT1A to OUT4A, OUT1B to OUT4B*).

↓ ESC key: Returns to the previous screen
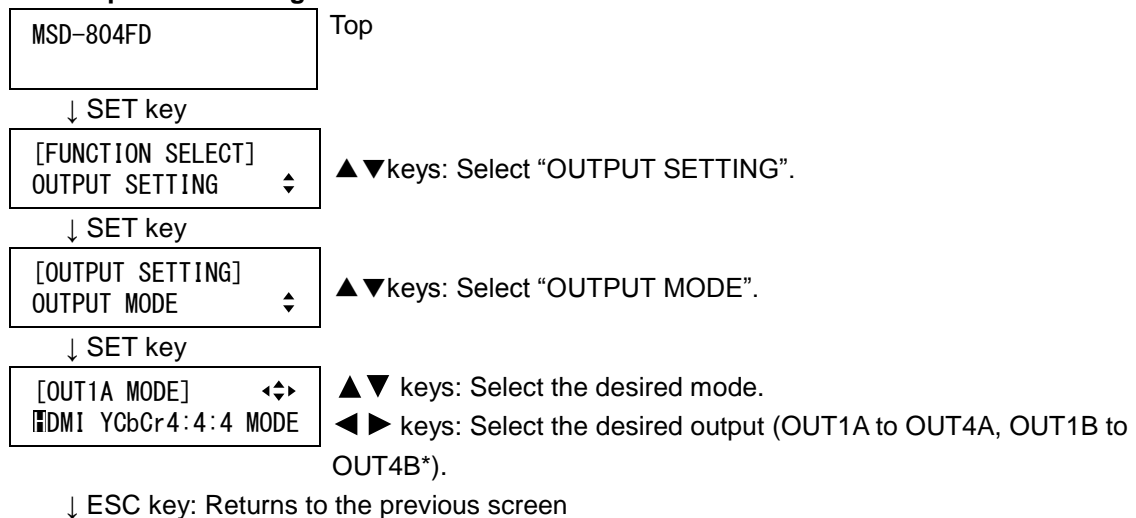
*"OUT1B" to "OUT4B" are displayed only if HDBaseT output optional extra is mounted.

2. To set the output mode using commands:

@SDM: Set output mode
@GDM: Get output mode

7.7.3　Synchronous signal output with no input video [SYNC OUTPUT]

You can set whether synchronous signals are output when no video signal is input from the selected input, or when "OFF" is selected for the input:

⎰ ·Not output: OFF
⎱ ·Output: ON: You can prevent the display device from being switched to the standby mode. [Default]

1. To enable/disable the synchronous output using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING      ↕
```
▲▼keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
SYNC OUTPUT         ↕
```
▲▼keys: Select "SYNC OUTPUT".

↓ SET key

```
[OUT1 SYNC OUTPUT]
ON                 ⬌↕
```
▲▼keys: Select "OFF" or "ON".
◄►keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen.
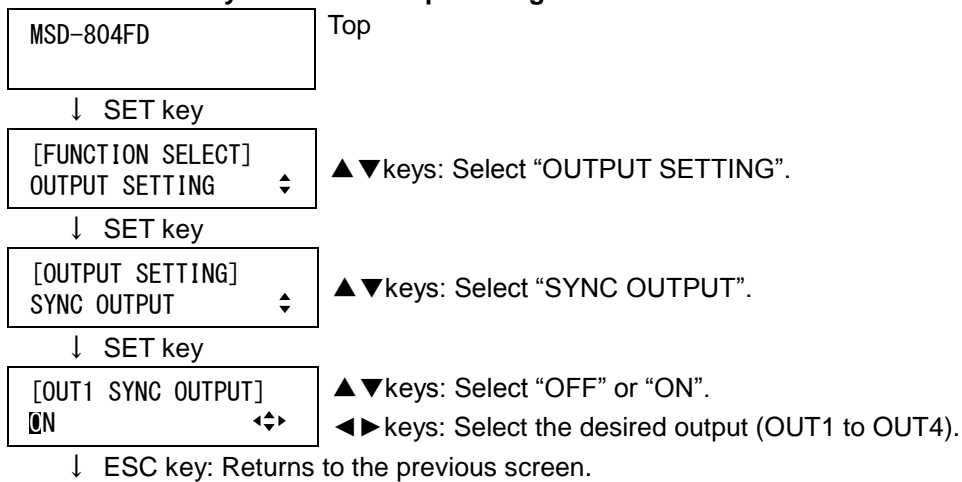
2. To enable/disable the synchronous output using commands:

　　　@SUY: Set synchronous signal output with no input video
　　　@GUY: Get synchronous signal output with no input video

7.7.4 Output video with no input video [VIDEO OUTPUT]

For each output (common to OUTA and OUTB)

You can set the color of the video to be output when no video signal is input from the selected input.*

- ·Black screen: BLACK
- ·Blue screen: BLUE [Default]
- ·Background color screen: BACKGROUND COLOR

* If you set "**7.7.3 Synchronous signal output with no input video [SYNC OUTPUT]**" to "OFF", no synchronous signal is output, and no video is output to the display device.

1. To set the video when no video is input using menu:

| MSD-804FD | Top |

↓ SET key

| [FUNCTION SELECT]
OUTPUT SETTING   ↕ | ▲▼keys: Select "OUTPUT SETTING". |

↓ SET key

| [OUTPUT SETTING]
VIDEO OUTPUT   ↕ | ▲▼keys: Select "VIDEO OUTPUT". |

↓ SET key

| [OUT1 VIDEO OUTPUT]
BLUE   ◄↕► | ▲▼keys: Select the desired output screen (BLACK, BLUE, or BACKGROUND COLOR).
◄►keys: Select the desired output (OUT1 to OUT4). |

↓ ESC key: Returns to the previous screen.
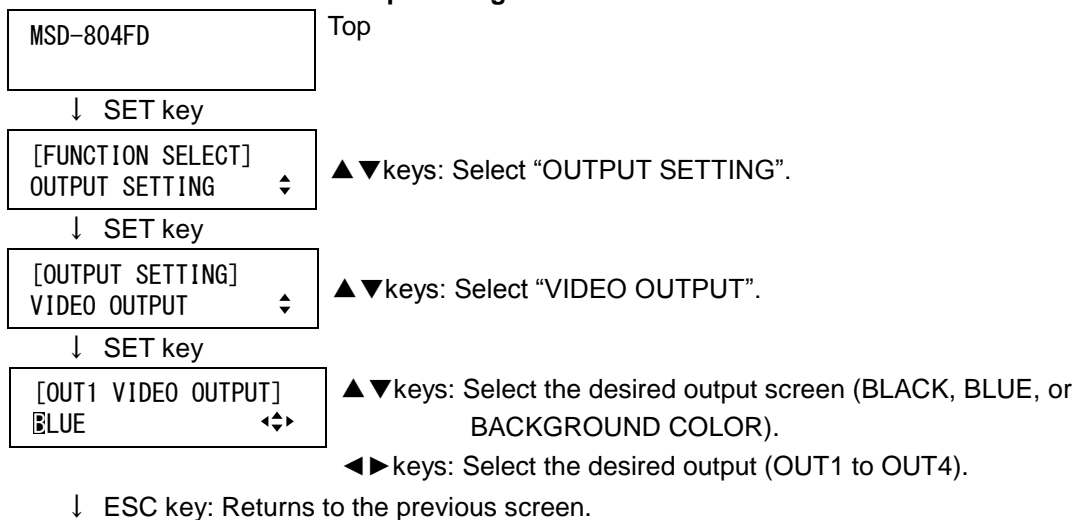
2. To set the video when no video is input using commands:

@SBO: Set output video with no input video

@GBO: Get output video with no input video

7.7.5 Window transition effect [VIDEO SWITCHING]

You can select a window transition effect for when the video input is switched.

Switching speed of effect other than "CUT" can be set in "**7.7.6 Window transition speed [SWITCHING SPEED]**".

"CUT": A black frame is displayed and the video input is switched instantly (approximately five frames).

"FADE OUT-IN": The current video fades out slowly and then a black frame is displayed. After that, the next video is displayed slowly.

"FREEZE->FADE OUT-IN": The current video fades out slowly after a freeze.

"WIPE": The color selected in "**7.7.7 Wipe color [WIPE COLOR]**" is wiped in and the video is displayed. After wipe-out, the next video is displayed. You can select a wiping direction from four directions.

However, if you switch the channel from a channel without input video signals or switch it to a channel without input video signals, "FADE OUT-IN" and WIPE OUT/IN cannot be performed regardless of the setting of this menu. You can set the switching speed of "FADE OUT-IN" and WIPE OUT/IN by following "**7.7.6 Window transition speed [SWITCHING SPEED]**".

```
・CUT
・FADE OUT-IN
・FREEZE→FADE OUT-IN    [Default]
・LEFT→RIGHT WIPE
・RIGHT→LEFT WIPE
・TOP→BOTTOM WIPE
・BOTTOM→TOP WIPE
```

Note:

The setting of this menu is valid not only when the input is switched, but also when "**7.5.4 Automatic detection of input video interruption [INPUT OFF CHECK]**" is set to "ON".

1. To set the window transition effect using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING      ↕
```
▲▼keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
VIDEO SWITCHING     ↕
```
▲▼keys: Select "VIDEO SWITCHING".

↓ SET key

```
[OUT1 SWITCHING] ↔
FREEZE→FADE OUT-IN
```
▲▼keys: Set the effect at switching video.
◄►keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen.
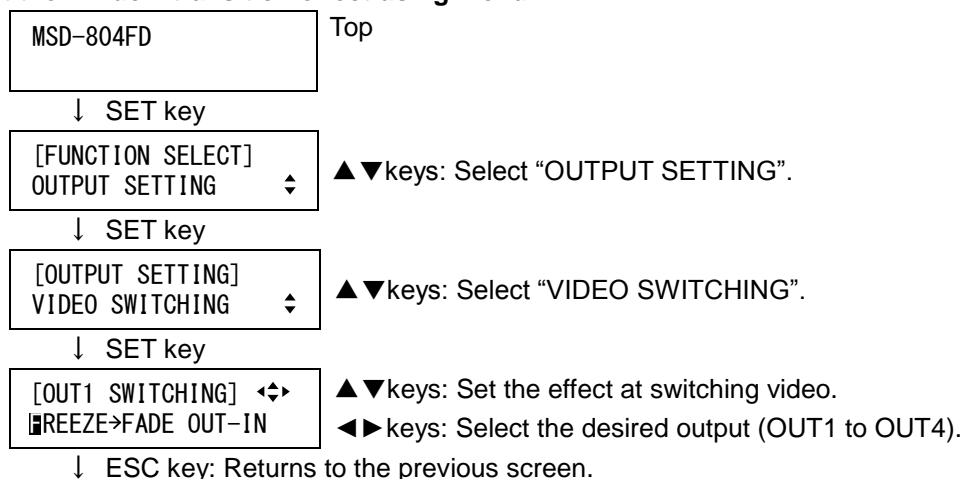
2. To set the window transition effect using commands:

@SFF: Set video switching effect

@GFF: Get video switching effect

7.7.6　Window transition speed [SWITCHING SPEED]

For each output (common to OUTA and OUTB)

You can set the window transition speed for "FADE OUT-IN", "DISSOLVE", or "WIPE OUT/IN" when input channel is switched.

These options are not available when "**7.7.5 Window transition effect [VIDEO SWITCHING]**" is set to "CUT".

・100 ms. (0.1 seconds) to 2000 ms. (2.0 seconds) by 10 ms.　[Default]: 350 ms. (0.35 seconds)
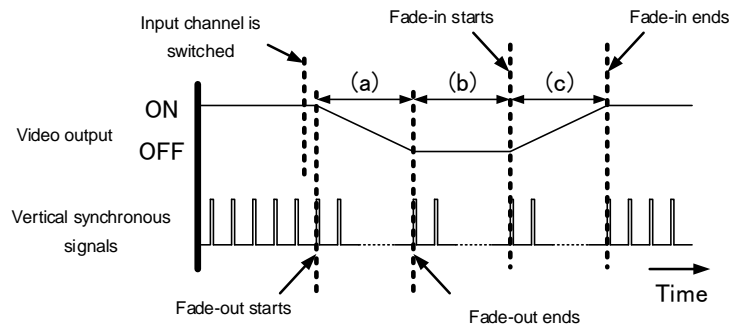
(a) Speed of switching video input channel
(b) Waiting time before video becomes stable (approx. 5 frames)
(c) Speed of switching video input channel

[Fig. 7.24] FADE OUT/IN

Note:

Setting of this menu is applied not only when input is switched but also when "**7.5.4 Automatic detection of input video interruption [INPUT OFF CHECK]**" is set to "ON".

Since "FADE OUT-IN", "DISSOLVE", and WIPE IN/OUT are performed after synchronization to vertical synchronous signals of the output, the actual speed may be a few milliseconds slower or faster than the set time. For example, if the output resolution is 1080p@60, the set switching speed of video inputs is 420 ms., and "FADE OUT-IN", "DISSOLVE", or WIPE IN/OUT is performed at 0.42 (second) × 60 (frame/second) ≒ 25 frames, the actual speed becomes 25 (frames) ÷ 60 (frame/second) ≒ 0.4166 seconds ≒ approximately 416.6 ms.

1. To set the switching speed using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
SWITCHING SPEED   ↕
```
▲▼keys: Select "SWITCHING SPEED".

↓ SET key

```
[OUT1 FADE SPEED]
350 ms          ⇔
```
▲▼keys: Set the switching speed (100 ms. to 2000 ms.).
◄►keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen.
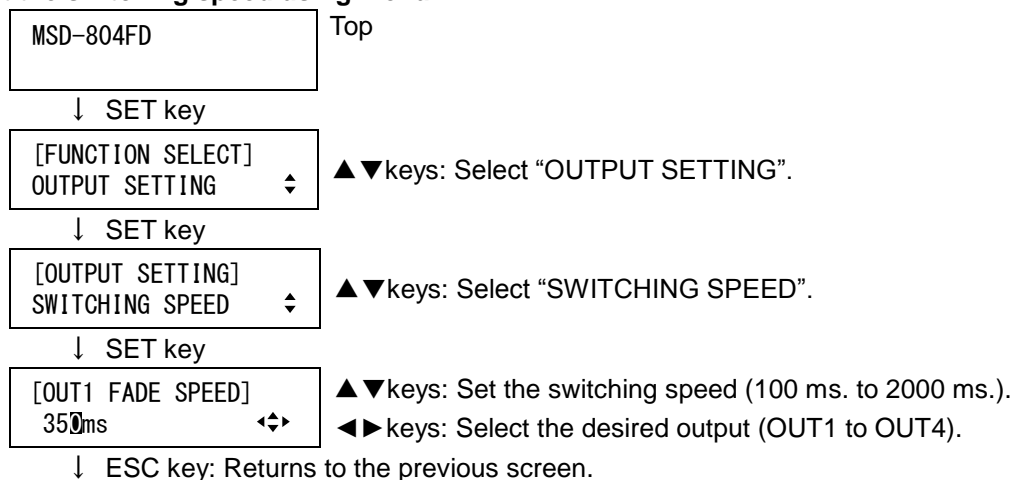
2. To set the window transition speed using commands:

@SFT: Set video switching speed
@GFT: Get video switching speed

7.7.7 Wipe color [WIPE COLOR]

For each output (common to OUTA and OUTB)

You can set the wipe color while switching video input.

Valid only if you set "**7.7.5 Window transition effect [VIDEO SWITCHING]**" to "WIPE".

·Wipe color Red: 0 to 255　[Default]: 0
·Wipe color Green: 0 to 255　[Default]: 0
·Wipe color Blue: 0 to 255　[Default]: 0

1. To set the wipe color using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
WIPE COLOR        ↕
```
▲▼keys: Select "WIPE COLOR".

↓ SET key

```
[OUT1 WIPE] LINK:ON
R:  0 G:  0 B:  0↔↕▸
```
▲▼keys: Set "LINK" to "OFF" or "ON". [*1]

↓ ◄►keys

```
[OUT1 WIPE] LINK:ON
R:  0 G:  0 B:  0↔↕▸
```
▲▼keys: Set the wipe color Red for OUT1 (0 to 255).

↓ ◄►keys

```
[OUT1 WIPE] LINK:OFF
R:  0 G:  0 B:  0↔↕▸
```
▲▼keys: Set the wipe color Green for OUT1 (0 to 255). [*2]

↓ ◄►keys

```
[OUT1 WIPE] LINK:OFF
R:  0 G:  0 B:  0↔↕▸
```
▲▼keys: Set the wipe color Blue for OUT1 (0 to 255). [*2]

↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) will also be changed according to the settings of the Red (R). For example, if you increase Red (R) +2, Green (G) and Blue (B) will also be increased at that level (+2).

[*2] If you set "LINK" to "OFF", you can set each of the wipe colors individually, Red, Green and Blue.

2. To set the wipe color using commands:

@SWC: Set wipe color
@GWC: Get wipe color

7.7.8 Video output connector [OUTPUT CONNECTOR]

For each output (OUTA and OUTB separately)

The MSD distributes the same video to 2 outputs, and you can enable or disable video output from each connector.

You can check or preview the video by setting this menu to ON for an output. When you decide which video to be displayed for both outputs, then set the other to ON.

Note:

This menu is available only if HDBaseT output option is mounted.

　　・Video output: OFF
　　・Video output: ON　[Default]

1. To set the video output connector using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
OUTPUT CONNECTOR  ↕
```
▲▼ keys: Select "OUTPUT CONNECTOR".

↓ SET key

```
[OUT1A VIDEO]
ON              ◄↕►
```
▲▼ keys: Set "OUTPUT CONNECOTR" to "ON" or "OFF".
◄ ► keys: Select the output (OUT1A to OUT4A, OUT1B to OUT4B).

↓ ESC key: Returns to the previous screen
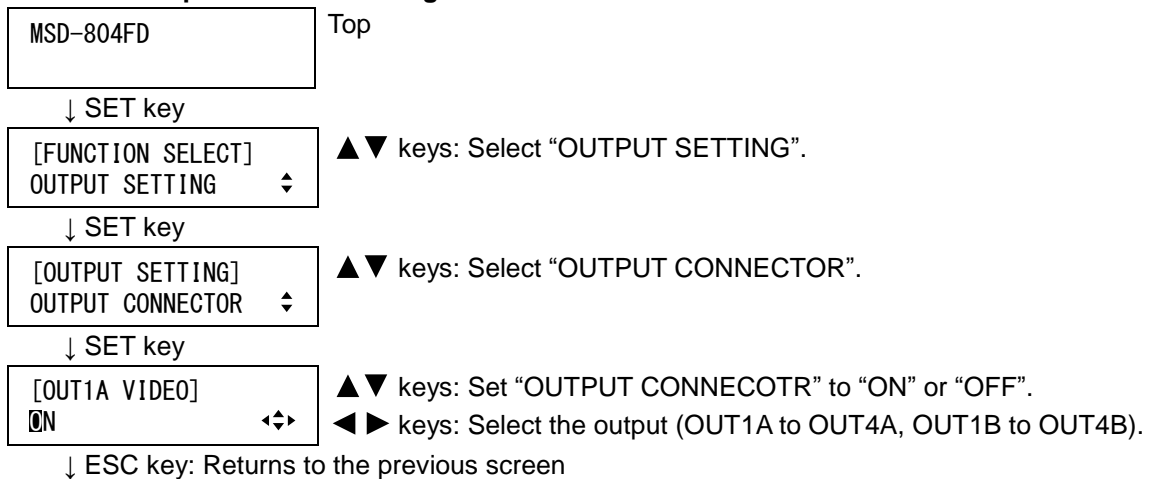
2. To set the video output connector using commands:

　　@SVO: Set video output connector
　　@GVO: Get video output connector

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7.7.9　HDCP output [HDCP OUTPUT MODE]

For each output (OUTA and OUTB separately)

You can set the HDCP output for when a display device that supports HDCP is connected.

"ALWAYS": HDCP is output at all times regardless of status of input signals.

"HDCP INPUT ONLY": HDCP is output only if the input signal has HDCP. However, some display devices may not output video and audio temporarily due to failure of the HDCP authentication when HDCP is switched from OFF to ON.

"DISABLE": only video and audio without HDCP are output, because HDCP is not authorized.

When a display device without HDCP is connected, only video and audio without HDCP are output regardless of the setting of this menu.

・HDCP is output only if input signals are with HDCP: HDCP INPUT ONLY
・HDCP is output at all times: ALWAYS　[Default]
・HDCP is not authorized: DISABLE

Note:

Normally, select "ALWAYS". If you connect a distribution amplifier supporting HDCP for output of the MSD and a display device without HDCP is connected from the output of the distribution amplifier, signals without HDCP are not output to the display device. In such a case, select "HDCP INPUT ONLY".

1. To set the HDCP output mode using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
HDCP OUTPUT MODE  ↕
```
▲▼ keys: Select "HDCP OUTPUT MODE".

↓ SET key

```
[OUT1A HDCP MODE]
ALWAYS          ↔↕
```
▲▼ keys: Select the HDCP output mode (HDCP INPUT ONLY, ALWAYS, DISABLE)

◄ ► keys: Select the output (OUT1A to OUT4A, OUT1B to OUT4B).*

↓ ESC key: Returns to the previous screen
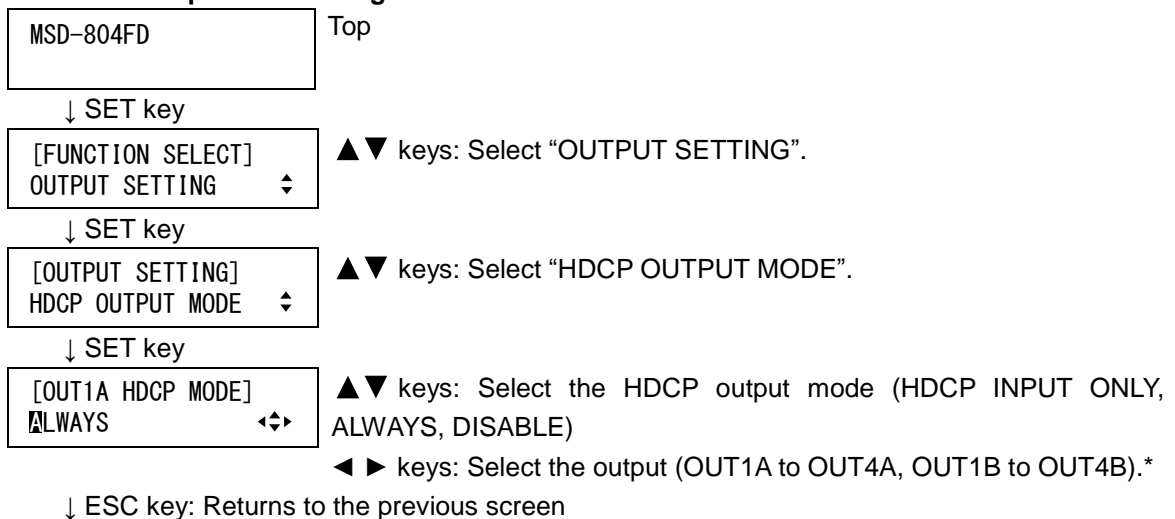
*OUT1B to OUT4B are available only if HDBaseT output option is mounted.。

2. To set the HDCP output mode using commands:

@SEN: Set HDCP output mode
@GEN: Get HDCP output mode

7.7.10 The number of HDCP retries [HDCP ERROR RETRY]

For each output (OUTA and OUTB separately)

If a display device with HDCP is connected and you set "**7.7.9 HDCP output [HDCP OUTPUT MODE]**" to "HDCP INPUT ONLY" or "ALWAYS", HDCP is authorized regardless of the status of input signals. Normally, set "HDCP ERROR RETRY" to "ETERNITY" to retry the authentication automatically after the first authentication fails. However, if you do not input signals protected by HDCP, you can set the number of retries arbitrarily. (If retry is not succeeded even after the MSD retries for the set number of retry times, video and audio with HDCP are not output.)

- ·Retry until succeeded: ETERNITY   [Default]
- ·Not retry: 0
- ·Retry for the set number of retry times: 1 to 100

1. To set the number of HDCP retries using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING      ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
HDCP ERROR RETRY    ↕
```
▲▼ keys: Select "HDCP ERROR RETRY".

↓ SET key

```
[OUT1A HDCP RETRY]
ETERNITY          ◄▲►
```
▲▼ keys: Set the number of HDCP retries for when HDCP authentication failed.

◄ ► keys: Select the output (OUT1A to OUT4A, OUT1B to OUT4B)*

↓ SET key

```
[HDCP ERROR RETRY]
NOW UPDATE...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[OUTPUT SETTING]
HDCP ERROR RETRY    ↕
```

Note:
If you do not press the "SET" key, the number of retries is not changed. Make sure to press the "SET" key.

*OUT1B to OUT4B are available only if HDBaseT output option is mounted.

2. To set the number of HDCP retries using commands:
   @SHR: Set the number of HDCP retries
   @GHR: Get the number of HDCP retries

7.7.11 Deep Color [DEEP COLOR OUTPUT]

For each output (OUTA and OUTB separately)

"30-BIT COLOR": signals are output with "30-BIT COLOR" only if a display device supporting Deep Color is connected. If a display device that does not support Deep Color is connected, signals are output with "24-BIT COLOR" automatically. However, since the transmission clock of "30-BIT COLOR" is faster than that of "24-BIT COLOR", noise may occur if a bad-quality cable or long cable is connected. In those cases, the noise may be removed by selecting "24-BIT COLOR".

> ·24-BIT COLOR　[Default]
> ·30-BIT COLOR

1. To set the Deep Color of HDMI outputs using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING    ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
DEEP COLOR OUTPUT ↕
```
▲▼ keys: Select "DEEP COLOR OUTPUT".

↓ SET key

```
[OUT1A DEEP COLOR]
24-BIT COLOR   ↔↕▸
```
▲▼ keys: Select the color depth (24-BIT COLOR, 30-BIT COLOR).
◀ ▶ keys: Select the output (OUT1A to OUT4A, OUT1B to　OUT4B)*

↓ ESC key: Returns to the previous screen
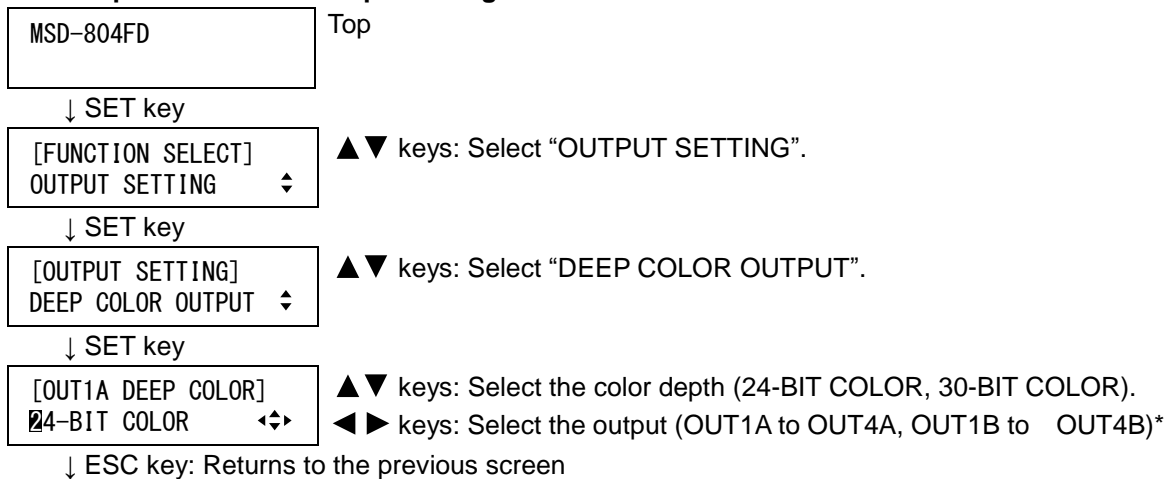
　*OUT1B to OUT4B are available only if HDBaseT output option is mounted.

2. To set the Deep Color of HDMI outputs using commands:

　　@SDC: Set Deep Color
　　@GDC: Get Deep Color

7.7.12 CEC (Consumer Electronics Control) [CEC CONNECTION]

You can select the channel for connecting CEC when a CEC-supported device with CEC is connected to HDMI input connector, HDMI output connector, and HDBaseT output connectors. CEC can be used only in HDMI connector (HDMI input connector IN1 to IN8, HDMI output connector OUT1A to OUT4A) or when HDC-RH100 is connected to HDBaseT output connector OUT1B to OUT4B. It cannot be used when HDC-RD100 is connected to HDBaseT output connector (OUT1B to OUT4B).

- ・NOT CONNECTED [Default]
- ・SELECTED CHANNEL
- ・IN1
- ・IN2
- ・IN3
- ・IN4
- ・IN5
- ・IN6
- ・IN7
- ・IN8

Note 1:

Using CEC may cause the following negative effects. If you do not use CEC, set this menu to "NOT CONNECTED."

If the status of the display devices connected to the HDMI output connector changes (such as being turned OFF→ON) or if the CEC connection changes, the EDID may also need to be changed (the MSD changes it automatically) in order to update the address of the connected device. When the EDID is changed, the source device stops outputting video temporarily. Note the following points to not make the EDID change at the time of operation.

- ● The MSD refers to the address of display device at the time of CEC connection. However, if display device is turned off or if the display device has multiple HDMI input connectors and a connector to which the MSD is connected is not selected, the MDS sometimes cannot load the address. (Address may be loaded depending on display devices.) Since the MSD saves the address of the last-used display device, EDID is not normally changed even if the display device status changes. However, when a display device is connected for its first time, EDID may possibly be changed. Therefore, before operation, connect a display device under the same CEC connection status to make the MSD recognize the address of the display device.
- ● If you select "SELECTED CHANNEL", the CEC connection changes when you switch inputs. If you connect display devices to each output having an address that is different from the MSD settings, the EDID is changed when CEC connections are changed. If you select "SELECTED CHANNEL", make sure to connect display devices having the same addresses.
- ● If a display device has multiple HDMI input connectors, each connector has the specific address that is different from each other. If connecting display devices of the same model to each MSD output, connect them to the same input connector of the display device. If you connect devices such as a repeater between the output of the MSD and a display device, the addresses may not be matched.
- ● In this case, set this menu to an option other than "SELECTED CHANNEL". The addresses of the display devices connected to each output connector are displayed on the upper right.

```
[OUT1A CEC]  1.0.0.0
▉ELECTED CHANNEL ◄▲▼►
```

Note 2:

CEC connection is a one-on-one basis; it cannot connect multiple inputs and outputs. If you set multiple outputs to connect to the same input, only a smaller output number is connected preferentially and other outputs are not connected. For example, if you set both OUT1 and OUT2 to IN2, OUT1 is connected to IN2, while OUT 2 is not connected.

Note 3:

To use CEC, enable HDMI link control of the connected device (such as digital TV, Blu-ray disc recorder, and so on). The MSD is counted as a CEC device, and several CEC devices including the MSD may be displayed on the CEC operation window. In this case, select the device you want to operate. (For settings and operation of your device, refer to the manual of the device.)

1. To set the CEC using menu:

```
┌─────────────────────────┐  Top
│ MSD-804FD               │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Select "OUTPUT SETTING".
│ [FUNCTION SELECT]       │
│ OUTPUT SETTING       ♦  │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Select "CEC CONNECTION".
│ [OUTPUT SETTING]        │
│ CEC CONNECTION       ♦  │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐   ▲▼ keys: Select the desired CEC connection.
│ [OUT1A CEC]             │   ◄► keys: Select the output (OUT1A to OUT4A, OUT1B to   OUT4B)*
│ NOT CONNECTED      ◄♦►  │
└─────────────────────────┘
        ↓ SET key: Applies settings.
┌─────────────────────────┐   Displays the message for 1 second before automatically returning to
│ [CEC CONNECTION]        │   the previous screen.
│ NOW UPDATE...           │
└─────────────────────────┘
        ↓
┌─────────────────────────┐
│ [OUTPUT SETTING]        │
│ CEC CONNECTION       ♦  │
└─────────────────────────┘
```

Note:

If you do not press the "SET" key, the CEC is not changed. Make sure to press the "SET" key.

*OUT1B to OUT4B are available only if HDBaseT output option is mounted.

2. To set the CEC using commands:

@SCE: Set CEC
@GCE: Get CEC

7.7.13 HDCP re-authentication [HDCP AUTHORIZATION]

> For each output (OUTA and OUTB separately)

If a display device supporting HDCP is connected, HDCP is authorized automatically. You can re-authorize HDCP manually using this menu. (Connection Reset is performed automatically, but it can be performed manually using this menu.)

1. To perform the HDCP re-authentication using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OUTPUT SETTING      ↕
```
▲▼ keys: Select "OUTPUT SETTING".

↓ SET key

```
[OUTPUT SETTING]
HDCP AUTHORIZATION ↕
```
▲▼ keys: Select "HDCP AUTHORIZATION".

↓ SET key

```
[OUT1A AUTH]
SURE? = NO      ◄↕►
```
▲▼ keys: Select "YES" or "NO".
◄ ► keys: Select the output (OUT1A to OUT4A, OUT1B to OUT4B)*.

↓ To execute re-authentication: Select "YES" and press the "SET" key.
 To return to the menu without execution: Select "NO" and press the "SET" key.

```
[OUT1A AUTH]
NOW UPDATE...    ◄↕►
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[OUT1A AUTH]
HDCP AUTHORIZATION ↕
```

*OUT1B to OUT4B are available only if HDBaseT output option is mounted.

2. To perform the HDCP re-authentication using commands:
 @HAU: Re-authorize HDCP

7.7.14 Frame lock mode [FRAME LOCK]

You can set the frame lock mode.

- ・OFF [Default]
- ・ON: Synchronous signals of all outputs will be output at the same timing. This mode is for multiple windows configuration and others. Settings of "**7.3.1 Output resolution [RESOLUTION]**" will apply to all outputs; settings cannot be set individually.

1. To set the frame lock mode using menu:

```
┌──────────────────┐   Top
│ MSD-804FD        │
└──────────────────┘
      ↓ SET key
┌──────────────────┐   ▲▼ keys: Select "OUTPUT SETTING".
│ [FUNCTION SELECT]│
│ OUTPUT SETTING  ↕│
└──────────────────┘
      ↓ SET key
┌──────────────────┐   ▲▼ keys: Select "FRAME LOCK".
│ [OUTPUT SETTING] │
│ FRAME LOCK      ↕│
└──────────────────┘
      ↓ SET key
┌──────────────────┐   ▲▼ keys: Set the frame lock mode to "OFF" or "ON".
│ [FRAME LOCK]     │
│ OFF             ↕│
└──────────────────┘
    ↓ ESC key: Returns to the previous screen
```
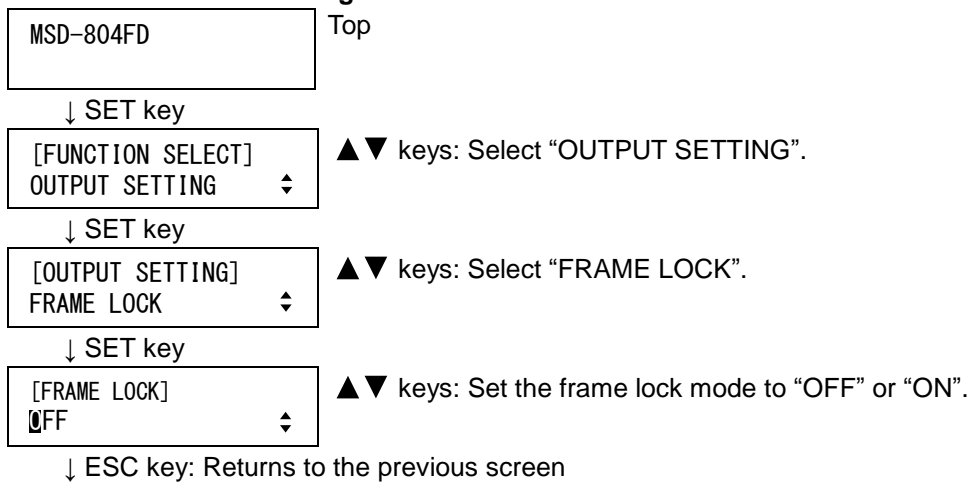
2. To set the frame lock mode using commands:

@SFL: Set the frame lock mode
@GFL: Get the frame lock mode

7.8 Audio settings

HDMI digital audio supports the following formats. For audio output of devices connected to the HDMI input connectors (such as DVD players), set a format supported by both the MSD and display device connected to HDMI output connector (such as display devices and AV amplifier). However, as factory default, only "2 channel linear PCM" can be input. If you want to use "Multi channel linear PCM" or bit stream signals (compressed audio), set "**7.9.5 Audio format [AUDIO FORMAT]**" and "**7.9.6 Speaker configuration [SPEAKER]**".

[Table 7.3] Supported formats of HDMI digital audio

Audio format	Description
2 channel linear PCM	2ch, 32 kHz to 192 kHz, 16/20/24bit
Multi channel linear PCM	8ch, 32 to 192kHz, 16/20/24bit
AC-3, Dolby Digital, DTS	Bit stream
Dolby Digital+, DTS-HD, Dolby TrueHD	Bit stream
AAC	Bit stream

If Multi channel linear PCM signals are input to digital audio, two channels set in "**7.8.10 Multi-channel audio output [MULTI AUDIO]**" or down-mixed audio is output to analog audio and display devices that do not support multi linear PCM.
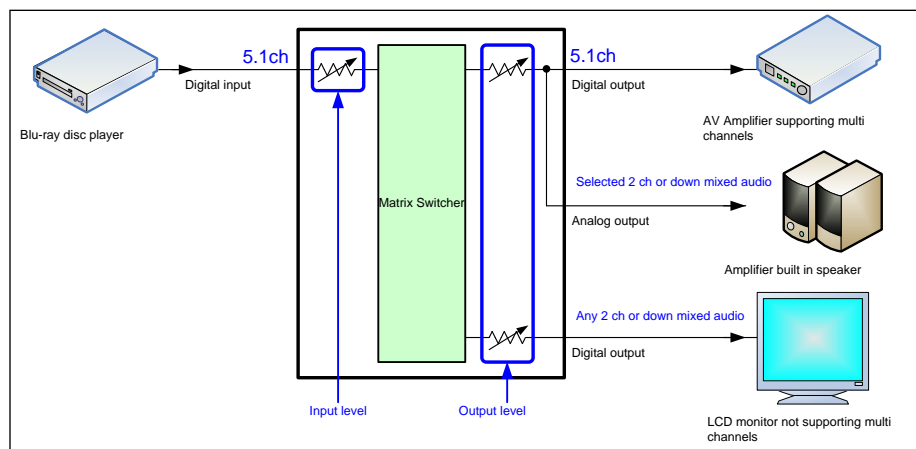
[Fig. 7.25] I/O of multi-channel signals

If bit stream signals (compressed audio) such as Dolby Digital are input to HDMI digital audio, these input audio signals are output to digital audio as they are. They are not output to analog audio, and audio volume cannot be adjusted.
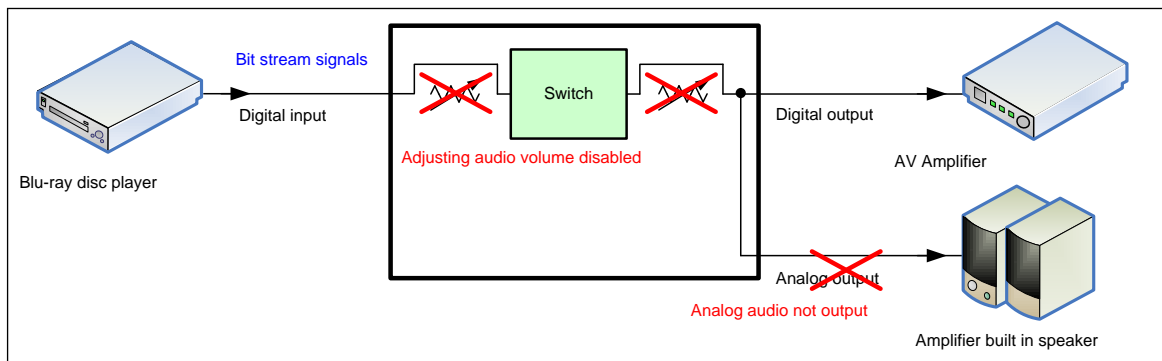
[Fig. 7.26] Inputting/Outputting bit stream signals

7.8.1 Audio output level [OUTPUT LEVEL]

For each output (common to OUTA and OUTB)

You can set the audio output level using audio output volume.

・Audio output level: -60 dB to +10 dB [Default]: ±0 dB

Note: If you change the output level while "**7.8.2**" is set to "ON", mute is canceled.

If you set "**7.16.6 Top VFD screen [TOP DISPLAY]**" to "AUDIO VOLUME", you can set the audio output level on the top screen.

1. To set the audio output level using menu:

```
┌─────────────────────┐   Top
│  MSD-804FD          │
│                     │
└─────────────────────┘
      ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "AUDIO".
│ [FUNCTION SELECT]   │
│ AUDIO          ⬍    │
└─────────────────────┘
      ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "OUTPUT LEVEL".
│ [AUDIO]             │
│ OUTPUT LEVEL   ⬍    │
└─────────────────────┘
      ↓ SET key
┌─────────────────────┐   ▲▼keys: Set the audio output level (-60 to +10).
│ [OUT1 AUDIO VOLUME] │   ◄►keys: Select the desired output (OUT1 to OUT4).
│  0dB          ⬌     │
└─────────────────────┘
      ↓ ESC key: Returns to the previous screen
```
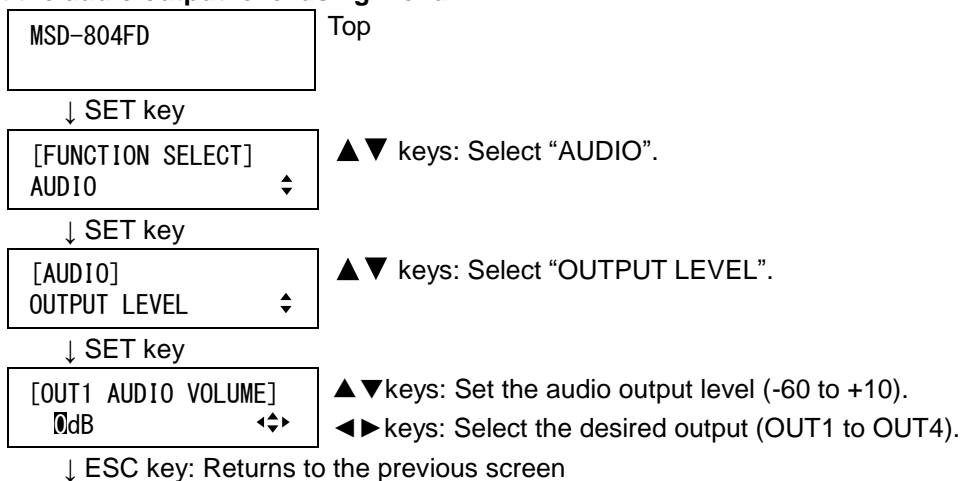
2. To set the audio output level using commands:

@SSL: Set audio output level
@GSL: Get audio output level
@SOL: Set relative value of audio output level
@GOL: Get limit status of audio output level

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7.8.2 **Mute [OUTPUT MUTE]**

For each output (common to OUTA and OUTB)

```
┌  ・ Mute OFF: OFF  [Default]
└  ・ Mute ON: ON
```

If you set "**7.16.6 Top VFD screen [TOP DISPLAY]**" to "AUDIO VOLUME," you can set this menu on the top screen.

1. To set the audio output mute using menu:

```
┌────────────────────────┐
│ MSD-804FD              │   Top
│                        │
└────────────────────────┘
        ↓ SET key
┌────────────────────────┐
│ [FUNCTION SELECT]      │   ▲▼keys: Select "AUDIO".
│ AUDIO              ↕   │
└────────────────────────┘
        ↓  SET key
┌────────────────────────┐
│ [AUDIO]                │   ▲▼keys: Select "OUTPUT MUTE".
│ OUTPUT MUTE        ↕   │
└────────────────────────┘
        ↓  SET key
┌────────────────────────┐
│ [OUT1 MUTE]            │   ▲▼keys: Select "OFF" or "ON".
│ ▊FF              ↔↕   │   ◄►keys: Select the desired output (OUT1 to OUT4).
└────────────────────────┘
    ↓ ESC key: Returns to the previous screen
```
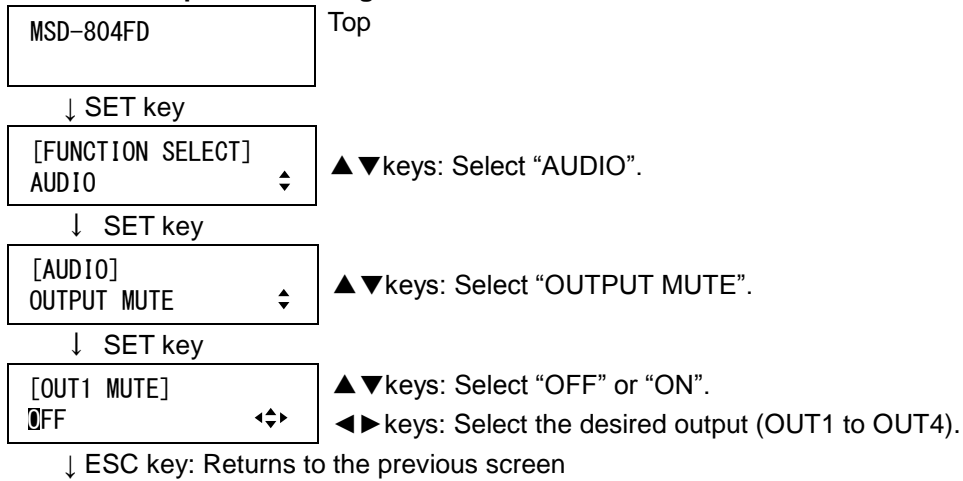
2. To set the audio output mute using commands:

　@SAM: Set output mute
　@GAM: Get output mute

7.8.3 Audio input selection [AUDIO INPUT SELECT]

If you select "AUTO," digital audio is output automatically when HDMI signals with audio signals are input; analog audio is output in other cases.[*]

```
    ⎧ ·AUTO   [Default]
    ⎨ ·ANALOG
    ⎩ ·DIGITAL
```

* If you select "AUTO" while both digital and analog audio signals are input, the digital audio is output. While no HDMI signals are input (for example, during a standby period until the source device starts or output resolution of the output device is changed), the analog audio is output. If you do not want to output analog audio in these conditions, set the audio input manually.

1. To select the digital or analog audio input using menu:

```
┌──────────────────────┐
│ MSD-804FD            │   Top
│                      │
└──────────────────────┘
        ↓ SET key
┌──────────────────────┐
│ [FUNCTION SELECT]    │   ▲▼keys: Select "AUDIO".
│ AUDIO             ↕  │
└──────────────────────┘
        ↓ SET key
┌──────────────────────┐
│ [AUDIO]              │   ▲▼keys: Select "AUDIO INPUT SELECT".
│ AUDIO INPUT SELECT ↕ │
└──────────────────────┘
        ↓ SET key
┌──────────────────────┐
│ [IN1 AUDIO SELECT]   │   ▲▼keys: Select the desired audio input (AUTO, ANALOG, DIGITAL).
│ AUTO(DIGITAL)    ⬦   │   ◄►keys: Select the desired input (IN1 to IN8).
└──────────────────────┘
     ↓ ESC key: Returns to the previous screen.
```
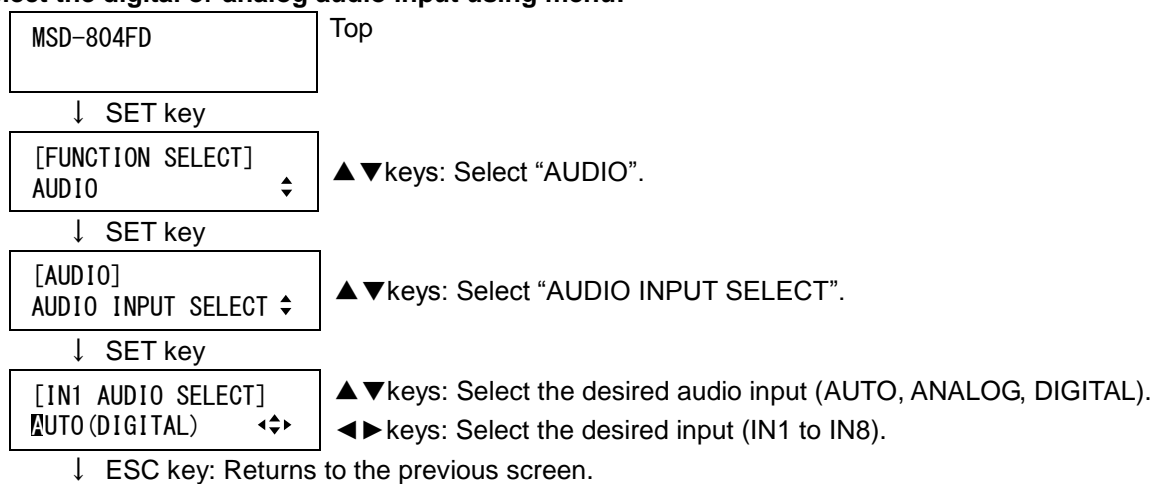
2. To select the digital or analog audio input using commands:

  @SAS: Select audio input
  @GAS: Get audio input
  @GSD: Get actual audio input

7.8.4 Audio input level [INPUT OFFSET]

You can correct the gap in audio input levels of each input signal, because audio input level can be set for each input connector.

･Audio input level: -60 dB to ± 0 dB [Default]: ±0 dB

1. To set the audio input level using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
AUDIO            ↕
```
▲▼keys: Select "AUDIO".

↓ SET key

```
[AUDIO]
INPUT OFFSET     ↕
```
▲▼keys: Select "INPUT OFFSET".

↓ SET key

```
[IN1 AUDIO OFFSET]
  0dB           ◄↕►
```
▲▼keys: Set the audio input level (-60 to ±0).
◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.
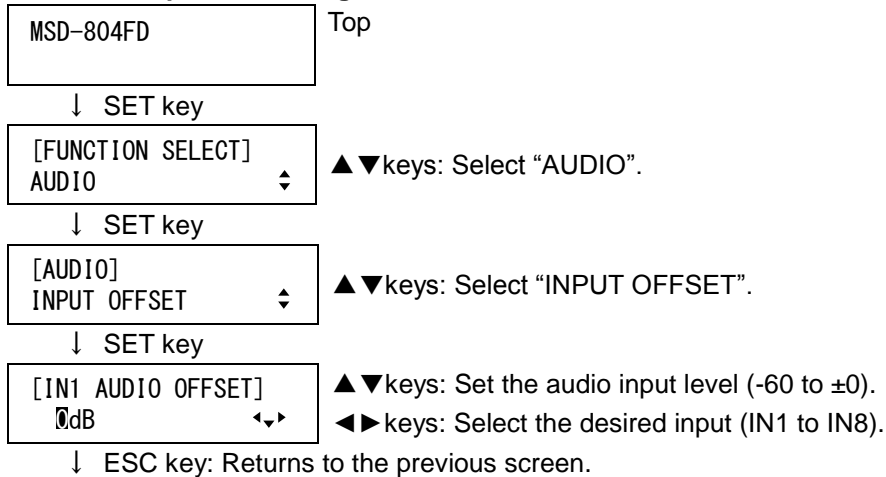
2. To set the audio input level using commands:

@SSO: Set audio input level
@GSO: Get audio input level
@SIL: Set relative value of audio input level
@GIL: Get limit status of audio input level

7. 8. 5   Output lip sync [OUTPUT LIP SYNC]

For each output (common to OUTA and OUTB)

Since video signals and audio signals are processed on different circuits, time lag between the lip movement and audio is developed. The time lag can be corrected by the lip sync correction function.

With this menu, you can set the lip synch value to delay the audio in order to match it with the video. The MSD can delay audio signals by one frame.

You can set this function for each output using this menu and for each input by following " **7.8.6**". Normally, set it for each output to delay audio depending on the video delay amount of the display device. In case the video source itself contains the gap between the video and audio, or video is delayed by connecting a frame synchronizer for input, set lip sync for each input.

        ·Lip sync: 0 to 8 frames   [Default]: 0 frame

Note:

Up to eight frames using lip-sync can be set for each output and input, but if the total number of frames for output plus input exceeds eight frames, the maximum number of delayed frames is limited to eight frames. If sampling frequency of the audio signals (sampling frequency of input signals or digital input; the set value of "**7.8.7**" for analog input) is 88.2 kHz or more, the amount of delay is also limited. For example, if sampling frequency is 192 kHz, only two frames are delayed even though lip-sync is set to three frames or more.

Sampling frequency	32 kHz	44.1 kHz	48 kHz	88.2 kHz	96 kHz	192 kHz
Max. delay	8 frames	8 frames	8 frames	5 frames[*]	5 frames[*]	2 frames

* If vertical synchronous frequency of "**7.3.1**" is 50 Hz (576i@50, 576p@50, 720p@50, 1080i@50, 1080p@50), the maximum delay is four frames.

1. To set the lip synch value to delay the audio using menu:

```
┌────────────────────┐   Top
│ MSD-804FD          │
│                    │
└────────────────────┘
      ↓  SET key
┌────────────────────┐
│ [FUNCTION SELECT]  │   ▲▼keys: Select "AUDIO".
│ AUDIO           ↕  │
└────────────────────┘
      ↓  SET key
┌────────────────────┐
│ [AUDIO]            │   ▲▼keys: Select "OUTPUT LIP SYNC".
│ OUTPUT LIP SYNC ↕  │
└────────────────────┘
      ↓  SET key
┌────────────────────┐   ▲▼keys: Set the output lip-sync (0 to 8 frames).
│ [OUT1 LIP SYNC]    │
│ ▉FRAME         ◄▲► │   ◄►keys: Select the desired output (OUT1 to OUT4).
└────────────────────┘
```
    ↓ ESC key: Returns to the previous screen.
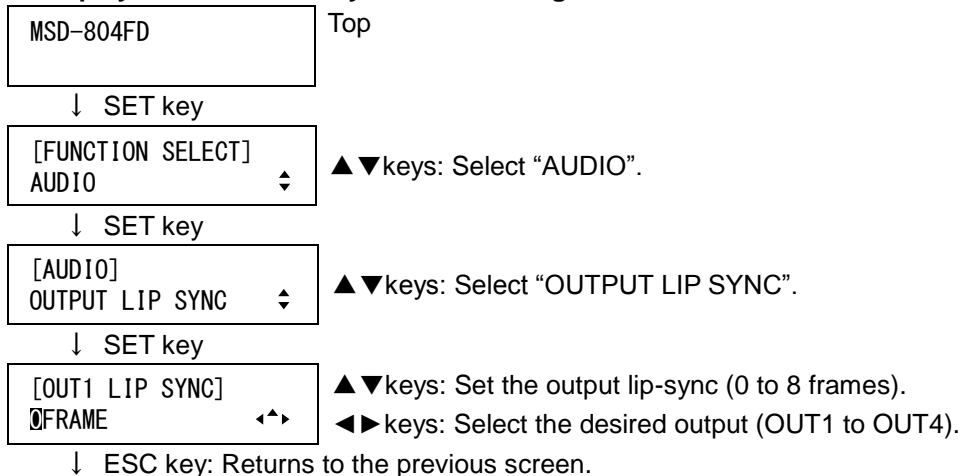
2. To set the lip synch value to delay the audio using commands:

        @SLO: Set output lip sync
        @GLO: Get output lip sync

7.8.6   Input lip sync [INPUT LIP SYNC]

For each input port/input signal

Normally, audio is delayed depending on the video delay amount of the display device in "**7.8.5 Output lip sync [OUTPUT LIP SYNC]**". If the video source itself includes the gap between video and audio or if video is delayed by connecting a frame synchronizer for the input, set the lip-sync frames individually for each input.

    ·Lip sync: 0 to 8 frames   [Default]: 0 frame

1. To set the input lip sync using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
AUDIO              ↕
```
▲▼keys: Select "AUDIO".

↓ SET key

```
[AUDIO]
INPUT LIP SYNC    ↕
```
▲▼keys: Select "INPUT LIP SYNC".

↓ SET key

```
[IN1 LIP SYNC]
0FRAME           ◄▲►
```
▲▼keys: Set the input lip sync (0 to 8 frames).
◄►keys: Select the desired input (IN1 to IN8).

↓ ESC key: Returns to the previous screen.
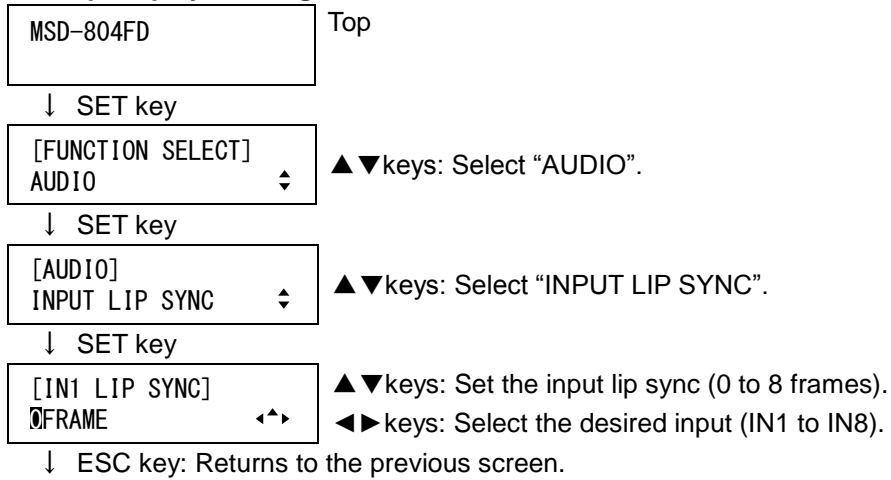
2. To set the input lip sync using commands:

    @SLY: Set input lip sync
    @GLY: Get input lip sync

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7.8.7 **Sampling frequency of analog audio input [SAMPLING FREQUENCY]**

> For each output
> (common to OUTA and OUTB)

You can set the sampling frequency for when analog audio input signals (you set "**7.8.3 Audio input selection [AUDIO INPUT SELECT]**" to "ANALOG") are output to digital audio. If you set it to "AUTO-A" or "AUTO-B", the maximum sampling frequency supported by the connected display device is output.[*]

  * If you select "AUTO", the MSD determines the sampling frequency based on the EDID (see "**7.9 EDID (Extended Display Identification Data)**" for details) of the display device and displays the output frequency in parentheses of the VFD screen.

  If the MSD cannot load the EDID from the display device, it outputs signals with the last-used sampling frequency, and displays an "*" following the sampling frequency that is actually output.

```
[OUT1 FREQUENCY]
AUTO(48kHz)      ◄♦►
```
[EDID can be loaded]

```
[OUT1 FREQUENCY]
AUTO(48kHz)∗     ◄♦►
```
[EDID cannot be loaded]

{ ・AUTO-A [Default] ・32kHz ・48kHz ・192kHz
   ・AUTO-B   ・44.1kHz ・96kHz

1. To set the sampling frequency for the selected analog audio input using menu:

```
MSD-804FD
```
Top

    ↓ SET key

```
[FUNCTION SELECT]
AUDIO            ♦
```
▲▼keys: Select "AUDIO".

    ↓ SET key

```
[AUDIO]
SAMPLING FREQUENCY ♦
```
▲▼keys: Select "SAMPLING FREQUENCY".

    ↓ SET key

```
[OUT1 FREQUENCY]
AUTO-A(48kHz)    ◄♦►
```
▲▼ keys: Set the sampling frequency.
◄► keys: Select the desired output (OUT1 to OUT4).

    ↓ ESC key: Returns to the previous screen
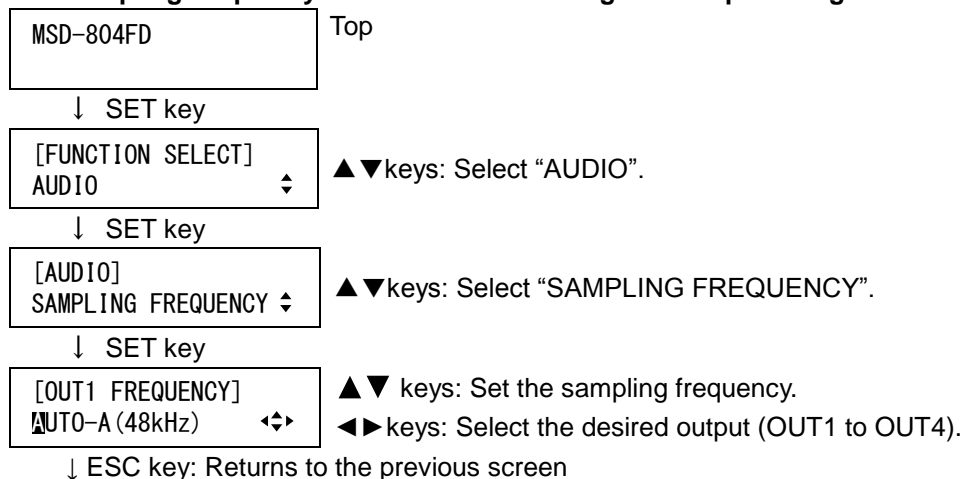
2. To set the sampling frequency for the selected analog audio input using commands:

       @SSF: Set sampling frequency of analog audio input
       @GSF: Get sampling frequency of analog audio input
       @GFD: Get actual sampling frequency of analog audio input

7. 8. 8 Audio output connector [OUTPUT CONNECTOR]

For each output (common to OUTA and OUTB)

You can select audio output connectors.

For digital output, the settings of HDMI output connector and HDBaseT output connector are common. If you want to set them separately, set the audio output connector in "**7.8.9 Digital audio output connector [DIGITAL OUTPUT]**".

- ・Only analog audio output connector: ANALOG
- ・Only digital output connector: DIGITAL
- ・Both analog audio output and digital output connectors: ANALOG&DIGITAL   [Default]

Note:

If you set "**7.7.2 Output mode [OUTPUT MODE]**" to "DVI MODE", no audio is output to any HDMI output connector or HDBaseT output connector regardless of the setting of this menu.

1. To set the audio output connector using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
AUDIO              ↕
```
▲▼keys: Select "AUDIO".

↓ SET key

```
[AUDIO]
OUTPUT CONNECTOR   ↕
```
▲▼keys: Select "OUTPUT CONNECTOR".

↓ SET key

```
[OUT1 AUDIO OUTPUT]
ANALOG&DIGITAL    ◄↕►
```
▲▼keys: Select the desired audio output (ANALOG, DIGITAL, or ANALOG&DIGITAL).

◄►keys: Select the desired output (OUT1 to OUT4).

↓ ESC key: Returns to the previous screen.
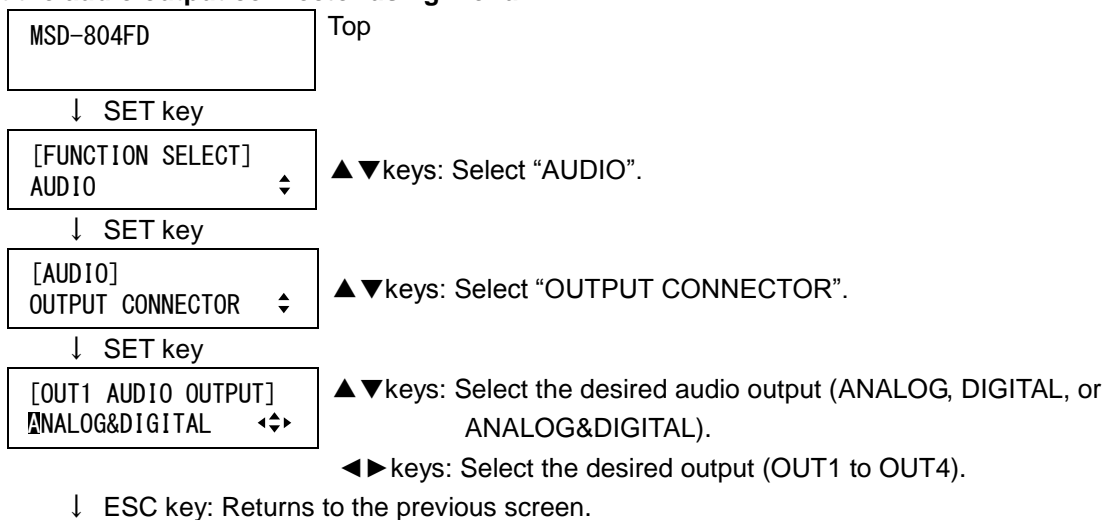
2. To set the audio output connector using commands:

@SDO: Set audio output connector
@GDO: Get audio output connector

7.8.9 Digital audio output connector [DIGITAL OUTPUT]

For each output (OUTA and OUTB separately)

You can enable/disable digital audio output connector. This menu is available only if HDBaseT output option is mounted.

- ・Digital audio output OFF: OFF
- ・Digital audio output ON: ON   [Default]

Note:

If you set "**7.7.2 Output mode [OUTPUT MODE]**" to "DVI MODE", no audio is output to any HDMI output connector or HDBaseT output connector regardless of the setting of this menu.

1. To enable/disable Digital audio output connector using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
AUDIO              ⬍
```
▲▼ keys: Select "AUDIO".

↓ SET key

```
[AUDIO]
DIGITAL OUTPUT     ⬍
```
▲▼ keys: Select "DIGITAL OUTPUT".

↓ SET key

```
[OUT1A D-AUDIO]
ON              ⬌⬍
```
▲▼ keys: Select "ON" or "OFF".
◀ ▶ keys: Select the output (OUT1A to OUT4A, OUT1B to OUT4B).

↓ ESC key: Returns to the previous screen
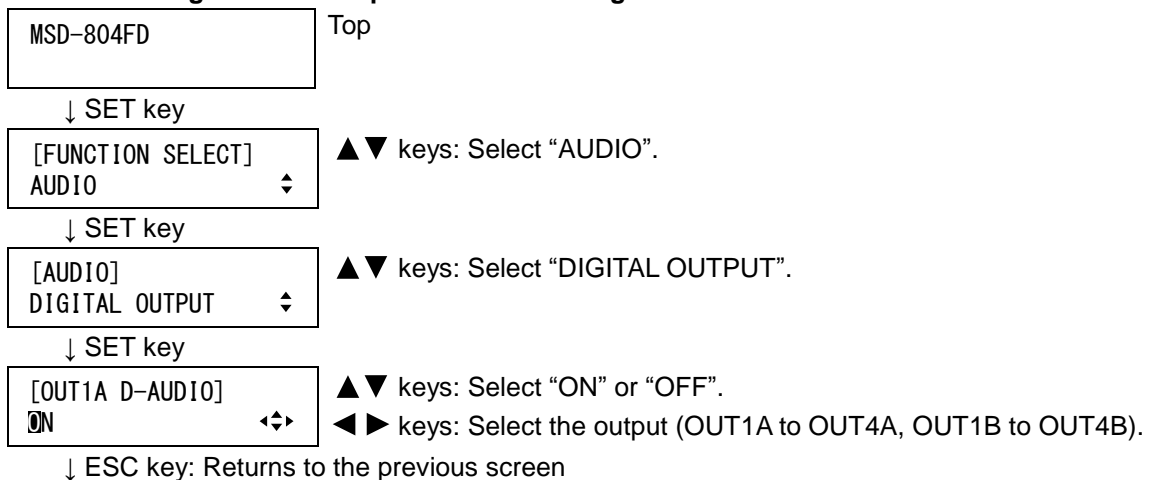
2. To enable/disable Digital audio output connector using commands:

@SDO: Set the digital audio output connector
@GDO: Get the digital audio output connector

7.8.10 Multi-channel audio output [MULTI AUDIO]

For each output (common to OUTA and OUTB)

You can set audio to be output to a display device that does not support multi-channel linear PCM or analog audio for when multi-channel linear PCM audio is input from an HDMI input connector.

If you select "DOWN MIX", the MSD will down-mix the multi-channel audio and then output the down-mixed audio.

·CH1/CH2 STEREO	·CH7/CH8 STEREO	·CH5/CH6 MONO
·CH3/CH4 STEREO	·CH1/CH2 MONO	·CH7/CH8 MONO
·CH5/CH6 STEREO	·CH3/CH4 MONO	·DOWN MIX [Default]

1. To set the multi-channel audio output using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
AUDIO            ⬍
```
▲▼keys: Select "AUDIO".

↓ SET key

```
[AUDIO]
MULTI AUDIO      ⬍
```
▲▼keys: Select "MULTI AUDIO".

↓ SET key

```
[OUT1 MULTI AUDIO]
DOWN MIX       ⬌⬍
```
▲▼keys: Select the desired multi-channel audio output.
◄►keys: Select output (OUT1 to OUT4)

↓ ESC key: Returns to the previous screen.
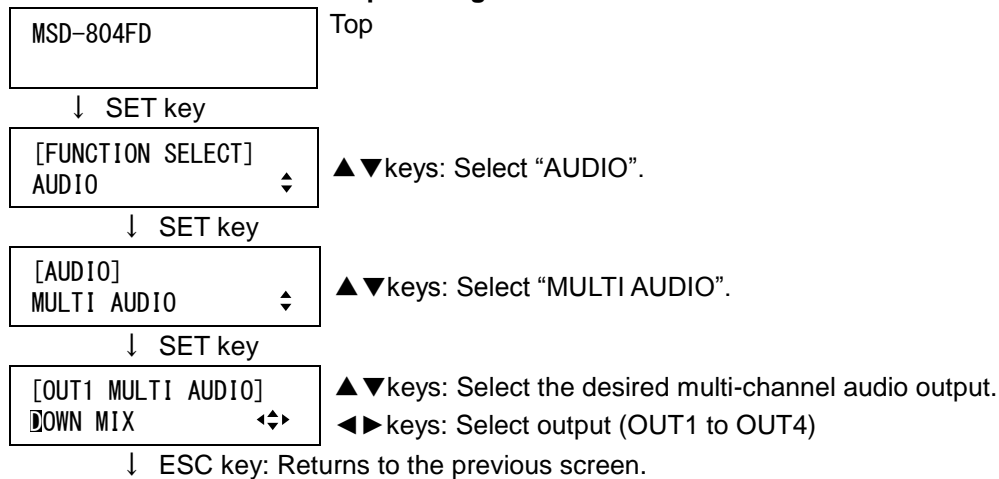
2. To set the multi-channel audio output using commands:

@SMD: Set multi-channel audio output

@GMD: Get multi-channel audio output

7.8.11 Test tones [TEST TONE]

For each output (common to OUTA and OUTB)

Since test tone can be output only to specific speakers, you can check the position of the speakers.

・Test tones
  ・OFF [Default]
  ・1kHz
  ・400Hz

・Speaker
  ・ALL [Default]   ・FRONT LEFT   ・REAR LEFT
  ・FRONT L/R   ・FRONT RIGHT   ・REAR RIGHT
  ・REAR L/R   ・LOW FREQUENCY EFFECT   ・REAR LEFT CENTER
  ・REAR L/R CENTER   ・FRONT CENTER   ・REAR RIGHT CENTER

Note:

For "LOW FREQUENCY EFFECT", only test tone of 30 Hz is output.

FL	Front Left	RRC	Rear Right Center
FC	Front Center	LFE	Low Frequency Effect
FR	Front Right	FLW	Front Left Wide
FLC	Front Left Center	FRW	Front Right Wide
FRC	Front Right Center	FLH	Front Left High
RL	Rear Left	FCH	Front Center High
RC	Rear Center	FRH	Front Right High
RR	Rear Right	TC	Top Center
RLC	Rear Left Center		
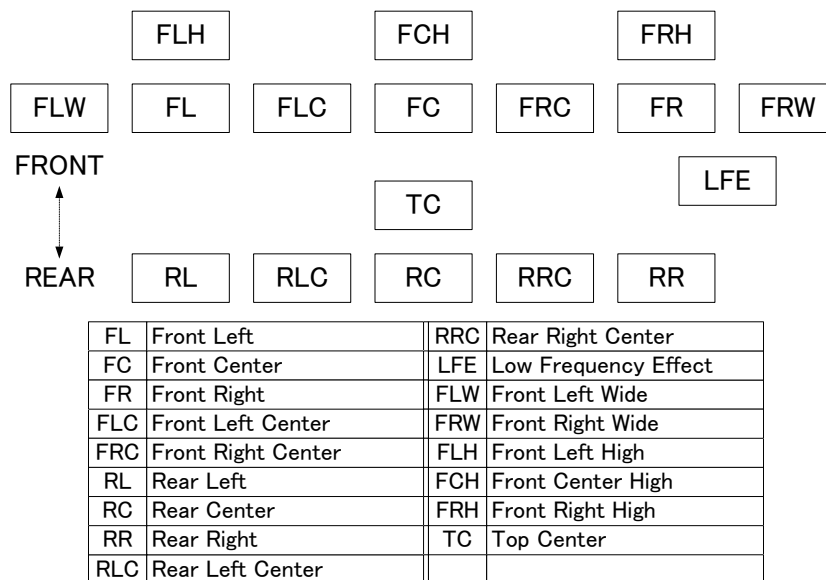
[Fig. 7.1] Speaker configuration

1. To set the test tone using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
       ↓  SET key
┌─────────────────────┐   ▲▼keys: Select "AUDIO".
│ [FUNCTION SELECT]   │
│ AUDIO            ↕  │
└─────────────────────┘
       ↓  SET key
┌─────────────────────┐   ▲▼keys: Select "TEST TONE".
│ [AUDIO]             │
│ TEST TONE        ↕  │
└─────────────────────┘
       ↓  SET key
┌─────────────────────┐   ▲▼keys: Select the desired test tone of OUT1.
│ [OUT1 TEST TONE]    │
│ OFF              ◄↕►│
└─────────────────────┘
       ↓  ◄►keys
┌─────────────────────┐   ▲▼keys: Select the desired speaker of OUT1.*
│ [OUT1 SPEAKER]      │
│ ALL              ◄↕►│
└─────────────────────┘
     ↓  ESC key: Returns to the previous screen.
```
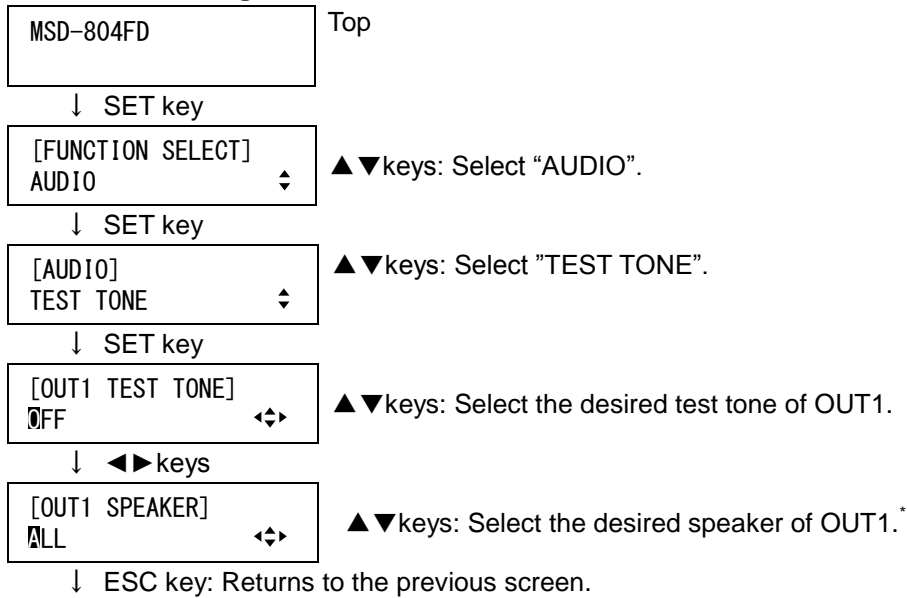
* Only if you set the test tone to "1 kHz" or "400 Hz", you can set a speaker.

2. To set the test tone using commands:

　　　@SAT: Set test tone
　　　@GAT: Get test tone

7.9 EDID (Extended Display Identification Data)

You can select the EDID from either the built-in data or the data loaded from the connected display device. The MSD can load EDID that conforms to VESA DDC2B/EDID standard ver. 1.0 to 1.3.

Note:

For PCs, since EDID is acquired when the PC is turned on, turn on the PC while the MSD and display device are turned on. When turning off the system, first turn off the PC and then turn off the MSD and display device. If you change the settings of EDID during operation, the MSD may not be recognized correctly. Set EDID while source devices are turned off as much as possible.

7.9.1 EDID setting [EDID DATA]

For each input

You can set the EDID to be sent to the connected source device. If you select "INTERNAL EDID", the EDID that is set in the following menus is sent: "7.9.2PC resolutions [PC RESOLUTION]", "**7.9.3 Input resolution for AV devices [AV RESOLUTION]**", "**7.9.4 Deep Color [DEEP COLOR INPUT]**", "**7.9.5 Audio format [AUDIO FORMAT]**", and "**7.9.6 Speaker configuration [SPEAKER]**".

- ·Built-in data: INTERNAL EDID   [Default]
- ·Data of display device connected to HDMI output connector: OUTn MONITOR[1]
- ·Data copied from display device: COPY DATA 1 to 8[2]

> [1] "n": Output number: 1A to 4A, 1B to 4B
>   1B to 4B are available only if HDBaseT option is mounted.
> [2] EDID must be loaded from the display device set in "**7.9.7 EDID Copy [MONITOR EDID COPY]**" beforehand.

1. To set the EDID using menu:

```
┌─────────────────────────┐
│ MSD-804FD               │   Top
│                         │
└─────────────────────────┘
```
      ↓ SET key

```
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼keys: Select "EDID".
│ EDID                ⬍   │
└─────────────────────────┘
```
      ↓ SET key

```
┌─────────────────────────┐
│ [EDID]                  │   ▲▼keys: Select "EDID DATA".
│ EDID DATA           ⬍   │
└─────────────────────────┘
```
      ↓ SET key

```
┌─────────────────────────┐
│ [IN1 EDID]              │   ▲▼keys: Select the EDID.
│ ▮INTERNAL EDID     ◄⬍►  │   ◄►keys: Select the desired input (IN1 to IN8).
└─────────────────────────┘
```
    ↓ SET key: Applies settings.

```
┌─────────────────────────┐
│ [EDID DATA]             │   The message is displayed for one second and then previous screen is
│ NOW UPDATE...           │   displayed automatically.
└─────────────────────────┘
```
      ↓

```
┌─────────────────────────┐
│ [EDID]                  │
│ EDID DATA           ⬍   │
└─────────────────────────┘
```
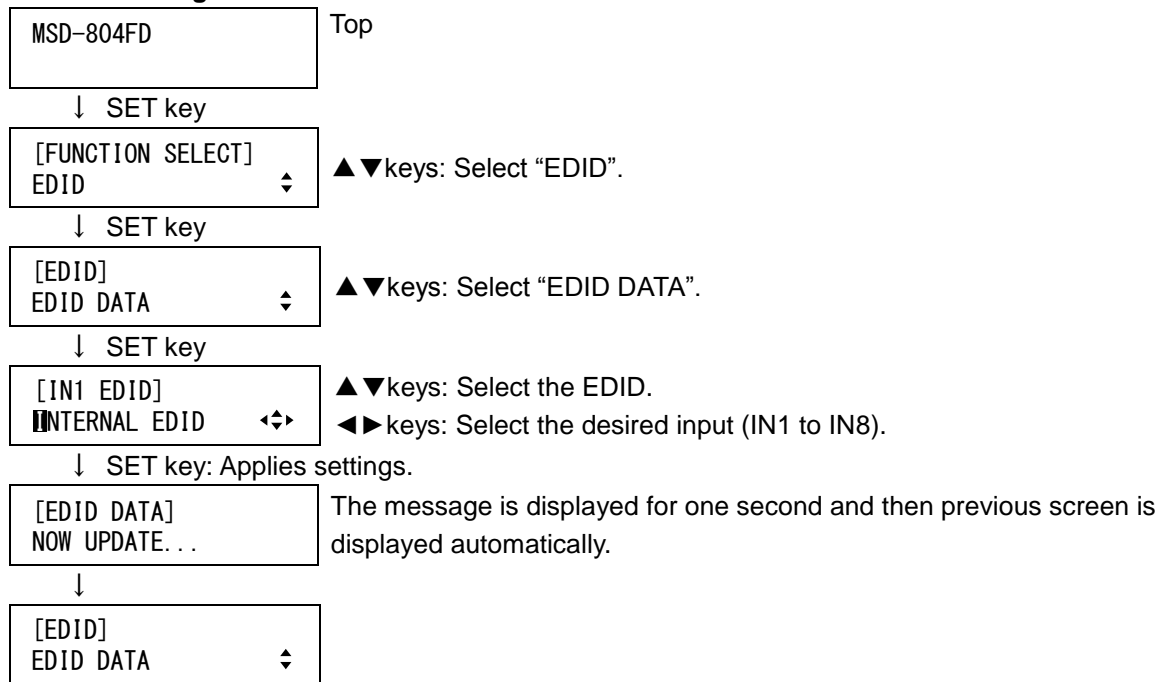
Note:

If you do not press the "SET" key, the EDID is not changed. Make sure to press the "SET" key.

The error message below is displayed for a second when the VFD screen moves from the sub menu to the setup menu in the following cases:
 - "OUTn MONITOR" is set for any input channel, and
 - no display device is connected, or
 - loading EDID fails.

```
┌─────────────────────────┐      ┌─────────────────────────┐
│ OUT1A MONITOR           │      │ OUT1A MONITOR           │
│ UNCONNECTED             │      │ EDID READ ERROR         │
└─────────────────────────┘      └─────────────────────────┘
```

If EDID cannot be updated pressing the "SET" key, the same message is displayed for a second as well.
If the error message is displayed, check the connection of the display device. If EDID can be loaded, EDID will be updated automatically.

2. To set the EDID using commands:
        @SED: Set EDID
        @GED: Get EDID

7.9.2 PC resolutions [PC RESOLUTION]

For each input

You can set the resolution to be output from source devices.

This menu is valid only if you select "INTERNAL EDID" for "**7.9.1 EDID setting [EDID DATA]**". Normally, set the resolution when connecting DVI devices such as PCs. However, if you connect AV devices such as Blu-ray disc player using HDMI, the setting of this menu is valid in order to limit the output resolution.

- ・SVGA (800x600)
- ・XGA (1024x768)
- ・720p (1280x720)
- ・WXGA (1280x768)
- ・WXGA (1280x800)
- ・Quad-VGA (1280x960)
- ・SXGA (1280x1024)
- ・WXGA (1360x768)
- ・WXGA (1366x768)
- ・SXGA+ (1400x1050)
- ・WXGA+ (1440x900)
- ・WXGA++ (1600x900)
- ・UXGA (1600x1200)
- ・WSXGA+ (1680x1050)
- ・1080i (1920x1080)
- ・1080p (1920x1080)
- ・WUXGA (1920x1200)
- ・QWXGA (2048x1152)

[Default]: 1080p (1920x1080)

Timing of 720p, 1080i, and 1080p is the same as that of HD signals meeting the CEA-861D standard. For other resolutions, timings meet the VESA DMT or VESA CVT standards. 1920x1200 and 2048x1152 are Reduced Blanking.

Set the maximum available resolution for EDID, but the lower resolutions are also supported. Select the resolution responding to the resolution that is output from the connected PC.

[Table 7.4] Supported resolution

Y: Supported   N:Not supported

Input Resolution setting \ Supported Resolution	640 x 480	800 x 600	1024 x 768	1280 x 720	1280 x 768	1280 x 800	1280 x 960	1280 x 1024	1360 x 768	1366 x 768	1400 x 1050	1440 x 900	1600 x 900	1600 x 1200	1680 x 1050	1920 x 1080i	1920 x 1080p	1920 x 1200	2048 x 1152
800x600	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1024x768	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x720[D4]	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x768	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x800	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x960	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N
1280x1024	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
1360x768	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N
1366x768	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N	N	N	N	N
1400x1050	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
1440x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N
1600x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	N
1600x1200	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N	N	N	N
1680x1050	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	N	N
1920x1080i[D3]	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N
1920x1080p[D5]	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	N
1920x1200	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N
2048x1152	Y	Y	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y

1. To set the PC resolution using menu:

```
┌─────────────────────┐
│ MSD-804FD           │     Top
│                     │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐
│ [FUNCTION SELECT]   │     ▲▼keys: Select "EDID".
│ EDID             ◆  │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐
│ [EDID]              │     ▲▼keys: Select "PC RESOLUTION".
│ PC RESOLUTION    ◆  │
└─────────────────────┘
        ↓  SET key
┌─────────────────────┐
│ [IN1 PC FORMAT]     │     ▲▼keys: Set the resolution for the PC.
│ ▌1080p(1920x1080) ◀◆▶│   ◀▶keys: Select the desired input (IN1 to IN8).
└─────────────────────┘
        ↓  SET key: Applies settings.
┌─────────────────────┐
│ [PC RESOLUTION]     │     The message is displayed for one second and then previous screen is
│ NOW UPDATE...       │     displayed automatically.
└─────────────────────┘
        ↓
┌─────────────────────┐
│ [EDID]              │
│ PC RESOLUTION    ◆  │
└─────────────────────┘
```
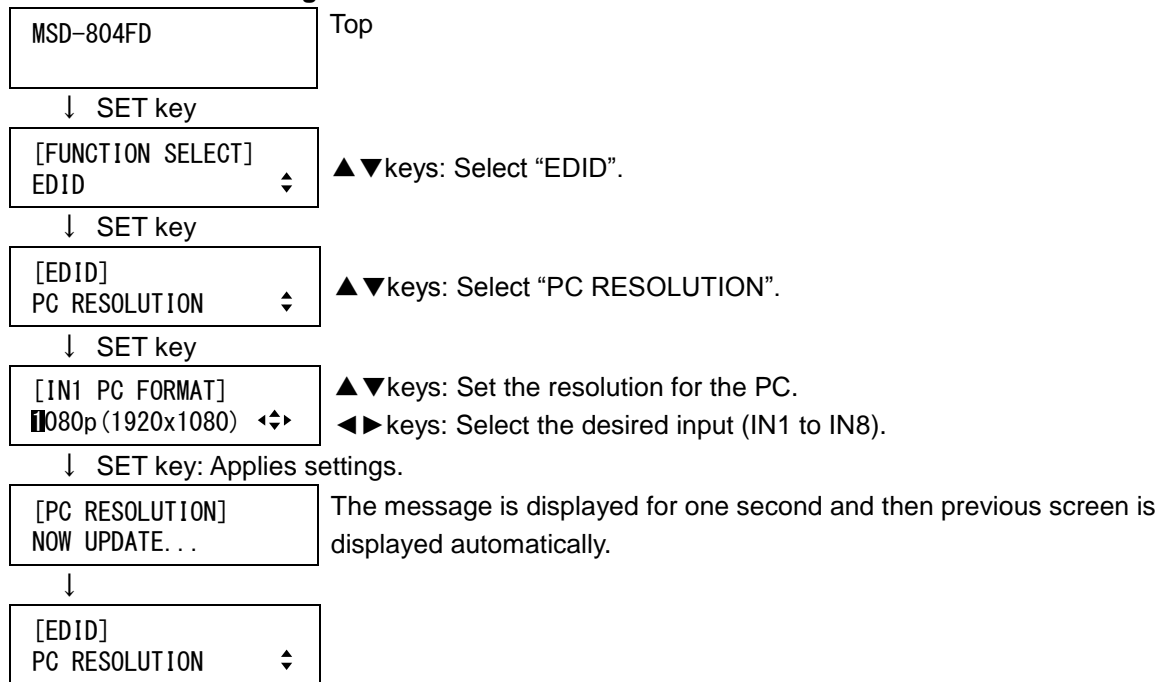
Note:
If you do not press the "SET" key, the PC resolution is not changed. Make sure to press the "SET" key.

2. To set the PC resolution using commands:
> @SVF: Set PC resolution (EDID)
> @GVF: Get PC resolution (EDID)

7.9.3 Input resolution for AV devices [AV RESOLUTION]

This menu is valid only if you select "INTERNAL EDID" for "**7.9.1 EDID setting [EDID DATA]** " and an AV device such as Blu-ray disc player is connected. Normally, select "AUTO" and set the resolution using the setting of "**7.9.2 PC resolutions [PC RESOLUTION]**".

```
┌  ·UNUSED      ·720p      ·1080p
└  ·480p        ·1080i     ·AUTO   [Default]
```

"UNUSED" disables the EDID for AV devices. If you select "AUTO" and the resolution output from the PC is different from the resolution set in Properties, the problem may be solved by selecting "UNUSED". If you select "UNUSED", the settings of "**7.9.4 Deep Color [DEEP COLOR INPUT]**", "**7.9.5 Audio format [AUDIO FORMAT]**", and "**7.9.6 Speaker configuration [SPEAKER]**"will be disabled and audio is not output because the source device outputs signal through DVI mode.

If there is a potential to connect both PCs and AV devices with different resolutions (for example, PC with WXGA (1366x768), Blu-ray disc player with 1080p), set the PC resolution in "**7.9.2 PC resolutions [PC RESOLUTION]**" and select the AV resolution from 480p, 720p, 1080i, and 1080p in this menu. However, some PCs and AV devices may choose the higher resolution of the resolutions set in " **7.9.2 PC resolutions [PC RESOLUTION]**" or set in this menu.

If you select "AUTO", resolutions for AV devices are set automatically according to the settings of "**7.9.2 PC resolutions [PC RESOLUTION]**".

[Table 7.5] Input resolutions with "AUTO"

PC resolution	800 x 600	1024 x 768	1280 x 720	1280 x 768	1280 x 800	1280 x 960	1280 x 1024	1360 x 768	1366 x 768	1400 x 1050	1440 x 900	1600 x 900	1600 x 1200	1680 x 1050	1920 x 1080i	1920 x 1080 p	1920 x 1200	2048 x 1152
AV resolution	480p	720p													1080i	1080p		

1. To set the HDTV resolution using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
EDID            ↕
```
▲▼keys: Select "EDID".

↓ SET key

```
[EDID]
AV RESOLUTION   ↕
```
▲▼keys: Select "AV RESOLUTION".

↓ SET key

```
[IN1 AV FORMAT]
AUTO           ⬌↕
```
▲▼keys: Select the desired resolution for the AV device.
◄►keys: Select the desired input (IN1 to IN8).

↓ SET key: Applies settings.

```
[AV RESOLUTION]
NOW UPDATE...
```
The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[EDID]
AV RESOLUTION   ↕
```
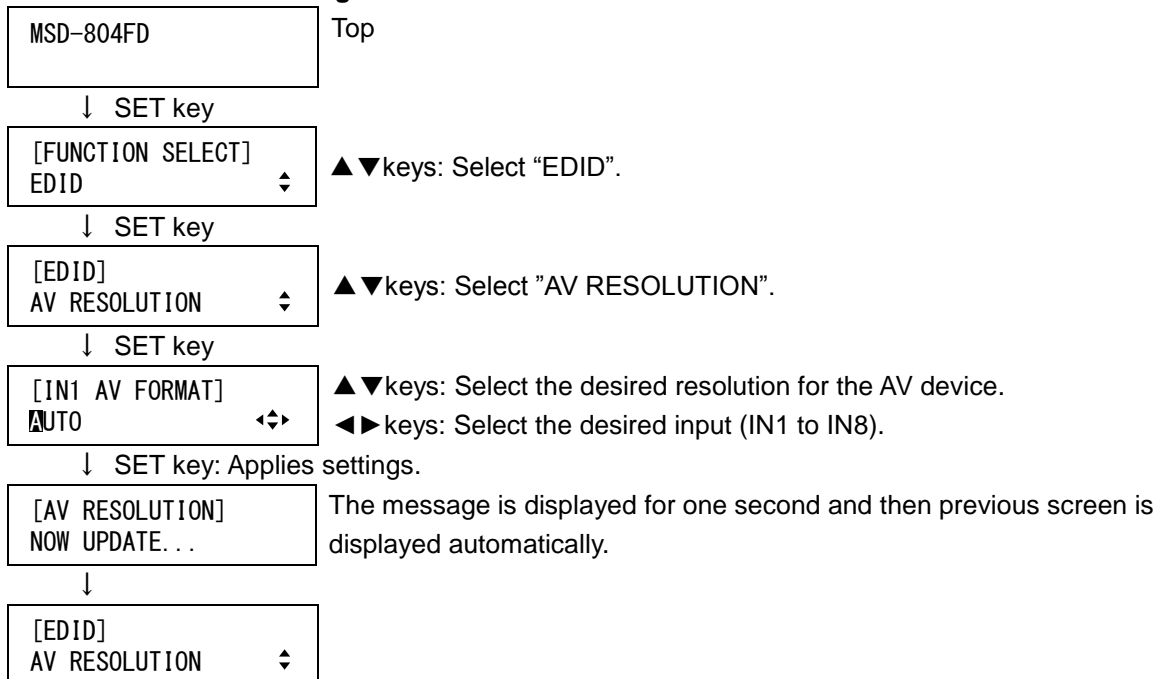
Note:

If you do not press the "SET" key, the AV resolution is not changed. Make sure to press the "SET" key.

2. To set the HDTV resolution using commands:

@SHF: Set HDTV resolution (EDID)
@GHF: Get HDTV resolution (EDID)

7.9.4 Deep Color [DEEP COLOR INPUT]

This menu is valid only all conditions below are met: if you select "INTERNAL EDID" for "**7.9.1 EDID setting [EDID DATA]**", you select a resolution other than "UNUSED" for "**7.9.3 Input resolution for AV devices [AV RESOLUTION]**", and you connect an HDMI device such as a Blu-ray recorder.

If you select "30-BIT COLOR" in this menu setting and a display device supporting Deep Color is connected, the Deep Color is used. However, compared to "24-BIT COLOR", "30-BIT COLOR" is transmitted using a higher clock frequency, which may cause noise if a cable with a bad quality or a long cable is connected. In such a case, the noise may be removed by setting the color to "24-BIT COLOR".

> · 24-BIT COLOR [Default]
> · 30-BIT COLOR

1. To set the Deep Color using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
EDID              ↕
```
▲▼keys: Select "EDID".

↓ SET key

```
[EDID]
DEEP COLOR INPUT  ↕
```
▲▼keys: Select "DEEP COLOR INPUT".

↓ SET key

```
[IN1 DEEP COLOR]
24-BIT COLOR   ◄↕►
```
▲▼keys: Select the desired color depth (24-BIT COLOR or 30-BIT COLOR).
◄►keys: Select the desired input (IN1 to IN8).

↓ SET key: Applies settings.

```
[DEEP COLOR INPUT]
NOW UPDATE...
```
The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[EDID]
DEEP COLOR INPUT  ↕
```

Note:

If you do not press the "SET" key, Deep Color is not changed. Make sure to press the "SET" key.

2. To set the Deep Color using commands:

@SDI: Set Deep Color
@GDI: Get Deep Color

7.9.5　Audio format [AUDIO FORMAT]

For each input

You can set the audio format and maximum sampling frequency to be output from a source device. This menu is valid only all conditions below are met: if you select "INTERNAL EDID" for "**7.9.1 EDID setting [EDID DATA]**", you select a resolution other than "UNUSED" for "**7.9.3 Input resolution for AV devices [AV RESOLUTION]**", and you connect an HDMI device such as a Blu-ray recorder.

[Table 7.6] Audio formats

Audio format	ON/OFF	Sampling frequency (kHz)
Linear PCM	Not settable	32/44.1/48/88.2/96/176.4/192 (48)
AC-3/Dolby Digital	Settable (OFF)	32/44.1/48 (48)
AAC	Settable (OFF)	32/44.1/48/88.2/96 (48)
Dolby Digital+	Settable (OFF)	32/44.1/48(48)
DTS	Settable (OFF)	32/44.1/48/96 (48)
DTS-HD	Settable (OFF)	44.1/48/88.2/96/176.4/192 (192)
Dolby TrueHD	Settable (OFF)	44.1/48/88.2/96/176.4/192 (96)

Default values are enclosed in parentheses.

1. To set the audio format using menu:

```
MSD-804FD
```
Top

↓　SET key

```
[FUNCTION SELECT]
EDID              ▲▼
```
▲▼keys: Select "EDID".

↓　SET key

```
[EDID]
AUDIO FORMAT      ▲▼
```
▲▼keys: Select "AUDIO FORMAT".

↓　SET key

```
[IN1 PCM]
MAX FREQ:48kHz    ◄▲▼►
```
▲▼keys: Set the maximum sampling frequency of IN1
(32 kHz, 44.1k Hz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz).

↓　◄► keys

```
[IN1 Dolby Digital]
ON                ◄▲▼►
```
▲▼keys: Set "OFF" or "ON" for AC-3/Dolby Digital output of IN1.

↓　◄► keys

```
[IN1 Dolby Digital]
MAX FREQ:48kHz    ◄▲▼►
```
▲▼keys: Set the maximum sampling frequency of AC-3/Dolby Digital of IN1 (32 kHz, 44.1 kHz, 48 kHz).

This is displayed only if output (set in the previous screen) is set to "ON"

Repeat the same procedure to set the audio formats of AAC, Dolby Digital+, DTS, DTS-HD, and Dolby TrueHD.

↓　SET key: Applies settings.

```
[AUDIO FORMAT]
NOW UPDATE...
```
The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[EDID]
AUDIO FORMAT      ▲▼
```
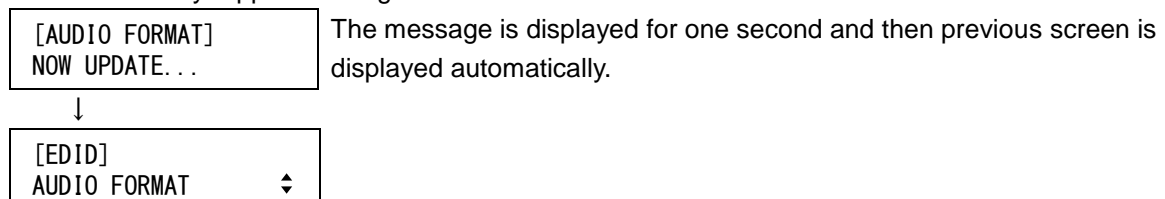
Note:

If you do not press the "SET" key, the audio format is not changed. Make sure to press the "SET" key.

2. To set the audio format using commands:

@SAF: Set audio format

@GAF: Get audio format

For each input

7.9.6 Speaker configuration [SPEAKER]

This menu is valid only all conditions below are met: if you select "INTERNAL EDID" for "**7.9.1 EDID setting [EDID DATA]**", you select a resolution other than "UNUSED" for "**7.9.3 Input resolution for AV devices [AV RESOLUTION]**", and you connect an HDMI device such as a Blu-ray recorder.

　　　　　·The number of speakers: 1 to 8　　[Default]: 2

If you select "AUTO" for the setting mode and set the number of speakers, the speaker configuration will be set by default that is shown in the following table. To change the default configuration, set the mode to "MANUAL" and set each speaker to ON/OFF individually.

[Table 7.7] Default speaker configuration

Number of speakers	FR/FL	LFE	FC	RL/RR	RC	FLC/ FRC	RLC/ RRC	FLW/ FRW	FLH/ FRH	TC	FCH
1	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
5	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
8	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF

FL	Front Left	RRC	Rear Right Center
FC	Front Center	LFE	Low Frequency Effect
FR	Front Right	FLW	Front Left Wide
FLC	Front Left Center	FRW	Front Right Wide
FRC	Front Right Center	FLH	Front Left High
RL	Rear Left	FCH	Front Center High
RC	Rear Center	FRH	Front Right High
RR	Rear Right	TC	Top Center
RLC	Rear Left Center		
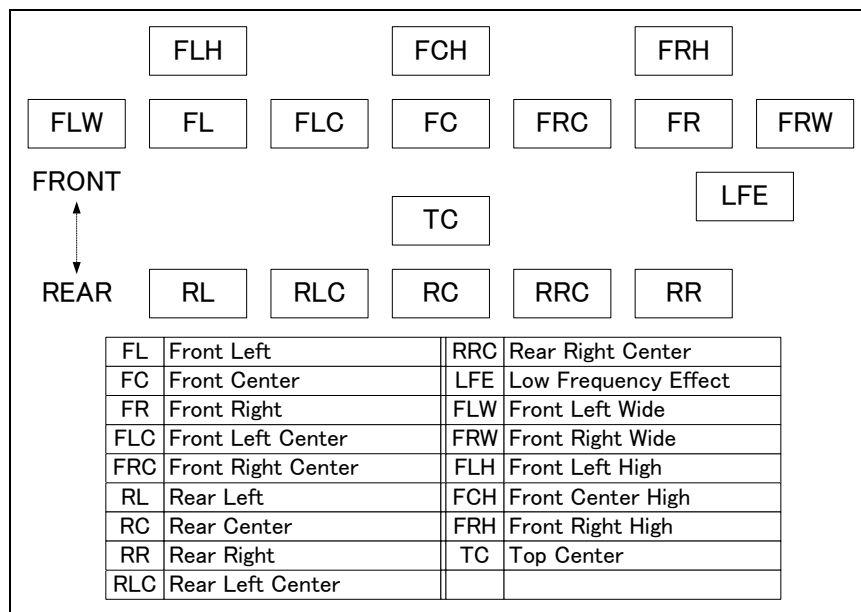
[Fig. 7.27] Speaker configuration

1. To set the speaker configuration using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
EDID           ⬍
```
▲▼keys: Select "EDID".

↓ SET key

```
[EDID]
SPEAKER        ⬍
```
▲▼keys: Select "SPEAKER".

↓ SET key

```
[IN1 SPEAKER]   ⬌⬍▸
MODE:█UTO  NUMBER:2
```
▲▼keys: Select the setting mode of IN1 (AUTO, MANUAL).

↓ ◀▶keys

```
[IN1 SPEAKER]   ⬌⬍▸
MODE:AUTO  NUMBER:█
```
▲▼keys: Set the number of speakers of IN1 (1 to 8).
When it is changed, the speaker configuration will be set automatically

↓

```
[IN1 FL/FR]    ⬌⬍▸
█N        NUMBER:2
```
▲▼keys: Set "OFF" or "ON" for the front L/R of IN1.*

Repeat the same procedure for other speakers.

↓ SET key: Applies settings.

```
[SPEAKER]
NOW UPDATE...
```
The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[EDID]
SPEAKER        ⬍
```

* The cursor can be moved only if you select "MANUAL". The number of speakers is displayed on the right side of the screen.

Note:
If you do not press the "SET" key, the speaker configuration is not changed. Make sure to press the "SET" key after each change.

If you set the speaker configuration manually and press the "SET" key, the number of speakers will be set automatically. If the number of speakers exceeds the available value, the following message is displayed and the settings will not be applied.

```
DATA INVALID
```

2. To set the speaker configuration using commands:
@SSP: Set speaker configuration
@GSP: Get speakers configuration

7.9.7 EDID Copy [MONITOR EDID COPY]

You can load the EDID of display devices and save it in the MSD.

To use the copied EDID, select "COPY DATA" for "**7.9.1 EDID setting [EDID DATA]**". After that, the copied data can be used as the same as that of the built-in data.

1. To copy the EDID using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
│                     │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "EDID".
│ [FUNCTION SELECT]   │
│ EDID             ↕  │
└─────────────────────┘
        ↓ SET key
┌─────────────────────┐   ▲▼ keys: Select "MONITOR EDID COPY".
│ [EDID]              │
│ MONITOR EDID COPY ↕ │
└─────────────────────┘
    ↓ SET key      ↑ ESC key: Cancels the setting and returns to the previous screen.
┌─────────────────────┐   ▲▼ keys: Select the output connector (OUT1A to OUT4A, OUT1B
│ [MONITOR EDID COPY] │   to OUT4B).*
│ OUT1█NO.1 COPY DATA1│
└─────────────────────┘
      ↓ ◀ ▶ keys
┌─────────────────────┐   ▲▼ keys: Select the EDID number (1 to 8).
│ [MONITOR EDID COPY] │
│ OUT1ANO.█ COPY DATA1│
└─────────────────────┘
      ↓ ◀ ▶ keys
┌─────────────────────┐   ▲▼ keys: Enter the EDID name (20 to 7D of ASCII codes).
│ [MONITOR EDID COPY] │   Up to 10 characters can be registered. The cursor moves to the next
│ OUT1ANO.1 █OPY DATA1│           character using ◀▶keys.
└─────────────────────┘
    ↓ SET key: Displays the confirmation screen      ↑ ESC key
┌─────────────────────┐   ▲▼ keys: Select "YES" or "NO".
│ [MONITOR EDID COPY] │
│ SAVE? = █O       ↕  │
└─────────────────────┘
      ↓ To save the settings: Select "YES" and press the "SET" key.
         To return to the menu without saving: Select "NO" and press the "SET" key.
┌─────────────────────┐   Displays the message for 1 second before automatically returning to
│ [MONITOR EDID COPY] │   the previous screen.
│ EDID COPY COMPLETE  │
└─────────────────────┘
          ↓
┌─────────────────────┐
│ [EDID]              │
│ MONITOR EDID COPY ↕ │
└─────────────────────┘
```

　∗OUT1B to OUT4B are available only if HDBaseT output option is mounted.

If no display device is connected to the selected output, the message is displayed, and you cannot press the "SET" key.

```
┌─────────────────────┐
│ [MONITOR EDID COPY] │
│ OUT1█ UNCONNECTED   │
└─────────────────────┘
```

2. To copy the EDID using command:
　　@RME: Copy EDID

7.10 **RS-232C**

The MSD has two kinds of connectors that control the MSD or peripheral devices:

1. RS-232C connectors (RS-232C CH1, CH2): controlling the MSD or peripheral devices externally

2. HDBaseT output connectors (OUT1B to OUT4B): controlling peripheral devices via twisted pair cable receiver (HDC series) of connected devices. OUT1B to OUT4B are available only if HDBaseT output option is mounted.
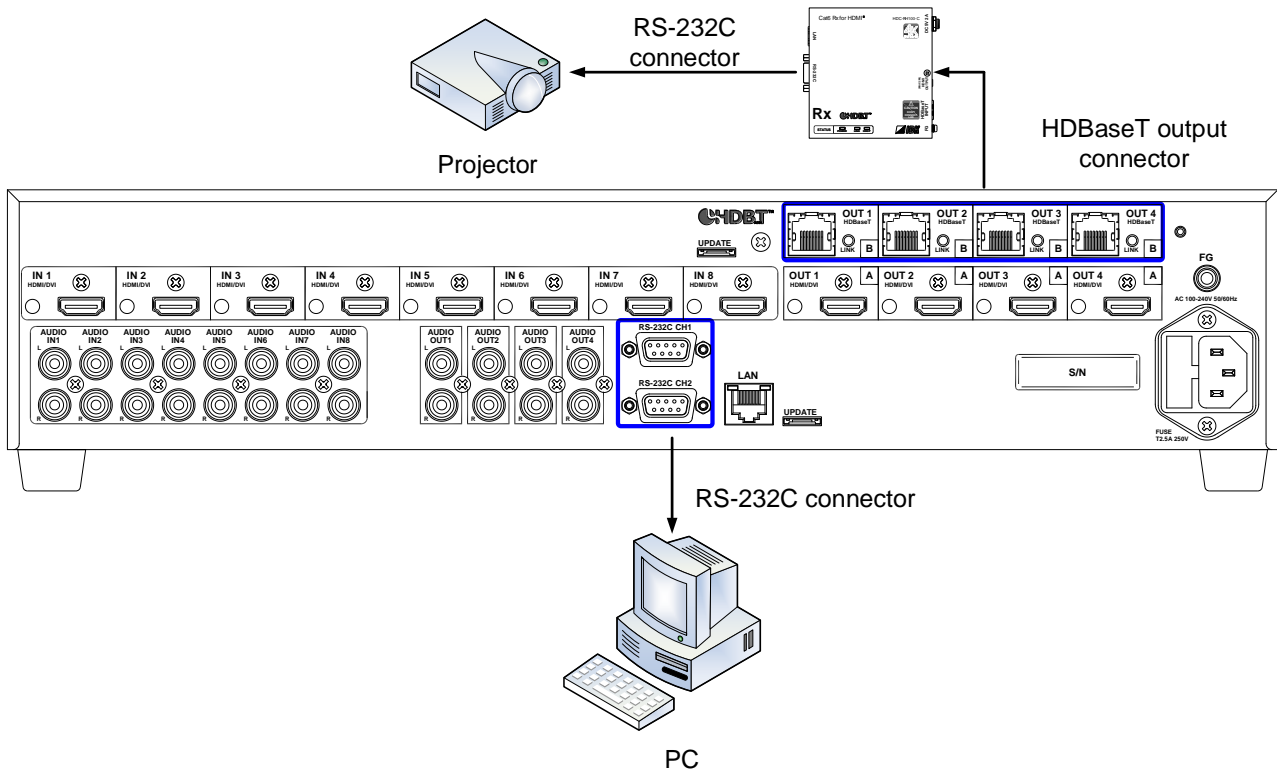
[Fig. 7.28] RS-232C connector

7.10.1 **RS-232C communication settings [PARAMETERS]**

You can set up the RS-232C communication settings for each connector.

- ·Baud rate: 4800, 9600, 19200, 38400 [bps]   [Default]: 9600 [bps]
- ·Data length: 8, 7 [bit]   [Default]: 8 [bit]
- ·Parity: NONE, EVEN, ODD   [Default]: NONE
- ·Stop bits: 1, 2[bit]   [Default]: 1[bit]

1. To set the COM port using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
COM PORT           ↕
```
▲▼ keys: Select "COM PORT".

↓ SET key

```
[COM PORT]
PARAMETERS         ↕
```
▲▼ keys: Select "PARAMETERS".

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
[CH1 PARAMETERS]
 9600 8 NONE ▮  ◄↕►
```
▲▼ keys: Set the communication of RS-232C CH1.

↓ ◄ ► keys

```
[CH2 PARAMETERS]
 9600 8 NONE ▮  ◄↕►
```
▲▼ keys: Set the communication of RS-232C CH2.

↓ ◄ ► keys

```
[OUT1B PARAMETERS]
 9600 8 NONE ▮  ◄↕►
```
▲▼ keys: Set the communication of OUT1B.*

↓ SET key: Applies settings

```
[COM PARAMETERS]
NOW UPDATE...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[COM PORT]
PARAMETERS         ↕
```

Note:

If you do not press the "SET" key, the communication setting is not changed. Make sure to press the "SET" key.

   *OUT1B to OUT4B are available only if HDBaseT output option is mounted.

2. To set the COM port using commands:

   @SCT: Set COM port communication
   @GCT: Get COM port communication

7.10.2 RS-232C operation mode [FUNCTION]

You can set the operation mode to "RECEIVER" mode in which the MSD is controlled externally or "TRANSMITTER" mode in which the MSD controls external devices.

```
┌ ·RECEIVER   [Default]
└ ·TRANSMITTER
```

[Table 7.8] RS-232C operation

Mode	External control	Controlling external devices using "**7.12**"
RECEIVER	Can be used	Cannot be used [*1]
TRANSMITTER	Cannot be used [*2]	Can be used

[*1] You cannot use the serial Com ports set to "RECEIVER" mode to control external devices.

[*2] You cannot use the serial Com ports set to "TRANSMITTER" mode to control the MSD externally.

Note:

There is no setting menu for OUT1B to OUT4B.

1. To set the COM operation mode using menu:

```
┌─────────────────────┐
│ MSD-804FD           │   Top
│                     │
└─────────────────────┘
      ↓ SET key
┌─────────────────────┐
│ [FUNCTION SELECT]   │   ▲▼ keys: Select "COM PORT".
│ COM PORT        ↕   │
└─────────────────────┘
      ↓ SET key
┌─────────────────────┐
│ [COM PORT]          │   ▲▼ keys: select "FUNCTION".
│ FUNCTION        ↕   │
└─────────────────────┘
      ↓ SET key      ↑ESC key: Cancels the setting and returns to the previous screen.
┌─────────────────────┐
│ [CH1 FUNCTION]      │   ▲▼ keys: Select the desired operation mode of RS-232C CH1
│ RECIEVER        ↔   │   (RECIEVER or TRANSMITTER).
└─────────────────────┘
      ↓ ◄ ► keys
┌─────────────────────┐
│ [CH2 FUNCTION]      │   ▲▼ keys: Select the desired operation mode of RS-232C CH2
│ RECIEVER        ↔   │   (RECIEVER or TRANSMITTER).
└─────────────────────┘
      ↓ SET key: Applies settings.
┌─────────────────────┐
│ [COM FUNCTION]      │   Displays the message for 1 second before automatically returning to
│ NOW UPDATE...       │   the previous screen.
└─────────────────────┘
      ↓
┌─────────────────────┐
│ [COM PORT]          │
│ FUNCTION        ↕   │
└─────────────────────┘
```

Note:

If you do not press the "SET" key, the COM operation mode is not changed. Make sure to press the "SET" key.

2. To set the COM operation mode using commands:

@SCF: Set COM port operation
@GCF: Get COM port operation

7.11 LAN settings

The MSD does not support automatic acquisition of IP address using DHCP (Dynamic Host Configuration Protocol). If you use the MSD in a network with DHCP, keep a fixed IP address. If controlling external devices connected over LAN from the MSD, keep several fixed IP addresses.

The MSD has two kinds of connectors that control the MSD or peripheral devices:

1. LAN port: controlling the MSD or peripheral devices externally

2. HDBaseT output connectors (OUT1B to OUT4B): controlling peripheral devices via twisted pair cable receiver (HDC series) of connected devices. OUT1B to OUT4B are available only if HDBaseT output option is mounted.

[Fig. 7.29] LAN port

7.11.1 IP address [IP ADRESS]

You can set the IP address of the MSD.
[Default]: LAN port: 192.168.001.199   OUTB connector: 192.168.001.200

1. To set the IP address using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
│                         │
└─────────────────────────┘
```

↓ SET key

```
┌─────────────────────────┐   ▲▼ keys: Select "LAN".
│ [FUNCTION SELECT]       │
│ LAN                  ◆  │
└─────────────────────────┘
```

↓ SET key

```
┌─────────────────────────┐   ▲▼ keys: Select "IP ADDRESS".
│ [LAN]                   │
│ IP ADDRESS           ◆  │
└─────────────────────────┘
```

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
┌─────────────────────────┐   ▲▼ keys: Set the IP address of the LAN port (0 to 255).
│ [LAN IP ADDRESS]        │
│ 192.168.  1.199    ◀◆▶  │   ◀▶ keys: Moves the cursor.
└─────────────────────────┘
```

↓ ◀ ▶ keys

```
┌─────────────────────────┐   ▲▼ keys: Set the IP address of the OUTB connector (0 to 255)[1, 2]
│ [OUTB IP ADDRESS]       │
│ 192.168.  1.200    ◀◆▶  │   ◀▶ keys: Moves the cursor.
└─────────────────────────┘
```

↓ SET key: Applies settings.

```
┌─────────────────────────┐   Displays the message for 1 second before automatically returning to
│ [IP ADDRESS]            │   the previous screen.
│ NOW UPDATE...           │
└─────────────────────────┘
```

↓

```
┌─────────────────────────┐
│ [LAN]                   │
│ IP ADDRESS           ◆  │
└─────────────────────────┘
```

Note:

If you do not press the "SET" key, the IP address is not changed. Make sure to press the "SET" key.

[1] OUTB is available only if HDBaseT output option is mounted.
[2] IP address of OUTB is common to OUT1B to OUT4B.

2. To set the IP address using commands:

@SIP: Set IP address of LAN port.
@GIP: Get IP address of LAN port.
@SBI: Set IP address of OUTB connector.
@GBI: Get IP address of OUTB connector.

7.11.2 Subnet mask [SUBNET MASK]

You can set the subnet mask.
[Default: 255.255.255.000

1. To set the subnet mask using menu:

```
┌──────────────────────┐
│ MSD-804FD            │  Top
│                      │
└──────────────────────┘
```

↓ SET key

```
┌──────────────────────┐
│ [FUNCTION SELECT]    │  ▲▼ keys: Select "LAN".
│ LAN              ⬍   │
└──────────────────────┘
```

↓ SET key

```
┌──────────────────────┐
│ [LAN]                │  ▲▼ keys: Select "SUBNET MASK".
│ SUBNET MASK      ⬍   │
└──────────────────────┘
```

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
┌──────────────────────┐
│ [LAN SUBNET MASK]    │  ▲▼ keys: Set the subnet mask of LAN port
│ 255.255.255.  0 ⬌  │  (0.0.0.0 to 255.255.255.254).
└──────────────────────┘
```

↓ SET keys

```
┌──────────────────────┐
│ [OUTB SUBNET MASK]   │  ▲▼ keys: Set the subnet mask of OUTB
│ 255.255.255.  0 ⬌  │  (0.0.0.0 to 255.255.255.254)[1, 2].
└──────────────────────┘
```

↓ SET key: Applies settings.

```
┌──────────────────────┐
│ [SUBNET MASK]        │  Displays the message for 1 second before automatically returning to
│ NOW UPDATE...        │  the previous screen.
└──────────────────────┘
```

↓

```
┌──────────────────────┐
│ [LAN]                │
│ SUBNET MASK      ⬍   │
└──────────────────────┘
```

Note:

If you do not press the "SET" key, the subnet mask is not changed. Make sure to press the "SET" key.

[1] OUTB is available only if HDBaseT output option is mounted.
[2] Subnet mask of OUTB is common to OUT1B to OUT4B.

2. To set the subnet mask using commands:

@SSB: Set subnet mask of LAN port.
@GSB: Get subnet mask of LAN port.
@SBS: Set the subnet mask of OUTB connector.
@GBS: Get the subnet mask of OUTB connector.

7.11.3 Gateway address [GATEWAY ADDRESS]

You can set the gateway address.

[Default]: 192.168.001.201

1. To set the gateway address using menu:

| MSD-804FD | Top |

↓ SET key

| [FUNCTION SELECT]
LAN   ↕ | ▲▼ keys: Select "LAN". |

↓ SET key

| [LAN]
GATEWAY ADDRESS   ↕ | ▲▼ keys: select "GATEWAY ADDRESS". |

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

| [LAN GW ADDRESS]
192.168. 1.201 ↔↕▸ | ▲▼ keys: Set the gateway address of the LAN port (0 to 255).
◀ ▶ keys: Moves the cursor. |

↓   keys

| [OUTB GW ADDRESS]
192.168. 1.201 ↔↕▸ | ▲▼ keys: Set the gateway address of OUTB connector (0 to 255)[1, 2].
◀ ▶ keys: Moves the cursor. |

↓ SET key: Applies settings.

| [GATEWAY ADDRESS]
NOW UPDATE... | Displays the message for 1 second before automatically returning to the previous screen. |

↓

| [LAN]
GATEWAY ADDRESS   ↕ |

Note:

If you do not press the "SET" key, the gateway address is not changed. Make sure to press the "SET" key.

* 1   OUTB is available only if HDBaseT output option is mounted.
* 2   Gateway of OUTB is common to OUT1B to OUT4B.

2. To set the gateway address using commands:

@SGW: Set gateway address of LAN port.
@GGW: Get gateway address of LAN port.
@SBG: Set the gateway address of OUTB connector.
@GBG: Get the gateway address of OUTB connector.

7.11.4 LAN operation mode [FUNCTION]

Set the LAN operation mode consisting of "RECEIVER" mode that controls the MSD externally and "TRANSMITTER" mode that controls external devices from the MSD.

If you select "TRANSMITTER" mode, you need to set the IP address of the device and the port number to be connected. The MSD can establish up to eight connections and the operation mode can be set separately.

If HDBaseT output option is mounted, peripheral devices can be controlled via LAN of the twisted pair cable receiver (HDC series) for each output. The operation mode of HDBaseT output is fixed at "TRANSMITTER".

[Table 7.9] Setting items of LAN operation mode

Item	Description	Range
FUNCTION [*1][*2]	Controlling the MSD externally or controlling external devices from MSD.	RECEIVER [Default] TRANSMITTER
IP [*3]	IP address of target device	4 bytes between 0 to 255 [Default] 192.168.001.198
PJLink [*3]	Whether you use PJLink (class1) for projector control or not.	OFF : PJLink is not used. [Default] ON : PJLink is used.
PORT [*3][*4]	Port number for "TRANSMITTER" mode. (Set the port number for "RECEIVER" mode in "**7.11.5**".)	1 to 65535 [Default]: 1100 Make sure the port number is correct, because reserved port number that is only for specific purpose can also be selected technically.
PASSWORD [*3][*5]	Password for authentication at PJLink protocol connection (up to 32 characters). Not necessary if you do not perform the authentication with password.	30 to 39, 41 to 5A, and 61 to 7A (alphanumeric character) of ASCII codes. Final character: 20 (space) [Default]

[*1][Table 7.10] LAN operation mode

Mode	External control	Controlling external devices using "**7.12**"
RECEIVER mode	Can be used	Cannot be used[*6]
TRANSMITTER mode	Cannot be used[*7]	Can be used

[*2] Operation mode of OUT1B to OUT4B is fixed at "TRANSMITTER".

[*3] If selecting "RECEIVER" for operation mode, you do not need to set the item.

[*4] If selecting "ON" for PJLink protocol, the target port number is fixed at "4352".

[*5] If selecting "OFF" for PJLink protocol, you do not need to set the item.

[*6] Connections that are set to "RECEIVER" cannot be used for controlling external devices.

[*7] Connections that are set to "TRANSMITTER" cannot be used for controlling the MSD externally.

[All connections: "RECEIVER" mode (Default)]

Connection 1
Connection 2
Connection 3
　Port No.: 1100

←――――― Communication command control

Connection 4
Connection 5
Connection 6
　Port No.: 23

←――――― Communication command control

Connection 7
Connection 8
　Port No.: 80

←――――― Browser control

MSD-804FD
IP address: 192.168.1.199

PC
IP address: 192.168.1.1
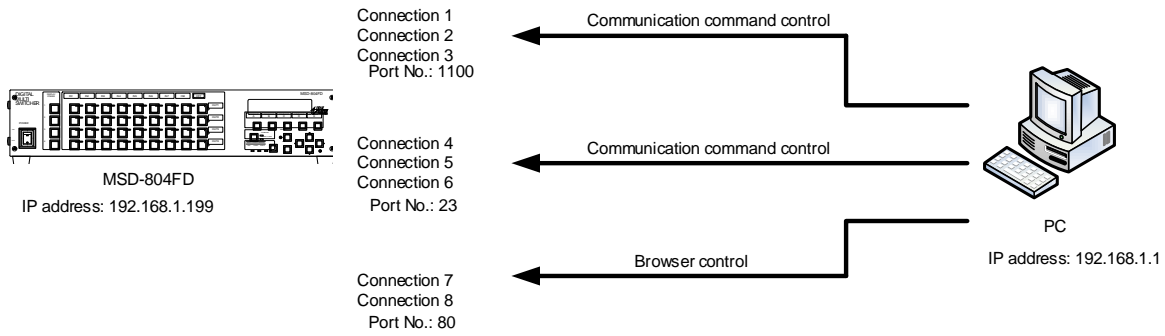
Factory default: All 8 connections are "RECEIVER" mode; the MSD can be controlled externally.

[Change connections 3 and 6 to "TRANSMITTER" mode]

←――――― Communication command control

Connection 1
Connection 2
　Port No.: 1100

Communication command control

Connection 3

Browser control

Connection 4
Connection 5
　Port No.: 23

Connection 6

IP address:
　192.168.1.197

Control peripheral devices

PJLink: OFF
Port No.: 1200

DVD player

Connection 7
Connection 8
　Port No.: 80

IP address:
　192.168.1.198

Control peripheral devices

PJLink: OFF
Port No.: 1300

Projector

MSD-804FD
IP address: 192.168.1.199

PC
IP address: 192.168.1.1

To control peripheral devices, select "TRANSMITTER" mode.
Set the IP address and port number of the destination.

[Change connection 6 to "TRANSMIT" mode of "PJLink protocol"]

←――――― Control over communication command

Connection 1
Connection 2
Connection 3
　Port No.: 1100

Communication command control

Connection 4
Connection 5
　Port No.: 23

Browser control

Connection 6

IP address:
　192.168.1.198

Connection 7
Connection 8
　Port No.: 80

Control peripheral devices

PJLink: ON
Port number: 4352

Projector

MSD-804FD
IP address: 192.168.1.199

PC
IP address: 192.168.1.1

If you use "PJLink protocol", the port number will be fixed at "4352".

[Fig. 7.30] LAN operation mode

OUT1B to OUT3B: PJLink protocol: OFF; OUT4B: ON

OUT1B → Control peripheral devices → IP address: 192.168.1.1 / PJLink:OFF / Port number: 1000 — PC

OUT2B → Control peripheral devices → IP address: 192.168.1.2 / PJLink:OFF / Port number: 1100 — PC

OUT3B → Control peripheral devices → IP address: 192.168.1.197 / PJLink:OFF / Port number: 1200 — DVD player

OUT4B → Control peripheral devices → IP address: 192.168.1.198 / PJLink:ON / Port number: 4352 — Projector

MSD-804FD IP address:192.168.1.199

When PJLink protocol is used, the port number is fixed at "4352".

[Fig. 7.31] OUTB LAN control

1. To set the LAN operation mode using menu:

MSD-804FD — Top

↓ SET key

[FUNCTION SELECT] LAN — ▲▼ keys: Select "LAN".

↓ SET key

[LAN] FUNCTION — ▲▼ keys: Select "FUNCTION".

↓ SET key ↑ ESC key: Cancels the setting and returns to the previous screen.

[CONNECTION1] FUNC:RECIEVER — ▲▼ keys: Select the desired mode of CONNECTION 1. (RECIEVER, TRANSMITTER)

↓ ◀▶ keys

[CONNECTION2] FUNC:TRANSMITTER — ▲▼ keys: Select the desired mode of CONNECTION 2. (RECIEVER, TRANSMITTER)

↓ ◀▶ keys

[CONNECTION2] IP:192.168.1.198 — ▲▼ keys: Set the IP address of CONNECTION 2 (0 to 255).[1] ◀▶ keys: Moves the cursor.

↓ ◀▶ keys

[CONNECTION2] PJLink:OFF — ▲▼ keys: Select "OFF" or "ON" for PJLink protocol.[1]

↓ ◀▶ keys

```
[CONNECTION2]    ◄✛►
PORT: 110⬛
```
▲▼ keys: Set destination port no. of CONNECTION 2 (1 to 65535). [1] [2]

or

```
[CONNECT2 PASSWORD]
1:⬛
```
▲▼ keys: Set the password of CONNECTION 2 (30 to 39, 41 to 5A, 61 to 7A of ASCII codes). [1] [2] [3]

◄► keys: Moves the cursor to the next character (Up to 32 characters).

↓ ◄ ► keys

```
[CONNECTION3]    ◄✛►
FUNC:⬛ECIEVER
```
▲▼ keys: Select the desired mode of CONNECTION 3.
(RECIEVER, TRANSMITTER)

⋮ ◄ ► keys

```
[CONNECTION8]    ◄✛►
FUNC:⬛ECIEVER
```
▲▼ keys: Select the desired mode of CONNECTION 8.
(RECIEVER, TRANSMITTER)

↓ ◄ ► keys

```
[OUT1B]          ◄ ►
FUNC:⬛RANSMITTER
```
▲▼ keys: OUT1B[4] Operation mode (TRANSMITTER[5]).

↓ ◄ ► keys

```
[OUT1B]          ◄✛►
IP:19⬛.168.   1.198
```
▲▼ keys: Set the IP address of OUT1B (0 to 255).[1]
◄► keys: Moves the cursor.

↓ ◄ ► keys

```
[OUT1B]          ◄✛►
PJLink:⬛FF
```
▲▼ keys: Set PJLink protocol to "ON" or "OFF".[1]

↓ ◄ ► keys

```
[OUT1B]          ◄✛►
PORT: 110⬛
```
▲▼ keys: Set the destination port number of OUT1B (1 to 65535)[1],[2].

or

```
[OUT1B PASSWORD] ◄✛►
1:⬛
```
▲▼ keys: Set the password of OUT1B (30 to 39, 41 to 5A, 61 to 7A of ASCII codes)[1] [2] [3].

◄► keys Moves the cursor to the next character (Up to 32 characters).

⋮ ◄ ► keys

```
[OUT4B]          ◄ ►
FUNC:⬛RANSMITTER
```
▲▼ keys: OUT4B[4] operation mode (TRANSMITTER[5]).

↓ SET key: Applies settings.

```
[LAN FUNCTION]
NOW UPDATE...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[LAN]
FUNCTION          ✛
```

[1] Settable only if you select "TRANSMITTER".

[2] If setting PJLink protocol to "OFF", set the port number of the destination. If turning it "ON", set the password.

[3] The number of characters at the cursor position is displayed at the lower left, and the maximum number of the characters is 16. Space would be the final character, and characters before the space will be registered as the password.

[4] OUT1B to OUT4B are available only if HDBaseT output option is mounted.

[5] The operation mode of HDBaseT output connector (OUT1B to OUT4B) is fixed at "TRANSMITTER".

Note:

If you do not press the "SET" key, the LAN operation mode is not changed. Make sure to press the "SET" key.

2. To set the LAN operation mode using commands:

@SLF: Set LAN operation mode

@GLF Get LAN operation mode

7.11.5 **TCP port number [PORT NUMBER]**

You can set the TCP port number to control the MSD externally.

The MSD supports up to eight connections at once. Connections are assigned either communication command control or browser control according to the set port numbers. By factory default, six connections are assigned for communication command control while two connections are for browser control. Settings of port numbers depend on the setting of "**7.11.4 LAN operation mode [FUNCTION]**" ("RECEIVER" or "TRANSMITTER"). For the "RECEIVER" mode, use this menu to set the port number; for "TRANSMITTER" mode, use "**7.11.4 LAN operation mode [FUNCTION]**".

> ・Port number: 23, 80, 1100, 5000 to 5999, 6000 to 6999
> 　　　[Default]: Connections 1 to 3 = 1100,
> 　　　　　　　　Connections 4 to 6 = 23,
> 　　　　　　　　Connections 7 to 8 = 80

Set connections for communication command control to any of 23, 1100, and 6000 to 6999. Set connections for browser control to any of 80 and 5000 to 5999.

1. To set the TCP port number using menu:

```
┌─────────────────────────┐   Top
│ MSD-804FD               │
│                         │
└─────────────────────────┘
      ↓  SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼keys: Select "LAN".
│ LAN                 ⬍   │
└─────────────────────────┘
      ↓  SET key
┌─────────────────────────┐
│ [LAN]                   │   ▲▼keys: Select "PORT NUMBER".
│ PORT NUMBER         ⬍   │
└─────────────────────────┘
      ↓  SET key       ↑  ESC key: Cancels the setting and returns to the previous screen.
┌─────────────────────────┐   ▲▼keys: Set the port number of CONNECTION1 (23, 80, 1100, 5000
│ [CONNECTION1 PORT]      │   to 5999 , 6000 to 6999).
│ 110０               ⬌   │
└─────────────────────────┘
      ↓  ◄►keys
┌─────────────────────────┐   ▲▼keys: Set the port number of CONNECTION2 (23, 80, 1100, 5000
│ [CONNECTION2 PORT]      │   to 5999 , 6000 to 6999).
│ 110０               ⬌   │
└─────────────────────────┘
      ↓  SET key: Applies settings.
┌─────────────────────────┐   The message is displayed for one second and then previous screen is
│ [PORT NUMBER]           │   displayed automatically.
│ NOW UPDATE...           │
└─────────────────────────┘
      ↓
┌─────────────────────────┐
│ [LAN]                   │
│ PORT NUMBER         ⬍   │
└─────────────────────────┘
```
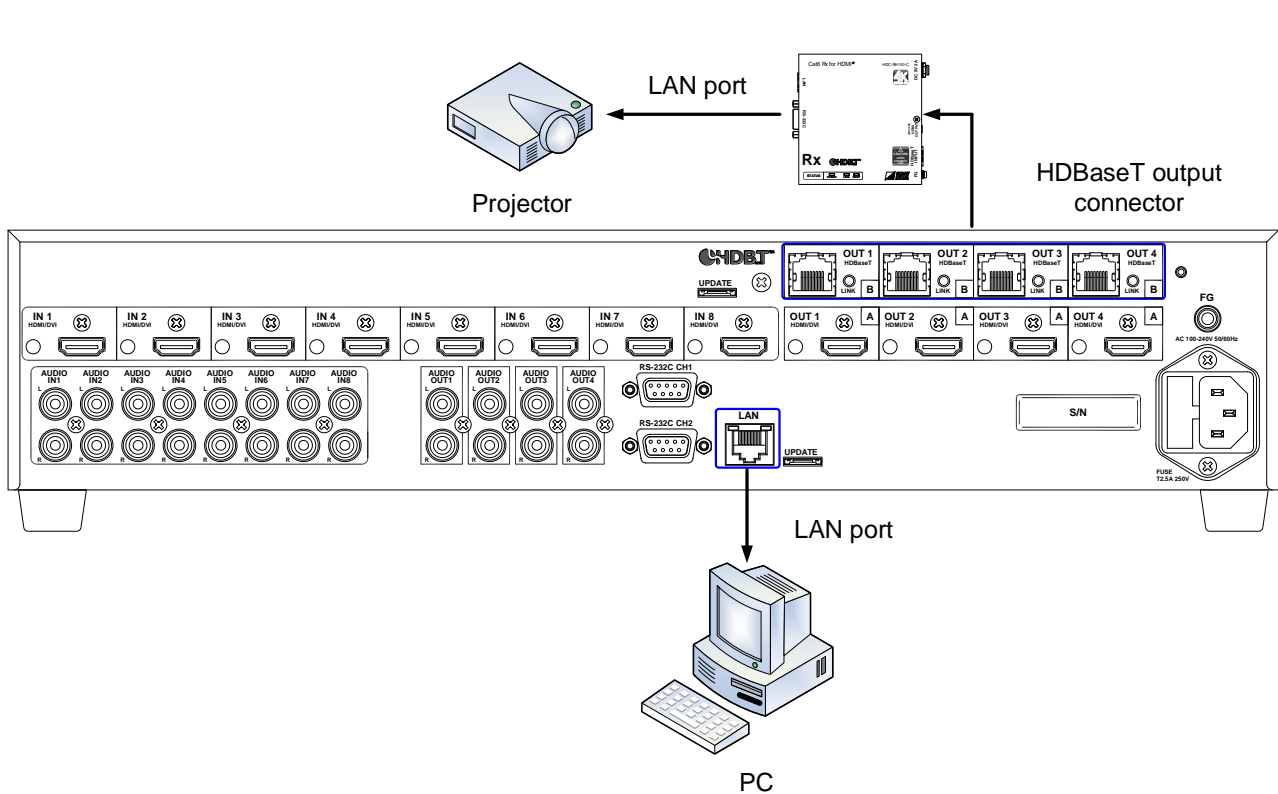
Note:

If you do not press the "SET" key, the TCP port number is not changed. Make sure to press the "SET" key.

2. To set the TCP port number using commands:

　　　@SLP: Set TCP port number
　　　@GLP: Get TCP port number

7.11.6 Displaying MAC address [MAC ADDRESS]

You can display the MAC address of the MSD.

1. To display the MAC address using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
LAN                ▲▼
```
▲▼keys: Select "LAN".

↓ SET key

```
[LAN]
MAC ADDRESS        ▲▼
```
▲▼keys: Select "MAC ADDRESS".

↓ SET key

```
[LAN MAC ADDRESS]
00-08-E5-5A-00-00  ◂▸
```
The MAC address of LAN port is displayed.

↓   keys

```
[OUTB MAC ADDRESS]
00-08-E5-5A-80-00  ◂▸
```
The MAC address of OUTB connector is displayed.*

↓ ESC key: Returns to the previous screen
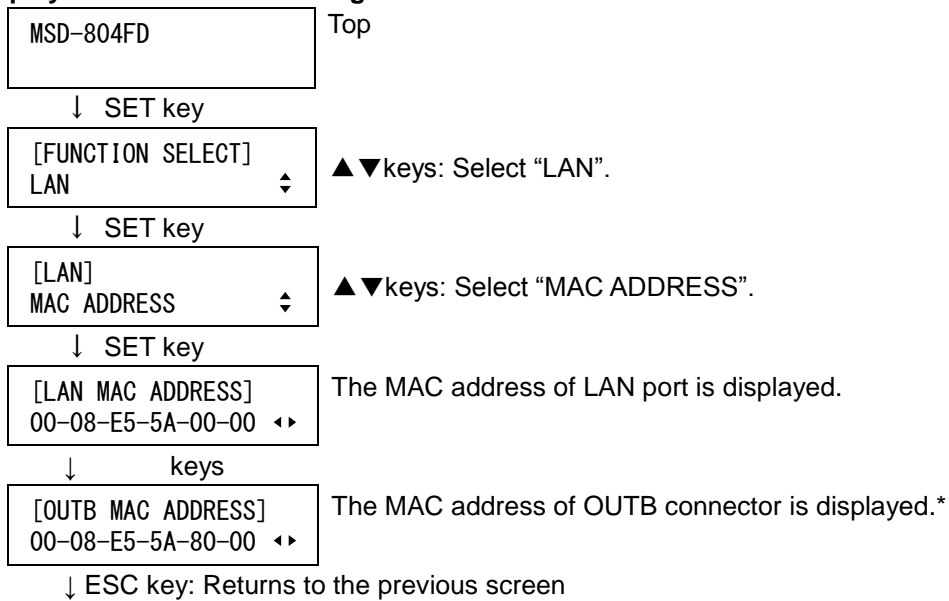
　*OUTB is available only if HDBaseT output option is mounted.

2. To display the MAC address using commands:

　　@GMC: Get MAC address of LAN port.
　　@GMA: Get MAC address of OUTB connector.

7.12 Control command function

You can control external devices (for example, turning ON/OFF projectors) using RS-232C, LAN, or CEC. You can register up to 32 commands in the MSD. Associate registered commands with one of 98 operating conditions (for example, switching control command execution keys, COMMANDs A to I, and switching video/audio). When execution conditions are met, the associated commands are performed according to the set execution order. The loop back function allows you to control the commands of MSD itself.
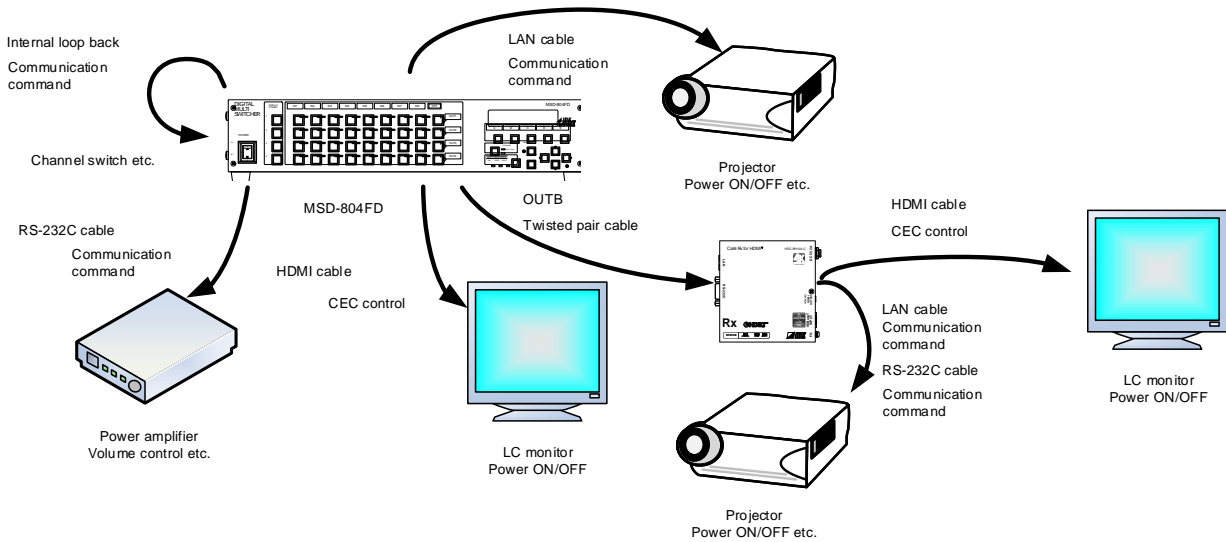
[Fig. 7.32] Sending control commands
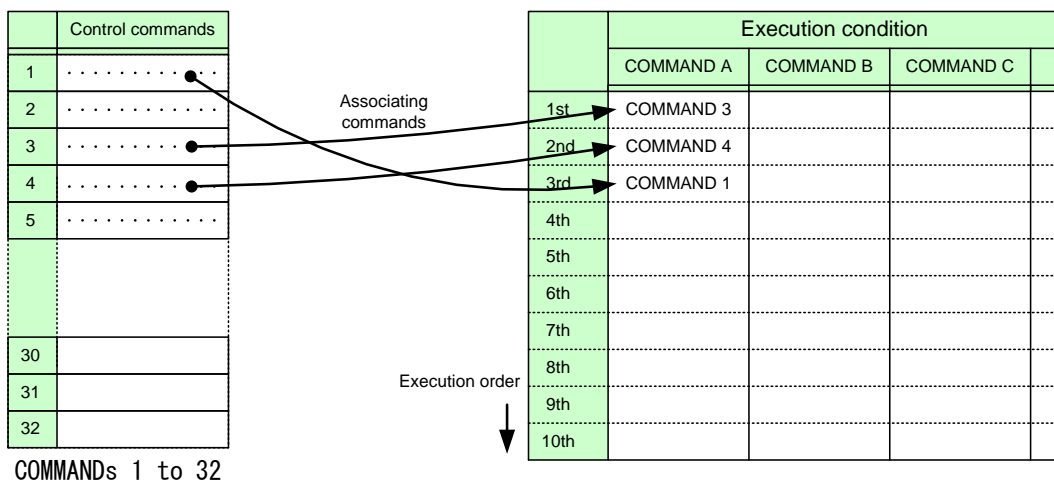
[Fig. 7.33] Associating control commands

In order to control peripheral devices via RS-232C, set "**7.10.2 RS-232C operation mode [FUNCTION]**" to "TRANSMITTER". For HDBaseT output connector (OUT1B to OUT4B), the mode is fixed at "TRANSMITTER"; no menu is displayed.

In order to control peripheral devices via LAN, set "**7.11.4 LAN operation mode [FUNCTION]**" to "TRANSMITTER". For HDBaseT output connector (OUT1B to OUT4B), you do not need to change the mode since it is fixed at "TRANSMITTER".

When a control command is executed, the user setting for the text of "MEMO" is displayed (Example 1), and if the reply command is received, the "MEMO" text registered for the reply command is also displayed (Example 2) for one second (when the control command that is used for checking the reply command is executed).

The received data is displayed (Example 3) for two seconds (when the control command that is used for displaying the received data is executed).

However, if you configure several control commands, or if you display data received from several com ports, the display time may be shortened by one to two seconds while control commands are being successively executed. If the received data does not fit in the full screen, the displayed data is scrolled.

Example 1: "SCREEN UP" is registered as the "MEMO".

Example 2: "SCREEN OK" is registered as the "MEMO".

Example 3: "PROJECTOR LAMP" is registered as the "MEMO", and "%1LAMP=1000 1" is received.

Example 4: If the reply command to the sent command cannot be received, it causes retry over.

Number	VFD screen
Example 1	SEND:SCREEN UP
Example 2	SEND:SCREEN UP RECV:SCREEN OK
Example 3	SEND:PROJECTOR LAMP RECV:%1LAMP=1000 1↵
Example 4	SEND:SCREEN UP RETRY OVER ERROR

Control command is executed

*1 "DELAY" is set to a value other than "0"?
NO
YES

Past time t = 0
The execution of control command is delayed until the set time passes.

t >= the set "DELAY"?
NO
YES

*2 "PORT" is set to "COM"?
NO
YES

The number of executions n = 0

*3 Command is sent

*4 Received data is displayed?
YES
NO

Reply command is checked?
NO
YES
Reply command are not checked, since all reply commands 1 to 32 is set to "NOT CHECK".

Past time t = 0

*7 Data is received?
NO
YES

*9 t >= the set timeout time ?
NO
YES
NO data matching with reply command is received within the set time.

*7 "CHECK" is selected for receive command 1?
YES
NO

Received data is matched with reply command 1?
YES
NO

*8 "RETRY" is set for when reply command 1 is received?
NO
YES
Retry command to the sent command is received.

*8 "STOP" is set for when reply command 1 is received?
YES
NO
Reply command to the sent command is received.

*7 "CHECK" is selected for receive command 2?
YES
NO

Received data is matched with reply command 2?
YES
NO

*8 "RETRY" is set for when reply command 2 is received?
NO
YES
Retry command to the sent command is received.

*8 "STOP" is set for when reply command 2 is received?
YES
NO
Reply command to the sent command is received.

*7 "CHECK" is selected for receive command 32?
YES
NO

Received data is matched with reply command 32?
YES
NO

*8 "RETRY" is set for when reply command 32 is received?
NO
YES
Retry command to the sent command is received.

*8 "STOP" is set for when reply command 32 is received?
YES
NO
Reply command to the sent command is received.

Not matched with any reply command

Stopped by reply command

*10 n = the set number of retries?
YES
NO

*12 Processing continues?
YES
NO
No reply command to the sent command is received.

Stopped by retry over

*11 "INTERVAL" is set to a value other than 0?
NO
YES

Past time t = 0
The execution of retry is delayed until the set time passes.

T >= "INTERVAL"?
NO
YES

The number of executions n = n+1
Command is resent.

Past time t = 0

Delimiter is checked?
NO
YES

*5 Delimiter is received?
NO
YES
Received response command to sent command

*9 t >= the set timeout time ?
NO
YES
Data including delimiter is not received within the set time.

*6 t >= the set timeout time ?
NO
YES
Received data is read until the set time comes.

*6 Received no data?
NO
YES
Data is not received within the set time.
Reply command to the sent command is received.

NO

*15 CEC is controlled.

Response from device?
YES
NO

*16 Processing continues?
YES
NO

Stopped by non-response

Next command is associated?
YES
NO
Next command is executed.

Completed

[Fig. 7.34] Control command processing

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For details of the settings below, see "**7.12.1 Editing control commands [COMMAND EDIT]**".

*[1] If you set "DELAY" to a value other than "0", command execution is delayed according to the set value. Control command number to be executed and remaining time before the command execution are displayed by 100 ms.

```
[COMMAND EXEC WAIT]
No. 1 DELAY: 10.5sec
```

*[2] This depends on setting of "PORT".

*[3] The send control command data set in "**7.12.1 Editing control commands [COMMAND EDIT]**" is sent for the number of bytes specified in "SIZE".

*[4] If you set "RECV DISPLAY" to "ASCII" or "HEX", the received data is displayed on VFD screen in "ASCII" or "HEX".

*[5] If you set "DELIMITER" to a value other than "NONE", the MSD waits until it receives the set delimiter.

*[6] If you set "DELIMITER" to "NONE", the MSD waits the receive data until the time set for "TIME OUT" passes. If no data is received, the MSD retries.

*[7] If you set "RECV" to "NOT CHECK" for all (32) commands, the next command will be performed without checking reply commands. If you set it to "CHECK" for only one command, the reply command is compared with the received data in order of "1→2---31→32".

*[8] If received data matches "DATA" of "RECV COMMAND" registered in "**7.12.2 Reply commands [RECV COMMAND EDIT]**", the next operation will be determined according to "PROCESS" of "**7.12.2 Reply commands [RECV COMMAND EDIT]**". If you set "PROCESS" to "RETRY", the retry operation will be performed. If you set it to "EXEC", the next command will be executed. If you set it to "STOP", the next command will not be executed even if the next command is associated.

*[9] If a delimiter or data matching reply command is not received even after the time set in "TIME OUT" passes, it causes timeout and retries the operation.

*[10] If any reply command is not received, the send command data is resent for the number of replies set in "RETRY". If you set "RETRY" to "0", the command is not resent.

*[11] If you set "INTERVAL" to an interval other than "0", retry will be delayed according to the set time.

*[12] If the reply command is not sent even after retry for the number of retry times set in "RETRY," the next operation will be determined according to "ERROR". If you set "ERROR" to "EXEC", the next command will be executed automatically. If you set it to "STOP", the next command will not be executed even if the command is associated. If you turn multiple communication ports "ON", it becomes "RETRY OVER ERROR" unless reply commands from all communication ports to which commands are sent are received.

*[14] The connector that is set to "POWER OFF" or "POWER ON" for "HDMI CEC control" will be controlled.

*[15] If no response from a device controlled with CEC, the next operation will be determined according to the setting of "**7.12.1**". If you set "ERROR" to "EXEC", the next command will be executed, but if you set it to "STOP", the next command is not executed even if the command is associated. If you set multiple outputs to be controlled in "HDMI CEC control" and any response from all devices controlled by CEC are not sent, it causes an error.

7.12.1 Editing control commands [COMMAND EDIT]

You can register up to 32 control commands.

[Table 7.11] Setting items of control commands

Item	Description	Range
PORT	Select "COM" or "CEC".	COM: Communication command [Default] CEC: HDMI CEC
DELAY	Set the waiting time of the control command. Use this item for devices such as projectors that requires time to cool down after powering off.	0 ms. to 999 seconds and 999 ms. [Default]: 0 ms.

Communication port[*1]	Set the following communication ports to "OFF" (not sending communication commands) or "ON" (sending communication commands). Those ports can be set separately, and communication commands can be sent to multiple communication ports at the same time.
	- RS1: RS-232C CH1[*6]
	- RS2: RS-232C CH2[*6]
	 - OUT1B RS to OUT4B RS:OUT1B to OUT4B[*6*7]
	   (RS-232C of OUT1B to OUT4B)
	- LOOP BACK: Internal loop back
	 - LAN1 to LAN8: LAN connections 1 to 8[*8]
	 - OUT1B LAN to OUT4B LAN:OUT1B to OUT4B[*7*8]
	   (LAN port of OUTB1 to OUTB4B)
		OFF [Default]
		ON

COM SIZE[*1]	Set the number of bytes to be sent starting with the first byte.	0 byte to 30 bytes [Default]: 0 byte
COMMAND INPUT MODE[*1]	Set the input mode of send command data. Select "ASCII" if "DATA" of "COMMAND" consists of only 0A, 0D, and 20 to 7D of ASCII codes; select "HEX" if "DATA" of "COMMAND" includes other codes.	ASCII [Default] HEX
Send command data [*1]	Set the command from the first byte according to the number of bytes set in "COM SIZE" (up to 30 bytes).	0A, 0D, 20 to 7D of ASCII codes (If inputting with ASCII codes), or 00 to FF of hex (If inputting with hex) [Default]: 20 (Space) (All numbers above are hex)
RECV DISPLAY [*1]	Set whether received data is displayed or not.	OFF [Default] ASCII HEX

DELIMITER [*1] [*2]	Set the delimiter to be sent at the end of the received data. "NONE": delimiter is not checked and all received data within the set timeout will be valid. Value other than "NONE": delimiter is checked and data received before delimiter will be valid.	NONE [Default] 00 to FF (Hex)
RCV CHECK [*1] [*3]	Set whether reply command that may be returned is checked or not.	CHECK [Default] NOT CHECK
TIME OUT [*1] [*4] [*5]	Set the timeout time for reply command to a sent command.	0 ms. to 99 seconds and 999 ms. [Default]: 0 ms.
RETRY [*1] [*4] [*5]	Set the number of retries to resend the same command again if no valid response is replied.	0 to 99 [Default]: 0
INTERVAL [*1] [*4] [*5]	Set the retry interval to resend the command.	0 ms. to 99 seconds and 999 ms. [Default]: 0 ms.
ERROR [*1] [*4] [*5]	Set whether the next command is to be executed or not if no valid response is replied, even after completing retry for the set number of retries.	STOP: [Default] EXEC: Continue
HDMI CEC control [*9]	Set the CEC control for display devices connected to OUT1A to OUT4A.	-: Not control [Default] POWER OFF POWER ON
HDBaseT CEC	Set the CEC control for display devices connected to OUT1B to OUT4B.	-: Not control [Default] POWER OFF POWER ON
Process for CEC error [*9]	Set whether the next command is executed or not if no response is replied from the display device that is controlled with CEC.	STOP [Default] EXEC: Continue
MEMO	Register a note up to 14 characters. The registered note is displayed when the control command is executed.	20 to 7D of ASCII codes except for 2C (,) [Default]: All spaces

[*1] If "Port" is set to "CEC", you do not need to set this item.

[*2] If "RECV DISPLAY" is set to "OFF", you do not need to set this item.

[*3] If "RECV DISPLAY" is set to "ASCII" or "HEX", you do not need to set this item.

[*4] If only "LOOP BACK" of communication ports is set to "ON", you do not need to set this item.

[*5] If all "RCV CHECK" is set to "NOT CHECK", you do not need to set this item.

[*6] If either "RS-1" or "RS-2" is set to "ON", set "**7.10.2 RS-232C operation mode [FUNCTION]**" to "TRANSMITTER". The mode of OUT1B RS to OUT4B RS is fixed at "TRANSMITTER", no menu is displayed.

[*7] OUT1B to OUT4B are available only if HDBaseT output option is mounted.

[*8] If any LAN connections for "LAN1" to "LAN8" are set to "ON", set "**7.11.4 LAN operation mode [FUNCTION]" to "TRANSMITTER**".

[*9] If "PORT" is set to "COM", you do not need to set this item.

1. To edit the control command using menu:

```
┌─────────────────────────┐
│ MSD-804FD               │   Top
│                         │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼ keys: Select "PRESET COMMAND".
│ PRESET COMMAND      ↕   │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [PRESET COMMAND]        │   ▲▼ keys: Select "COMMAND EDIT".
│ COMMAND EDIT        ↕   │
└─────────────────────────┘
        ↓  SET key
┌─────────────────────────┐
│ [COMMAND EDIT]      ↕   │   ▲▼keys: Select the desired control command (CMD 1 to CMD 32).
│ CMD 1                   │   "MEMO" is displayed on the right of the command number.
└─────────────────────────┘
        ↓  SET key        ↑  ESC key: Cancels the setting and returns to the previous screen.
┌─────────────────────────┐
│ PORT:COM SIZE: 0BYTE    │   ▲▼keys: Set the desired port (COM, CEC).
│ DELAY:  0s000ms   ↔↕▸  │
└─────────────────────────┘
        ↓ ◄►keys
```

After this step, procedures differ depending on the settings of "PORT".

Go to steps I, II, or III depending on the PORT setting being selected.

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[Step I. When setting "PORT" to "COM"]

```
PORT:COM SIZE: 0BYTE
DELAY:   0s000ms  ◂▴▸
```
▲▼ keys: Set the size of send command data (1 to 30).
If not registered, "0" is displayed. [*1]

↓ ◂ ▶ keys

```
PORT:COM SIZE: 0BYTE
DELAY:   0s000ms  ◂▴▸
```
▲▼ keys: Set the delay time in seconds (0 to 999).

↓ ◂ ▶ keys

```
PORT:COM SIZE: 0BYTE
DELAY:   0s000ms  ◂▴▸
```
▲▼ keys: Set the delay time in milliseconds (0 to 999).

↓ ◂ ▶ keys

```
RS1:0FF  RS2:OFF
OUT1B RS:OFF      ◂✛▸
```
▲▼keys: Select the RS port to send commands (OFF, ON).
◂▶keys: Moves the cursor to the next communication port.[*2]

↓ ◂ ▶ keys

```
OUT2B RS:0FF
OUT3B RS:OFF      ◂✛▸
```
▲▼keys: Select the RS port to send commands (OFF, ON).
◂▶keys: Moves the cursor to the next communication port.[*2]

↓ ◂ ▶ keys

```
OUT4B RS:0FF
LOOP BACK:OFF     ◂✛▸
```
▲▼ keys: Select the RS port to send commands (OFF, ON).
◂▶ keys: Moves the cursor to the next communication port.[*2]

↓ ◂ ▶ keys

```
LAN1:0FF LAN2:OFF
LAN3:OFF LAN4:OFF◂✛▸
```
▲▼ keys: Select the RS port to send commands (OFF, ON).
◂▶ keys: Moves the cursor to the next communication port.

↓ ◂ ▶ keys

```
LAN5:0FF LAN6:OFF
LAN7:OFF LAN8:OFF◂✛▸
```
▲▼keys: Select the RS port to send commands (OFF, ON).
◂▶keys: Moves the cursor to the next communication port.

↓ ◂ ▶ keys

```
OUT1B LAN:0FF
OUT2B LAN:OFF     ◂✛▸
```
▲▼keys: Select the RS port to send commands (OFF, ON).
◂▶keys: Moves the cursor to the next communication port.[*2]

↓ ◂ ▶ keys

```
OUT3B LAN:0FF
OUT4B LAN:OFF     ◂✛▸
```
▲▼ keys: Select the RS port to send commands (OFF, ON).
◂▶keys: Moves the cursor to the next communication port.[*2]

◂ ▶ keys

```
COMMAND INPUT MODE:
ASCII             ◂✛▸
```
▲▼ keys: Select the desired command input mode (ASCII, HEX).

↓ ◂ ▶ keys

After this step, procedures to input send command data differ depending on settings of the "COMMAND INPUT MODE". Go to I-i or I-ii below to continue.

[*1] The command size can be set also when inputting the command data.
If you press the "SET" key for 1 second or longer on the command data input screen, the number of data up to the current cursor position will be set as the size of the command data. For example, when pressing the "SET" key for one second or longer while the following display is displayed, up to the 5th byte is set as the data size.

```
DATA:INPUT              DATA:49 4E 50 55 54
   5:                      5:20 20 20 20 20
```

[*2] OUT1B to OUT4B are available only if HDBaseT output option is mounted.

[Step I-i. When setting "COMMAND INPUT MODE" to "ASCII"]

You can set 30 bytes in total on the front panel VFD screen. A (LF) and 0D (CR) are displayed as shown below, and for 20 to 7D, codes corresponding to ASCII codes are displayed. If a code other than 0A, 0D, 20 to 7D is detected, an "=" symbol is displayed.

```
0A(LF) = ↓
0D(CR) = ↵
```

```
DATA:█
   1:
```

▲▼keys: Set the command data; 1 to 15 bytes (upper row), 16 to 30 bytes (lower row) (0A, 0D, 20 to 7D of ASCII codes) [*3]

◄►keys: Moves the cursor to the next data.

↓◄►keys

Go to step I-iii below.

[Step I-ii. When setting "COMMAND INPUT MODE" to "HEX"]

10 bytes are displayed on a VFD screen (30 bytes in three VFD screen in total) in 00 to FF (Hex).

```
DATA:█0 20 20 20 20
   1:20 20 20 20 20
```

▲▼keys: Set the command data; 1st to 5th bytes (upper row), 6th to 10th bytes (lower row) (0 to F in Hex). [*3]

◄►keys: Moves the cursor to the next number.

↓ ◄►keys

```
DATA:█0 20 20 20 20
  11:20 20 20 20 20
```

▲▼keys: Set the command data; 11th to 15th bytes (upper row), 16th to 20th bytes (lower row) (0 to F in Hex). [*3]

◄►keys: Moves the cursor to the next number.

↓ ◄►keys

```
DATA:█0 20 20 20 20
  21:20 20 20 20 20
```

▲▼keys: Set the command data; 21st to 25th bytes (upper row), 26th to 30th bytes (lower row) (0 to F in Hex.) [*3]

◄►keys: Moves the cursor to the next number.

↓ ◄►keys

Go to step I-iii below

[*3] The numbers at the lower left indicate the number of characters of the cursor position.

[Step I-iii. Whether to display received data or not]

```
RECV DISPLAY:█FF
              ◄↕►
```

▲▼keys: Set whether to display the received data "RECV DISPLAY" (OFF, ASCII, HEX).

↓ ◄►keys

```
RECV DISPLAY:ASCII
DELIMITER:█ONE  ◄↕►
```

▲▼keys: Set whether to check delimiter (NONE, 00 to FF in hex). [*4]

↓ ◄►keys

If selecting "RECV DISPLAY" to "OFF", set whether to check the reply command or not (Go to step I-iv).

If selecting "ASCII" or "HEX", set "TIME OUT" (Go to step I-v)

[*4] Displayed only if you select "ASCII" or "HEX".

If you set "DELIMITER" to a value other than "NONE", ASCII codes (text) will also be displayed in parentheses along with hexadecimal. ASCII codes (text) are displayed the same as in step I-i.

[Step I-iv. Reply command]

```
RCV 1:
NOT CHECK        ◄♦►
```
▲▼keys: Set whether to check reply command 1 (NOT CHECK, CHECK). Memo is displayed at the right of the command number.

↓ ◄►keys

```
RCV 2:
NOT CHECK        ◄♦►
```
▲▼keys: Set whether to check reply command 2. (NOT CHECK, CHECK). Memo is displayed at the right of the command number.

⋮ ◄►keys

```
RCV32:NG
NOT CHECK        ◄♦►
```
▲▼keys: Set whether to check reply command 32 (NOT CHECK, CHECK). Memo is displayed at the right of the command number.

↓ ◄►keys

Go to step I-v below to continue.

[Step I-v. Setting timeout]

```
TIME OUT: 0s000ms
RETRY: 0          ◄▲►
```
▲▼keys: Set the retry timeout in seconds (0 to 99).

↓ ◄►keys

```
TIME OUT: 0s000ms
RETRY: 0          ◄▲►
```
▲▼keys: Set the retry timeout in milliseconds (0 to 999).

↓ ◄►keys

```
TIME OUT: 0s000ms
RETRY: 0          ◄▲►
```
▲▼keys: Set the number of retries (0 to 99).

↓ ◄►keys

```
INTERVAL: 0s000ms
ERROR:STOP        ◄▲►
```
▲▼keys: Set the retry interval in seconds (0 to 99).

↓ ◄►keys

```
INTERVAL: 0s000ms
ERROR:STOP        ◄▲►
```
▲▼keys: Set the retry interval in milliseconds (0 to 999).

↓ ◄►keys

```
INTERVAL: 0s000ms
ERROR:STOP        ◄▲►
```
▲▼keys: Select the action for when retry over occurs (STOP, EXEC).

↓ ◄►keys

```
MEMO:█
1                ◄♦►
```
▲▼keys: Set the "MEMO" (20 to 7D of ASCII codes except for 2C).
◄►keys: Moves the cursor to the next number (Up to 14 characters).[5]

↓ SET key: Applies settings.

```
[PRESET COMMAND 1]
NOW UPDATE...
```
The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[COMMAND EDIT]    ♦
CMD 1
```

[5] The numbers at the lower left indicate the number of characters of the cursor position.

Note:

If you do not press the "SET" key, the control command is not changed. Make sure to press the "SET" key.

[Setting loop back]

If the MSD sends a communication command back to the MSD itself using the loop back function, the MSD replies "OK" if processed normally while replying "NG" if parameter or command is incorrect. (These commands differ from reply commands to communication commands received externally; not loop-back.) Since "OK" and "NG" are registered to reply commands 31 and 32 by factory default, respectively, set CHECK" for those commands in order to check reply commands using the loop back function. However, these commands can be changed in "**7.12.2 Reply commands [RECV COMMAND EDIT]**", so confirm that "OK" and "NG" have not been changed before using.

With this function, you can register several communication commands to one control command. (Up to 30 bytes) For example, if sending the channel switching command "@SSW,1,1CR LF" and the audio output setting command "@SSL,1,1 CR LF" successively, register "@SSW,1,1 CR LF @SSL,1,1 CR LF" (20 bytes). Even if you send several communication commands, the number of reply commands is 1, and "OK" is replied if processed successfully while "NG" is replied if there is an error even in just one command.

[Setting PJLink]

The MSD supports PJLink (class1), which is a standard protocol to control projectors. If you set a LAN port to be connected using the PJLink protocol for the communication port (can be set in "**7.11.4 LAN operation mode [FUNCTION]**"), you can select a PJLink command when inputting send command data.

[Table 7.12] PJLink command (class1)

Header	Standard class	Command	Separator	Parameter	Delimiter
% (25)	1 (31)	4-character alphabet	Space (20)	ASCII codes (text) within 128 bytes	*CR* (0D)

Hexadecimal values are in parentheses.

You can select PJLink command by pressing ▲▼keys when the cursor is at the first byte of the data or right of the delimiter (CR). You can select ASCII codes (text) and change parameters by pressing these keys when the cursor is at another position.
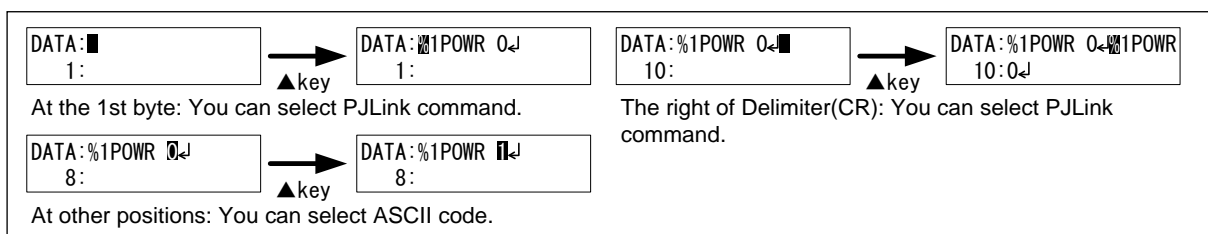
[Fig. 7.35] Selecting PJLink command (class1)

The MSD supports the following PJLink commands.

[Table 7.13] PJLink commands (class1) (ASCII codes)

No.	Command										Description
1	%	1	P	O	W	R	(SP)	0	*CR*		Power off (Standby)
2	%	1	P	O	W	R	(SP)	1	*CR*		Power on (Lamp on)
3	%	1	P	O	W	R	(SP)	?	*CR*		Get power status
4	%	1	I	N	P	T	(SP)	1	*1	*CR*	Switch input to RGB
5	%	1	I	N	P	T	(SP)	2	*1	*CR*	Switch input to VIDEO
6	%	1	I	N	P	T	(SP)	3	*1	*CR*	Switch input to DIGITAL
7	%	1	I	N	P	T	(SP)	4	*1	*CR*	Switch input to STORAGE
8	%	1	I	N	P	T	(SP)	5	*1	*CR*	Switch input to NETWORK
9	%	1	I	N	P	T	(SP)	?	*CR*		Get input selection settings

10	%	1	A	V	M	T	(SP)	1	0	*CR*	Switch off video mute
11	%	1	A	V	M	T	(SP)	1	1	*CR*	Switch on video mute
12	%	1	A	V	M	T	(SP)	2	0	*CR*	Switch off audio mute
13	%	1	A	V	M	T	(SP)	2	1	*CR*	Switch on audio mute
14	%	1	A	V	M	T	(SP)	3	0	*CR*	Video+audio mute off
15	%	1	A	V	M	T	(SP)	3	1	*CR*	Video+audio mute on
16	%	1	A	V	M	T	(SP)	?		*CR*	Get mute settings
17	%	1	E	R	S	T	(SP)	?		*CR*	Get error status
18	%	1	L	A	M	P	(SP)	?		*CR*	Get time and status of lamp
19	%	1	I	N	S	T	(SP)	?		*CR*	Get list of switching input
20	%	1	N	A	M	E	(SP)	?		*CR*	Get projector name
21	%	1	I	N	F	1	(SP)	?		*CR*	Get manufacture name
22	%	1	I	N	F	2	(SP)	?		*CR*	Get product name
23	%	1	I	N	F	O	(SP)	?		*CR*	Get other information (optional of manufacturer)

(SP): Space

*[1] You can specify the input number from 1 to 9, but types and the number of selectable input connectors differ depending on the connected projector. "1" is displayed by default.

Reply command structure for PJLink commands:

The first 6 bites: The sent command data without change

The 7th bite: "="

After the 8th bite: Processing result

For example, if a command, "%1POWR 1CR", is processed normally, the reply command, "%1POWR=OK CR" will be replied.

PJLink specifications regulate that projectors are required to reply the reply commands within 2 seconds after receiving the PJLink command. However, some projectors have different specifications. Check the manual of your projector and apply the response time indicated in the manual if there is one listed.

[Table 7.14] Reply command to PJLink command (class1)

Header	Standard class	Command	Separator	Parameter	Delimiter
% (25)	1 (31)	4-character alphabet	=(3D)	Processing result	CR (0D)

Hex values are in parentheses.

There are five types of normal reply commands as shown in **[Table 7.15].** In addition to these five commands, there are other reply commands listed in **[Table 7.16]** are defined for setting acquisition commands.

[Table 7.15] Reply commands to PJLink command (class1) (ASCII codes)

No.	Command											Description
1	%	1	x	x	x	x	=	O	K	*CR*		Terminated normally
2	%	1	x	x	x	x	=	E	R	R	1 *CR*	Mistake in command itself (Undefined command)
3	%	1	x	x	x	x	=	E	R	R	2 *CR*	Invalid parameter
4	%	1	x	x	x	x	=	E	R	R	3 *CR*	Currently not acceptable
5	%	1	x	x	x	x	=	E	R	R	4 *CR*	Malfunction of projector

xxxx: Command itself

[Table 7.16] Individual reply command of status acquisition commands (text)

No.	Command												Description
Reply command to power status commands													
1	%	1	P	O	W	R	=	0	*CR*				Stand by
2	%	1	P	O	W	R	=	1	*CR*				Power ON
3	%	1	P	O	W	R	=	2	*CR*				Cooling
4	%	1	P	O	W	R	=	3	*CR*				Warming up
Reply command to input status commands													
1	%	1	I	N	P	T	=	1	*2	*CR*			RGB selected
2	%	1	I	N	P	T	=	2	*2	*CR*			VIDEO selected
3	%	1	I	N	P	T	=	3	*2	*CR*			DIGITAL selected
4	%	1	I	N	P	T	=	4	*2	*CR*			STORAGE selected
5	%	1	I	N	P	T	=	5	*2	*CR*			NETWORK selected
Get mute settings													
1	%	1	A	V	M	T	=	3	0	*CR*			Video+audio Mute OFF
2	%	1	A	V	M	T	=	1	1	*CR*			Video Mute ON
3	%	1	A	V	M	T	=	2	1	*CR*			Audio Mute ON
4	%	1	A	V	M	T	=	3	1	*CR*			Video+audio mute ON
Get error status													
1	%	1	E	R	S	T	=	*3	*4	*5	*6	*7	*8 *CR*
Get time and status of lamp													
1	%	1	L	A	M	P	=	*9	(SP)	*10	*CR*		
Get list of input switching													
1	%	1	I	N	S	T	=	*11	*CR*				
Get projector name													
1	%	1	N	A	M	E	=	*12	*CR*				
Get manufacturer name													
1	%	1	I	N	F	1	=	*13	*CR*				
Get product name													
1	%	1	I	N	F	2	=	*13	*CR*				
Get other information (optional)													
1	%	1	I	N	F	O	=	*13	*CR*				

(SP): Space

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*[2] Input number, which is any of "1" to "9", but types and the numbers of selectable input connectors differ depending on connected projectors.

*[3] Fan error, which is any of 0 to 2.

        0: Error not detected or no detect error function

        1: Warning

        2: Error

*[4] Lamp error. Numbers and meanings are the same as those of the fan error status above.

*[5] Temperature error. Numbers and meanings are the same as those of the fan error status above.

*[6] Cover open error. Numbers and meanings are the same as those of the fan error status above.

*[7] Filter error. Numbers and meanings are the same as those of the fan error status above.

*[8] Other errors. Numbers and meanings are the same as those of the fan error status above.

*[9] Accumulated time of lamp, which is any of 0 to 99999. (For projectors that do not count the accumulated time, the value is 0 at all times.).

*[10] Whether the lamp illuminates or not (0 or 1).

        0: Not illuminate

        1: Illuminates

        For devices containing several lamps, accumulated time and lightning state for each device are replied in sequence. For example, if a device containing three lamps, the following command is replied: "%1LAMP=accumulated time 1(SP) lightning state 1(SP) accumulated time 2(SP) lightning state 2(SP) accumulated time 3(SP) lightning state 3 *CR"*

*[11] Source number, which is input switchable. Any of 11 to 59 (Meaning is the same as that of "%INPT" command). For devices containing several inputs, several statuses separated with a (SP) are sent. For example, for a device having two inputs, "%1INST= source number1(SP)source number2*CR"* is sent.

*[12] 20 to FF in hex; up to 64 characters.

*[13] 20 to 7F in hex; up to 32 characters.

To check reply commands of PJLink commands, register reply commands by following tables above.

[Step II. When setting "PORT" to CEC]

```
PORT:CEC
DELAY:  0s000ms  ◂▴▸
```
▲▼ keys: Set the delay time in seconds (0 to 999).

↓ ◀ ▶ keys

```
PORT:CEC
DELAY:  0s000ms  ◂▴▸
```
▲▼ keys: Set the delay time in seconds in milliseconds (0 to 999).

↓ ◀ ▶ keys

```
OUT1A CEC:▆
              ◂▾▸
```
▲▼ keys: Select the control of OUT1A (-, POWER OFF, POWER ON).

↓ ◀ ▶ keys

```
OUT1B CEC:▆
              ◂▾▸
```
▲▼ keys: Select the control of OUT1B (-, POWER OFF, POWER ON).

⋮ ◀ ▶ keys

```
OUT4B CEC:▆
              ◂▾▸
```
▲▼ keys: Select the control of OUT4B (-, POWER OFF, POWER ON).

↓ ◀ ▶ keys

```
ERROR:STOP
              ◂▾▸
```
▲▼ keys: Select the action for when retry over occurs (STOP, EXEC).

↓ ◀ ▶ keys

```
MEMO:█
  1:          ◂▾▸
```
▲▼ keys: Set the "MEMO" (20 to 7D of ASCII codes except for 2C).
◀ ▶ keys: Moves the cursor to the next character (Up to 14 characters)

↓ SET key: Applies settings.

```
[PRESET COMMAND 1]
NOW UPDATE...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[COMMAND EDIT]    ▲▼
CMD █
```

Note:

If you do not press the "SET" key, the control command is not changed. Make sure to press the "SET" key.

CEC can only control the power of display devices connected to the HDMI output connector (OUT A) or HDBaseT output connector (OUT B) . Devices connected to HDMI input connectors (IN1 to 8) cannot be controlled, and only power control is available.
OUT1B to OUT4B are available only if HDBaseT output option is mounted.
This function may not work correctly in old devices and some devices supporting CEC.

2. To edit the control command using commands:

@SEC: Set control command (Control communication command)
@GEC: Get control command (Control communication command)
@SEC: Set control command (Display received data)
@GEC: Get control command (Display received data)
@SEC: Set control command (Control CEC)
@GEC: Get control command (Control CEC)

7. 12. 2 Reply commands [RECV COMMAND EDIT]

You can register up to 32 commands.

[Table 7.17] Setting items of reply commands

Item	Description	Range
SIZE	Set the number of bytes from the first byte to be compared.	0 to 30 bytes [Default]: 0 byte
PROCESS	Select "STOP" (to stop the next operation), "EXEC" (to execute it), or "RETRY" (to send the command again) for when received data and reply command data match.	STOP EXEC [Default] RETRY: Resend commands
PJLink	Select whether PJLink commands are set or not for when input reply command data is input.	OFF [Default] ON
COMMAND INPUT MODE	Select the input mode of reply command data. "ASCII": For data consisting of only 0A, 0D, 20 to 7D (text) "HEX": For data including other codes	ASCII [Default] HEX
DATA	Set the command to be compared with the received data from the first byte to the byte count set in "SIZE". If using alphabets (A to Z, a to z), make sure to distinguish capital and lower case letters. (Up to 30 bytes)	0A, 0D, and 20 to 7D of ASCII codes or 00 to FF (Hex) [Default]: 20 (Space) (Values described above all with hex)
MASK	Received data is compared with MASK DATA without "AND" of each bit and reply command data. (Use this item to determine the state using the received data bit.)	00 to FF (Hex) [Default]: All: "FF"
MEMO	Register a note up to 14 characters. When reply command is received, the registered note is displayed.	20 to 7D of ASCII codes except for 2C (,) [Default]: All: Spaces

Those default values do not apply to reply commands 31 and 32.

Note:

If the MSD sends a communication command back to the MSD itself using the loop back function, the MSD replies "OK" if processed normally while it replies "NG" if parameter or command is incorrect. (This differs from reply commands to communication commands received externally; not loop back.) Since "OK" and "NG" are registered to reply commands 31 and 32 by factory default, respectively, do not edit or delete those commands if you use the loop back function and check reply commands.

	SIZE	PROCESS	DATA	MASK	MEMO
1	0 byte	EXEC	All 00	All FF	All space
2	0 byte	EXEC	All 00	All FF	All space
3	0 byte	EXEC	All 00	All FF	All space
4	0 byte	EXEC	All 00	All FF	All space
5	0 byte	EXEC	All 00	All FF	All space
30	0 byte	EXEC	All 00	All FF	All space
31	2 bytes	EXEC	OK	All FF	OK
32	2 bytes	STOP	NG	All FF	NG

(32 rows total)

[Table 7.18] Defaults of reply commands

1. To edit the reply command using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET COMMAND    ↕
```
▲▼keys: Select "PRESET COMMAND".

↓ SET key

```
[PRESET COMMAND]
RECV COMMAND EDIT ↕
```
▲▼keys: Select "RECV COMMAND EDIT".

↓ SET key

```
[RECV COMMAND EDIT]↕
CMD 1
```
▲▼keys: Select the reply command (CMD 1 to CMD 32).
Memo is displayed on the right of the command number.

↓ SET key   ↑ ESC key: Cancels the setting and returns the menu.

```
SIZE: 0BYTE
PROCESS:EXEC      ◄▲►
```
▲▼keys: Set the size of reply command data (0 to 30).
If not registered, "0" is displayed.

↓ ◄►keys

```
SIZE: 0BYTE
PROCESS:EXEC      ◄↕►
```
▲▼keys: Select the mode for when retry over occurs (STOP, EXEC, RETRY).

↓ ◄►keys

```
PJLink:OFF
                 ◄↕►
```
▲▼keys: Set whether setting PJLink commands (OFF, ON).

↓ ◄►keys

```
COMMAND INPUT MODE:
ASCII            ◄↕►
```
▲▼keys: Set "COMMAND INPUT MODE".
(ASCII, HEX)

↓ ◄►keys

Procedures to input send command data differ depending on settings of "COMMAND INPUT MODE" (Go to steps I-I or I-ii below)

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[Step I-i. When setting "COMMAND INPUT MODE" to "ASCII"]

You can set the command up to 30 bytes in total on an VFD screen. 0A (LF) and 0D (CR) are displayed as follows. For 20 to 7D, the corresponding codes in ASCII codes are displayed. If a code other than 0A, 0D, 20 to 7D is detected, "=" symbol is displayed.

```
0A(LF) = ↓
0D(CR) = ↵
```

If using ASCII codes (text), the mask data will automatically be "FF". (Setting of mask data is not displayed.)
To set the mask data to a value other than "FF", use HEX codes.

```
DATA:█
  1:
```

▲▼keys: Set the reply command data; 1 to 15 bytes (upper row), 16 to 30 bytes (lower row) (0A, 0D, 20 to 7D of ASCII codes.[*1]

◄►keys: Moves the cursor to the next data.

↓ ◄►keys

Go to settings in step I-iii below.

[Step I-ii. When setting "COMMAND INPUT MODE" of reply command to "HEX"]

5-byte reply command and mask data are displayed in an VFD screen (30 bytes in total for 6 VFD screens) in "00" to "FF" (Hex).

```
DATA1:█0 00 00 00 00
MASK1:FF FF FF FF FF
```

▲▼ keys: Set the reply command data for 1 to 5 bytes on the upper row; mask data for 1 to 5 on the lower row. (0 to F in hex).[*2]

◄►keys: Moves the cursor to the next number.

↓ ◄►keys

```
DATA6:█0 00 00 00 00
MASK6:FF FF FF FF FF
```

▲▼keys: Set the reply command data for 6 to 10 bytes on the upper row; mask data for 6 to 10 on the lower row. (0 to F in hex).[*2]

◄►keys: Move the cursor to the next number.

⋮   ◄►keys: Move cursor to the next port

```
DAT26:█0 00 00 00 00
MAS26:FF FF FF FF FF
```

▲▼keys: Set the reply command data for 26 to 30 bytes on the upper row; mask data for 26 to 30 on the lower row. (0 to F in hex).[*2]

◄►keys: Moves the cursor to the next number.

↓ ◄►keys

Go to step I-iii below to continue.

[Step I-iii. Setting]

```
MEMO:█
  1:              ↔
```

▲▼keys: "MEMO" (20 to 7D of ASCII codes except for 2C)

◄►keys: Moves the cursor to the next character (Up to 14 characters).[*1]

↓ SET key: Applies settings

```
[RECV COMMAND 1]
NOW UPDATE...
```

The message is displayed for one second and then previous screen is displayed automatically.

↓

```
[RECV COMMAND EDIT]↕
CMD █
```

[*1] The number on the lower left shows the number of characters at the cursor position.

[*2] Numbers following "DATA" and "MASK" shows the number of characters at the cursor position.

Note:

If you do not press the "SET" key, the reply command is not changed. Make sure to press the "SET" key.

The received data without mask data and "AND" of each bit is compared with the reply command data. Set "MASK" to "FF". Since "FF" is set by factory default, you do not need to change the mask data normally. Only to determine the status using bits of the received data, change the setting.

[If ASCII codes (text) are replied from an external device]
Since the received data and "Reply command data" are compared without any changes, set "MASK" to "FF". (If you set "COMMAND INPUT MODE" of reply command to "ASCII", it is automatically set to "FF".)
For example, if "0" of ASCII codes ("30" in hex) is replied:

	Binary		Binary	Hexadecimal
(Received data)	00110000	& (MASK)	11111111	=30
(Reply command data)	00110000			=30 matched

```
DATA1:30 00 00 00 00
MASK1:FF FF FF FF FF
```

[If status is determined using bits of the received data]
Set only bits that determine the Mask data to "1" and set other bits to "0".
For example, if determining status using the second bit from the left:

	Binary		Binary	Hexadecimal
(Received data)	11111111	& (MASK)	01000000	=40
(Reply command data)	01000000			=40 matched

	Binary		Binary	Hexadecimal
(Received data)	10111111	& (MASK)	01000000	=00
(Reply command data)	01000000			=40 not matched

```
DATA1:40 00 00 00 00
MASK1:40 FF FF FF FF
```

[PJLink]

The MSD supports PJLink (class1), which is the standard protocol to control projectors. If you set "PJLink" to "ON", the PJLink command can be selected at the time of inputting the reply command data.

You can select PJLink command by pressing ▲▼keys when the cursor is at the first byte of the data or right of the delimiter (CR). You can select ASCII codes (text) and change parameters by pressing the keys when the cursor is at another position.
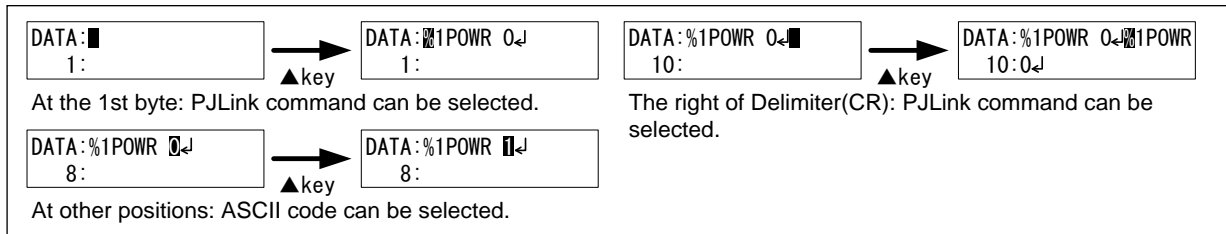
[Fig. 7.36] Selecting PJLink commands (class1)

2. To edit the reply command using commands:

@SRC: Set reply command

@GRC: Get reply command

7.12.3 **Control command association [COMMAND LINK]**

The MSD has 90 command execution conditions as shown below. If these execution conditions are met, control commands which are associated beforehand will be executed. One execution condition can be associated to up to 10 commands. If several commands are associated, commands are executed in order of registration. If the same command is associated several times, it is repeatedly executed.

[Table 7.19] Execution condition of control commands

Execution condition	Function	Execution condition	Function
COMMANDs A to I	Control command execution key	VIDEO:OUT2-IN1 to VIDEO:OUT2-IN8	Selecting video input channel of OUT2
POWER ON	Controlling power switch	VIDEO:OUT2-OFF	
DISPLAY1 POWER ON	Controlling display device power of OUT1	AUDIO:OUT2-IN1 to AUDIO:OUT2-IN8	Selecting audio input channel of OUT2
DISPLAY1 POWER OFF			
DISPLAY2 POWER ON	Controlling display device power of OUT2		
DISPLAY2 POWER OFF		AUDIO:OUT2-OFF	
DISPLAY3 POWER ON	Controlling display device power of OUT3	VIDEO:OUT3-IN1 to VIDEO:OUT3-IN8	Selecting video input channel of OUT3
DISPLAY3 POWER OFF			
DISPLAY4 POWER ON	Controlling display device power of OUT4	VIDEO:OUT3-OFF	
DISPLAY4 POWER OFF			
VIDEO:OUT1-IN1 to VIDEO:OUT1-IN8	Selecting video input channel of OUT1	AUDIO:OUT3-IN1 to AUDIO:OUT3-IN8	Selecting audio input channel of OUT3
VIDEO:OUT1-OFF		AUDIO:OUT3-OFF	
AUDIO:OUT1-IN1 to AUDIO:OUT1-IN8	Selecting audio input channel of OUT1	VIDEO:OUT4-IN1 to VIDEO:OUT4-IN8	Selecting video input channel of OUT4
AUDIO:OUT1-OFF		VIDEO:OUT4-OFF	
		AUDIO:OUT4-IN1 to AUDIO:OUT4-IN8	Selecting audio input channel of OUT4
		AUDIO:OUT4-OFF	

Those functions can be controlled not only by pressing the front panel keys but also using communication commands.

For association, select control commands registered in "**7.12.1 Editing control commands [COMMAND EDIT]**" (COMMAND 1 to 32). If you do not want to execute any commands, select "OFF". All execution conditions are set to "OFF" by default.
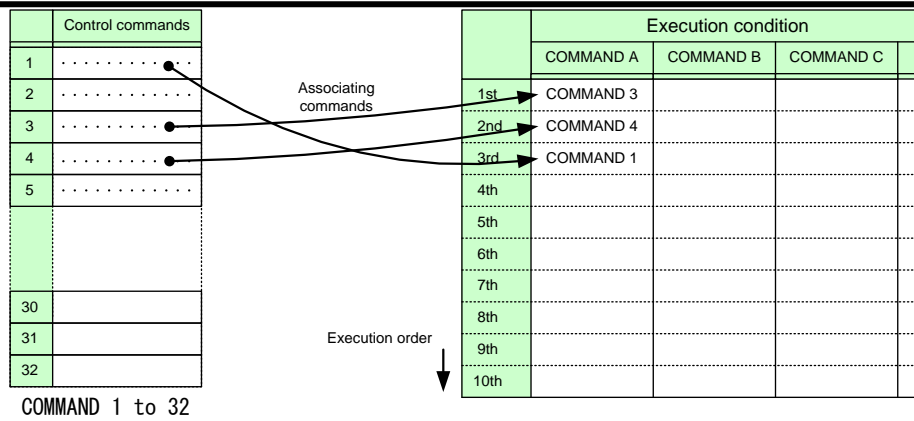
[Figure 7.37] Associating control command

For association of control command execution keys (COMMANDs A to I), each execution condition has two planes. Normally, use only "PLANE A", but if you want to operate different operations alternately at every time execution conditions are met, turn "TOGGLE" to "ON" and associate PLANE A and PLANE B separately. You can select which command will be executed at start-up of the MSD from "AUTO", "PLANE A", or "PLANE B". If you select "AUTO", the opposite plane of the plane executed immediately before turning off the MSD will be executed. "TOGGLE" of all execution conditions is set to "OFF" by default.
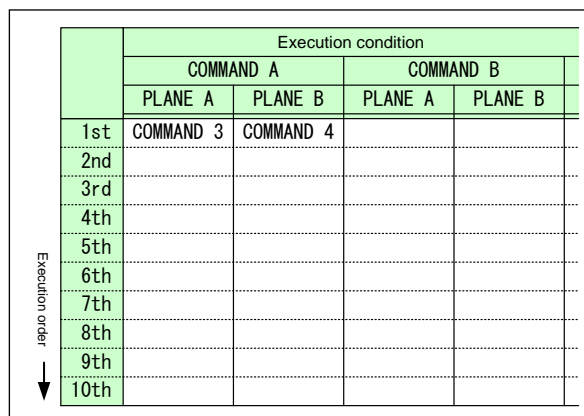
[Fig. 7.38] Associating control command execution keys

When PLANE B is executed, LEDs for control command execution keys on the front panel are illuminated (PLANE A will be executed at the next press); when PLANE A is executed, the LEDs blink (PLANE B will be executed at the next press).
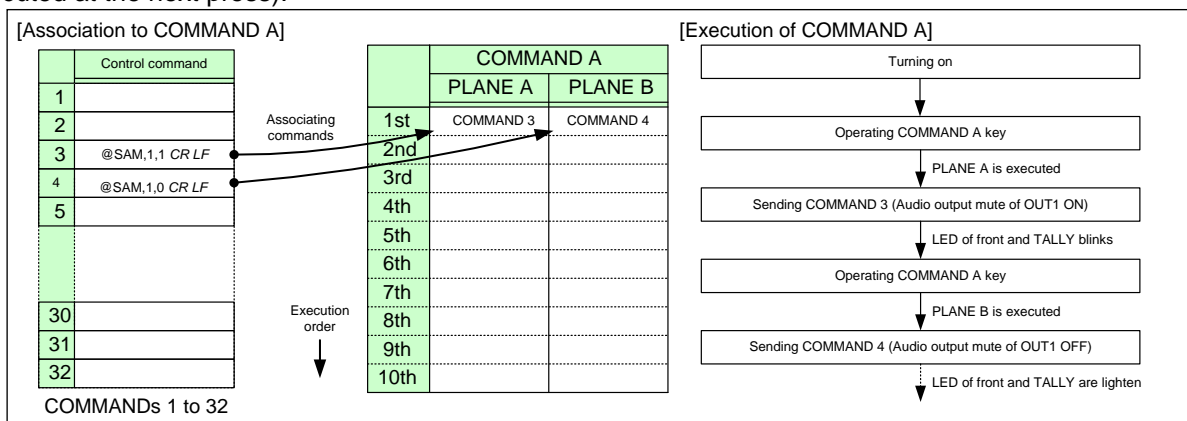
[Fig. 7.39] Example of toggle operation of control command execution key

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1. To associate the control command using menu:

```
 ┌─────────────────────────┐
 │ MSD-804FD               │   Top
 │                         │
 └─────────────────────────┘
        ↓ SET key
 ┌─────────────────────────┐
 │ [FUNCTION SELECT]       │   ▲▼keys: Select "PRESET COMMAND".
 │ PRESET COMMAND     ↕    │
 └─────────────────────────┘
        ↓ SET key
 ┌─────────────────────────┐
 │ [PRESET COMMAND]        │   ▲▼keys: Select "COMMAND LINK".
 │ COMMAND LINK       ↕    │
 └─────────────────────────┘
        ↓ SET key
 ┌─────────────────────────┐
 │ [COMMAND LINK]          │   ▲▼keys: Select the execution condition (COMMAND A to
 │ COMMAND A          ↕    │   AUDIO:OUT4-OFF).
 └─────────────────────────┘
        ↓ SET key        ↑ ESC key: Cancels the setting and returns to menu.
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Set the toggle operation (OFF, ON).
 │ TOGGLE:OFF        ↔↕▸   │   Settable only if you select any of COMMAND A to I for the execution
 └─────────────────────────┘   condition.

        ↓ ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Select the plane you want to execute at starting up (AUTO,
 │ STARTUP:AUTO      ↔↕▸   │   A, B).
 └─────────────────────────┘   Settable only if you set "TOGGLE" to "ON".

        ↓ ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Set the 1st command (OFF, COMMAND 1 to COMMAND
 │  1st:OFF          ↔↕▸   │   32).
 └─────────────────────────┘   If you set "TOGGLE" to "OFF", this screen is for "PLANE A".

        ↓ ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Set the 2nd command (OFF, COMMAND 1 to COMMAND
 │  2nd:OFF          ↔↕▸   │   32).
 └─────────────────────────┘
                               If you set "TOGGLE" to "OFF", this screen is for "PLANE A".
        ↓ ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Set the 10th command (OFF, COMMAND 1 ~ COMMAND
 │ 10th:OFF          ↔↕▸   │   32)
 └─────────────────────────┘
                               If you set "TOGGLE" to "OFF", this screen is for "PLANE A".
        ↓ ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: Set the PLANE B-1st command.
 │ B- 1st:OFF        ↔↕▸   │   Settable only if you set "TOGGLE" to "ON".
 └─────────────────────────┘

     ⋮  ◄►keys
 ┌─────────────────────────┐
 │ [COMMAND A]             │   ▲▼keys: PLANE B-10th command
 │ B-10th:OFF        ↔↕▸   │   Settable only if you set "TOGGLE" to "ON".
 └─────────────────────────┘
        ↓ SET key: Applies settings.
 ┌─────────────────────────┐
 │ [COMMAND A]             │   The message is displayed for one second and then the previous
 │ NOW UPDATE...           │   screen is displayed automatically.
 └─────────────────────────┘
        ↓
 ┌─────────────────────────┐
 │ [COMMAND LINK]          │
 │ COMMAND A          ↕    │
 └─────────────────────────┘
```

Note:

If you do not press the "SET" key, the command link is not changed. Make sure to press the "SET" key.

2. To associate the control command using commands:

> @SCC: Set command link
> @GCC: Get command link
> @STG: Set toggle operation
> @GTG: Get toggle operation
> @SUP: Set execution plane at starting up
> @GUP: Get execution plane at starting up

7.12.4 Command execution [COMMAND EXECUTION]

Although you can execute only COMMANDs A to E using the control command execution keys on the front panel, you can execute all COMMANDs A to I using this menu. You can specify command numbers and execute them without an association.

1. To execute control commands:

```
┌────────────────────────┐
│ MSD-804FD              │   Top
└────────────────────────┘
```
↓ SET key
```
┌────────────────────────┐
│ [FUNCTION SELECT]      │   ▲▼keys: Select "PRESET COMMAND".
│ PRESET COMMAND      ⬍  │
└────────────────────────┘
```
↓ SET key
```
┌────────────────────────┐
│ [PRESET COMMAND]       │   ▲▼keys: Select "COMMAND EXECUTION".
│ COMMAND EXECUTION   ⬍  │
└────────────────────────┘
```
↓ SET key
```
┌────────────────────────┐
│ [COMMAND EXECUTION]⬍   │   ▲▼keys: Select the command you want to execute
│ COMMAND A              │   (COMMAND A to I, COMMAND 1 to 32).*
└────────────────────────┘
```
↓ SET key: Executes the command.
```
┌────────────────────────┐
│ [COMMAND EXECUTION]⬍   │
│ COMMAND A              │
└────────────────────────┘
```
↓ ESC key: Returns to the previous screen.
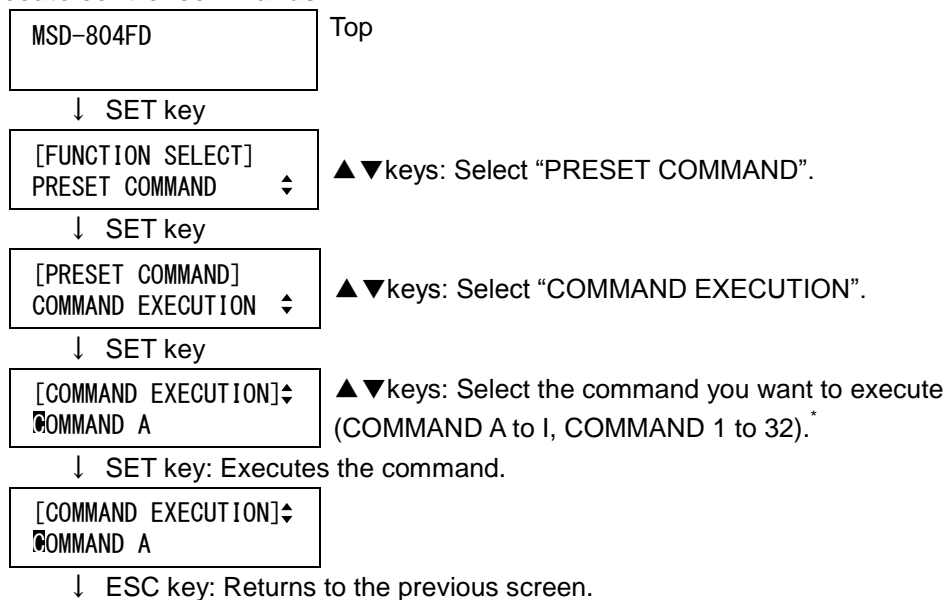
* Only executable commands are displayed.

2. To execute control commands using command:

@EXC: Execute control commands

7.12.5 Invalid time [INVALID TIME]

During control command execution, other operations from a port (any of front panel, RS-232C CH1, RS-232C CH2, LAN communication command, and LAN browser) that executes control commands will be invalid. Since the execution time of some control commands is short, you can set the waiting time from starting control command execution to receiving the next command. The longer time either of control command execution time or the time set in this menu will be applied as the invalid operation time. Use this menu to prevent repeated execution caused by pressing the control command execution key twice. Only operations from ports that execute control commands will be invalid; operations from other ports can be performed. For example, if you execute a control command from the front panel, you cannot perform all operations from the front panel until the control command execution time or time set in this menu passes, but you can perform operations from LAN communication command control. However, even during invalid operation time, for controlling power of display devices and switching inputs, you can control display devices' power and can then switch input only for different outputs, in order to operate several outputs successively.

· Invalid time: 0 ms. to 999999 ms.　[Default]: 0 ms.

1. To set the invalid time using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET COMMAND      ⬍
```
▲▼keys: Select "PRESET COMMAND".

↓ SET key

```
[PRESET COMMAND]
INVALID TIME        ⬍
```
▲▼keys: Select "INVALID TIME".

↓ SET key

```
[INVALID TIME]
0s000ms           ◄▲►
```
▲▼keys: Set the invalid time in seconds (0 to 999).

↓ ◄►keys

```
[INVALID TIME]
0s000ms           ◄▲►
```
▲▼keys: Set the invalid time in milliseconds (0 to 999).

↓ ESC key: Returns to the previous screen.
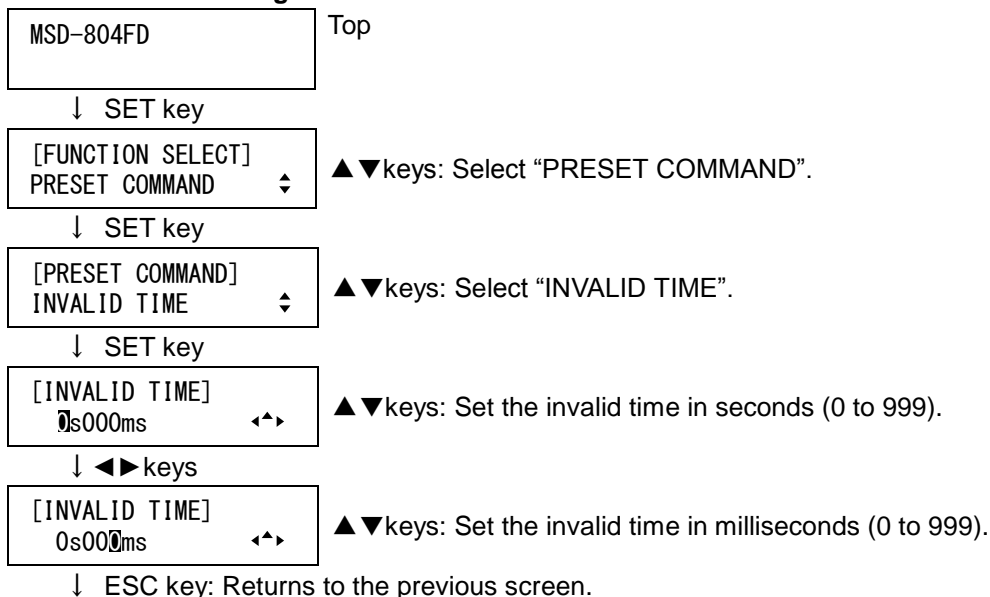
2. To set the invalid time using commands:

@SIT: Set ineffective time during control command
@GIT: Get ineffective time during control command

7.12.6 Initializing registered commands and associations [INITIALIZE]

You can initialize the following commands and associations:

- Control commands registered in "**7.12.1 Editing control commands [COMMAND EDIT]**"
- Reply commands registered in "**7.12.2 Reply commands [RECV COMMAND EDIT]**"
- Associations of control commands registered in "**7.12.3 Control command association [COMMAND LINK]**"

Use this menu to delete or set them from the first step again.

1. To initialize commands using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET COMMAND      ↕
```
▲▼keys: Select "PRESET COMMAND".

↓ SET key

```
[PRESET COMMAND]
INITIALIZE         ↕
```
▲▼keys: Select "INITIALIZE".

↓ SET key   ↑ ESC key: Cancels initializing and returns to the previous screen.

```
[PRESET INITIALIZE]↕
CMD 1
```
▲▼keys: Select the command or association you want to initialize.
(CMD1 to CMD 32, RCV 1 to RCV 32, or Association conditions[*])
For control commands (CMD x) and reply commands (RCV x), MEMO
is displayed at the right side.

↓ SET key: Displays the confirmation screen.   ↑ ESC key

```
[PRESET COMMAND1]
SURE? = NO         ↕
```
▲▼keys: Select "YES" or "NO".

↓ SET key: Initializes setting.

```
[PRESET COMMAND 1]
NOW INITIALIZATION..
```
Displays the message for 1 second before automatically returning to
the previous screen.

↓

```
[PRESET COMMAND]
INITIALIZE         ↕
```

*[Table 7.20] Association conditions of control commands

Execution condition	Function	Execution condition	Function
COMMAND A–PLANE A	Control command execution key	VIDEO:OUT2-IN1	Selecting video input channel of OUT2
COMMAND A–PLANE B		to	
to		VIDEO:OUT2-IN8	
COMMAND I–PLANE A		VIDEO:OUT2-OFF	
COMMAND I–PLANE B		AUDIO:OUT2-IN1	Selecting audio input channel of OUT2
POWER ON	Controlling power switch	to	
DISPLAY1 POWER ON	Controlling display device power of OUT1	AUDIO:OUT2-IN8	
DISPLAY1 POWER OFF		AUDIO:OUT2-OFF	
DISPLAY2 POWER ON	Controlling display device power of OUT2	VIDEO:OUT3-IN1	Selecting video input channel of OUT3
DISPLAY2 POWER OFF		to	
DISPLAY3 POWER ON	Controlling display device power of OUT3	VIDEO:OUT3-IN8	
DISPLAY3 POWER OFF		VIDEO:OUT3-OFF	
DISPLAY4 POWER ON	Controlling display device power of OUT4	AUDIO:OUT3-IN1	Selecting audio input channel of OUT3
DISPLAY4 POWER OFF		to	
VIDEO:OUT1-IN1	Selecting video input channel of OUT1	AUDIO:OUT3-IN8	
to		AUDIO:OUT3-OFF	
VIDEO:OUT1-IN8		VIDEO:OUT4-IN1	Selecting video input channel of OUT4
VIDEO:OUT1-OFF		to	
AUDIO:OUT1-IN1	Selecting audio input channel of OUT1	VIDEO:OUT4-IN8	
to		VIDEO:OUT4-OFF	
AUDIO:OUT1-IN8		AUDIO:OUT4-IN1	Selecting audio input channel of OUT4
AUDIO:OUT1-OFF		to	
		AUDIO:OUT4-IN8	
		AUDIO:OUT4-OFF	

2. To initialize commands using commands:

  @DEC: Initialize registered command and association

7.12.7 Command execution key: Lighting condition [COMMAND TALLY]

You can set the lighting condition of COMMANDs A to E on the front panel and COMMANDs A to I of Tally output separately.

{ ·Lights if a control command is registered: REGISTERED [Default][*1]
·Lights while a control command is executed[*1][*2] : EXECUTION }

[*1] There are two planes (PLANE A and B) for each execution condition of COMMANDs A to I. If you register control commands for both planes, the control commands are executed alternatively every time you press the command key as follows.

[Table 7.21] Lighting conditions of control command execution keys

Lighting condition	If you register a command only for one plane	If you register commands for both two planes
REGISTERED	Lights if a control command is registered	Lights if PLANE A will be executed at the next press; blinks if PLANE B will be executed at the next press.
EXECUTION	Lights while a control command is executed	Lights if PLANE A will be executed at the next press; turned off if PLANE B will be executed at the next press.

[*2] If execution time is 500 ms. or shorter, it lights for only 500 ms. It can be set to blinking in "**7.12.8**" that follows.

1. To set the lighting condition of command keys using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET COMMAND    ◆
```
▲▼ keys: Select "PRESET COMMAND".

↓ SET key

```
[PRESET COMMAND]
COMMAND TALLY    ◆
```
▲▼ keys: Select "COMMAND TALLY".

↓ SET key

```
[COMMAND A] LINK:ON
REGISTERED    ◆◆▸
```
▲▼ keys: Select "OFF" or "ON" for "LINK".*

↓ ◀▶ keys

```
[COMMAND A] LINK:ON
REGISTERED    ◆◆▸
```
▲▼ keys: Select the lighting condition of COMMAND A (REGISTERED, EXECUTION).

↓ ◀▶ keys

```
[COMMAND B] LINK:ON
REGISTERED    ◆◆▸
```
▲▼ keys: Select the lighting condition of COMMAND B (REGISTERED, EXECUTION).

⋮ ◀▶ keys

```
[COMMAND E] LINK:ON
REGISTERED    ◆◆▸
```
▲▼ keys: Select the lighting condition of COMMAND B (REGISTERED, EXECUTION).

↓ ESC key: Returns to the previous screen

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* If you set "LINK" to "ON", you can change all registered conditions at the same time.

2. To set the lighting condition of command keys using commands:

      @STL: Set command ley lighting

      @GTL: Get command ley lighting

7.12.8 Flash time (Control command keys) [FLASH TIME]

You can set the flash time (blink duration) of command execution keys and power switch of display devices during command execution:

You can set the time for COMMANDs A to E and DISPLAY POWER separately.

    ·Blinks while a control command is being executed: EXECUTION

    ·Not blink: OFF

    ·Blinks for the specified time*: 1 to 1000 sec.

        [Defaults]: For COMMANDs A to E: OFF

                For DISPLAY POWER: EXECUTION

* If the command execution has not been completed even after the set time passes, it continues to blink until the execution is completed.

1. To set the flash time of command keys and display power keys using menu:

MSD-804FD	Top

    ↓ SET key

[FUNCTION SELECT] PRESET COMMAND ↕	▲▼keys: Select "PRESET COMMAND".

    ↓ SET key

[PRESET COMMAND] FLASH TIME ↕	▲▼keys: Select "FLASH TIME".

    ↓ SET key

[COMMAND A] OFF ◄↕►	▲▼keys: Set the flash time of COMMAND A (EXECUTION, OFF, or 1 sec. to 1000 sec.).

    ↓ ▲▼keys

[COMMAND B] OFF ◄↕►	▲▼keys: Set the flash time of COMMAND B (EXECUTION, OFF, or 1 sec. to 1000 sec.).

    ⋮   ▲▼keys

[DISPLAY4 POWER] EXCUTION ◄▴►	▲▼keys: Set the flash time of DISPLAY POWER 4 (EXECUTION, OFF, or 1 sec. to 1000 sec.).

    ↓ ESC key: Returns to the previous screen.

2. To set the flash time of command keys and display power keys using menu:

      @STF: Set flash time (Command keys and DISPLAY POWER keys)

      @GTF: Get flash time (Command keys and DISPLAY POWER keys)

7.13 Preset memory

7.13.1 Loading cross point [LOAD CROSS POINT]

You can load the video and audio channel settings that have been saved in the cross point memory.

1. To load the cross point using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET MEMORY     ↕
```
▲▼keys: Select "PRESET MEMORY".

↓ SET key

```
[PRESET MEMORY]
LOAD CROSS POINT  ↕
```
▲▼keys: Select "LOAD CROSS POINT".

↓ SET key   ↑ ESC key: Cancels loading and returns to the previous screen.

```
[LOAD CROSS POINT]
No. 1             ↕
```
▲▼keys: Select the desired memory number (1 to 8).[*]
Memory name is displayed on the right of the memory number.

↓ SET key: Loads settings.

```
[CROSS POINT 1]
NOW LOADING...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[PRESET MEMORY]
LOAD CROSS POINT  ↕
```

2. To load the cross point using commands:

@RCM: Load video and audio channel setting from cross point memory

@RCV: Load video channel setting from cross point memory

@RCA: Load audio channel setting from cross point memory

7.13.2 Saving cross point [SAVE CROSS POINT]

You can save the current settings of video and audio channels into the cross point memory.

Note:

Do not turn off the MSD while "NOW SAVING..." is displayed. Otherwise, setting data may be lost.

1. To save the cross point using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET MEMORY      ▲▼
```
▲▼keys: Select "PRESET MEMORY".

↓ SET key

```
[PRESET MEMORY]
SAVE CROSS POINT   ▲▼
```
▲▼keys: Select "SAVE CROSS POINT".

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
[SAVE CROSS POINT]
No. ▌1             ◄▲▼►
```
▲▼keys: Select the desired memory number (1 to 8).

↓ ◄►keys

```
[SAVE CROSS POINT]
No. 1  ▌            ◄▲▼►
```
▲▼keys: Set the cross point memory name (20 to 7D of ASCII code).
◄►keys: Moves the cursor to the next character (Up to 10 characters).

↓ ◄►keys

```
[SAVE] EDIT:▌CONTINUE
No. 1              ◄▲▼►
```
▲▼keys: Select the desired write method (CONTINUE, DELETE).*

↓ SET key: Saves settings.

```
[CROSS POINT 1]
NOW SAVING...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[PRESET MEMORY]
SAVE CROSS POINT   ▲▼
```

* If you select a memory number that is set to not control channels, you can select the write method.

 "CONTINUE": The settings will be kept.

 "DELETE": The settings will be overwritten.

 (For settings to not control channels, see "**7.12.3 Control command association [COMMAND LINK]**")

```
┌─────────────────────────┐                    ┌─────────────────────────┐
│ OUT 1 = Input channel 1 │                    │ OUT 1 = Input channel 1 │
│ OUT 2 = Input channel 2 │                    │ OUT 2 = Not controlled  │
│ OUT 3 = Input channel 3 │                    │ OUT 3 = Input channel 3 │
│ OUT 4 = Input channel 4 │                    │ OUT 4 = Not controlled  │
└─────────────────────────┘                    └─────────────────────────┘
Current input channel settings          Settings of cross point memory 1 with "CONTINUE" selected

                              ────────►
                               Save
┌─────────────────────────┐                    ┌─────────────────────────┐
│ OUT 1 = Input channel 3 │                    │ OUT 1 = Input channel 1 │
│ OUT 2 = Not controlled  │                    │ OUT 2 = Input channel 2 │
│ OUT 3 = Input channel 1 │                    │ OUT 3 = Input channel 3 │
│ OUT 4 = Not controlled  │                    │ OUT 4 = Input channel 4 │
└─────────────────────────┘                    └─────────────────────────┘
Settings of current cross point memory 1    Settings of cross point memory 1 with "DELETE" selected
```

[Fig. 7.40] Saving cross point

2. To save the cross point using commands:

@SCM: Overwrite video and audio channel setting in cross point memory

@SCV: Overwrite video channel setting in cross point memory

@SCA: Overwrite audio channel setting in cross point memory

@SEM: Save video and audio channel setting in cross point memory

@SEV: Save video channel setting in cross point memory

@SEA: Save audio channel setting in cross point memory

7.13.3 Editing cross point [EDIT CROSS POINT]

You can edit the setting of cross point memory.

Note:

Do not turn off the MSD while "NOW SAVING..." is displayed. Otherwise, setting data may be lost.

1. To edit the cross point using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET MEMORY        ↕
```
▲▼keys: Select "PRESET MEMORY".

↓ SET key

```
[PRESET MEMORY]
EDIT CROSS POINT     ↕
```
▲▼keys: Select "EDIT CROSS POINT".

↓ SET key

```
[EDIT CROSS POINT]
No. 1                ↕
```
▲▼keys: Select the desired memory number (1 to 8).

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
[CROSS POINT 1]   ↔↕►
OUT:1    V:--- A:---
```
▲▼keys: Select output (OUT1 to OUT4).

↓ ◄►keys

```
[CROSS POINT 1]   ↔↕►
OUT:1    V:■-- A:---
```
▲▼keys: Select the desired video input channel (---, 1 to 8, or OFF).*

↓ ◄►keys

```
[CROSS POINT 1]   ↔↕►
OUT:1    V:--- A:■--
```
▲▼keys: Select the desired audio input channel (---, 1 to 8, or OFF).*

↓ ◄►keys

```
[CROSS POINT 1]   ↔↕►
NAME:■
```
▲▼keys: Set the memory name (20 to 7D of ASCII codes).
◄►keys: Moves the cursor to the next character (Up to 10 characters).

↓ SET key: Displays confirmation screen.   ↑ ESC key

```
[CROSS POINT 1]
SAVE? = NO           ↕
```
▲▼keys: Select "Yes" or "No".

↓ Select "YES" and press the "SET" key: Saves settings

Select "NO" and press the "SET" key: Not save settings and returns to the former display

```
[CROSS POINT 1]
NOW SAVING...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[PRESET MEMORY]
EDIT CROSS POINT     ↕
```

* "---" is displayed for settings that do not control channels. Outputs that do not control channels when cross point memory is loaded do not switch channels.

All cross point memories are set to not to control channel by factory default.
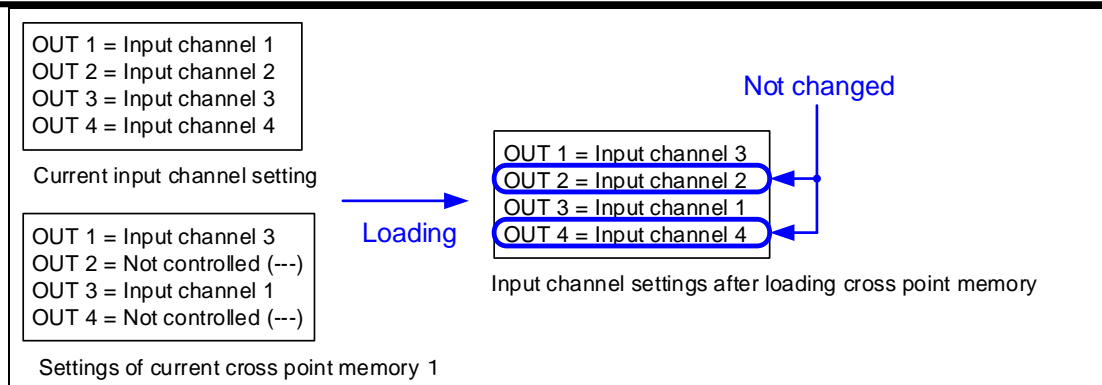
[Fig.7.41] Loading edited cross point memory

2. To edit the cross point using commands:

@ECM: Edit video and audio channel setting in cross point memory

@ECV: Edit video channel setting in cross point memory

@ECA: Edit audio channel setting in cross point memory

@GCM: Get video and audio channel setting in cross point memory

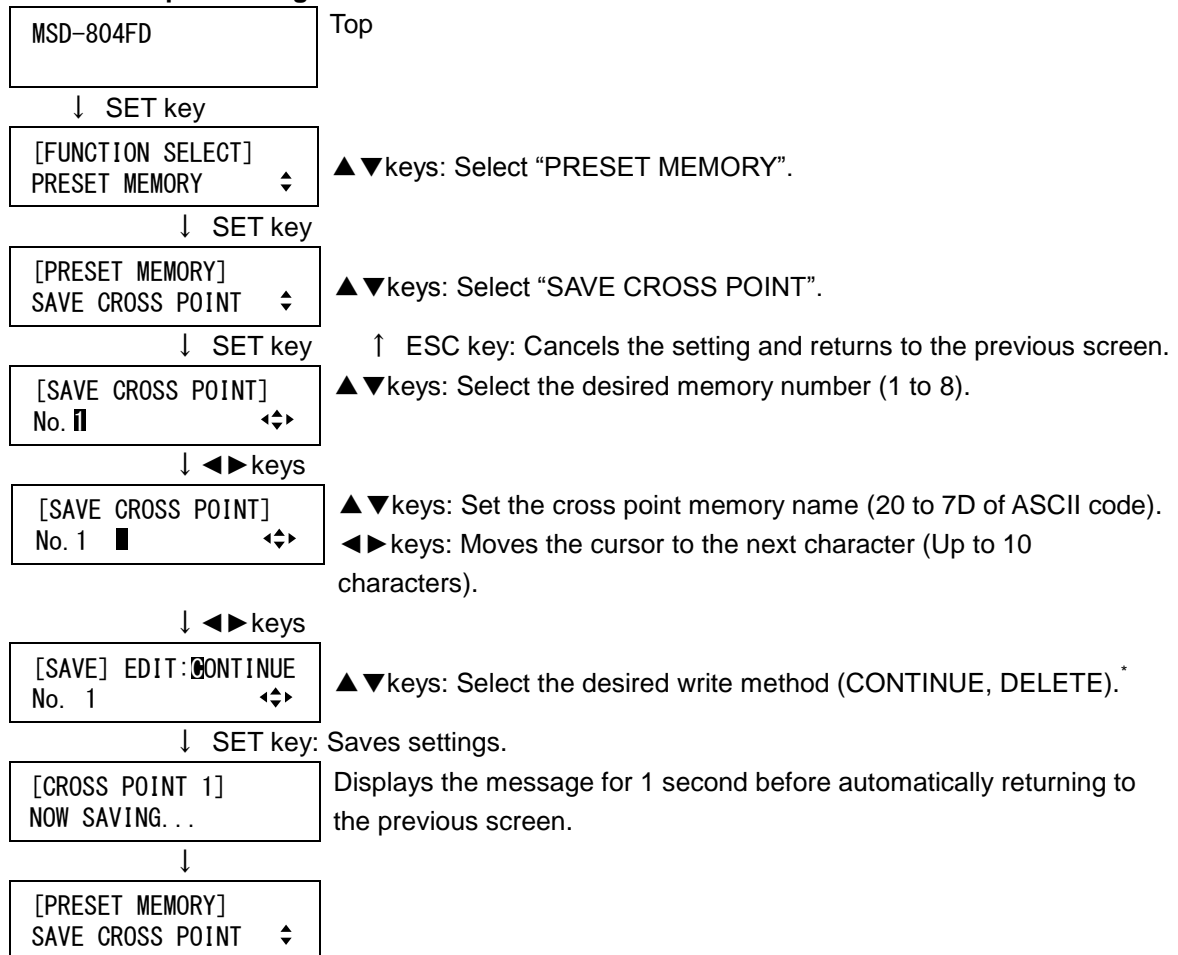@GCV: Get video channel setting in cross point memory

@GCA: Get audio channel setting in cross point memory

7.13.4 **Loading all settings [LOAD ALL SETTING]**

Once you perform this operation, all settings related to video and audio I/O except for some environmental settings will be updated. (For settings to be loaded, see the next page) Operate this menu with great attention. This menu is not displayed if setting is not saved in memory. Since no setting is saved in any memories by factory default, this menu is not displayed.

1. To load the settings saved in the preset memory using menu:

```
┌─────────────────────────┐
│ MSD-804FD               │   Top
│                         │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼keys: Select "PRESET MEMORY".
│ PRESET MEMORY        ↕  │
└─────────────────────────┘
        ↓ SET key
┌─────────────────────────┐
│ [PRESET MEMORY]         │   ▲▼keys: Select "LOAD ALL SETTING".
│ LOAD ALL SETTING     ↕  │
└─────────────────────────┘
      ↓ SET key      ↑ ESC key: Cancels loading and returns to the previous screen.
┌─────────────────────────┐   ▲▼keys: Select the desired memory number (1 to 8).*
│ [LOAD ALL SETTING]      │
│ No. 1                ↕  │   Memory name is displayed on the right of the memory number.
└─────────────────────────┘
      ↓ SET key: Displays the confirmation screen.      ↑ ESC key
┌─────────────────────────┐
│ [PRESET MEMORY 1]       │   ▲▼keys: Select "YES" or "NO".
│ LOAD? = NO           ↕  │
└─────────────────────────┘
      ↓ To load the setting: Select "YES" and press the "SET" key.
                To return to the menu without any loading: Select "NO" and press the "SET" key.
┌─────────────────────────┐   Displays the message for 1 second before automatically returning to
│ [PRESET MEMORY 1]       │
│ NOW LOADING...          │   the previous screen.
└─────────────────────────┘
        ↓
┌─────────────────────────┐
│ [PRESET MEMORY]         │
│ LOAD                 ↕  │
└─────────────────────────┘
```

 * You cannot select a preset memory number in which settings are not saved.

2. To load the settings saved in the preset memory using command:

   @RPM: Load all settings from preset memory

7.13.5 Saving all settings [SAVE ALL SETTING]

You can save up to 8 settings of the following settings:

6.1 Selecting input channels

7.3 Setting Position, Size, and Masking
  7.3.1 Output resolution [RESOLUTION]
  7.3.2 Aspect ratio control of output video [MONITOR ASPECT]
  7.3.3 Aspect ratio control of input video [INPUT ASPECT]
  7.3.4 Aspect ratio control [ASPECT PROCESS]
  7.3.5 Overscan [INPUT OVER SCAN]
  7.3.6 Input position [INPUT POSITION]
  7.3.7 Input size [INPUT SIZE]
  7.3.8 Input masking [INPUT MASKING]
  7.3.10 Output position [OUTPUT POSITION]
  7.3.11 Output size [OUTPUT SIZE]
  7.3.12 Output masking [OUTPUT MASKING]
  7.3.14 Background color [BACKGROUND COLOR]
  7.3.15 Test pattern [TEST PATTERN]
  7.3.16 Multi display mode [MULTI DISPLAY]

7.4 Video Correction
  7.4.1 Input brightness [INPUT BRIGHTNESS]
  7.4.2 Input contrast [INPUT CONTRAST]
  7.4.3 Hue [INPUT HUE]
  7.4.4 Saturation [INPUT SATURATION]
  7.4.5 Black level [INPUT SETUP LEVEL]
  7.4.7 Output brightness [OUTPUT BRIGHTNESS]
  7.4.8 Output contrast [OUTPUT CONTRAST]

7.5 Input Settings
  7.5.1 No-signal input monitoring [INPUT VIDEO DETECT]
  7.5.2 HDCP input enabled/disabled [HDCP INPUT ENABLE]
  7.5.3 Input equalizer [INPUT EQUALIZER]
  7.5.4 Automatic detection of input video interruption [INPUT OFF CHECK]

7.6 Input Timing Settings
  7.6.2 Horizontal start position [H START]
  7.6.3 Horizontal display period [H DISPLAY]
  7.6.4 Vertical start position [V START]
  7.6.5 Vertical display period [V DISPLAY]

7.7 Output Settings
  7.7.1 Output equalizer [OUTPUT EQUALIZER]
  7.7.2 Output mode [OUTPUT MODE]
  7.7.3 Synchronous signal output with no input video [SYNC OUTPUT]
  7.7.4 Output video with no input video
  7.7.5 Window transition effect [VIDEO SWITCHING]
  7.7.6 Window transition speed [SWITCHING SPEED]
  7.7.7 Wipe color [WIPE COLOR]
  7.7.8 Video output connector [OUTPUT CONNECTOR]
  7.7.9 HDCP output [HDCP OUTPUT MODE]
  7.7.9 HDCP output [HDCP OUTPUT MODE]
  7.7.10 The number of HDCP retries [HDCP ERROR RETRY]
  7.7.11 Deep Color [DEEP COLOR OUTPUT]
  7.7.12 CEC (Consumer Electronics Control) [CEC CONNECTION]
  7.7.14 Frame lock mode [FRAME LOCK]

7.8 Audio settings
  7.8.1 Audio output level [OUTPUT LEVEL]
  7.8.2 Mute [OUTPUT MUTE]
  7.8.3 Audio input selection [AUDIO INPUT SELECT]
  7.8.4 Audio input level [INPUT OFFSET]
  7.8.5 Output lip sync [OUTPUT LIP SYNC]
  7.8.6 Input lip sync [INPUT LIP SYNC]
  7.8.7 Sampling frequency of analog audio input [SAMPLING FREQUENCY]
  7.8.8 Audio output connector [OUTPUT CONNECTOR]
  7.8.9 Digital audio output connector [DIGITAL OUTPUT]
  7.8.10 Multi-channel audio output [MULTI AUDIO]
  7.8.11 Test tones [TEST TONE]

7.9 EDID (Extended Display Identification Data)
  7.9.1 EDID setting [EDID DATA]
  7.9.2 PC resolutions [PC RESOLUTION]
  7.9.3 Input resolution for AV devices [AV RESOLUTION]
  7.9.4 Deep Color [DEEP COLOR INPUT]
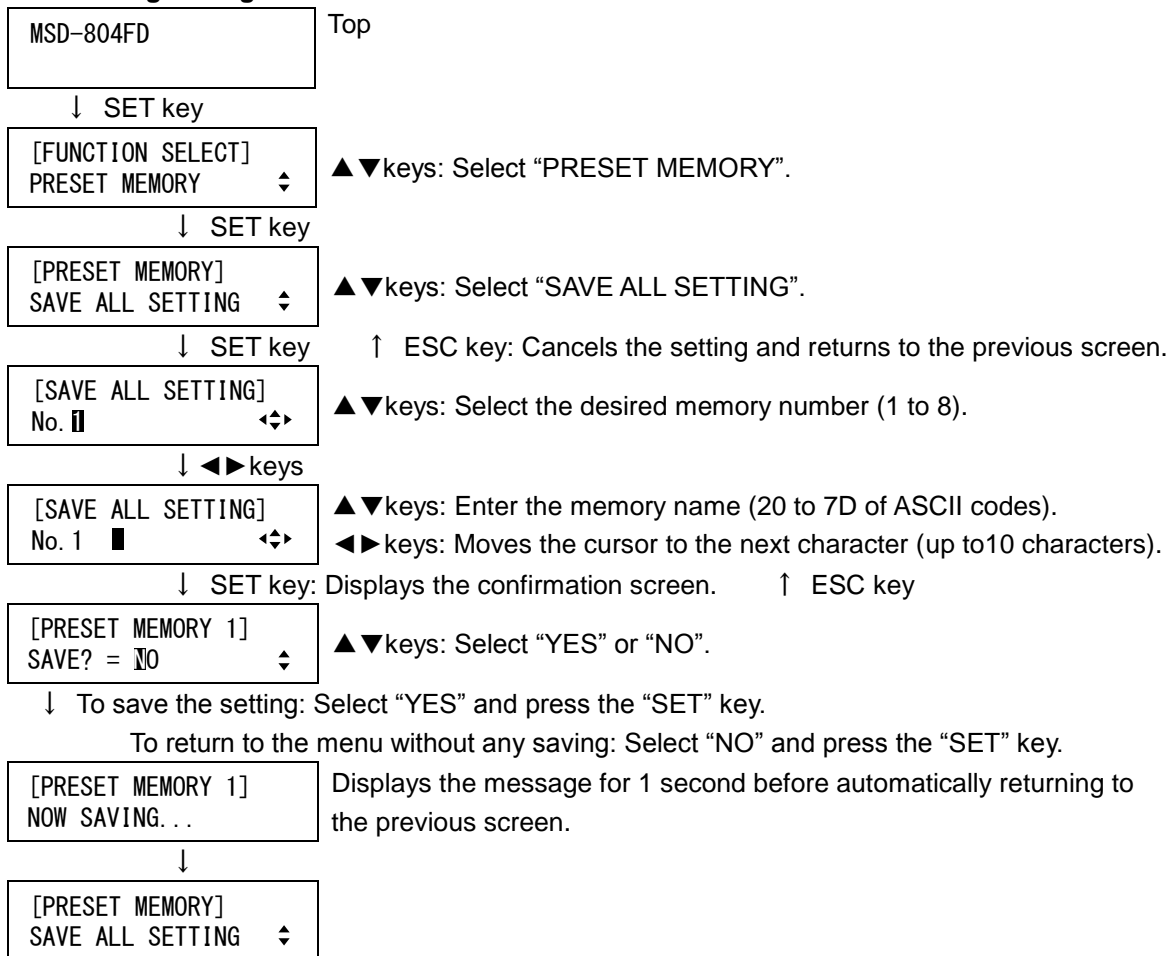 7.9.5 Audio format [AUDIO FORMAT]
  7.9.6 Speaker configuration

Note:

Do not turn off the MSD while "NOW SAVING..." is displayed. Otherwise, setting data may be lost.

1. To save all settings using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET MEMORY        ↕
```
▲▼keys: Select "PRESET MEMORY".

↓ SET key

```
[PRESET MEMORY]
SAVE ALL SETTING     ↕
```
▲▼keys: Select "SAVE ALL SETTING".

↓ SET key   ↑ ESC key: Cancels the setting and returns to the previous screen.

```
[SAVE ALL SETTING]
No. 1              ⬌↕
```
▲▼keys: Select the desired memory number (1 to 8).

↓ ◄►keys

```
[SAVE ALL SETTING]
No. 1    █         ⬌↕
```
▲▼keys: Enter the memory name (20 to 7D of ASCII codes).
◄►keys: Moves the cursor to the next character (up to10 characters).

↓ SET key: Displays the confirmation screen.   ↑ ESC key

```
[PRESET MEMORY 1]
SAVE? = NO           ↕
```
▲▼keys: Select "YES" or "NO".

↓ To save the setting: Select "YES" and press the "SET" key.

To return to the menu without any saving: Select "NO" and press the "SET" key.

```
[PRESET MEMORY 1]
NOW SAVING...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[PRESET MEMORY]
SAVE ALL SETTING     ↕
```

2. To save all settings using command:

@SPM: Save all settings in preset memory

7.13.6 Startup settings [STARTUP]

・Cross point memories: CROSS POINT1 to 8
　　Starts up with the channel settings saved in the selected cross point memory. For settings other than channel settings, starts up with the settings of the last MSD power off.

・CHANNEL OFF
　　Channel setting will be OFF. For settings other than channel setting, starts up with the settings of the last MSD power off.

・LAST CHANNEL [Default]
　　Starts up with the settings of the last MSD power off.

・Preset memory: PRESET MEMORY 1 to 8
　　Starts up with the settings saved in the preset memory. For settings that are not saved in the preset memory, it starts up with the settings of the last MSD power off. (For settings that can be saved in the preset memory, see "**7.13.5 Saving all settings [SAVE ALL SETTING]**".)

1. To set the startup setting using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
PRESET MEMORY        ⬍
```
▲▼keys: Select "PRESET MEMORY".

↓ SET key

```
[PRESET MEMORY]
STARTUP              ⬍
```
▲▼keys: Select "STARTUP".

↓ SET key

```
[STARTUP]
▌AST CHANNEL         ⬍
```
▲▼keys: Select the setting for startup (CROSS POINT 1 to 8, CHANNEL OFF, LAST CHANNEL, PRESET MEMORY 1 to 8). *

↓ ESC key: Returns to the previous screen.
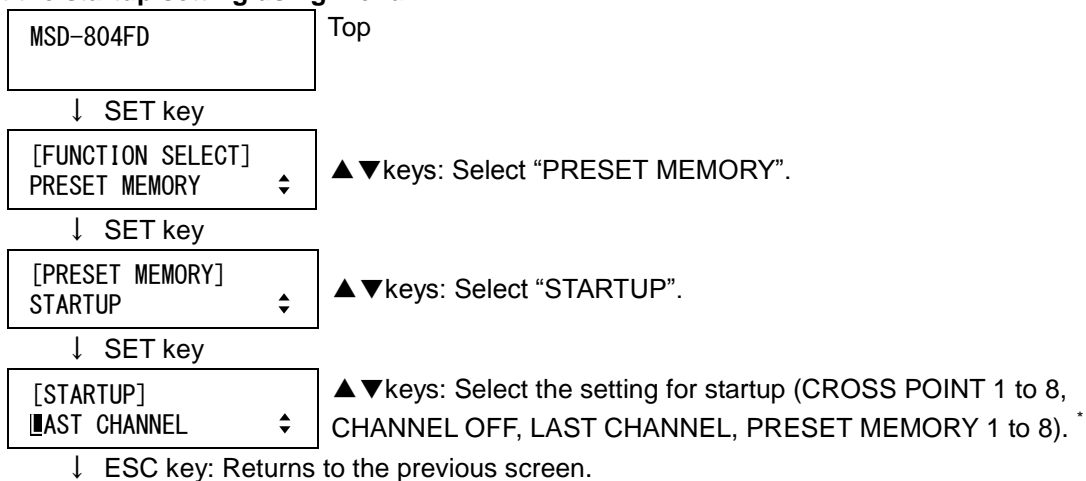
* You cannot select a preset memory whose settings are not saved. Nothing is saved in all preset memories by factory default.

2. To set the startup setting using commands:
　　　@SMU: Set startup status
　　　@GMU: Get startup status

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7.14 Bitmap

The MSD outputs an bitmap for approximately 5 seconds after it is turned on by setting "**7.14.2 Bitmap output [BITMAP OUTPUT]**" to "ON", selecting a video input set in "**7.14.6 Input bitmap channel assignment [CHANNEL ASSIGN]**", or setting "**7.14.7 Bitmap output at startup [POWER ON BITMAP]**" to "ON". IDK's logo is displayed by factory default, but you can change it to the bitmap you want to display. You can register up to four images, and you can capture input videos to register it as bitmap images.

[Fig.7.42] Default bitmap image

7.14.1 Bitmap transfer

To send bitmap files to the MSD, you can use browser, RS-232C communication, and LAN communication. The MSD supports DIB (Device Independent Bitmap) with a header generally used for Windows, and those files have to meet the following requirements:
・File header:
   Having "BITMAPFILEHEADER"
・Information header:
   Having "BITMAPCOREHEADER" (for OS/2) or "BITMAPINFOHEADER" (for Windows)
   ("BITMAPV4HEADER" or "BITMAPV5HEADER" are not supported.)
・The number of colors:
   One of the following: 2 colors (monochrome, 1 bit), 16 colors (4 bits), 256 colors (8 bits), 16.77 million colors (TRUE COLOR, 24 bits)
・Resolution:
   The maximum resolution: [Horizontal resolution x Vertical resolution x The number of bytes per pixel] = 8,388,608 bytes or less. If you register several bitmaps, the total bytes of all bitmaps should be 8,388,608 bytes or less. (Aspect ratio does not matter as long as it is within the maximum resolution).
   Bytes per pixel: 1 byte per pixel for 2 colors (monochrome, 1 bit), 16 colors (4 bits), and 256 colors (8bits); 3 bytes per pixel for 16.77 million colors (TRUE COLOR, 24 bits).
   Bitmaps can be enlarged but cannot be reduced. The larger the resolution is, the longer the output time will be, and it may take a maximum of approximately six seconds to output a bitmap. Register a bitmap having smaller resolution than that of the display device.
・Compression format:
   One of the following: No compression (BI_RGB), 8 bit-run-length compression (BI_RLE8), 4 bit-run-length compression (BI_RLE4)

[Transferring bitmap file via browser]

*IDK evaluated the operation on Microsoft Internet Explorer 6.0, 7.0 and 8.0 for Windows. It may not operate correctly on other versions or on other browsers.

Open the WEB browser on a PC using the same LAN and enter the IP address of the MSD followed by "/bitmap.html" to open the window that is for sending bitmap files.

・When "80" is set for port number of browser control port:

　http://192.168.1.199/bitmap.html

・When a number other than "80" (5000 to 5999) is set for port number of browser control port:

　(For example, the port number is 5000)

　http://192.168.1.199:5000/bitmap.html
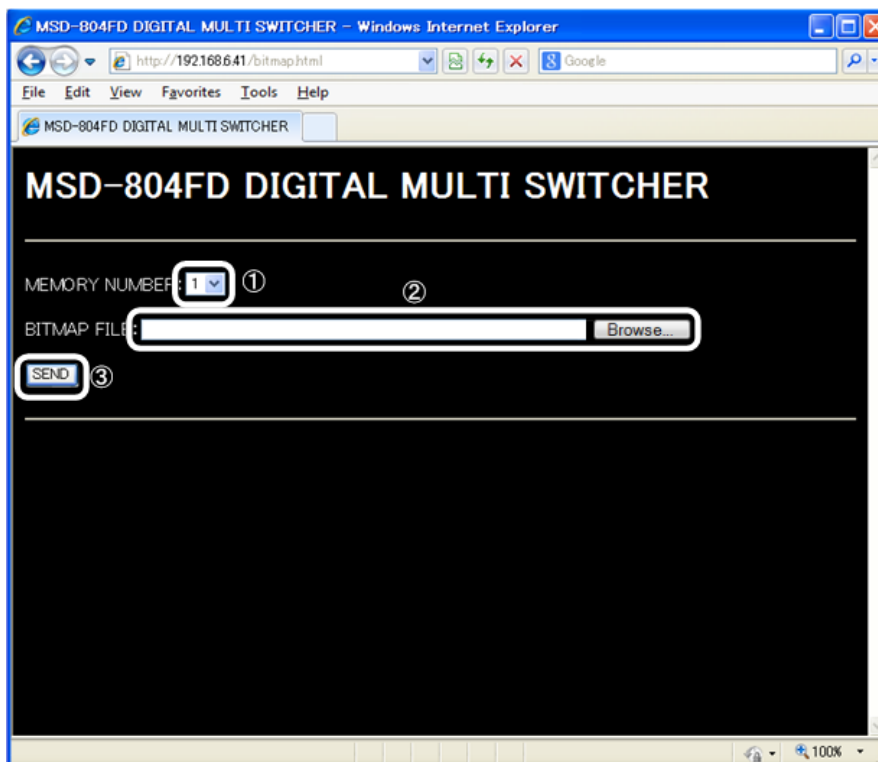
1. (Memory Number is displayed only if the bitmap area is divided.) Select the number you want to register.
2. Click "Browse" to display the file selection window and select the desired bitmap file.
3. Click "SEND" to send the bitmap file to the MSD.

[Fig. 7.43] Sending a bitmap file from browser

When bitmap file is sent correctly, the message below is displayed on the VFD screen and the bitmap file is being saved. Do not turn off the MSD while the message is displayed.

```
BITMAP SAVE NOW
PLEASE WAIT
```

If a bitmap file is not valid, one of the following error messages will be displayed.

FILE NAME INVALID: The file name is not valid.

FILE DATA INVALID: The MSD does not support the file.

FILE DATA SIZE OVER: Exceeds the maximum resolution.

MEMORY ALLOCATE ERROR: Enough memory to save the bitmap file temporarily could not be allocated. You may solve this error by rebooting the MSD and sending the bitmap file again.
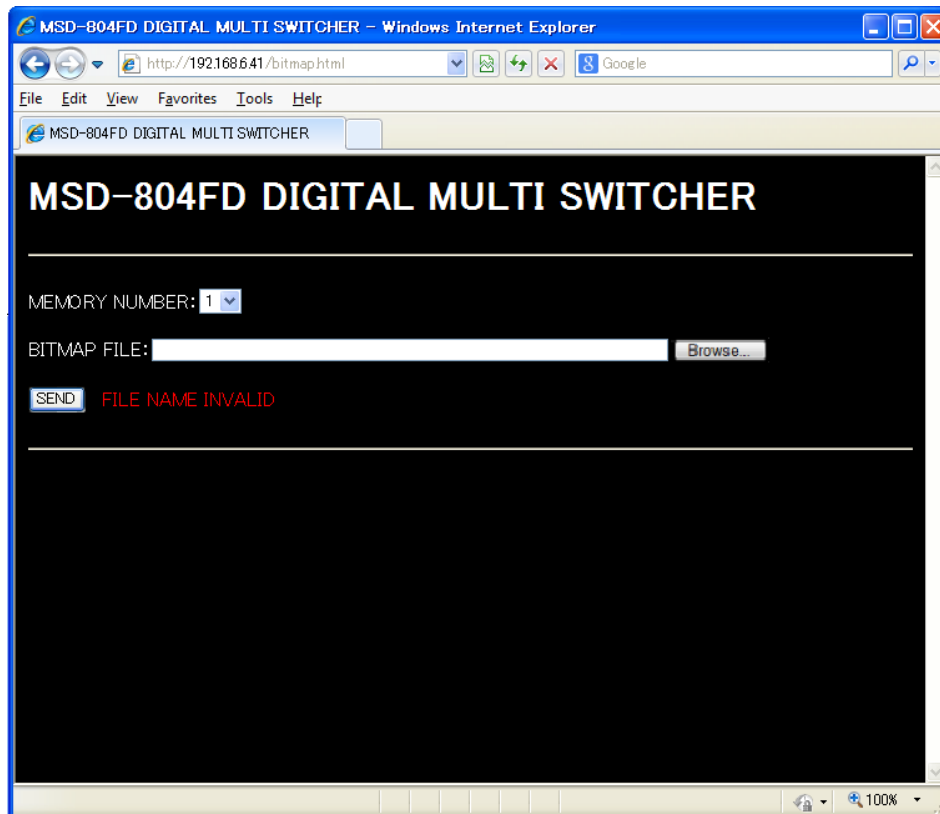
[Fig. 7.44] Bitmap send error

Note:

The MSD has an approximately 900,000-byte memory to save data temporarily after all bitmap data is received. However, if bitmap data whose size is larger than 900,000 is sent, receiving and writing data are performed simultaneously, and the browser sends a time-out status. As a result, the writing operation may fail.

7.14.2 Bitmap output [BITMAP OUTPUT]

For each output (common to OUTA and OUTB)

　　·To output the normal image: OFF　[Default]
　　·To output a bitmap image: ON

1. To set bitmap output using menu:

```
┌─────────────────────┐   Top
│ MSD-804FD           │
└─────────────────────┘
```
　　　　↓ SET key
```
┌─────────────────────┐
│ [FUNCTION SELECT]   │ ▲▼keys: Select "BITMAP".
│ BITMAP           ↕  │
└─────────────────────┘
```
　　　　↓ SET key
```
┌─────────────────────┐
│ [BITMAP]            │ ▲▼keys: Select "BITMAP OUTPUT".
│ BITMAP OUTPUT    ↕  │
└─────────────────────┘
```
　　　　↓ SET key
```
┌─────────────────────┐
│ [OUT1 BITMAP OUTPUT]│ ▲▼keys: Select "OFF" or "ON". *
│ OFF              ⬌↕ │ ◄►keys: Select the desired output (OUT1 to OUT4).
└─────────────────────┘
```
　　　↓ ESC key: Returns to the previous screen.
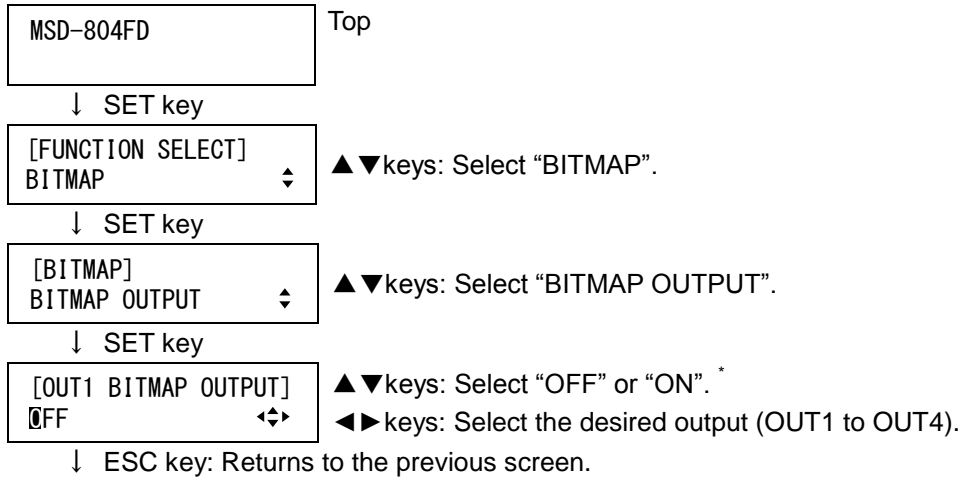
* If several bitmaps are registered, select the bitmap number you want to output.

2. To set bitmap output using commands:
　　　@SBM: Set bitmap output
　　　@GBM: Get bitmap output

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7.14.3 Background color [BACKGROUND COLOR]

You can select the background color from approx. 16.7 million color combinations of red, green, and blue.

·BACKGROUND COLOR (R): 0 to 255   [Default]: 255
·BACKGROUND COLOR (G): 0 to 255   [Default]: 255
·BACKGROUND COLOR (B): 0 to 255   [Default]: 255

1. To set background color using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
BITMAP            ▲▼
```
▲▼keys: Select "BITMAP".

↓ SET key

```
[BITMAP]
BACKGROUND COLOR  ▲▼
```
▲▼keys: Select "BACKGROUND COLOR".

↓ SET key

```
[OUT1 COLOR]LINK:ON
1 R:255 G:255 B:255◄▼►
```
▲▼keys: Set "LINK" of R&G&B to "OFF" or "ON". [*1]

↓ ◄►keys

```
[OUT1 COLOR]LINK:ON
1 R:255 G:255 B:255◄▼►
```
▲▼keys: Select the desired bitmap number (1 to 4). [*2]

↓ ◄►keys

```
[OUT1 COLOR]LINK:ON
1 R:255 G:255 B:255◄▼►
```
▲▼keys: Set the background color (Red) for OUT1 (0 to 255).

↓ ◄►keys

```
[OUT1 COLOR]LINK:OFF
1 R:255 G:255 B:255◄▼►
```
▲▼keys: Set the background color (Green) for OUT1 (0 to 255). [*3]

↓ ◄►keys

```
[OUT1 COLOR]LINK:OFF
1 R:255 G:255 B:255◄▼►
```
▲▼keys: Set the background color (Blue) for OUT1 (0 to 255). [*3]

↓ ESC key: Returns to the previous screen.

[*1] If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) are also changed according to the setting of the Red (R). For example, if you increase Red (R) +2, Green (G) and Blue (B) are also increased (+2). If one of these three colors reaches the limiting value, it cannot be changed any further.

[*2] This is displayed only if you register several bitmaps. Select the bitmap number you want to set.

[*3] Only if you set "LINK" to "OFF", you can set the background color for Green and Blue individually.

2. To set background color using commands:

@SBB: Set background color
@GBB: Get background color

7. 14. 4 Aspect ratio [ASPECT]

For each output/bitmap

- ·AUTO [Default]
- ·FULL
- ·THROUGH

Bitmap (1024x768)

["AUTO"]

Output screen (1920x1080)

Aspect ratio is kept, and the image is displayed on the whole screen vertically.

["THROUGH"]

Output screen (1920x1080)

If the image is output as it is, it becomes smaller against the output screen.

[FULL]

Output screen (1920x1080)

Aspect ratio is not kept, and the image is displayed on the whole screen.
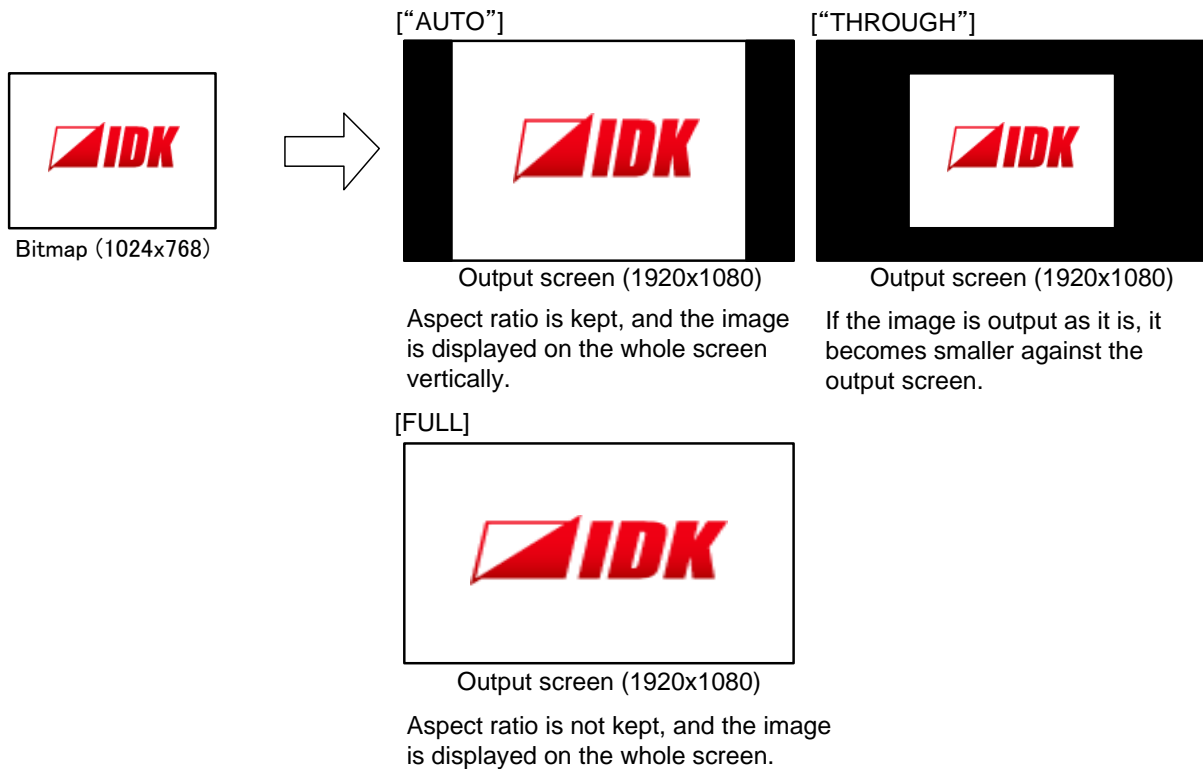
[Fig. 7.45] Setting aspect ratio

Note:

Bitmaps can be enlarged but cannot be reduced. If you select "AUTO", the aspect ratio is kept. However, if either of horizontal or vertical is enlarged and the other is reduced, the aspect ratio cannot be kept. In such a case, the image is displayed using "THROUGH" automatically to keep the aspect ratio.

1. To set bitmap aspect using menu:

```
┌──────────────────────┐
│ MSD-804FD            │  Top
│                      │
└──────────────────────┘
```
↓ SET key

```
┌──────────────────────┐
│ [FUNCTION SELECT]    │
│ BITMAP           ⬍   │
└──────────────────────┘
```
▲▼keys: Select "BITMAP".

↓ SET key

```
┌──────────────────────┐
│ [BITMAP]             │
│ ASPECT           ⬍   │
└──────────────────────┘
```
▲▼keys: Select "ASPECT".

↓ SET key

```
┌──────────────────────┐
│ [OUT1 ASPECT]        │
│ No. 1 AUTO       ⬌⬍  │
└──────────────────────┘
```
▲▼keys: Select the desired bitmap number. (1 to 4) [*]

↓ ◄►keys

```
┌──────────────────────┐
│ [OUT1 ASPECT]        │
│ No. 1 AUTO       ⬌⬍  │
└──────────────────────┘
```
▲▼keys: Select the desired aspect ratio for OUT1. (AUTO, FULL, THROUGH)
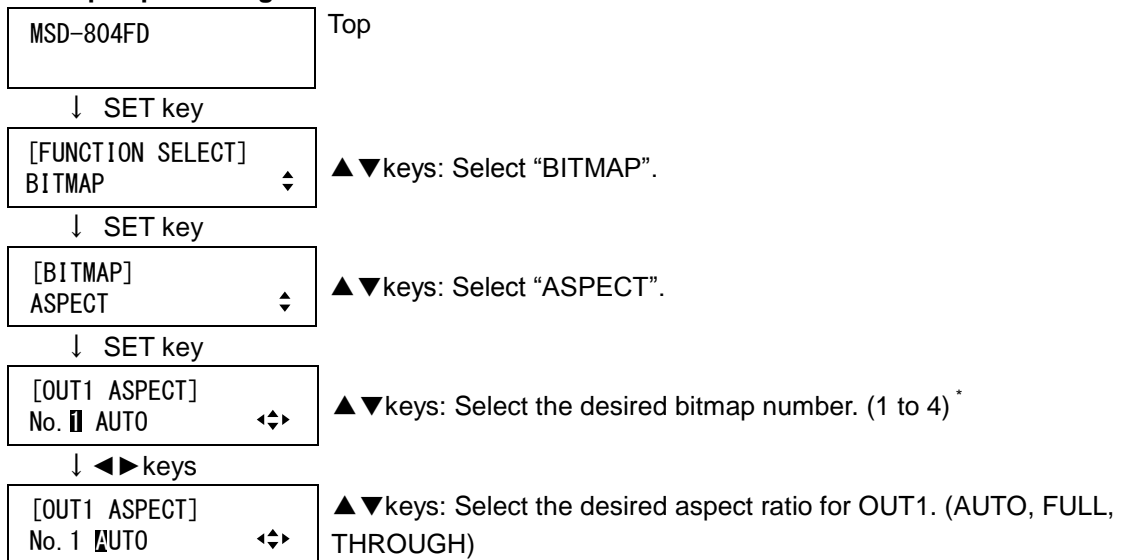
*If several bitmaps are registered, select the bitmap number you want to set.

2. To set bitmap aspect using commands:

@SBT: Set bitmap aspect ratio

@GBT Get bitmap aspect ratio

7.14.5 Display position [POSITION]

```
┌  ・CENTER  [Default]  ・BOTTOM-LEFT    ・BOTTOM-RIGHT
└  ・TOP-LEFT           ・TOP-RIGHT
```

1. To set bitmap position using menu:

```
┌─────────────────────┐
│ MSD-804FD           │   Top
│                     │
│                     │
└─────────────────────┘
         ↓ SET key
┌─────────────────────┐
│ [FUNCTION SELECT]   │   ▲▼keys: Select "BITMAP".
│ BITMAP          ↕   │
└─────────────────────┘
         ↓ SET key
┌─────────────────────┐
│ [BITMAP]            │   ▲▼keys: Select "POSITION".
│ POSITION        ↕   │
└─────────────────────┘
         ↓ SET key
┌─────────────────────┐
│ [OUT1 POSITION]     │   ▲▼keys: Select the desired bitmap number (1 to 4).*
│ No. 1 CENTER    ↔↕  │
└─────────────────────┘
         ↓ ◀▶keys
┌─────────────────────┐
│ [OUT1 POSITION]     │   ▲▼keys: Set the desired display position for OUT1 (CENTER,
│ No. 1 CENTER    ↔↕  │   TOP-LEFT, BOTTOM-LEFT, TOP-RIGHT, BOTTOM-RIGHT).
└─────────────────────┘
```
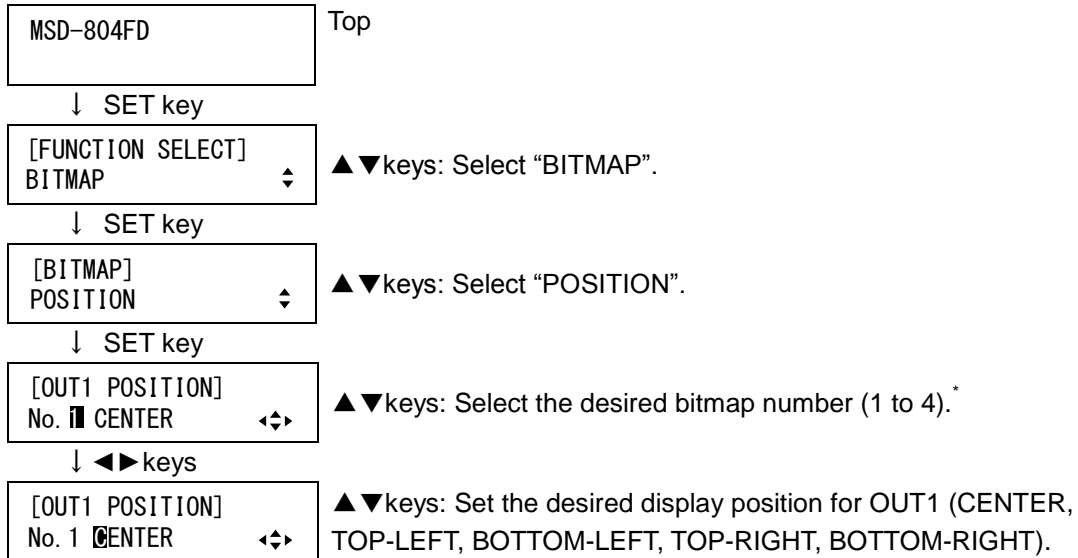
*If several bitmaps are registered, select the bitmap number you want to set.

2. To set bitmap position using commands:

@SZP: Set bitmap display position
@GZP: Get bitmap display position

7.14.6 Input bitmap channel assignment [CHANNEL ASSIGN]

A bitmap can be treated as an input video source by assigning the bitmap to any input that is not currently being used. A bitmap can be assigned to an output or input separately.

> ·Not assign bitmap to input: OFF [Default]
> ·Assign bitmap to input: ON

Note:

Larger resolutions require a longer writing time; it may take approximately 6 seconds at a maximum to write a bitmap. If you switch a normal image to a bitmap image, it takes longer time to output the image, and you cannot perform other operations while the bitmap is being written.

1. To assign bitmap channel using menu:

```
┌────────────────────┐   Top
│ MSD-804FD          │
│                    │
└────────────────────┘
       ↓ SET key
┌────────────────────┐
│ [FUNCTION SELECT]  │      ▲▼keys: Select "BITMAP".
│ BITMAP          ↕  │
└────────────────────┘
       ↓ SET key
┌────────────────────┐
│ [BITMAP]           │      ▲▼keys: Select "CHANNEL ASSIGN".
│ CHANNEL ASSIGN  ↕  │
└────────────────────┘
       ↓ SET key
┌────────────────────┐
│ [OUT1 ASSIGN]      │      ▲▼keys: Select the desired input assigned for OUT1 (IN1 to IN8).
│ IN1  OFF       ⬦  │
└────────────────────┘
       ↓ ◄►keys
┌────────────────────┐
│ [OUT1 ASSIGN]      │      ▲▼keys: Select "OFF" or "ON". *
│ IN1  OFF       ⬦  │
└────────────────────┘
       ↓ SET key: Applies settings.
┌────────────────────┐      Displays the message for 1 second before automatically returning to
│ [CHANNEL ASSIGN]   │      the previous screen.
│ NOW UPDATE...      │
└────────────────────┘
       ↓
┌────────────────────┐
│ [BITMAP]           │
│ CHANNEL ASSIGN  ↕  │
└────────────────────┘
```

Note:

If you do not press the "SET" key, the assignment is not changed. Make sure to press the "SET" key.

* If several bitmaps are registered, select the bitmap number you want to output.

2. To assign bitmap channel using commands:

@SBA: Set bitmap input channel assignment
@GBA Get bitmap input channel assignment

7.14.7 Bitmap output at startup [POWER ON BITMAP]

You can enable or disable bitmap output at the time of startup.

For each output (common to OUTA and OUTB)

{ ·OFF: Bitmap is not output.   [Default]
  ·ON: Bitmap is output.

1. To enable or disable bitmap output using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
BITMAP              ‡
```
▲▼keys: Select "BITMAP".

↓ SET key

```
[BITMAP]
POWER ON BITMAP     ‡
```
▲▼keys: Select "POWER ON BITMAP".

↓ SET key

```
[OUT1 POWER ON]
OFF                 ‡
```
▲▼keys: Select "OFF" or "ON". *
◄►keys: Select the desired output (OUT 1 to OUT 4).

↓ ESC key: Returns to the previous screen.
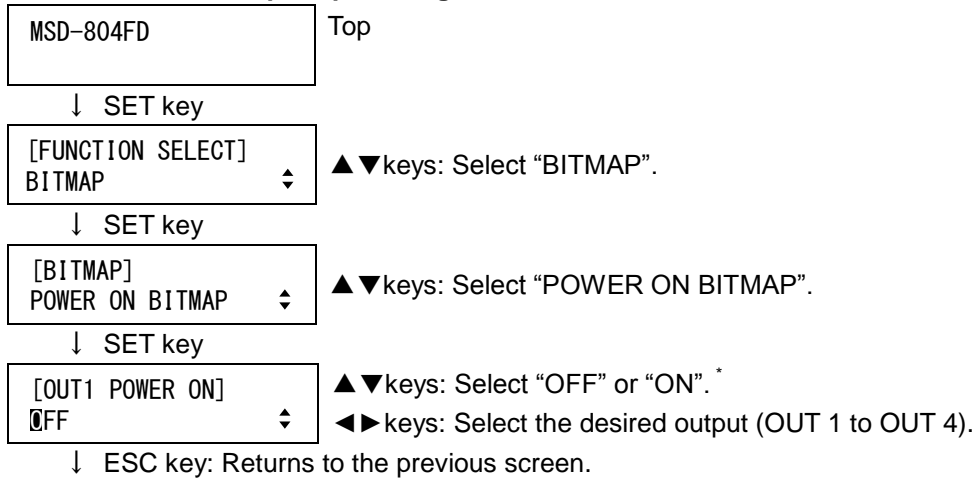
*If several bitmaps are registered, select the bitmap number you want to output.
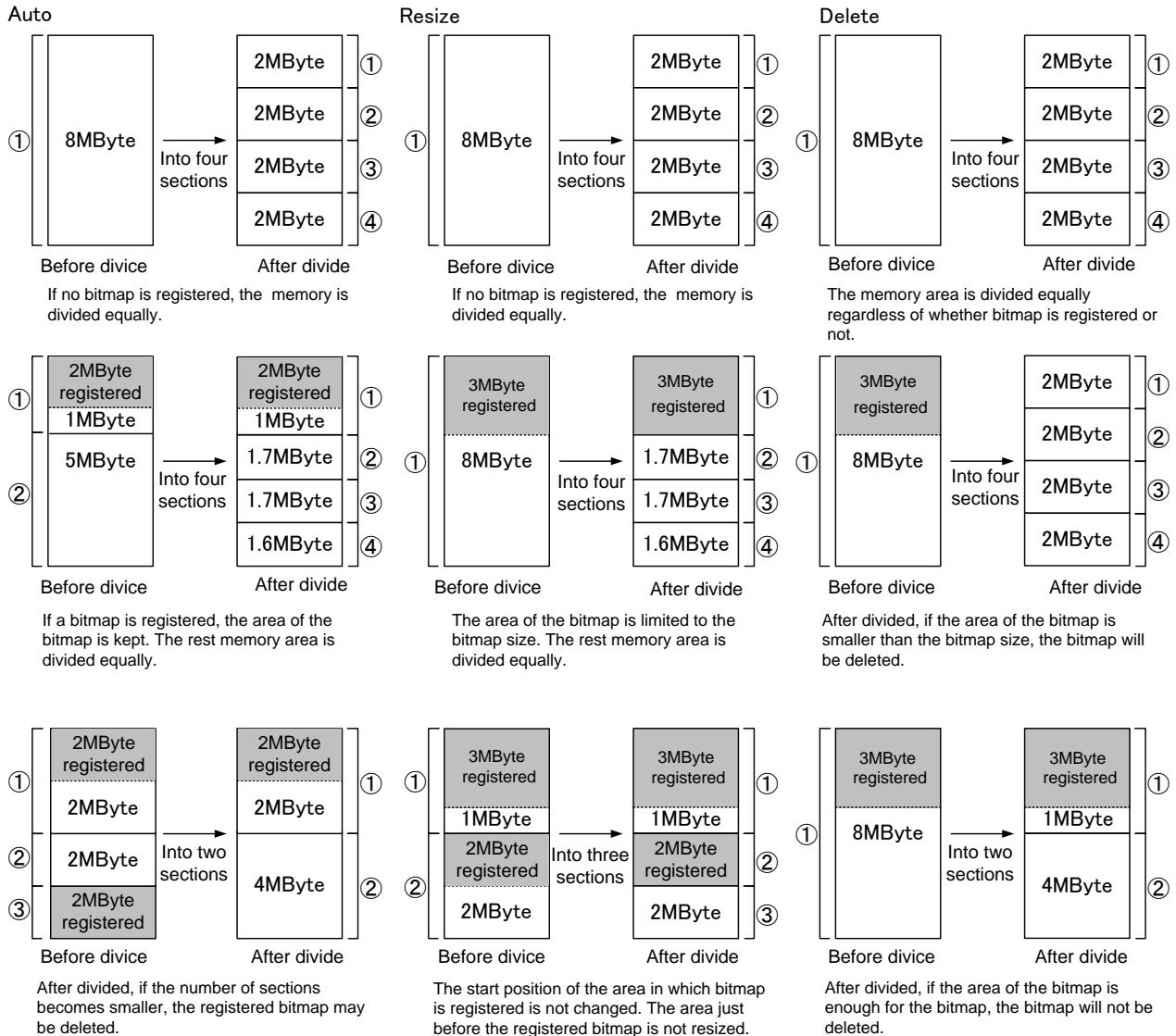
2. To enable or disable bitmap output using commands:

@SPB: Set startup bitmap
@GPB: Get startup bitmap

195

7.14.8 Dividing memory area [DIVIDE MEMORY]

You can register up to four bitmaps within the available memory area by dividing the memory. You can select one of three dividing modes or specify the size you want to divide manually.

Memory areas are controlled by blocks. 1 block = 65,536 bytes; 128 blocks = 8,388,608 bytes in total.

Auto

If no bitmap is registered, the memory is divided equally.

If a bitmap is registered, the area of the bitmap is kept. The rest memory area is divided equally.

After divided, if the number of sections becomes smaller, the registered bitmap may be deleted.

Resize

If no bitmap is registered, the memory is divided equally.

The area of the bitmap is limited to the bitmap size. The rest memory area is divided equally.

The start position of the area in which bitmap is registered is not changed. The area just before the registered bitmap is not resized.

Delete

The memory area is divided equally regardless of whether bitmap is registered or not.

After divided, if the area of the bitmap is smaller than the bitmap size, the bitmap will be deleted.

After divided, if the area of the bitmap is enough for the bitmap, the bitmap will not be deleted.

[Fig. 7.46] Divide mode

1. To divide memory area using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
BITMAP            ↕
```
▲▼keys: Select "BITMAP".

↓ SET key

```
[BITMAP]
DIVIDE MEMORY     ↕
```
▲▼keys: Select "DIVIDE MEMORY".

↓ SET key

```
[DIVIDE MEMORY]   ↔↕
MODE:RESISE NUMBER:1
```
▲▼keys: Select the desired divide mode (AUTO, RESIZE, DELETE).

↓ ◀▶keys

```
[DIVIDE MEMORY]   ↔↕
MODE:RESISE NUMBER:1
```
▲▼keys: Set the number of divisions (1 to 4).

↓ ◀▶keys

```
[DIVIDE MEMORY]   ↔↕
DISPLAY:BLOCK
```
▲▼keys: Select the desired display mode (BLOCK, BYTE).

↓ ◀▶keys

```
[BITMAP1 BLOCK]   ↔↕
 0- 63(   )→ 0- 63
```
▲▼keys: Set the end block position of "BITMAP1" (0 to 127).*

↓ ◀▶keys

```
[BITMAP2 BLOCK]   ↔↕
 64-127(   )→ 64-127
```
▲▼keys: Set the end block position of "BITMAP2" (0 to 127).*

↓ SET key: Displays the confirmation screen.   ↑ ESC key

```
[DIVIDE MEMORY]
SURE? = NO        ↕
```
▲▼keys: Select " YES" or "NO".

↓ To execute divide: Select "YES" and press the "SET" key.

To return to the menu without divide: Select "NO" and press the "SET" key.

```
[DIVIDE MEMORY]
NOW UPDATE...
```
Displays the message for 1 second before automatically returning to the previous screen.

↓

```
[BITMAP]
DIVIDE MEMORY     ↕
```
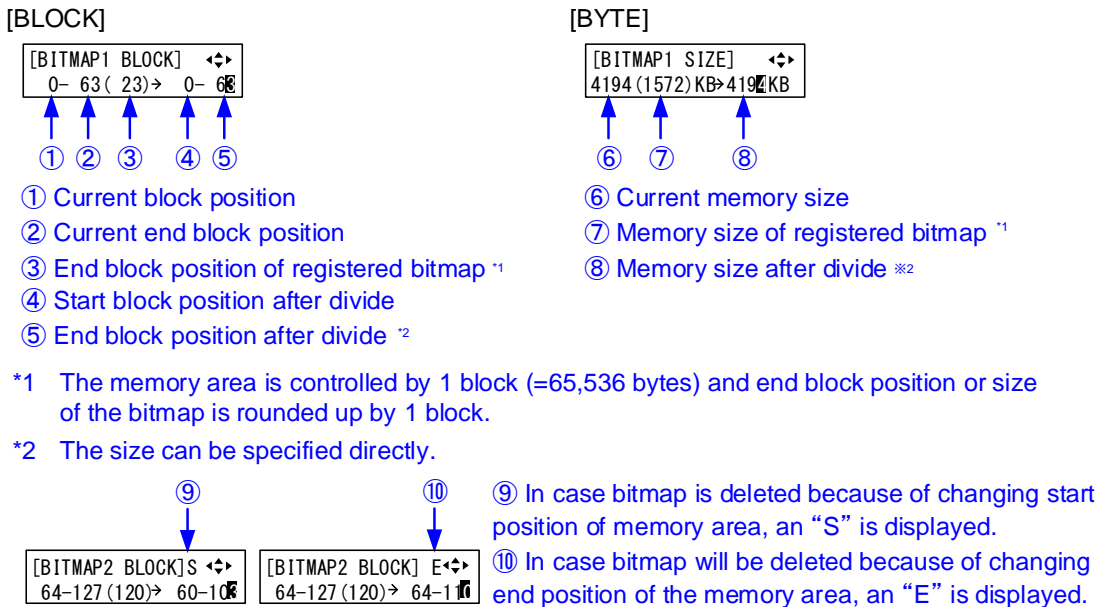
* If you select "BLOCK" for "DISPLAY", the current start and end block positions are displayed on the left of the VFD screen. If a bitmap is registered, the final block position is displayed in parentheses. The start and end block positions after divide are displayed on the right. If you want to specify the after-divide size directly, change the end block position.

If you select "BYTE", the currently reserved memory size is displayed on the left. If a bitmap is registered, the number of bytes is displayed in parentheses. The memory size after divide is displayed on the right so that you can specify directly the after-division memory size.

In case the registered bitmap will be deleted as a result of specifying the size directly, an "S" or "E" is displayed in the upper right.

[BLOCK]

```
[BITMAP1 BLOCK] ◄↕►
 0- 63( 23)→ 0- 63
```
①②③ ④⑤

① Current block position
② Current end block position
③ End block position of registered bitmap [*1]
④ Start block position after divide
⑤ End block position after divide [*2]

[BYTE]

```
[BITMAP1 SIZE]  ◄↕►
4194(1572)KB→4194KB
```
⑥ ⑦ ⑧

⑥ Current memory size
⑦ Memory size of registered bitmap [*1]
⑧ Memory size after divide ※2

*1 The memory area is controlled by 1 block (=65,536 bytes) and end block position or size of the bitmap is rounded up by 1 block.

*2 The size can be specified directly.

⑨   ⑩

```
[BITMAP2 BLOCK]S ◄↕►
64-127(120)→ 60-10F
```
```
[BITMAP2 BLOCK] E◄↕►
64-127(120)→ 64-1F6
```

⑨ In case bitmap is deleted because of changing start position of memory area, an "S" is displayed.

⑩ In case bitmap will be deleted because of changing end position of the memory area, an "E" is displayed.

[Fig. 7.47] "BLOCK" and "BYTE"

In case the total number of blocks exceeds 128 as a result of setting the size manually, a message shown right is displayed when you press the "SET" key and the setting cannot be applied.

```
MEMORY SIZE OVER
```
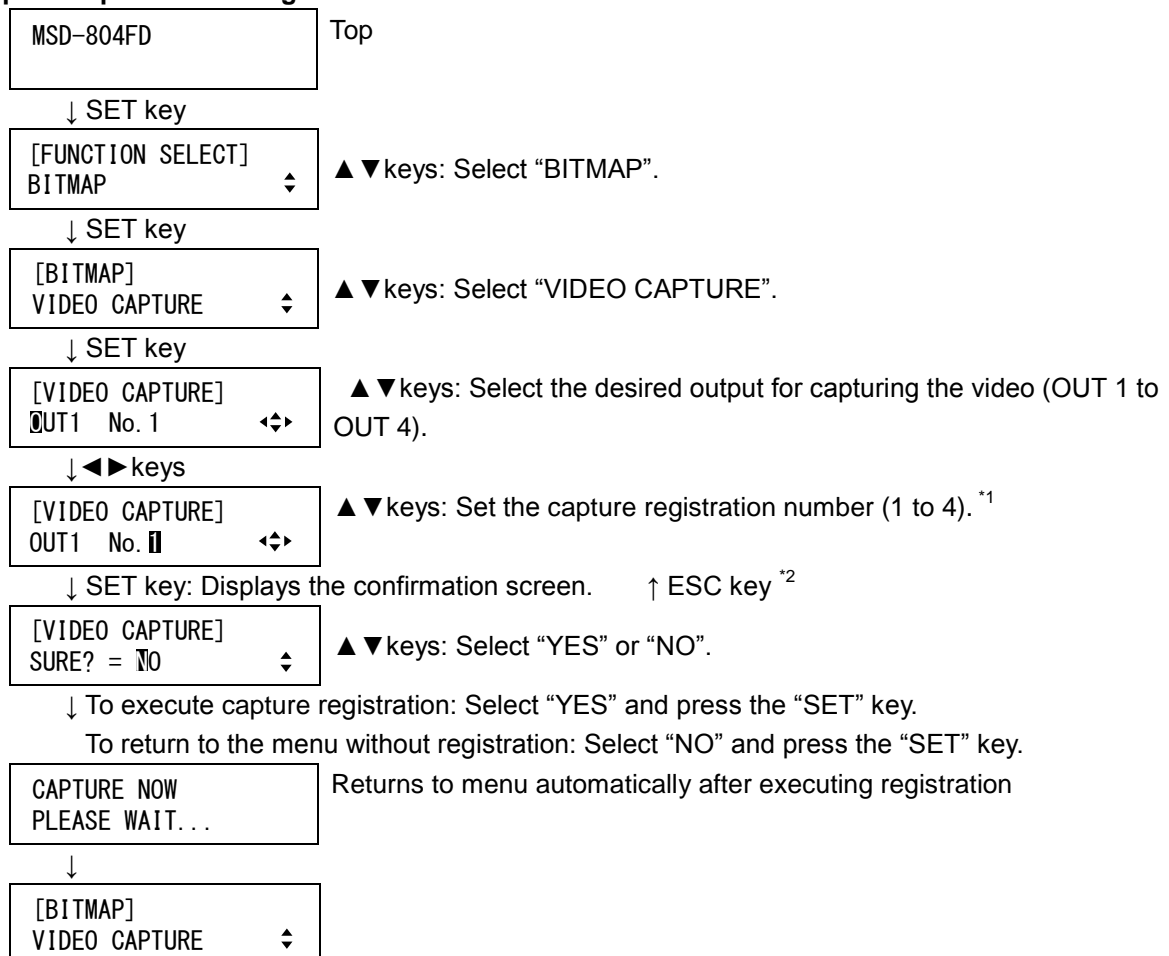
2. To divide memory area using commands:

@SBD: Set bitmap memory divide
@GBD: Get bitmap memory divide
@GBV Get bitmap memory usage

7.14.9　Input image capture [VIDEO CAPTURE]

An input video can be treated as a bitmap by capturing the input video. The maximum resolution has to be [Horizontal resolution x Vertical resolution x 3 (the number of bytes per pixel; "3" is fixed)] = 8,388,608 bytes or less. If you register several bitmaps and captured video, the total resolution of all bitmaps and captured videos has to be 8,388,608 bytes or less (aspect ratio does not matter).

Captured images can be displayed in the same size or enlarged size but not in the reduced size. Larger resolutions require a longer writing time ; it may take approximately six seconds at a maximum to write a bitmap. Register images with lower resolution than that of the display device. (If an input image is larger than the output image, capture it with reduced image size. If an input image is the same size or smaller, capture the image without changing its size. You can register images with lower resolution by setting "**7.3.1 Output resolution [RESOLUTION]**" to smaller value and capture the images.)

1. **To capture input video using menu:**

MSD-804FD	Top

↓ SET key

[FUNCTION SELECT] BITMAP　　　　　　♦	▲▼keys: Select "BITMAP".

↓ SET key

[BITMAP] VIDEO CAPTURE　　　♦	▲▼keys: Select "VIDEO CAPTURE".

↓ SET key

[VIDEO CAPTURE] OUT1　No.1　　　◄♦►	▲▼keys: Select the desired output for capturing the video (OUT 1 to OUT 4).

↓◄►keys

[VIDEO CAPTURE] OUT1　No.1　　　◄♦►	▲▼keys: Set the capture registration number (1 to 4). [*1]

↓ SET key: Displays the confirmation screen.　　↑ ESC key [*2]

[VIDEO CAPTURE] SURE? = NO　　　　♦	▲▼keys: Select "YES" or "NO".

↓ To execute capture registration: Select "YES" and press the "SET" key.
　To return to the menu without registration: Select "NO" and press the "SET" key.

CAPTURE NOW PLEASE WAIT...	Returns to menu automatically after executing registration

↓

[BITMAP] VIDEO CAPTURE　　　♦

[*1] Displayed only if memory area is divided into several sections.

[*2] To freeze the input video temporarily, press the "SET" key. To register the frozen video, select "YES" and then press the "SET" key again. To release freeze, press the "ESC" key. It can be released automatically when an input is switched or input signal changes.

If resolution of input video is too large against the reserved memory area and it causes a memory shortage, a message shown on the right is displayed after you press the "SET" key. In such a case, registration will not be executed.

MEMORY SIZE OVER

2. **To capture input video using commands:**
　　@SFZ: Set freeze

@GFZ: Get freeze
@CAP: Capture input image

Capturing input video using browser

IDK evaluated the operation on Microsoft Internet Explorer 6.0, 7.0 and 8.0 of Windows. It may not be performed correctly on other versions and browsers.

Open the WEB browser on a PC using the same LAN and enter the IP address of the MSD followed by "/capture.html" to open the window for capturing images.
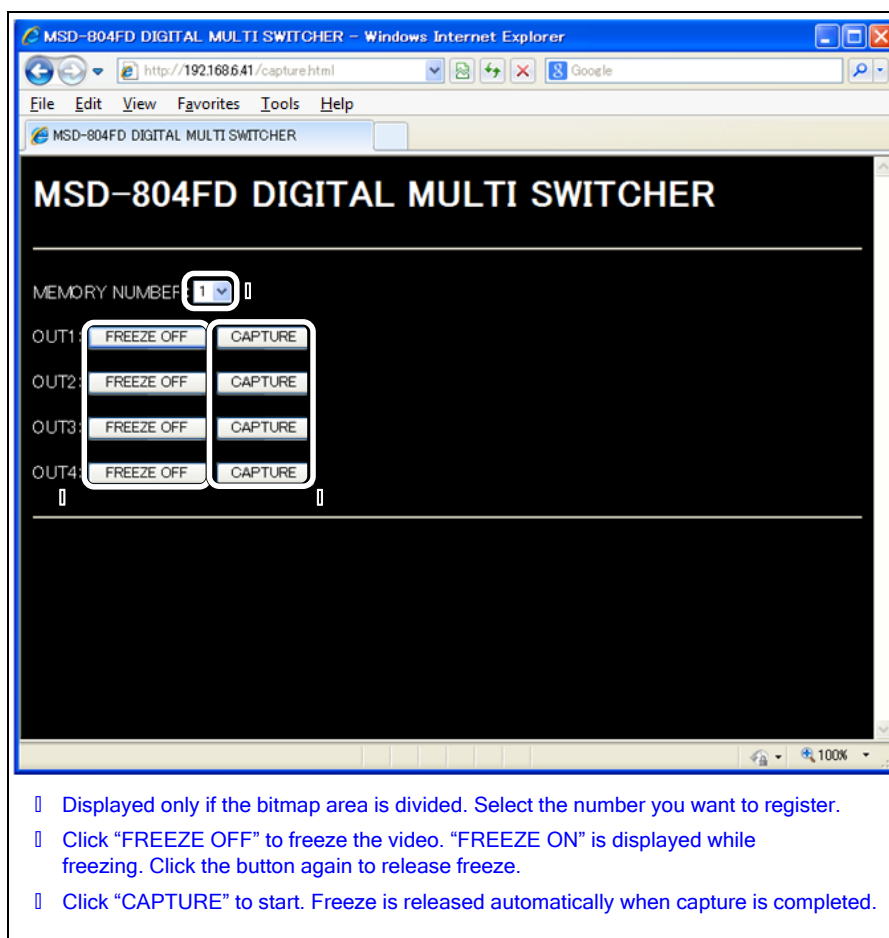
・"80" is set for port number of browser control port: 80 (normal case)

http://192.168.1.199/capture.html

・To set a number (5000 to 5999) other than "80" for port number of browser control port:

(For example, the port number is 5000)

http://192.168.1.199:5000/capture.html

Ⅰ Displayed only if the bitmap area is divided. Select the number you want to register.

Ⅱ Click "FREEZE OFF" to freeze the video. "FREEZE ON" is displayed while freezing. Click the button again to release freeze.

Ⅲ Click "CAPTURE" to start. Freeze is released automatically when capture is completed.

[Fig. 7.48] Capturing input video using browser

When the capture starts, the message below is displayed. Do not turn off the MSD while it is being displayed

```
CAPTURE NOW
PLEASE WAIT
```

If the capture fails, one of the following error messages is displayed.

NOT AVAILABLE NOW: Cannot be captured, because the input video is not displayed.

MEMORY SIZE ERROR: Cannot be saved, because the input video is larger than the reserved memory area.

200
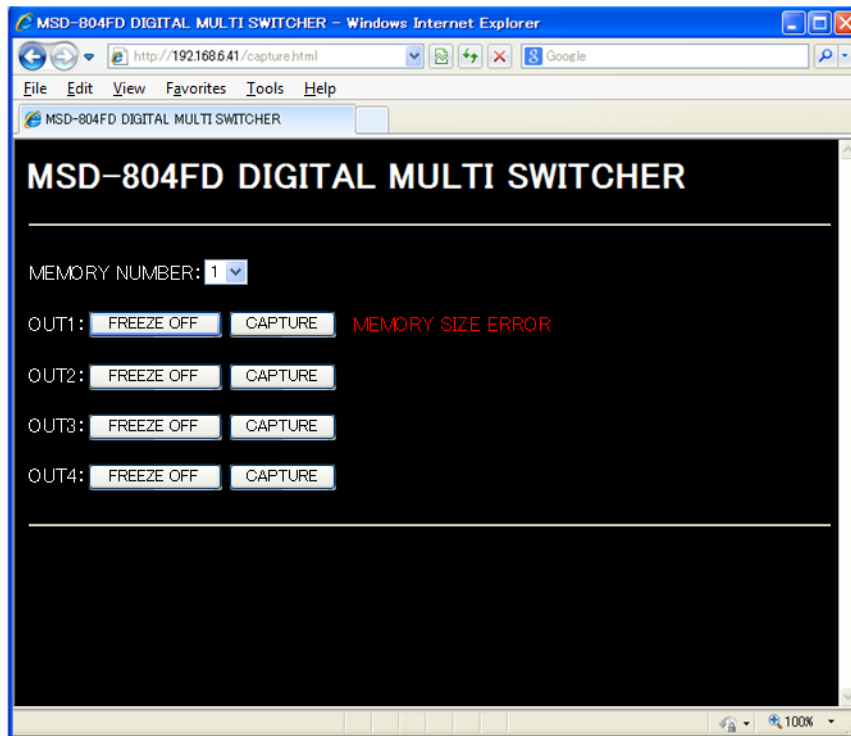
[Fig. 7.49] Capture error of input video using browser

7.15 Startup Settings

You can set status of the MSD at the time of its start up.
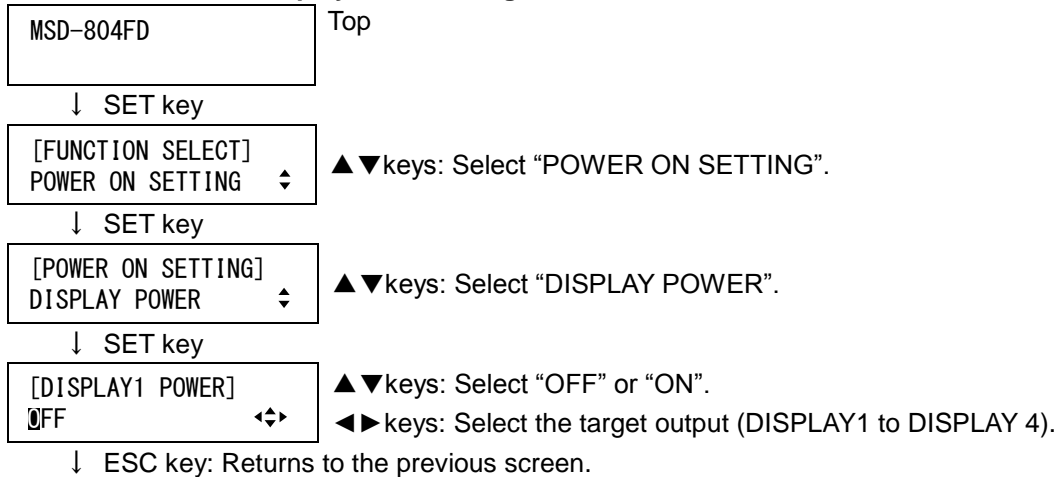
7.15.1 DISPLAY POWER keys [DISPLAY POWER]

For each output (common to OUTA and OUTB)

You can set whether display devices will be turned on or not when the MSD is powered on.

- ・OFF [Default]
- ・ON

1. To set whether to turn on display device using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
POWER ON SETTING    ◆
```
▲▼keys: Select "POWER ON SETTING".

↓ SET key

```
[POWER ON SETTING]
DISPLAY POWER       ◆
```
▲▼keys: Select "DISPLAY POWER".

↓ SET key

```
[DISPLAY1 POWER]
OFF              ◀◆▶
```
▲▼keys: Select "OFF" or "ON".
◀▶keys: Select the target output (DISPLAY1 to DISPLAY 4).

↓ ESC key: Returns to the previous screen.

2. To set whether to turn on display device using commands:

None

7.15.2 Control command keys [COMMAND KEY]

You can set the operation mode of the control command execution keys for when MSD is turned on.

- ·AUTO [Default]
- ·COMMAND
- ·PRESET LOAD
- ·LOCK

If you select "AUTO" and turn on the MSD, the previous mode (when you turned off the MSD last time) of control command execution key will be applied. To fix the operation mode, set this menu to a mode other than "AUTO".

[Table 7.22] Operation mode of control command execution keys

Setting	Previous operation mode	Operation mode that will be applied when turning ON
AUTO (Default)	COMMAND	COMMAND
	PRESET LOAD	PRESET LOAD
	LOCK	LOCK
COMMAND		COMMAND
PRESET LOAD		PRESET LOAD
LOCK		LOCK

1. To set operation mode of the control command keys using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
POWER ON SETTING    ⬍
```
▲▼keys: Select "POWER ON SETTING".

↓ SET key

```
[POWER ON SETTING]
COMMAND KEY         ⬍
```
▲▼keys: Select "COMMAND KEY".

↓ SET key

```
[COMMAND KEY]
AUTO                ⬍
```
▲▼keys: Set the desired operation mode of control command execution key. (AUTO, COMMAND,PRESET LOAD, LOCK)

↓ ESC key: Returns to the previous screen.
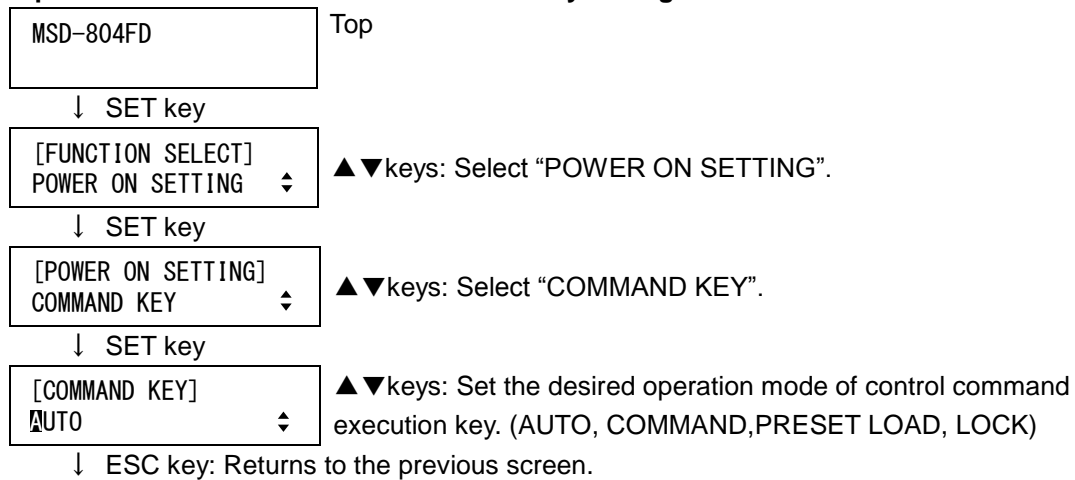
2. To set operation mode of the control command keys using commands:

None

7.15.3 Key lock [KEY LOCK]

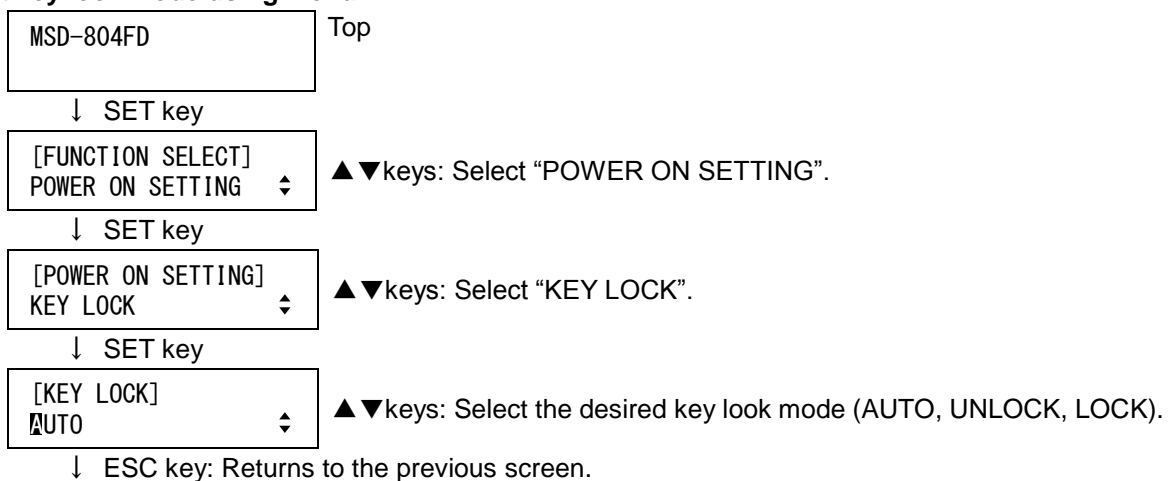You can enable or disable key lock for when MSD is turned on.

- ·AUTO   [Default]
- ·UNLOCK
- ·LOCK

If you select "AUTO" and turn on the MSD, the previous mode (when you turned off the MSD last time) will be applied. To fix the key lock state, select "UNLOCK" or "LOCK".

[Table 7.23] Key lock mode when MSD is powered on

Setting	Previous key lock mode	Key lock mode that will be applied when turning ON
AUTO (Default)	UNLOCK	UNLOCK
	LOCK	LOCK
UNLOCK		UNLOCK
LOCK		LOCK

1. To set key lock mode using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
POWER ON SETTING   ⬍
```
▲▼keys: Select "POWER ON SETTING".

↓ SET key

```
[POWER ON SETTING]
KEY LOCK           ⬍
```
▲▼keys: Select "KEY LOCK".

↓ SET key

```
[KEY LOCK]
AUTO               ⬍
```
▲▼keys: Select the desired key look mode (AUTO, UNLOCK, LOCK).

↓ ESC key: Returns to the previous screen.

2. To set key lock mode using commands:

None

7.16 Others

7.16.1 Setting key lock mode [KEY LOCK MODE]

You can set the key lock mode for each key group on the front panel.

The front panel consists of six groups of keys as shown below. If you set "**6.6 Locking/unlocking front keys**" to "ON", keys set to "LOCK" in this menu will be locked and cannot be operated. If you set "**7.15.3 Key lock [KEY LOCK]**" to "ON", keys set to "LOCK" in this menu will be locked and cannot be operated when you turn on the MSD.
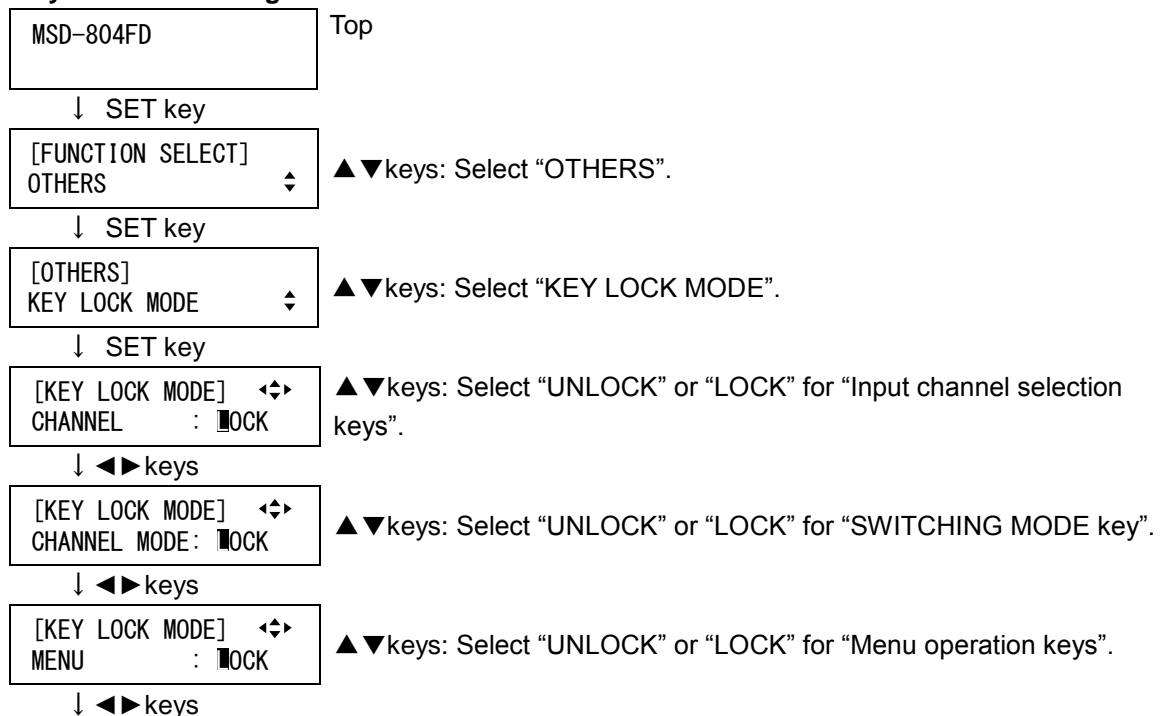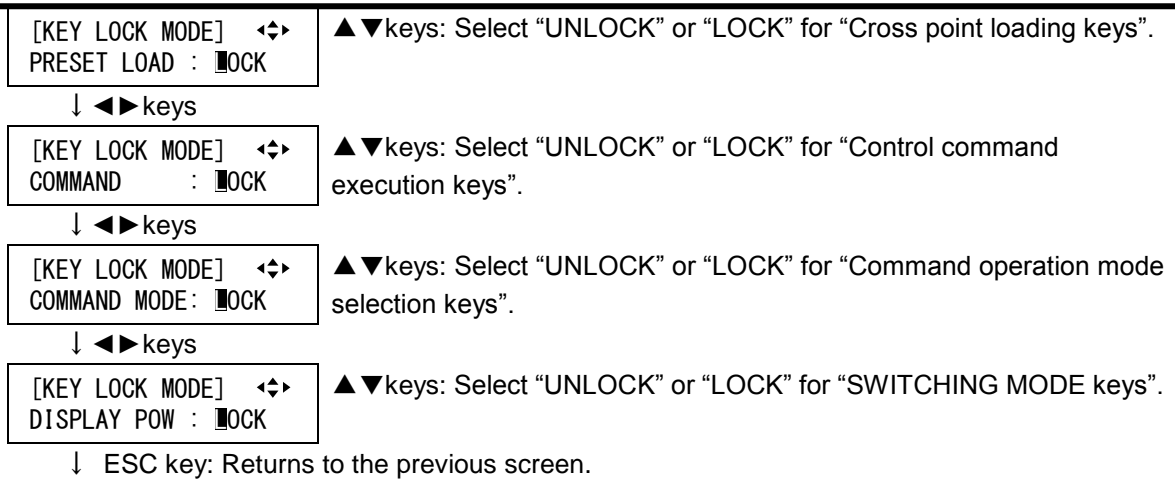
```
┌ ・UNLOCK
└ ・LOCK   [Default]
```


Control command execution/Cross point loading keys*

Input channel selection keys

DISPLAY POWER keys

Operation mode selection key

SWITCHING MODE key

Menu operation keys
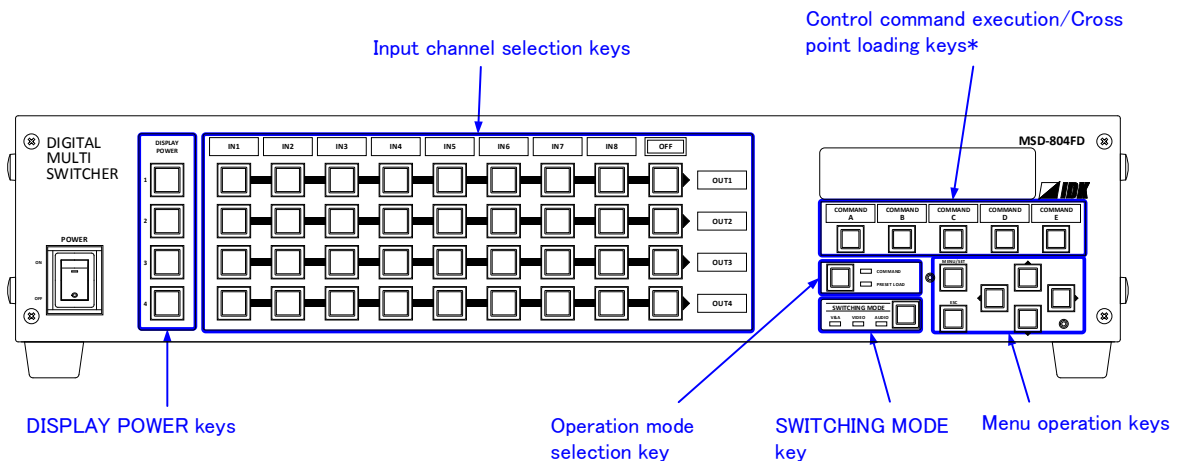
※ * Control command execution/ Cross point loading keys cannot operate at the same time; it is selected by the command operation mode selection key.

[Fig. 7.50] Front key group

1. To set key lock mode using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OTHERS             ⇕
```
▲▼keys: Select "OTHERS".

↓ SET key

```
[OTHERS]
KEY LOCK MODE      ⇕
```
▲▼keys: Select "KEY LOCK MODE".

↓ SET key

```
[KEY LOCK MODE]  ⬍▶
CHANNEL     : █OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "Input channel selection keys".

↓ ◀▶keys

```
[KEY LOCK MODE]  ⬍▶
CHANNEL MODE: █OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "SWITCHING MODE key".

↓ ◀▶keys

```
[KEY LOCK MODE]  ⬍▶
MENU        : █OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "Menu operation keys".

↓ ◀▶keys

```
[KEY LOCK MODE]  ◄◆►
PRESET LOAD : ▊OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "Cross point loading keys".

↓ ◄►keys

```
[KEY LOCK MODE]  ◄◆►
COMMAND      : ▊OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "Control command execution keys".

↓ ◄►keys

```
[KEY LOCK MODE]  ◄◆►
COMMAND MODE: ▊OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "Command operation mode selection keys".

↓ ◄►keys

```
[KEY LOCK MODE]  ◄◆►
DISPLAY POW : ▊OCK
```
▲▼keys: Select "UNLOCK" or "LOCK" for "SWITCHING MODE keys".

↓ ESC key: Returns to the previous screen.

2. To set key lock mode using commands:

@SLM: Set key lock target for front panel

@GLM: Get key lock target for front panel

7.16.2 Key buzzer [BUZZER]

You can turn ON/OFF the buzzer function (sounding every time you press a front panel key).

$$\begin{cases} \cdot \text{OFF} \\ \cdot \text{ON [Default]} \end{cases}$$

1. To set buzzer using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OTHERS              ◆
```
▲▼keys: Select "OTHERS".

↓ SET key

```
[OTHERS]
BUZZER              ◆
```
▲▼keys: Select "BUZZER".

↓ SET key

```
[BUZZER]
▊N                  ◆
```
▲▼keys: Select "OFF" or "ON".

↓ ESC key: Returns to the previous screen.
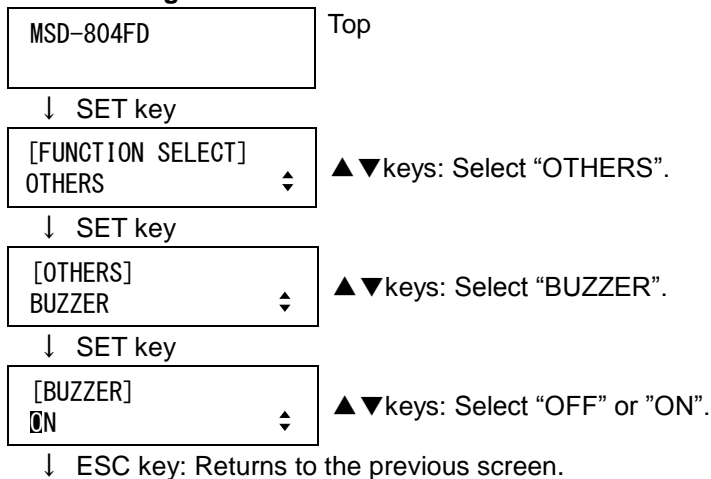
2. To set buzzer using commands:

@SBZ: Set buzzer

@GBZ: Get buzzer

7.16.3 Automatic key lock for control command keys [COMMAND AUTO LOCK]

You can enable or disable the key lock function to automatically control the command execution keys if no operation is performed for 30 seconds during the unlocked mode.

If you select "ON" and no operation of menu control keys is performed for 30 seconds, the display brightness will be reduced to approximately 25%. When you operate any key operation, the luminance will return to 100%.

⎧ ·OFF
⎨
⎩ ·ON   [Default]

1. To set auto key lock using menu:

| MSD−804FD | Top |

↓ SET key

| [FUNCTION SELECT]
OTHERS   ↕ | ▲▼keys: Select "OTHERS". |

↓ SET key

| [OTHERS]
COMMAND AUTO LOCK ↕ | ▲▼keys: Select "COMMAND AUTO LOCK". |

↓ SET key

| [COMMAND AUTO LOCK]
ON   ↕ | ▲▼keys: Select "OFF" or "ON". |

↓ ESC key: Returns to the previous screen.
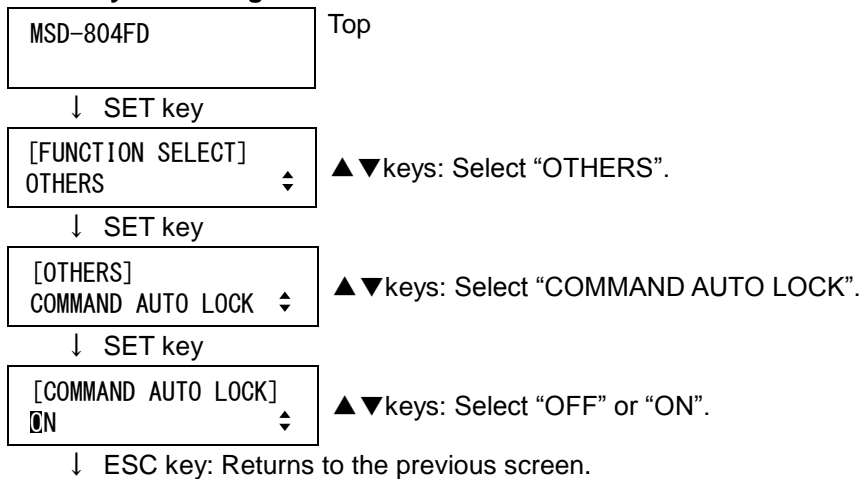
2. To set command auto lock commands:

None

7.16.4 **DISPLAY POWER key pressing time length [POWER SWITCH ON]**

You can set the pressing response time of the DISPLAY POWER keys to prevent the device from being turned off when the switch is pressed accidentally:

> 0 ms. (starts the operation immediately after you press the power switch) to 5000 ms. (5 seconds); by 10 ms.   [Default]: 0 ms.

1. To set time for pressing power switch using menu:

```
┌─────────────────────────┐   Top
│  MSD-804FD              │
│                         │
└─────────────────────────┘
        ↓  SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]    ▲  │   ▲▼keys: Select "OTHERS".
│ OTHERS               ▼  │
└─────────────────────────┘
        ↓  SET key
┌─────────────────────────┐
│ [OTHERS]             ▲  │   ▲▼keys: Select "POWER SWITCH ON".
│ POWER SWITCH ON      ▼  │
└─────────────────────────┘
        ↓  SET key
┌─────────────────────────┐
│ [FRONT POWER SW]        │   ▲▼keys: Set the time length for the front panel (0 to 5000).
│   0ms             ◄▲►   │
└─────────────────────────┘
        ↓  ESC key: Returns to the previous screen.
```
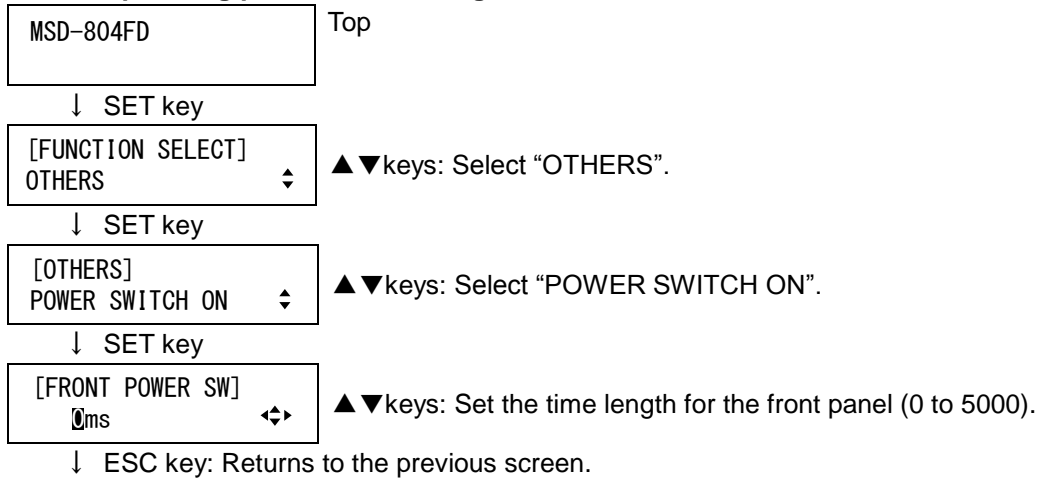
2. To set time for pressing power switch using commands:
> None

7.16.5 **Input channel automatic linking [INPUT CHANNEL LINK]**

Menus to be adjusted for each channel can be adjusted after the input number is selected. With this menu, you can select input to be adjusted automatically by switching input in "**6.1 Selecting input channels**". This function is convenient to adjust each input channel based on specific display devices or AV amplifiers.

> ・Inputs to be adjusted are not selected automatically: OFF   [Default]
> ・When inputs of OUT1 is switched, the input to be adjusted automatically will be selected: OUT1.
> ・When inputs of OUT2 is switched, the input to be adjusted automatically will be selected: OUT 2.
> ・When inputs of OUT3 is switched, the input to be adjusted automatically will be selected: OUT 3.
> ・When inputs of OUT4 is switched, the input to be adjusted automatically will be selected: OUT 4.

Input number to be adjusted keeps settings separately for video and audio.

```
[ "OUT 1"]
Video adjustment channel=IN1         Video adjustment channel=IN3         Video adjustment channel=IN3         Video adjustment channel=IN3
Audio adjustment channel=IN4   →     Audio adjustment channel=IN4   →     Audio adjustment channel=IN2   →     Audio adjustment channel=IN2
                               1                                     2                                     3

1  IN3 is selected for video input channel of OUT1. IN3 is selected for video adjustment channel automatically.

2  IN2 is selected for audio input channel of OUT1. IN2 is selected for audio adjustment channel automatically.

3  IN5 is selected for audio input channel of OUT2. The adjustment channel is not changed.
```

[Fig. 7.51] Automatic channel selection

Valid for the following menus (video input channel number):
>・**7.3**   ・**7.6**
> ・7.3.3.   ・7.6.2
> ・7.3.4   ・7.6.3
> ・7.3.5   ・7.6.4
> ・7.3.6   ・7.6.5
> ・7.3.7   ・7.6.6
> ・7.3.8   ・**7.16**
> ・7.3.9   ・7.16.7
>・**7.4**
> ・7.4.1
> ・7.4.2
> ・7.4.3
> ・7.4.40
> ・7.4.5
> ・7.4.6

Valid for the following menus (audio input channel number):
>・**7.8**   ・**7.16**
> ・7.8.4   ・7.16.7
> ・7.8.6

1. To set input channel automatic linking using menu:

```
┌─────────────────────────┐
│ MSD-804FD               │   Top
│                         │
└─────────────────────────┘
        ↓   SET key
┌─────────────────────────┐
│ [FUNCTION SELECT]       │   ▲▼keys: Select "OTHERS".
│ OTHERS              ↕   │
└─────────────────────────┘
        ↓   SET key
┌─────────────────────────┐
│ [OTHERS]                │   ▲▼keys: Select "INPUT CHANNEL LINK".
│ INPUT CHANNEL LINK ↕    │
└─────────────────────────┘
        ↓   SET key
┌─────────────────────────┐
│ [INPUT CHANNEL LINK]    │   ▲▼keys: Select the automatic selection of video adjustment channel
│ VIDEO:OFF          ↔↕   │   (OFF, OUT1, OUT2, OUT3, OUT4).
└─────────────────────────┘
        ↓   ◄►keys
┌─────────────────────────┐
│ [INPUT CHANNEL LINK]    │   ▲▼keys: Select the automatic selection of audio adjustment channel
│ AUDIO:OFF          ↔↕   │   (OFF, OUT1, OUT2, OUT3, OUT4).
└─────────────────────────┘
        ↓   ESC key: Returns to the previous screen.
```

2. To set input channel automatic linking using commands:

None

7.16.6 Top VFD screen [TOP DISPLAY]

You can select the top screen mode.

{
·NORMAL   [Default]   ·INPUT STATUS
·AUDIO VOLUME   ·MONITOR STATUS

"NORMAL"   "AUDIO VOLUME"

```
MSD-804FD
```

```
[OUT1 AUDIO]
  0dB
```

"INPUT STATUS"   "MONITOR STATUS"

```
IN1 2 3 4 5 6 7 8
♦   H⌧  D
```

```
OUTA1 2 3 4B1 2 3 4
♦    S S N   S S N
```
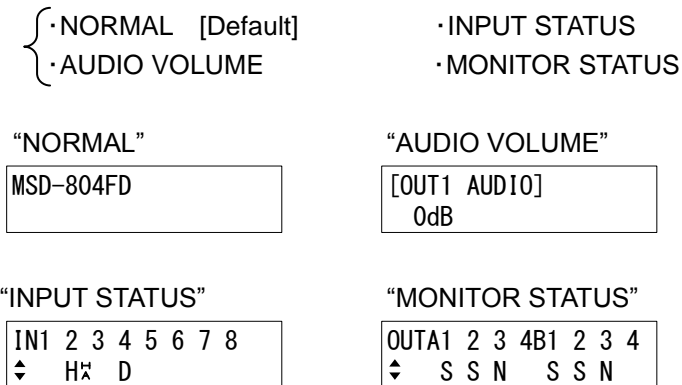
In "**7.16.7 Input signal status [INPUT STATUS]**", you can check input signal status that is from video input connectors. If you select "INPUT STATUS" in this menu, the input status is displayed on the top VFD screen at all times. For "INPUT STATUS", see "**7.16.7 Input signal status [INPUT STATUS]**".

In "**7.16.8 Display device status [MONITOR STATUS]**", you can check display device status connected to video output connector. If you select "MONITOR STATUS" in this menu, the display device status is displayed on the top VFD screen at all times. For "MONITOR STATUS", see " **7.16.8 Display device status [MONITOR STATUS]**".

1. To set top VFD screen using menu:

```
MSD-804FD
```
Top

        ↓ SET key

```
[FUNCTION SELECT]
OTHERS          ♦
```
▲▼keys: Select "OTHERS".

        ↓ SET key

```
[OTHERS]
TOP DISPLAY     ♦
```
▲▼keys: Select "TOP DISPLAY".

        ↓ SET key

```
[TOP DISPLAY]
NORMAL          ♦
```
▲▼keys: Select the information you want to display on the top VFD screen (NORMAL, AUDIO VOLUME, INPUT STATUS, MONITOR STATUS).

        ↓ ESC key: Returns to the previous screen.
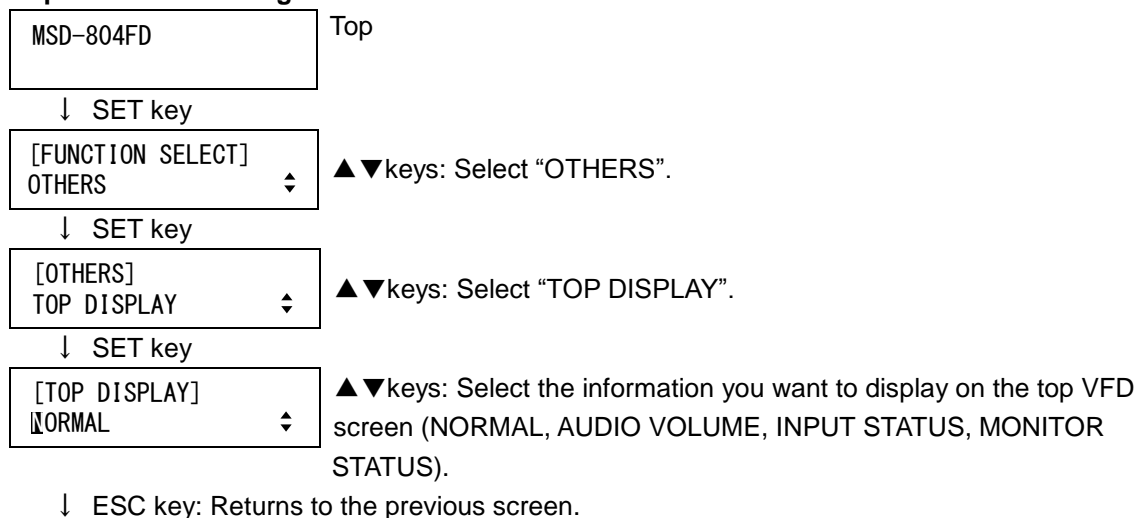
2. To set top VFD screen using commands:

        None

7.16.7 **Input signal status [INPUT STATUS]**

You can display the input signal status that is from HDMI input connectors.

1. To display input status using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OTHERS              ⬍
```
▲▼keys: Select "OTHERS".

↓ SET key

```
[OTHERS]
INPUT STATUS        ⬍
```
▲▼keys: Select "INPUT STATUS".

↓ SET key

```
IN1 2 3 4 5 6 7 8
⬍   Hᴬ  D    H H D
```
Displays statuses of all input connectors.

↓ ▲▼ keys

```
[IN1 FORMAT]       24
1080p 59.94Hz      Hᴬ
```
Displays video input status of IN1.

↓ ▲▼ keys

```
[IN1 AUDIO]        M⬍
LINEAR PCM  48kHz
```
Displays audio input status of IN1.

↓ ▲▼ keys

```
[IN2 FORMAT]        ⬍
NO SIGNAL
```
Displays video input status of IN2.

⋮   ▲▼ keys

```
[IN8 AUDIO]         ⬍
NO SIGNAL
```
Displays video input status of IN8.

↓ ESC key: Returns to the previous screen

For the status of all HDMI input connectors, channel numbers are displayed on the upper row and input signal status is displayed on the lower row.

[Input signal type]
These alphabets are displayed under the input numbers:
   H: HDMI signals are input
   D: DVI signals are input
   No alphabet: No signal is input

"H" (upper, if it is with HDCP) or "A" (lower, if digital audio is embedded) is displayed at the right of an alphabet above appear.

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[Formats of video input signals]

Resolution	Description
1080i 59.94 Hz	SDTV/HDTV signals are input. Format type and vertical synchronous frequency are displayed.
800 x 600 60.00 Hz	RGB signals are input. Value of [Horizontal resolution x Vertical resolution] and vertical synchronous frequency are displayed.
NO SIGNAL	No signal is input.

[Video input signal types and other information]

For the alphabets displayed at the lower right, see the descriptions of inputs.

Only if HDMI signals are input, the color depth is displayed at the upper right:

24: HDMI signals of 24-BIT COLOR are input.

30: HDMI signals of 30-BIT COLOR are input.

[If non-supported video signals are input]

If sampling clock exceeds 165 MHz is input, an "E" is displayed at the left of input signal type alphabet in the lower row, and video is not output.

```
[IN1 FORMAT]         ↕
1920x1440 60.00HzED
```

[Types of audio input signals]

Audio signal type	Description
LINEAR PCM 48 kHz:	Linear PCM signals are input. Sampling frequency is displayed on the right.
COMPRESSED AUDIO:	Compressed audio signals (such as Dolby Digital and DTS) are input. All compressed audio signals are displayed in the same way, because The MSD does not recognize detailed formats.
NO SIGNAL:	No audio signal is input

[Other information]

If multi-channel audio signals are input, an "M" is displayed on the upper right.

2. To display input signal status using commands:

      @GSS: Get I/O status

7.16.8　Display device status [MONITOR STATUS]

You can display the status of display device connected to video output connectors.

1. To display status of display device using menu:

```
  MSD-804FD
```
Top

　　↓　SET key

```
[FUNCTION SELECT]
OTHERS              ⬍
```
▲▼keys: Select "OTHERS".

　　↓　SET key

```
[OTHERS]
MONITOR STATUS      ⬍
```
▲▼keys: Select "MONITOR STATUS".

　　↓　SET key

```
OUTA1 2 3 4B1 2 3 4
⬍  S S N    S S N
```
Displays the status of the display device connected to output connectors.[1]

　↓ ▲▼ keys

```
[OUT1A MONITOR] H30⬍
HDCP SUPPORT
```
Displays the statuses of display device connected to OUT1A.

　　⋮ ▲▼ keys

```
[OUT4B MONITOR]     ⬍
UNCONNECTED
```
Displays the statuses of display device connected to OUT4B[1].

　　↓ ESC key: Returns to the previous screen

[1]OUT1B to OUT4B are available only if HDBaseT output option is mounted.

A) To output all connectors, channel number is displayed on the upper row and HDCP authentication state is displayed on the lower row with one of the following alphabet characters.

B) To output each connector, HDCP authentication state is displayed on the lower row with one of the following character strings.

A)	B)	Description
S	HDCP SUPPORT	HDCP-compliant display device is connected.
N	HDCP NOT SUPPORT	Non-HDCP-compliant display device is connected.
E	HDCP ERROR	HDCP-compliant display device is connected, but the authentication failed.
C	HDCP CHECK NOW	Status of display device is being checked. (such as when connection status of monitor is changed.)
D	MONITOR DISCONNECT	Monitor is disconnected (displayed only for 1 second)
L	Cat6 LINK DISCONNECT	Cat5e/Cat6 cable is unplugged. (displayed only for 1 second) [2]
O	Cat6 NO LINK	Cat5e/Cat6 cable is not connected. [2]
	UNCONNECTED	No display device is connected.

[2] only for OUT1B to OUT4B.

If it is displayed for each output connector and if a display device is connected, output signal type is displayed on the upper right, and color depth is displayed only if HDMI is output.

H24: HDMI signals of 24-BIT COLOR are output.

H30: HDMI signals of 30-BIT COLOR are output.

D   : DVI signals are output.

[Error codes]

Displaying for each output connector: the output statuses of video and audio are displayed on the lower right. The status characters are shown from the left to the right, the statuses of video output to HDMI or HDBaseT output connector, audio output to HDMI or HDBaseT output connector, and audio output to the analog audio output connector are displayed. The status of HDMI or HDBaseT output connector is displayed only if a display device is connected. If video or audio cannot be output, an error code number or alphabet character is displayed.

```
[OUT1A MONITOR] H30
HDCP SUPPORT      333
```

[Table 7.24] Output status

Status	Video output	Audio output
	If any number or "A" is not displayed, video or audio is output correctly.	
1	"**7.7.8 Video output connector [OUTPUT CONNECTOR]**" is set to "OFF".	"**7.8.2 Mute [OUTPUT MUTE]**" is set to "ON".
2	DDC power supply is not input. (If no input device is connected, this status is displayed.)	
3	No video signal is input.	No audio signal is input [1]
4	Video or audio output of source device is in a Mute status.	
5	Signals with HDCP are input, but the display device does not support HDCP. (This may also be displayed while authenticating HDCP.)	
6	The source device does not output required information (packets) for outputting video or audio.	
7	Signals that are not supported by the MSD are input. (Sampling clock is out of the range.)	Audio cannot be output, because compressed audio is input. (Compressed audio can be output only to display devices supporting compressed audio.)
8	—	"**7.8.8 Audio output connector [OUTPUT CONNECTOR]**" is set to "OFF".
9	—	"**7.7.2 Output mode [OUTPUT MODE]**" is set to "DVI MODE" or a display device that does not support audio is connected. [2]
A	Input is set to "OFF".	
B	—	"**7.8.9 Digital audio output connector [DIGITAL OUTPUT]**" is set to "OFF". [2]

[1] Input status of analog audio signals cannot be detected. Even if this status is not displayed, audio may sometimes not be output when analog input is selected.

[2] This status is only for HDMI or HDBaseT output connectors.

2. To display status of display device using commands:

@GSS: Get I/O status

7.16.9 EDID of display device [EDID STATUS]

You can display the EDID loaded from the display device that is connected to the video output connector.

1. To display EDID using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OTHERS           ↕
```
▲▼ keys: Select "OTHERS".

↓ SET key

```
[OTHERS]
EDID STATUS      ↕
```
▲▼ keys: Select "EDID STATUS".

↓ SET key

```
[OUT1A] MSD-804FD
1920x1080 148.50MHz↕
```
Displays the monitor name, resolution, and pixel clock of the display device connected to OUT1A.

↓ ▲▼ keys

```
[OUT1A] HDMI
RGB/YCbCr422/444  ↕
```
Displays the HDMI correspondence status and sampling configuration of the display device connected to OUT1A.

↓ ▲▼ keys

```
[OUT1A]
24/30/36BIT COLOR ↕
```
Displays color depth of the display device connected to OUT1A.

↓ ▲▼ keys

```
[OUT1A]
32/44.1/48kHz     ↕
```
Displays audio sampling frequency of the display device connected to OUT1A.

↓ ▲▼ keys

```
[OUT1A] 16/20/24BIT
8CHANNEL  COMPRESSED
```
Displays bit length, the number of channels, and correspondence status of compressed audio of the display device connected to OUT1A.

↓ ESC key: Returns to the previous screen

OUT1B to OUT4B are available only if HDBaseT output option is mounted.

EDID information is displayed into five screen pages at a maximum.

1st screen page:

Monitor name is displayed on the upper row. Resolution is displayed on the lower left and pixel clock is displayed on the lower right.

```
[OUT1A] MSD-804FD
1920x1080 148.50MHz↕
```

If no display device is connected, "UNCONNECTED" is displayed. If EDID cannot be loaded, "EDID READ ERROR" is displayed. In these cases, only the first screen page is displayed.

2nd screen page:

If the display device does not support HDMI, "DVI" is displayed on the lower row, and only the 1st and 2nd screen pages are displayed.

```
[OUT1A]
DVI                ↕
```

If the display device supports HDMI, "HDMI" is displayed on the upper row and the supported sampling configuration is displayed on the lower row. If only RGB signals

```
[OUT1A] HDMI
RGB/YCbCr422/444   ↕
```

are supported, "RGB" is displayed; and if color-difference signals are also supported, "YCbCr444" or "YCbCr422/444" follows "RGB".

3rd screen page:

The supported color depth is displayed. If Deep Color is not supported, "24BIT COLOR" is displayed; if Deep Color is supported, the supported color depth is displayed such as "24/30BIT COLOR" or "24/30/36BIT COLOR".

```
[OUT1A]
24/30BIT COLOR    ↕
```

4th screen page:

The supported audio sampling frequency is displayed.

```
[OUT1A]
32/44.1/48kHz     ↕
```

5th screen page:

The supported audio bit length such as "16BIT" and "16/20/24BIT" is displayed on the upper row, and the number of the supported audio channels, such as

```
[OUT1A] 16/20/24BIT
8CHANNEL  COMPRESSED
```

"2CHANNEL" and "8CHANNEL", is displayed on the lower left. If the compressed audio is supported, "COMPRESSED" is displayed on the lower right.

2. To display EDID using commands:

      @GES: Get monitor's EDID information

7.16.10 Version information [VERSION]

1. To display firmware version using menu:

```
MSD-804FD
```
Top

↓ SET key

```
[FUNCTION SELECT]
OTHERS              ⬍
```
▲▼ keys: Select "OTHERS".

↓ SET key

```
[OTHERS]
VERSION             ⬍
```
▲▼ keys: Select "VERSION".

↓ SET key

```
[VERSION]
MSD-804FD 1.00
```
Displays the firmware version.

↓ ESC key: Returns to the previous screen
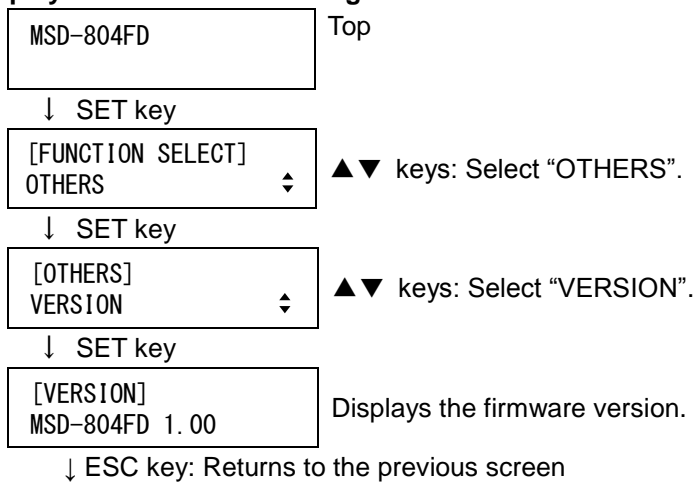
2. To display firmware version using commands:

@GIV: Get version information

8 ASCII codes

[Table 8.1] ASCII codes

Abbrev.	Hex	Abbrev.	Hex	Abbrev.	Hex	Abbrev.	Hex
NUL	00	SP	20	@	40	`	60
SOH	01	!	21	A	41	a	61
STX	02	"	22	B	42	b	62
ETX	03	#	23	C	43	c	63
EOT	04	$	24	D	44	d	64
ENQ	05	%	25	E	45	e	65
ACK	06	&	26	F	46	f	66
BEL	07	'	27	G	47	g	67
BS	08	(	28	H	48	h	68
HT	09	)	29	I	49	i	69
LF	0A	*	2A	J	4A	j	6A
VT	0B	+	2B	K	4B	k	6B
FF	0C	,	2C	L	4C	l	6C
CR	0D	-	2D	M	4D	m	6D
SO	0E	.	2E	N	4E	n	6E
SI	0F	/	2F	O	4F	o	6F
DLE	10	0	30	P	50	p	70
DC1	11	1	31	Q	51	q	71
DC2	12	2	32	R	52	r	72
DC3	13	3	33	S	53	s	73
DC4	14	4	34	T	54	t	74
NAK	15	5	35	U	55	u	75
SYN	16	6	36	V	56	v	76
ETB	17	7	37	W	57	w	77
CAN	18	8	38	X	58	x	78
EM	19	9	39	Y	59	y	79
SUB	1A	:	3A	Z	5A	z	7A
ESC	1B	;	3B	[	5B	{	7B
FS	1C	<	3C	¥	5C	|	7C
GS	1D	=	3D	]	5D	}	7D
RS	1E	>	3E	^	5E	to	7E
US	1F	?	3F	_	5F	DEL	7F

[Table 8.2] ASCII codes

Abbrev.	Hex	Description
NUL	00	NULl
SOH	01	Start Of Heading
STX	02	Start of TeXt
ETX	03	End of TeXt
EOT	04	End Of Transmission
ENQ	05	ENQuiry
ACK	06	ACKnowledge
BEL	07	BELl
BS	08	Back Space
HT	09	Horizontal Tabulation
LF	0A	Line Feed
VT	0B	Vertical Tabulation
FF	0C	Form Feed
CR	0D	Carriage Return
SO	0E	Shift Out
SI	0F	Shift In
DLE	10	Data Link Escape
DC1	11	Device Control 1
DC2	12	Device Control 2
DC3	13	Device Control 3
DC4	14	Device Control 4
NAK	15	Negative AcKnowledge
SYN	16	SYNchronous idle
ETB	17	End of Transmission Block
CAN	18	CANcel
EM	19	End of Medium
SUB	1A	SUBstitute
ESC	1B	ESCape
FS	1C	File Separator
GS	1D	Group Separator
RS	1E	Record Separator
US	1F	Unit Separator
SP	20	SPace
DEL	7F	DELete

9 Specification

Specifications and appearance are subject to change without notice.

Item			Description
Input	Video	HDMI/DVI	8 inputs
			TMDS single link, HDCP, TMDS clock: 25 MHz to 225 MHz
			HDMI Deep Color (*1)/DVI 1.0
			Cable equalization, EDID emulation
			Connector: HDMI TypeA (19 pin), female
		Supported format	VESA: Dot clock 25 MHz to 165 MHz (VGA to QWXGA)
			WUXGA/QWXGA: only Reduced Blanking
			SDTV/HDTV: 480i / 480p / 576i / 576p / 720p / 1080i / 1080p
	Audio	Digital audio	8 inputs Analog audio L/R switching
			Multi channel linear PCM: up to 8 channels
			Sampling frequency: 32 kHz to 192 kHz, 16 bit to 24 bit
			Standard level: -20 dBFS, maximum input level: 0 dBFS
			Connector: HDMI TypeA (19 pin), female
		Analog audio	8 inputs Digital audio switching
			Stereo L/R unbalanced signal
			Input impedance: 24 kΩ, Standard level: -10 dBu, Maximum input level: +10 dBu
			Connector: RCA pin jack
Output	Video	HDMI/DVI	4 outputs Distribution output with HDBaseT
			TMDS single link, HDCP, HDMI Deep Color (*1)/DVI 1.0
			Cable equalization
			Connector: HDMI TypeA (19 pin), female
		HDBaseT (Optional item)	2 outputs or 4 outputs (*2) Distribution output with HDMI/DVI
			Connector: RJ-45 (*3)
			Cable: Cat5e STP/UTP straight, Cat6 STP/UTP straight (*4)
		Supported format	VGA / SVGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA /
			SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ /
			WXGA++ / UXGA / WSXGA+ / VESA1080 / WUXGA / QWXGA
			VESA1080 / WUXGA / QWXGA: Reduced Blanking
			480i / 480p / 576i / 576p / 720p / 1080i / 1080p
	Audio	Digital audio	4 outputs × 2 distribution outputs
			2 distribution outputs only if HDBaseT output (optional extra) is mounted
			Multi channel linear PCM: up to 8 channels
			Sampling frequency: 32 kHz to 192 kHz, 16 bit to 24 bit
			Standard level: -20 dBFS; maximum output level: 0 dBFS
			Connector: HDMI TypeA (19 pin), female ×4, RJ-45×2/4 (optional extra)
		Analog audio	4 ouputs
			Stereo L / R unbalanced signal
			Output impedance: 75 Ω, standard level: -10 dBu, maximum output level: +10 dBu
			Connector: RCA pin jack
		Lip sync	Up to 8 frames
			88.2 kHz/96 kHz output: 5 frames (4 frames at output format 576i / 576p / 720p@50 / 1080i@50 / 1080p@50), 2 frames at 192 kHz output

Item		Description
Cable maximum extension distance		Digital input: 32.8 ft. to 98.4 ft./10 to 30 m (*5) Digital output: HDMI/DVI: 32.8 ft. to 164 ft./10 m to 50 m (*5), HDBaseT: 328 ft./100 m (*6)
Functions	Scan converter	Aspect ratio control, Picture adjustment (brightness, contrast, display position, display size, and so on), Seamless switching (*7)
	Others	Volume adjustment (settable for input/output separately), Lip sync, Video/audio (non-interlock) switching, Cross point memory (8 memories), Preset memory (8 memories + start-up memory), Last memory, Anti-Snow (*8), Connection reset (*9) External control commands (32 commands), Key lock
External control	RS-232C	2 ports, D-sub 9 pin connector, male
	LAN	1 port, RJ-45 connector, 10Base-T / 100Base-TX (Auto Negotiation), Auto MDI / MDI-X
	External control	Command output from RS-232C, LAN, or HDBaseT output to external devices PJLink (class1), Power control of sink devices using CEC (*10)
Others	Power supply voltage	AC ∼ 100 V - 240 V ±10%, 50 Hz / 60 Hz ±3 Hz
	Power consumption	0.8 A
	Enclosure dimensions	16.93(W) x 3.46(H) x 13.78(D)"/430(W) x 88(H) x 350(D) mm (EIA rack 2U, not including projections)
	Weight	Regular model: 11.9 lbs./ 5.4 kg HDBaseT2 and T4: 12.3 lbs./ 5.6 kg
	Temperature	Operating temperature: 32°F to 104 °F /0°C to + 40°C Storage temperature: -4°F to 176°F/-20°C to + 80°C
	Humidity	Operating/Storage humidity: 20% to 90% (Non condensing)
	Supplied items	RS-232C cable (1.8 m/ 5.9 feet), power cable (1.8 m/ 5.9 feet), brackets for mounting rack, Cable clamps×12

*1

30 bit/ pixel (10 bit/ component) Deep Color is supported.

xvYCC, Lip Sync, 3D, ARC, and HEC are not supported. (Lip Sync: manually adjustable)

*2

Only HDBaseT does not support DVI signal protected by HDCP. Use HDC-RD100 for the receiver to transmit those DVI signal.

*3

RJ-45 (HDBaseT output connector) is only for extending video, audio, power for a receiver, control signal using a Cat5e/Cat6 twisted pair cable. IDK receivers are required. Please do not connect LAN devices to this connector.

*4

Wiring is straight T568A or T568B. If exceeding 164.04 ft./50 m, it is recommended to use a Cat6 cable.

*5

Extended distance depends on the connected device. The data above is the maximum distance obtained when IDK's cable (AWG24) was used and signals, 1080p 60Hz 24 bit/ pixel (8 bit/ component), were input and output. If you use other cables or for other combinations of I/O devices, video signals may be unstable or may not be output even if it is within the distance range indicated above.

*6

Since some LCD monitors do not stabilize during operation, please check the operation before using or ask IDK for advices.

*7

Seamless switching with a black frame

*8

This function automatically recovers from a snow noise problem occurring when video signals having HDCP are displayed. It is mainly for the time of start-up and does not work if the problem has already occurred in signals input to the MSD or due to a low-grade transmission line.

*9

Connection reset function: Fixing problems automatically when a cable is repeatedly plugged in and out. This function may not be enabled if another device

is connected between the MSD and display device.

*10

Display device needs to support CEC. Some display device cannot be controlled by CEC from the MSD.

10 Trouble shooting

This chapter recommends what to do if you have problems operating the MSD.

In case the MSD does not work correctly, please check the following items first.
- ・Are the MSD and all devices plugged in and powered on normally?
- ・Are cables connected correctly?
- ・Are there no loose connections?
- ・Are correct cables supported by devices being used?
- ・Are signal specifications of connected devices matched to each other?
- ・Are settings of the display device correct?
- ・Are there any close objects that may cause noise?

If the problem still cannot be solved, perform the following actions. Refer to manuals of connected devices as well, since they may possibly be the cause of the problem.

Problem	Cause/Check item/Solution	Page
Video output		
Video is not output.	Check the error code in "**7.16.8 Display device status [MONITOR STATUS]**". (The MSD has multiple output connectors. Check the error code of the output connector that does not output video.) ・Error code 1: 　Set "**7.7.8 Video output connector [OUTPUT CONNECTOR]**" to "ON". ・Error code 2: 　Check if the source device is connected and turned on. ・Error code 3: 　Signals are not input. Check [1] to [5] on the next page. ・Error code 4: 　A problem may occur in the source device or HDCP authentication. Check [2], [4], and [5]. ・Error code 5: 　With using a sink device that is not HDCP compliant, only video without content protection (e.g. test pattern) can be output, and go black if signal with content protection is input. Some source devices check whether the sink device is HDCP compliant or not and output HDCP at all times. Since the MSD supports HDCP, output video cannot be output if the display device is not HDCP compliant. In that case, you can disable HDCP input from the source device in "**7.5.2 HDCP input enabled/disabled [HDCP INPUT ENABLE]**" in order to display the video. ・Error code 6 and 7: 　There are problems in the input device. ・If no error code is displayed: 　Set "**7.3.15 Test pattern [TEST PATTERN]**" to a pattern other than "OFF". If any test pattern is not output, check [5] to [6]. If a test pattern is output, the source device may not be outputting video.	—

Problem	Cause/Check item/Solution	Page
Video is not output.	[1] The set time for monitoring a no-signal input may be too short.	84
	[2] Change the setting of input equalizer.	87
	[3] If the source device has multiple output connectors, check the video output settings of the device.	－
Video is disappeared, interrupted, or has noise.	[4] If using a long cable for input or output, replace it with a 5 m/16.4 ft. or shorter cable. Since the MSD has the equalizing function, long cables can be connected, but the MSD may not provide its full performance depending on the cable quality and the connected device. If the problem is solved by replacing the cable, signals might have been degraded due to the long haul transmission. We have high-quality cables, equalizers, and extenders. Please contact us as needed.	－
	[5] When high-speed signals (high resolution: such as UXGA, WUXGA, 1080p; DEEP COLOR signals) are input or output, video may not be displayed or noise may appear depending on the cable quality and the connected device. If the problem occurs only when a specific input is selected, the problem was caused by the input side. If it occurs for all inputs or only when a test pattern is displayed, the problem was caused by the output side. Change the resolution to a lower level and/or disable Deep color.	
	You can check the resolution and color depth of the input signals in "**7.16.7 Input signal status [INPUT STATUS]**" and limit resolution and color depth of input signal according to the EDID setting.	125, 126

50 |
| | You can also specify output resolution and check the color depth of the output signals in "**7.16.8 Display device status [MONITOR STATUS]**" and limit the output signal color depth. | 105 |
| Input video and test pattern are not output. | [6] If you set the output resolution other than "AUTO", check if the selected resolution is supported by the sink device.
If you select 480i, 576i, or 1080i, video may not be output to sink devices that do not support interlaced signals.
For TV output resolutions (480i to 1080p), check the vertical synchronous frequency. PC output resolutions (VGA to QWXGA) may not be output to LCD TVs. | 50 |
Video is interrupted.	If you set "**7.5.4 Automatic detection of input video interruption [INPUT OFF CHECK]**" to "ON", false detection may occur. Change the setting to "OFF".	88
Video is interrupted or has noise.	If the problem occurs only with specific input, change settings of the input equalizer.	87
	If the problem occurs with all input channels or when a test pattern is displayed and if a long cable is connected for output, change the output equalizer setting.	95
The left, right, top and bottom sides are cut off.	If the problem occurs only when "CROSS HATCH" (a test pattern) is output, the sink device enlarges and displays the video. Adjust the sink device. If the device does not have the adjusting function, set the video size and position of the output.	71
	If the problem occurs even if "CROSS HATCH" is output to all outputs, check [7] to [11].	48

Problem	Cause/Check item/Solution	Page
Part of video is cut off or black is displayed at edge(s).	[7] Check the overscan setting.	59
	[8] Settings of the display position or size are not changed? **Note:** Display position and size can be set for each input or output.	60 to 69, 48
	[9] If aspect ratios of the input signals and output resolution do not match, video may be cut off or a black bar(s) may be displayed at edge(s) automatically depending on settings. If the video is displayed on the full screen by setting the aspect ratio to "FULL", there is no problem. If the aspect ratio does not match, you can select a) or b) below: a) video will be cut off b) a black bar(s) will be displayed at edge(s)	53 58
	[10] You do not normally need to set the starting point and active area, but set them only if the edge of 1 to 2 dots is cut off.	89 to 93
Black appears at top, bottom, right and left on PC video or only part of the PC video is displayed, and the rest is displayed by scrolling with the mouse.	[11] Does the resolution setting for the PC (You can check it in "Properties" of the PC) and the resolution output from the PC (You can check it in "**7.16.7 Input signal status [INPUT STATUS]**") match? If not, set the EDID and PC resolution manually.	123, 125 126
Video is reduced vertically or horizontally.	Do the selected aspect ratio of the output resolution and that of the connected sink device match? If not, set the aspect ratio of the sink device.	52
	Check the set aspect ratio of the input signals.	53
	Check the monitor setting of the source device (such as 4:3, 16:9, letter box and the like).	-
Video flickers.	If a still image of interlace signals is input, the video may blink.	-
	If interlace signals are input to a sink device that does not support interlace signals, the video may blink. Check the output resolution of the sink device.	50
PC's dual monitor cannot be set or the setting is canceled.	If the monitoring function for no-signal input works, the dual monitor function may not operate correctly. In this case, turn the monitoring function "OFF".	84
It takes a long time to output video after video input is switched.	If you set the HDCP output to "HDCP INPUT ONLY", some display devices may fail HDCP authentication. In this case, it may temporarily not output video and audio when a channel signal without HDCP support is input and then is switched to a channel signal with HDCP support is input. In this case, set the HDCP output setting to "ALWAYS".	103
Part of the bitmap is cut off, or bitmap is not displayed on the full screen.	If the bitmap resolution and output resolution are not matched, the bitmap may be partially cut off or may not be displayed on the full screen depending on settings of aspect ratio and display position. In this case, set the aspect ratio and display position as necessary.	191, 193

Problem	Cause/Check item/Solution	Page
Audio output		
Audio is not output	If audio is not output, first check the error code in "**7.16.8 Display device status [MONITOR STATUS]**". (The MSD has multiple output connectors. Find the error code of the output connector that does not output audio.) ・Error code 1: 　Turn "**7.8.2 Mute [OUTPUT MUTE]**" to "OFF". ・Error code 2: 　Ensure that the source device is connected and turned on. ・Error code 3: 　Signals are not input. Check [12],[13],[15], and [16]. ・Error code 4: 　There may be problems in the source device side or HDCP authentication. Check [12]. ・Error code 5: 　If the display device or AV amplifier does not support HDCP, only audio without content protection (such as analog input) is output; audio is not output when signals with content protection are input. Some HDMI/DVI devices will check if the connected device supports HDCP and determines whether to output HDCP signals or not. As the MSD supports HDCP, audio may not be output if the MSD is connected to a sink device or AV amplifier that does not support HDCP. In this case, disable HDCP input from the input device in "**7.5.2 HDCP input enabled/disabled [HDCP INPUT ENABLE]**". ・Error code 6: 　There are problems in the input device. ・Error code 7: 　LCD monitors may not output compressed audio, such as Dolby Digital, DTS, and so on. If playing contents with compressed audio (such as Blu-ray disc), check the audio output setting. Audio signals output from the source device can be controlled by setting EDID. ・Error code 8: 　Turn "**7.8.8 Audio output connector [OUTPUT CONNECTOR]**" to "ON". ・Error code 9: 　Set "**7.7.2 Output mode [OUTPUT MODE]**" to a mode other than "DVI MODE". ・Error code is not displayed: 　Check [12] to [16]. The input device may not be outputting audio.	129

Problem	Cause/Check item/Solution	Page
Audio is not output from digital input.	[12] Is video being output correctly? If not, check [1], [2], [4], and [5].	−
	[13] Are DVI signals output from the source device? You can check the input signal type in "**7.16.7 Input signal status [INPUT STATUS]**". DVI signals may be output depending on EDID settings.	126
	[14] Is audio format being used supported by the connected sink device or AV amplifier input? LCD monitors, especially, may not output 88.2 kHz or more sampling frequency of linear PCM and compressed audio (such as Dolby Digital, DTS, and so on).	212
	Audio signals output from the source device can be controlled by setting EDID.	129
Audio is not output.	[15] Is "**7.8.3 Audio input selection [AUDIO INPUT SELECT]**" set to "AUTO"? If not, change the setting to "AUTO" in order to switch the audio automatically.	113
	[16] If the input device has multiple output connectors, check audio output settings of the selected input device.	−
Audio is output from digital output connectors but not from analog output connectors.	If compressed audio (such as Dolby Digital, DTS, and so on) is input, analog audio is not output. You can check the input audio type in "**7.16.7 Input signal status [INPUT STATUS]**".	110, 129
Audio is output from analog output connectors but not from digital output connectors.	Can the connected display device or AV amplifier output audio with the selected resolution? With output resolutions for PCs (VGA to QWXGA), some display devices and AV amplifiers cannot output audio.	50
	Is the sampling frequency supported by the connected display device or AV amplifier? Plasma and LCD monitors may not output audio with a high sampling frequency (88.2 kHz or higher). If digital input audio is output, check the "SAMPLING FREQUENCY" of the input audio in "**7.16.7 Input signal status [INPUT STATUS]**". "SAMPLING FREQUENCY" output from the input device can be controlled by setting EDID. If analog input audio is output, set the "SAMPLING FREQUENCY"	129 117
Compressed audio (such as Dolby Digital, DTS) is not output from the source device.	Compressed audio input is controlled (EDID settings) by factory default. If using compressed audio, change the EDID setting.	129
	In order to output the compressed audio of multi-channel, set the number of speakers.	131
	Check the audio output settings of the source device.	−
Multi-channel audio is not output.	In order to output multi-channel audio, set the number of speakers.	131

Problem	Cause/Check item/Solution	Page
Key operation		
Keys do not operate.	Make sure that keys are not locked.	29
	Since no control command is registered by factory default, "DISPLAY POWER" and "COMMAND A to E" keys do not work. Register and associate control commands in order to enable these keys.	152, 168
	When a control command is executed using a key on the front panel, all keys are disabled until the command is executed or "INVALID TIME" passes.	172
	Immediately after start-up, all keys are disabled until the connection of the display device is completed.	208
	Make sure that keys are not locked.	－
Settings are not saved or reflected to the actual operation.	Settings of some menus will not be saved if the "MENU/SET" key is not pressed after setting.	－
Communication command control		

Communication command control from the PC to the MSD cannot be performed.	Are the following items set correctly?
	  For RS-232C: communication speed and data length
	  For LAN: IP address or subnet mask
		135, 138, 139, 146

	Is COM PORT's FUNCTION set to "RECIEVER" mode? If it is set to "TRANSMITTER" mode, the communication command of the MSD cannot be controlled externally.	136, 141
"@ERR,6" is returned.	If control command is executed by communication commands, communication command controls are disabled until execution of control commands finishes or "INVALID TIME" passes.	172
	Immediately after start-up, communication command controls are disabled until connection of the sink device is confirmed.	－
Sending control commands		
Control command is not sent.	Make sure that the registered control command and the number of bytes are correct. Devices requiring delimiters may not execute commands if the delimiters are not sent. If the set number of bytes is incorrect, the control command is not sent completely or unnecessary data is sent after the control command.	152
	Is the registered control command linked to the desired control command execution condition?	168
	Is COM PORT's FUNCTION set to "TRANSMITTER" mode? If it is set to "TRANSMITTER" mode, the communication command of MSD cannot be controlled externally. Set the communication port for sending control commands to "TRANSMITTER" mode. If using LAN, set the IP address and other settings of connected device.	136, 171

Problem	Cause/Check item/Solution	Page
"RETRY OVER ERROR" is displayed and control command is not sent completely.	Is the registered reply command correct?	163
	Make sure that the setting of "TIME OUT" for checking control commands is not too short.	152
Control through CEC cannot be performed.	Do you use cables supporting CEC? For CEC control, an HDMI cable supporting CEC is required.	163
	Does the display device support CEC? Is the HDMI association function of the display device set correctly? Enable the HDMI link control and Power on association function (for turning on the display device by external devices) of the display device.	
Others		
Input signals temporarily disappear when input channel is switched.	When the CEC connection changes, EDID may change. In this case, input signals are interrupted. Check the connection settings.	106
Devices cannot be controlled through CEC.	Are HDMI cables supporting CEC being used?	106
	To use CEC, enable HDMI link control of the connected devices (such as LCD TVs, Blu-ray recorder, and so on).	

If additional assistance is required, please perform the following tests and then contact us.

1. Does the same problem occur at all channels?
   -Yes-   -No-
2. Does the problem occur even if you directly connect the source and display devices using the genuine cable without using the MSD in-between?
   -Yes-   -No-

The problem still cannot be solved? Please contact us for assistance.

11 Fuse

The MSD is equipped with a glass tube-type fuse (5×20 mm/ 0.2"x0.79"), which prevents overcurrent from flowing into the MSD when a circuit or circuit part is broken.
If the MSD cannot be turned on, first check if the fuse placed in the AC inlet is blown or not. If it is blown, replace the blown fuse with the spare one by following the procedure below.

1. Turn off the MSD and unplug the power supply plug.
2. Remove the power connector from the AC inlet.
3. Remove the fuse holder by pulling out the depressed portion of the connection area for power supply connector using a screw driver or the like.
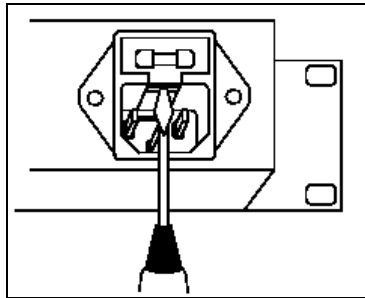
[Fig. 11.1] Fuse holder

4. Replace the current fuse with the spare fuse.
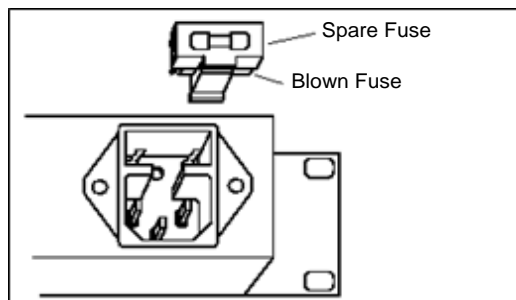
[Fig. 11.2] Replacing fuses

5. Put the fuse holder back into the original position.

Note:
In case the fuse blows again even after the blown fuse is replaced, the MSD may have problems. Please Contact your dealer.

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