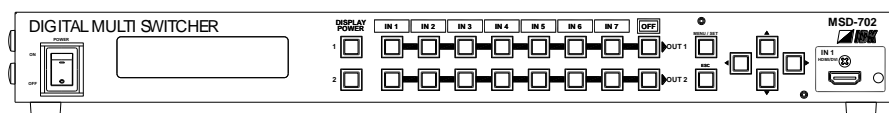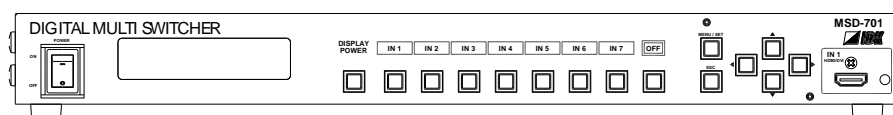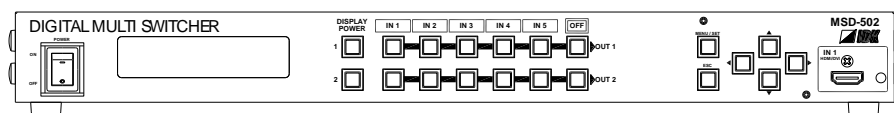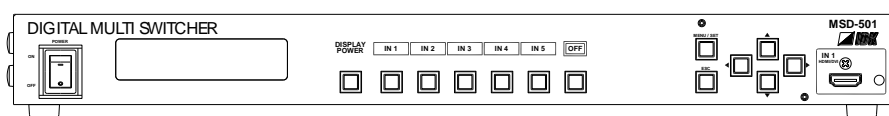**Presentation Switcher**

MSD-501/502/701/702

<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 User's Guide fully and carefully before using it and keep this manual beside the product.

IDK Corporation

Trademarks

- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing, LLC in the United States and other countries.
- PJLink is a trademark in Japan, the United States, and other countries/regions.
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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 Included items

Make sure all items below are included in the package.
If any items are missing or damaged, please contact IDK.
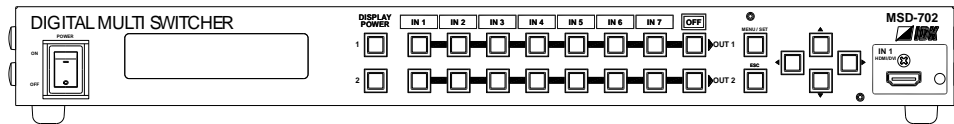
One (1) presentation switcher (main unit)
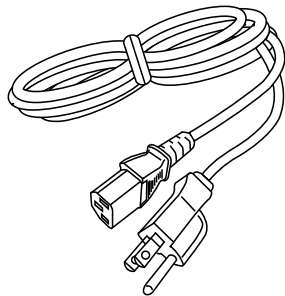
One (1) power cord
(1.8 meters; approximately 5.91 feet)
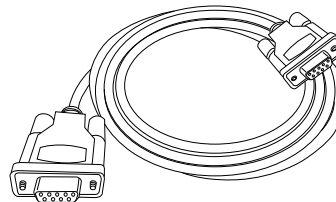
One (1) RS-232C cable
(1.8 meters; approximately 5.91 feet)
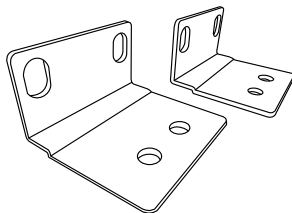
Two (2) rack mounting brackets
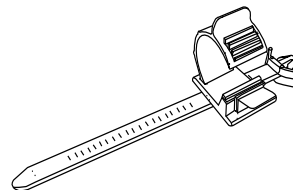
Cord clamps
   Three (3) for MSD-501
   Four (4) for MSD-502 and 701
   Five (5) for MSD-702

You can download the latest version of the User's Guide from IDK's website at:
http://www.idk.co.jp/en/index.html

2 Product outline

MSD-501/502/701/702 (hereafter referred to as "the MSD") is a presentation switcher having a built-in scan converter.

For video output, the following signals are supported: HDMI, DVI, composite video, S video, analog RGB, and analog YPbPr. Input video signal is converted up to QWXGA or 1080p and divided into two outputs: HDMI/DVI signal and HDBaseT signal.

For audio input, both digital and analog signals are supported and those signals can be converted each other. 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 signal.

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 can be controlled through RS-232C, LAN, and CEC 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.
HDBaseT signal support bidirectional communications of RS-232C and LAN.
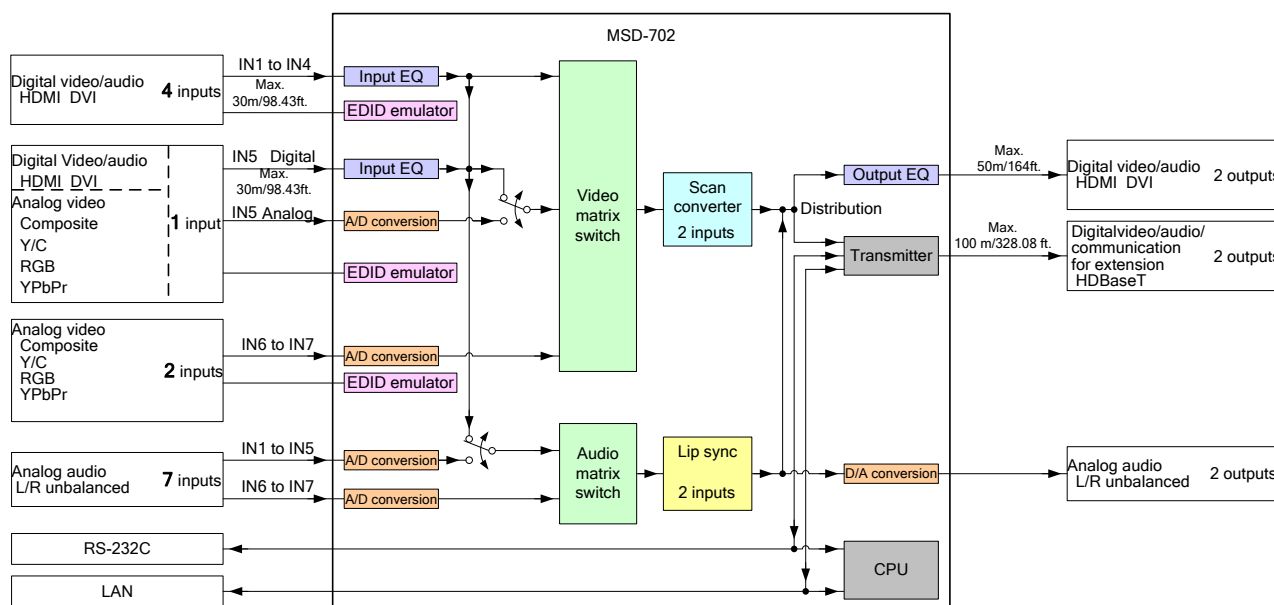
[Fig. 2.1] MSD-702 diagram

3 Features

- **Video**
  - Max. resolution: QWXGA (RB)[1],1080p
  - Digital cable compensatory function
      Input: up to 10 to 30 m/32.8 to 98.43 ft.
      Output: up to 10 to 50 m/32.8 to 164 ft.
  - Up to 100 m/328.08 ft. via Cat6 cable
  - Interlaced/Progressive conversion
  - Scan conversion
  - Aspect ratio control
  - Seamless switching[2]
  - A/D conversion output
  - Anti-snow

- **Audio**
  - Audio A/D and D/A conversion
  - Volume adjustment
  - Lip sync
  - Sample rate conversion

- **Control input**
  - RS-232C, LAN

- **Control output**
  - Control command output (Controlling projectors and the like)
  - PJLink
  - Controlling power supply of sink device by CEC

- **Others**
  - EDID emulation (with copy function)
  - Video and audio are switched separately
  - Front panel HDMI input connector
  - Cross point memory
  - Preset memory
  - Last memory
  - Connection reset
  - Key lock

*1 (RB) = Reduced Blanking

*2 A black frame is displayed at the time of switching

4 Panels

4.1 Front panel
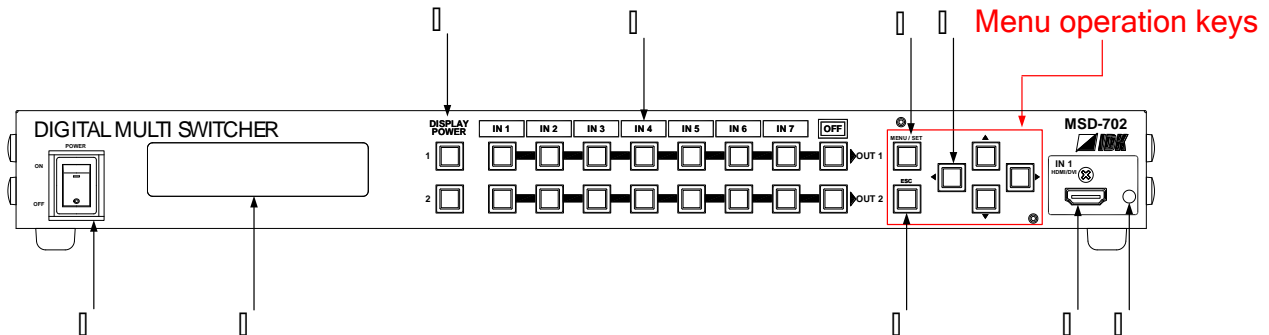
[Fig. 4.1] Front panel drawing (MSD-702)

#	Part name	Description
①	Power supply switch (POWER)	Turns on/off the MSD
②	DISPLAY POWER keys(DISPLAY POWER)	Turns on/off connected sink devices
③	Input channel selection key	Selects input channels
④	VFD screen	Displays menus and settings
⑤	MENU/SET key	Displays menus and edits/controls settings
⑥	ESC key	Cancels the current menu setting
⑦	Arrow keys (▲, ▼, ◄, ►)	Switches menu, moves cursor, and changes set values
⑧	HDMI input connector	An input connector for HDMI and DVI signal to connect to a source devices, such as Blu-ray players.
⑨	HDMI cable fixing hole	Fixes an HDMI cable by inserting a cable clamp.

4.2 Rear panel
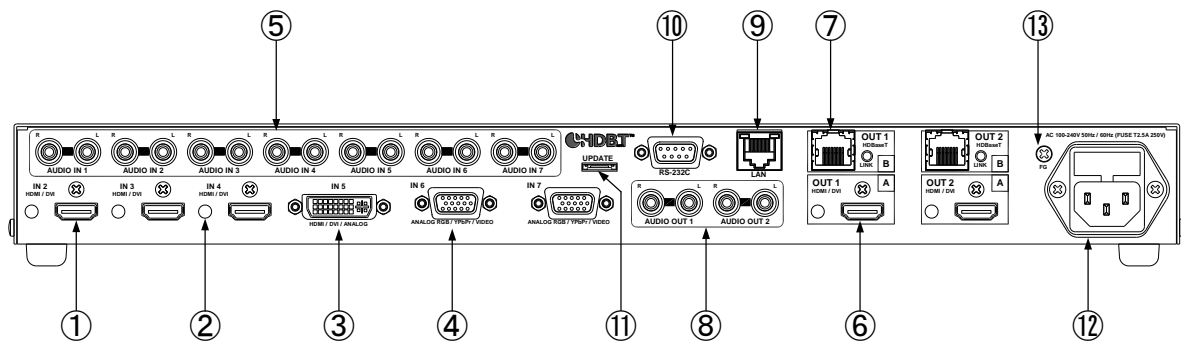
[Fig. 4.2] Rear panel drawing (MSD-702)

#	Part name	Description
①	HDMI input connector	Input connectors for HDMI and DVI signal to connect to a source devices, such as Blu-ray players.
②	HDMI cable fixing hole	Fixes HDMI cables by inserting cable clamps. 【See **[Fig. 5.8] Attaching a cable clamp**】
③	DVI input connector	Connects a DVI-I cable or DVI-D cable. HDMI signal can be input using an HDMI-DVI conversion cable. Analog video also can be input using a DVI-analog conversion cable. 【See: **DVI input connector**】 【See: **HDMI-DVI Conversion cable**】 【See: **Analog video input conversion cable**】
④	Analog video input connector	The following video signal can be input: analog RGB (such as PCs), YPbPr (SDTV/HDTV), composite video (NTSC/PAL), and S-video (NTSC/PAL) 【See: **Analog video input connector**】
⑤	Audio input connector	Input connector for stereo audio signal
⑥	HDMI output connector	Output connector for HDMI and DVI signal to connect to sink devices such as LC monitors and projectors
⑦	HDBaseT output connector	Digital (video/audio) signal can be extended up to 100 m/328.08 ft. using an HDC receiver together.
⑧	Audio output connectors	Analog output connectors of audio to connect to amplifier, speakers, and mixers.
⑨	LAN port	For external control by communication commands or web browsers
⑩	RS-232C ports	For external control by communication commands
⑪	Maintenance port	Not used. Keep this connector free
⑫	AC power connector	For the provided power cable
⑬	Frame ground	For indoor ground terminal. M3 screws are used.

5 Connecting to external device

5.1 Video input connector

■ DVI input connector

DVI-I29 pin connector is used. When inputting digital signal, use a single-link cable of DVI-I or DVI-D. Use a DVI-analog conversion cable to input analog video signal.
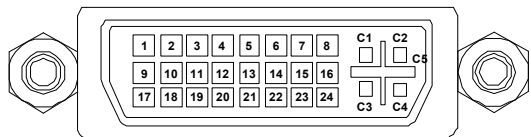
[Fig 5.1] DVI-I29 pin connector

[Table 5.1] Pin assignments

Pin #	Signal name	Pin #	Signal name	Pin #	Signal name
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+
3	TMDS Data2 Shield	11	TMDS Data1 Shield	19	TMDS Data0 Shield
4	N.C.	12	N.C.	20	N.C.
5	N.C.	13	N.C.	21	N.C.
6	DDC Clock	14	+5V Power	22	TMDS Clock Shield
7	DDC Data	15	GND	23	TMDS Clock+
8	Analog VD	16	Hot Plug Detect	24	TMDS Clock-
C1	Analog Red	C2	Analog Green	C3	Analog Blue
C4	Analog HD/CS	C5	Analog GND		

N.C.: No Connection

■ **Analog video input connector**

D-sub15 pin connector is used and enables not only analog RGB signal (such as PC) to be input, but also analog YPbPr (SDTV/HDTV), composite video (NTSC/PAL), and S-video (NTSC/PAL) signal to be input using a conversion cable.
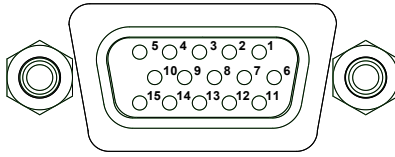
[Fig. 5.2] D-sub15 pin connector

[Table 5.2] Pin assignments

Pin #	Input signal to be used			
	Analog RGB	Analog YPbPr	Composite video	S video
1	Red	Pr/Cr	N.C.	N.C.
2	Green/G on Sync	Y	VIDEO	Y
3	Blue	Pb/Cb	N.C.	C
4	N.C.	N.C.	N.C.	N.C.
5	GND	N.C.	N.C.	N.C.
6	GND	GND	N.C.	N.C.
7	GND	GND	GND	GND
8	GND	GND	N.C.	GND
9	N.C.	N.C.	N.C.	N.C.
10	GND	N.C.	N.C.	N.C.
11	N.C.	N.C.	N.C.	N.C.
12	DDC Data	N.C.	N.C.	N.C.
13	HD/CS	N.C.	N.C.	N.C.
14	VD	N.C.	N.C.	N.C.
15	DDC Clock	N.C.	N.C.	N.C.

N.C.: No Connection

5.2 Preparation

Prepare the following cables before connecting to external devices, such as source and sink devices.

- ・HDMI cable (Type A (19 pin))
- ・DVI cable
- ・Twisted pair cable
- ・Stereo audio cable (RCA pin)

■ **HDMI cable**

[Conversion cable]

For when the external device has a DVI connector:
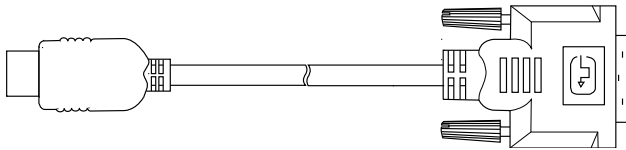
[Fig. 5.3] Conversion cable (HDMI-DVI conversion)

[Long cable]

For when a 5 m/16.4 ft. cable is used for I/O cable:
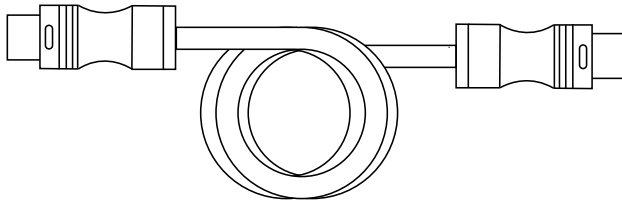
[Fig. 5.4] HDMI long cable (Flexible model)

■ DVI cable

For DVI input, use a DVI-I or DVI-D (male) cable.

For when a 5 m/16.4 ft. or longer cable is used:
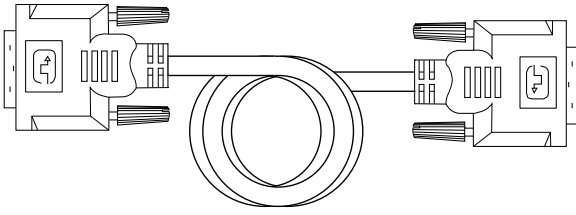
[Fig. 5.5] Single-link long cable

Note : Since DVI signal is very fast, use a cable meeting DVI Rev1.0 standard.

■ Analog video input conversion cable

If inputting analog YPbPr signal or composite video signal, use "CC-01", analog video input conversion cable.
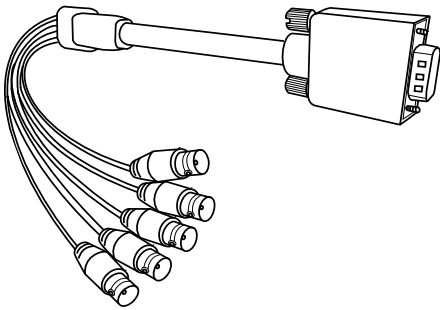
[Fig. 5.6] Analog video input conversion cable: CC-01

5.3 Precautions

Before connecting to external devices, follow the precautions below.

■ **Installation**
● Do not place the MSD on top of another MSD.
● Do not block vent holes. Please secure the space above ambient 30 mm/1.18 inches.
● Prepare ventilating equipment to keep the ambient temperature at 40 degrees C/104 degrees F or less. If inadequately vented, the life of parts may be shortened and operations may be affected.

■ **Twisted pair cable**
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.

● We recommend a Cat6 UTP/STP cable for the twisted pair cable.
● If using an STP cable, connect the FG connector to an earth ground source. Otherwise, the shielding feature does not work correctly. When using a UTP cable, we still recommend using the ground connector.
● For 50 m/164.04 ft. or shorter transmissions, Cat5e UTP cable can be used.
● The shielded STP cables are less affected by interference or external noise than UTP cables.
● The maximum extension distance of Cat5e/Cat6 UTP/STP cable is the shorter maximum extension distance of the connected HDC receiver and sink device.
● For pin assignments, apply T568A or T568B standards for straight through wiring.
● Do not give connection cables a strong pull. The allowable tension of the twisted pair cable is 110 N.
● Do not bend the connection cable at a sharp angle. Keep the bend radius four times of the cable diameter or longer.
● Do not tie the cable tightly; leave a space allowing the cable to move slightly.
● If you use the same cables, we recommended keeping a distance between the cables or not to place the cables closely in parallel.
● Keep the twisted pair cable as straight as you can. If you coil the cable, it is easily affected by noise.
● Do not place this product in an electrically noisy environment, since high-speed signal is transmitted. Particularly when you use a high-output radio around this device, video or audio may be interrupted.
● 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. Up to two cable couplers are allowed. Couplers supporting Cat6A (10GBase-T) are recommended.

Note: If there is a problem in the transmission path, video or audio may be interrupted. Please check the items above. If the problem still cannot be solved, shorten the length of the twisted pair cable.

■ Cabling

・ Read manuals of the external devices.

・ Be sure to plug cables completely and install them without any stress on connectors.

・ Fix HDMI cables using cable clamps to prevent those cables from falling off.

HDMI cable fixing hole
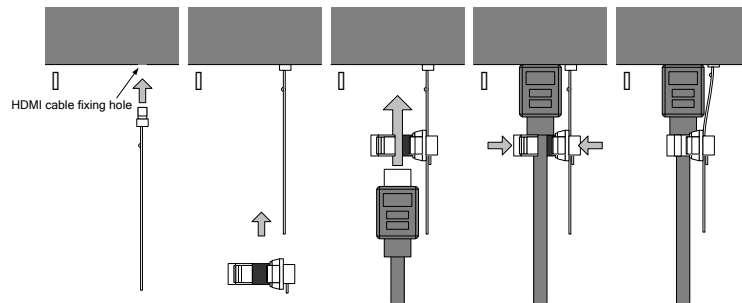
[Fig. 5.7] Attaching a cable clamp

Note: Cable clamps for the front panel is not provided as included items. Please contact us if needed.

5.4 Example connection

Video/audio
HDMI: Embeded audio can be used. (Multichannel linear PCM: up to 8 channels)

Video

HDMI, DVI, composite video (NTSC/PAL), S video (NTSC/PAL), analog RGB, analog YPbPr (SDTV/HDTV) can be input.

Audio
Digital I/O and analog I/O can be converted each other.

External control
For controlling the FDX, RS-232C and LAN can be used.

External device control
If control command is registered, external devices can be controlled via RS-232C, LAN, CEC.
Standard protocol PJLink (class1) for projector control is supported.

[Fig. 5.8] Source and sink devices are connected

6 Basic operation

6.1 Required time

After the MSD is turned on, it takes 3 seconds to receive communication command and takes 12 seconds or longer to receive front panel operation.

Operation	Required time
Receiving communication command	3 seconds
Receiving operation of front panel	12 or longer seconds

Note: If "**7.15.7 Bitmap output at startup (P.93)**" is set to "ON", the required time for front panel operation may be longer than 12 seconds.

6.2 Selecting input channel

Switching mode of input channel can be selected from the top screen or SWITCHING MODE menu.
If you set it from the top screen, use "▲" and "▼ "keys to select the desired mode and press the desired input channel key.

Top screen

MSD-702

[V&A]

V&A	Video and audio simultaneously
VIDEO	Only video
AUDIO	Only audio

Channel switching mode

Example MSD-702

IN3 input signals will be output to OUT1.

IN5 input signals will be output to OUT2.

Example MSD-501

IN1 input signals will be output.
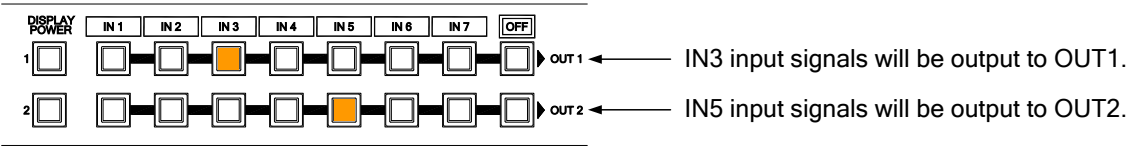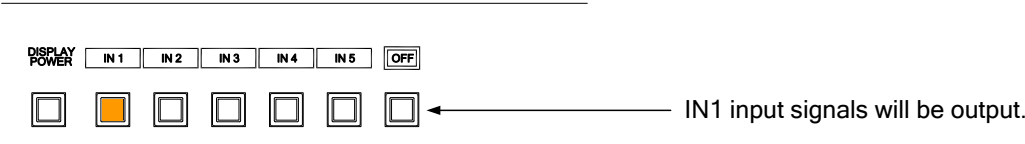
[Fig. 6.1] Setting output signal

6.3 Menu operation

You can use the VFD screen and front panel keys to set each setting.

- Press the "MENU/SET" key to apply the setting and to go to the next hierarchy.

- Press the "ESC" key to go back to the previous screen.

- Use the "◄" and "►" keys to select channels and use the "▲" and "▼" keys to select the menu item.
  In the setting screen, use "◄", "►", "▲" and "▼" keys to move the cursor and set the setting, and the set
  value will be saved automatically after the operation. Available   "◄", "►", "▲" and "▼" keys are displayed
  on the right side of the screen. LEDs of available menu operation keys turn on.
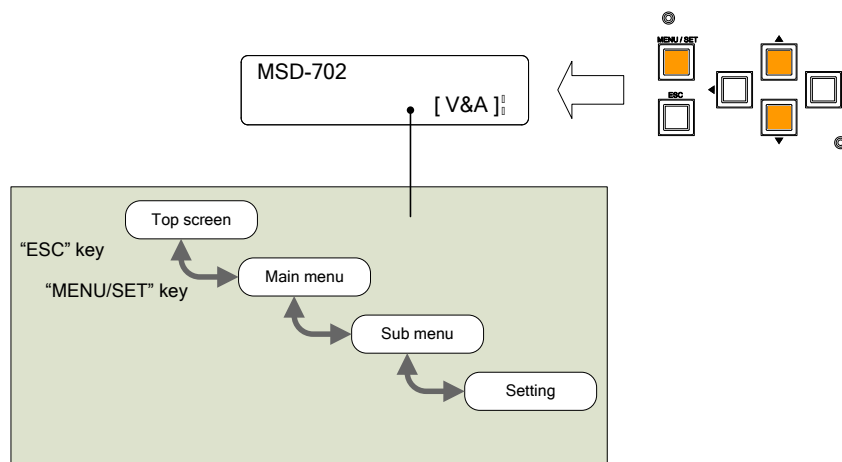
[Fig. 6.2] Menu hierarchy
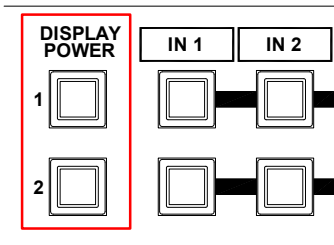
・Some setting screens, the set value is applied from the "**MENU/SET**" key. When the "**MENU/SET**" key blinks,
  press the key to apply the set value, and then the key will turn on (not blinking any more).

・We have the cover for menu operation keys to prevent accidental operations. Please contact us as needed.

Note: Do not turn off the MSD while "**NOW SAVING**" is displayed, otherwise, the setting information
        may be lost.

6.3.1 Controlling power supply of sink device

You can register the control command to turn on/off the sink device. Press the key to send the control command to the sink device.

【See: **7.13.3 Command link**】

Sink device	LED
Turned ON	Lights (orange)
Turned OFF	Turned off

[Fig. 6.3] Sink device power supply key
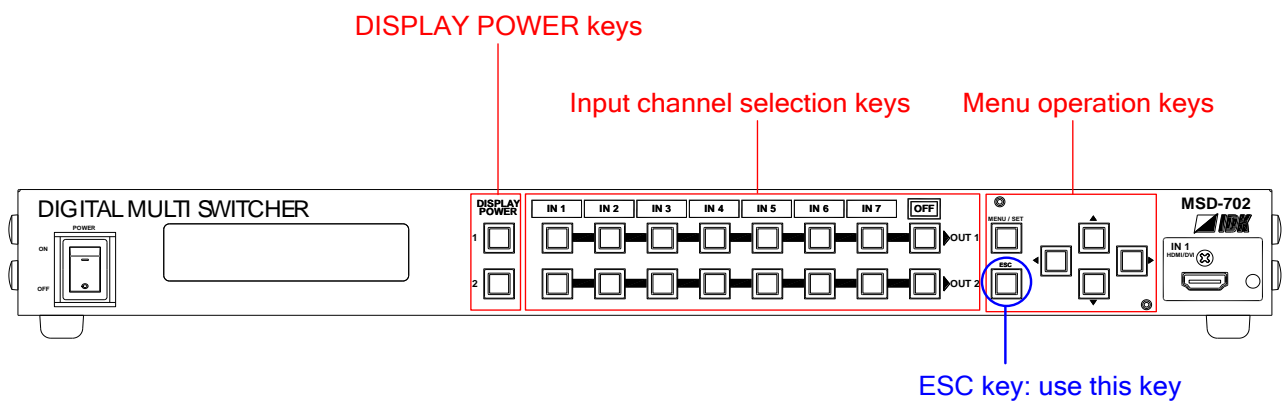
Note: If the reply command from the sink device is not checked, the actual power status of the sink device and the LED may not match.

6.3.2 Setting and canceling key lock

Press and hold the "**ESC**" key for 5 seconds or longer to set/cancel key lock for keys below. You will hear a long beep sound and then the following message is displayed for 1 second.

- ● "**KEY LOCK !**"
- ● "**KEY LOCK RELEASE !**"

【See: **7.17.1 Key lock mode**】

[Fig. 6.4] Keys to be set/cancel key lock (MSD-702)

6.4 Initialization

All settings will be reset to factory default values by turning on the MSD while pressing the "**ESC**" key.
Press and hold the "**ESC**" key until you hear a long beep sound.

6.5 Control from WEB browser

You can control the MSD via LAN from a web browser, such as Microsoft Internet Explorer.
Type the IP address that is set to the MSD in the address bar to open the operation window.

【See: **7.12.1 IP address/subnet mask/gate way address**】
【See: **7.12.3 TCP**】

Input example

Control port number of web browser	IP address
80 (Normal)	http://192.168.1.199
Other than 80 (5000 to 5999)	http://192.168.1.199:5000 (ex: 5000)

When you type the IP address, the following window will be displayed.
From the window shown in left, you can select input channel, read preset memory, and set output audio.
Set "**AUTO RELOAD TIMER**" (10 to 65535 seconds by 1 second) to update the state of the MSD regularly. In order to disable this function, set it to "0" second.
You can set the input and output channel name by clicking the "NAME EDIT" button to open the window shown in right.
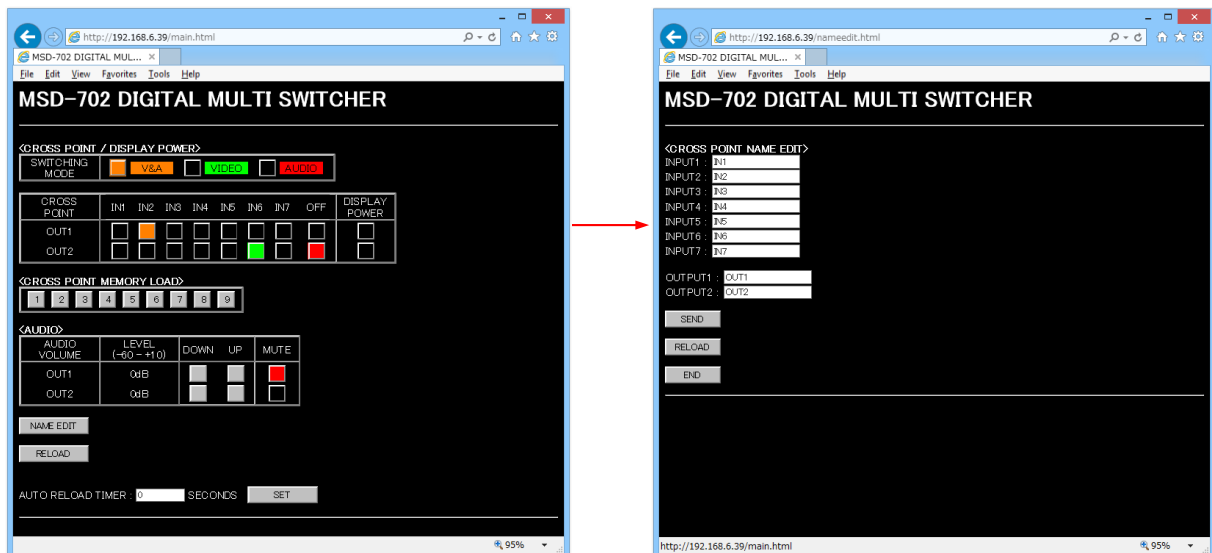
6.6 Remote control application

You can control the MSD from the PC through RS-232C or LAN communication using the remote control application which can be downloaded from IDK's website at: http://www.idk.co.jp/en/index.html

7 Menu

7.1 Menu list

```
Top screen
├──Main menu
│    ├──Sub menu
│    │   ├

MSD-501 / 502 / 701 / 702
│
│ /*7.3 Channel switching mode*/
├──SWITCHING MODE
│
│ /*7.4 Setting position, size, and masking*/
├──OUTPUT TIMING
│    ├──RESOLUTION
│    ├──MONITOR ASPECT
│    ├──INPUT ASPECT
│    ├──ASPECT PROCESS
│    ├──INPUT OVER SCAN
│    ├──INPUT POSITION
│    ├──INPUT SIZE
│    ├──INPUT MASKING
│    ├──INPUT AUTO SIZING
│    ├──OUTPUT POSITION
│    ├──OUTPUT SIZE
│    ├──OUTPUT MASKING
│    ├──OUTPUT AUTO SIZING
│    ├──BACKGROUND COLOR
│    └──TEST PATTERN
│
│ /*7.5 Quality setting*/
├──IMAGE EFFECT
│    ├──INPUT SHARPNESS
│    ├──INPUT BRIGHTNESS
│    ├──INPUT CONTRAST
│    ├──INPUT HUE
│    ├──INPUT SATURATION
│    ├──INPUT SETUP LEVEL
│    ├──IN DEFAULT COLOR
│    ├──OUTPUT BRIGHTNESS
│    ├──OUTPUT CONTRAST
│    └──OUT DEFAULT COLOR
│
│
```

```
│ /*7.6 Input settings*/
├──INPUT SETTING
│    ├──INPUT VIDEO DETECT
│    ├──HDCP INPUT ENABLE
│    ├──INPUT EQUALIZER
│    ├──ANALOG INPUT TYPE
│    ├──INPUT OFF CHECK
│    ├──INPUT5 TYPE[1]
│    ├──AUTO SWITCHING
│    └──AUTO SWITCHING MASK
│
│ /*7.7 Setting input timing*/
├──INPUT TIMING
│    ├──AUTO SETUP
│    ├──H TOTAL DOTS
│    ├──H START
│    ├──H DISPLAY
│    ├──V START
│    ├──V DISPLAY
│    ├──AUTO START POS
│    ├──UNKNOWN TIMING
│    ├──LOAD
│    ├──SAVE
│    └──TRACKING
│
│ /*7.8 Output settings*/
├──OUTPUT SETTING
│    ├──OUTPUT EQUALIZER
│    ├──OUTPUT MODE
│    ├──SYNC OUTPUT
│    ├──VIDEO OUTPUT
│    ├──VIDEO SWITCHING
│    ├──SWITCHING SPEED
│    ├──WIPE COLOR
│    ├──OUTPUT CONNECTOR
│    ├──HDCP OUTPUT MODE
│    ├──HDCP ERROR RETRY
│    ├──DEEP COLOR OUTPUT
│    ├──CEC CONNECTION
│    └──HDCP AUTHORIZATION
│
│
```

[1] Supported by only MSD-701/702.

```
│ /*7.9 Audio settings*/
├──AUDIO
│     ├──OUTPUT LEVEL
│     ├──OUTPUT MUTE
│     ├──AUDIO INPUT SELECT
│     ├──INPUT OFFSET
│     ├──OUTPUT LIP SYNC
│     ├──INPUT LIP SYNC
│     ├──SAMPLING FREQUENCY
│     ├──OUTPUT CONNECTOR
│     ├──DIGITAL OUTPUT
│     ├──MULTI AUDIO
│     └──TEST TONE
│
│ /*7.10 EDID*/
├──EDID
│     ├──EDID DATA
│     ├──PC RESOLUTION
│     ├──AV RESOLUTION
│     ├──DEEP COLOR INPUT
│     ├──AUDIO FORMAT
│     ├──SPEAKER
│     └──MONITOR EDID COPY
│
│ /*7.11 RS-232C*/
├──COM PORT
│     ├──PARAMETERS
│     ├──FUNCTION
│     └──OUT B SCI CONNECT
│
│ /*7.12 LAN*/
├──LAN
│     ├──IP ADDRESS
│     ├──SUBNET MASK
│     ├──GATEWAY ADDRESS
│     ├──FUNCTION
│     ├──PORT NUMBER
│     └──MAC ADDRESS
│
│ /*7.13 Setting control command*/
├──PRESET COMMAND
│     ├──COMMAND EDIT
│     ├──RECV COMMAND EDIT
│     ├──COMMAND LINK
│     ├──COMMAND EXECUTION
│     ├──INVALID TIME
│     ├──INITIALIZE
│     └──FLASH TIME
│
```

```
│ /*7.14 Preset memory*/
├──PRESET MEMORY
│     ├──LOAD CROSS POINT
│     ├──SAVE CROSS POINT
│     ├──EDIT CROSS POINT
│     ├──LOAD ALL SETTING
│     ├──SAVE ALL SETTING
│     └──START UP
│
│ /*7.15 Setting bitmap*/
├──BITMAP
│     ├──BITMAP OUTPUT
│     ├──BACKGROUND COLOR
│     ├──ASPECT
│     ├──POSITION
│     ├──CHANNEL ASSIGN
│     ├──POWER ON BITMAP
│     ├──DIVIDE MEMORY
│     └──VIDEO CAPTURE
│
│ /*7.16 Startup settings*/
├──POWER ON SETTING
│     ├──DISPLAY POWER
│     └──KEY LOCK
│
│ /*7.17 Other settings*/
└──OTHERS
      ├──KEY LOCK MODE
      ├──BUZZER
      ├──POWER SAVE
      ├──POWER SWITCH ON
      ├──INPUT CHANNEL LINK[*2]
      ├──TOP DISPLAY
      ├──INPUT STATUS
      ├──MONITOR STATUS
      ├──EDID STATUS
      └──VERSION
```

[*2] Supported by only MSD-502/702.

■ **Setting range**

Some menus can be set for each input or output, and each setting range is mentioned in the each menu description.

Setting range	Description
For each output (common to OUTA and OUTB)	The output setting can be applied to both OUTA and OUTB.
For each output (each OUTA/OUTB)	Can be set for each OUTA output and each OUTB output separately.
For each output (only OUTA)	Can be set for each output of OUTA.
For each output/ For each bitmap	The output setting can set for each bitmap separately. The setting can be applied to both OUTA and OUTB.
For each input/ For each input signal	Can be set for each input and each input signal separately.
For each input	Can be set for each input separately.
For each input (Only digital input)	Can be set for each digital input separately.
For each input (Only analog input)	Can be set for each analog input separately.
For each connection	Can be set for each connection separately.
For each command	Can be set for each command separately.

7.2 Input Signal Automatic Detection

The MSD continuously monitors input signal. If input signal that have been input before, they are output with the same size and quality of view used previously. If input signal is not matched with any signal 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.

【See: **7.4 Setting position, size, and masking**】
【See: **7.5 Quality setting**】
【See:**7.7 Setting input timing**】
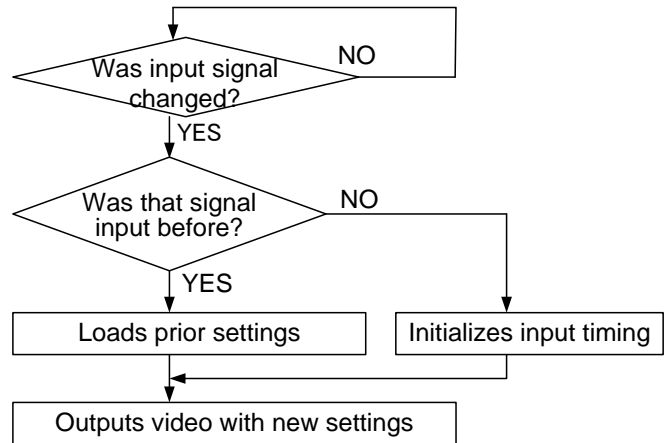
[Fig. 7.1] How signal is recognized

The MSD saves data of 50 input devices for each channel, and the data is used to check whether the input signal 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. 7.2] Memory table per channel

The following items are saved for each input signal.

[Table 7.1] Items saved for each input signal

Setting	Item
Setting position, size, and masking	Aspect ratio, Aspect ratio control, Overscan, Display position, Display size, Masking
Quality setting	Sharpness, Brightness, Contrast, HUE, Saturation, Black level
Input settings	Signal type of analog input
Setting input timing	The total number of horizontal dots, Start position, Active area, Automatic measurement of start position, Tracking
Audio settings*	Input level, Lip sync

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

7.3 Channel switching mode

Menu	Top→SWITCHING MODE
Setting value	V&A (video & audio) [Default], VIDEO, AUDIO

The mode can be switched from the top screen only when "**OTHERS→TOP DISPLAY**" is set to "**NORMAL".**

【See:**6.2 Selecting input channel**】

【See:**7.17.6 Top**】

7.4 Setting position, size, and masking

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

7.4.1 Output resolution

Menu	Top→OUTPUT TIMING→RESOLUTION
Setting for	Each output (common to OUTA and OUTB)
Setting value	

・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)	

Normally, the optimal resolution will be selected automatically if you set this menu to "AUTO-A" or "AUTO-B".

Numbers following "@" are vertical synchronous frequency.
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.

■"AUTO-A" and "AUTO-B":
"AUTO-A": selects the optimal resolution depending on the EDID of the connected sink device, and outputs video signal to the OUTA output connector.
"AUTO-B": selects the optimal resolution depending on the EDID of the connected sink device, and outputs video signal to the OUTB output connector.
At this time, the resolution that is actually output is displayed in parentheses. In case EDID cannot be loaded from the sink device, the resolution that was used in the last time is selected with "*" on its right side.

```
[OUT1 RESOLUTION]◀✦▶
AUTO-A(1080p59.94)
```
```
[OUT1 RESOLUTION]◀✦▶
AUTO-A(1080p59.94)＊
```

[Fig. 7.3] Left: optimal resolution; right: EDID cannot be loaded or the MSD cannot output the optimal resolution

7.4.2 Aspect ratio of sink device

Menu	Top→OUTPUT TIMING→MONITOR ASPECT
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	

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

You can set the aspect ratio of the connected sink device.

If you select "RESOLUTION", the aspect ratio of the resolution selected in "**Output resolution**" will be applied. If aspect ratio of the target sink device and the ratio set in "**Output resolution**" are different from each other, you can select an aspect ratio of the sink device from "4:3", "5:4", "5:3", "16:9", and "16:10".

7.4.3 Aspect ratio

Menu	Top→OUTPUT TIMING→INPUT ASPECT
Setting for	Each input/input signal
Setting value	

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

You can set the aspect ratio of input video.

If you select "AUTO-1" or "AUTO-2", the aspect ratio will be restored automatically to the original ratio according to the settings of "**7.4.2 Aspect ratio of sink device**" and "**7.4.4 Aspect ratio control**".
"AUTO-1" and "AUTO-2" work differently only when letter box signal is input. "AUTO-1" processes them as video signal 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.

Settings of "4:3","16:9","14:9","16:9 / 14:9 LETTER BOX", and "4:3 / 14:9 SIDE PANEL" are enabled only when TV signal is input. When PC signal is input, the aspect ratio will be restored automatically according to the aspect of the input signal regardless of settings of "AUTO-1","AUTO-2","4:3","16:9","14:9","16:9 / 14:9 LETTER BOX", and "4:3 / 14:9 SIDE PANEL".

"FULL": video signal is displayed always on full screen regardless of input video signal and settings of "**7.4.2 Aspect ratio of sink device**" and "**7.4.4 Aspect ratio control**".

"THROUGH": video signal is displayed always in pixel 1:1 regardless of settings of "**7.4.2 Aspect ratio of sink device**" and "**7.4.4 Aspect ratio control**".

7.4.4 Aspect ratio control

Menu	Top→OUTPUT TIMING→ASPECT PROCESS
Setting for	Each input/input signal
Setting value	L-BOX/S-PANEL : letter box/side panel [Default]
	S-CUT/TB-CUT : Side cut/top bottom cut

Input signal	Output signal	
	L-BOX/S-PANEL	S-CUT/TB-CUT
16:9 input video is output to a 4:3 sink device.	Letter box	Side cut
4:3 input video is output to a 16:9 sink device.	Side panel	Top/bottom cut
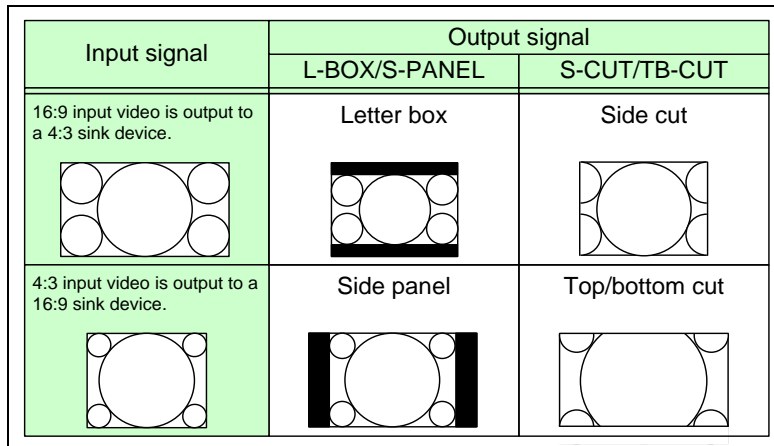
[Fig. 7.4] Restoring aspect ratio

7.4.5 Overscan

Menu	Top→OUTPUT TIMING→INPUT OVER SCAN
Setting for	Each input/input signal
Setting value	100% to 115%
	[Default] NTSC / PAL / SDTV: 105%; HDTV / PC: 100%

You can set enlarged display of input video.

7.4.6 Display position

Menu	Top→OUTPUT TIMING→INPUT POSITION (Input side) / OUTPUT POSITION (Output side)
Setting for	Input side : each input/input signal
	Output side : each output (COMMON TO OUTA AND OUTB)

Setting value

Input side:

Horizontal position (−Horizontal input size   to ＋Horizontal output resolution   [Default] 0)

Vertical position   (−Vertical input size   to ＋Vertical output resolution   [Default] 0)

Output side:

Horizontal position (−Horizontal output size to ＋Horizontal output resolution   [Default] 0)

Vertical position   (−Vertical output size   to ＋Vertical output resolution   [Default] 0)

You can set the position where input video is displayed.

Note:

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

7.4.7 Display size

Menu	Top→OUTPUT TIMING→INPUT SIZE (Input side) / OUTPUT SIZE (Output side)
Setting for	Input side : each input/input signal
	Output side : each output (COMMON TO OUTA AND OUTB)
Setting value	

Input side: Horizontal size (Horizontal output resolution÷4   to   Horizontal output resolution×4
      [Default] Horizontal output resolution)
      Vertical size   (Vertical output resolution÷4   to   Vertical output resolution×4
      [Default] Vertical output resolution)

Output side: Horizontal size (Horizontal output resolution÷4   to   Horizontal output resolution×4
      [Default] Horizontal output resolution)
      Vertical size   (Vertical output resolution÷4   to   Vertical output resolution×4
      [Default] Vertical output resolution)

You can set the display size of input video.
The video size is scaled based on the upper left of the input video set in "**7.4.6 Display position**".
If you set "LINK" to "ON", only settings of "H"(Horizontal) can be set and "V" is set automatically with the current aspect ratio kept.

Notes:
- If the resolutions of each output are not the same, the output resolution of OUT1 will be the standard.
- Numbers following "/" show the output resolution.

7.4.8 Masking

Menu	Top→OUTPUT TIMING→INPUT MASKING (Input side) / OUTPUT MASKING (Output side)
Setting for	Input side : each input/input signal
	Output side : each output (COMMON TO OUTA AND OUTB)
Setting value	

Input side: Left side masking   (Horizontal input position to Right side masking
    [Default] 0)
    Right side masking (Left side masking to Horizontal input position＋Horizontal input size
    [Default] Horizontal input size)
    Top side masking   (Vertical input position to Bottom side masking
    [Default] 0)
    Bottom side masking (Top side masking to Vertical input position＋Vertical input size
    [Default] Vertical input size)

Output side: Left side masking   (Horizontal output position (0 or more) to Right side masking
    [Default] 0)
    Right side masking (Left side masking to Horizontal output position＋Horizontal output size
    (Horizontal output resolution or less)
    [Default] Horizontal output resolution)
    Top side masking   (Vertical output position (0 or more) to Bottom side masking
    [Default] 0)
    Bottom side masking (Top side masking to Vertical output position＋Vertical output size
    (Vertical output resolution or less)
    [Default] Vertical output resolution)

You can set the masking of input video to hide unnecessary area (top/bottom and right/left).

7.4.9 Automatic sizing

Menu	Top→OUTPUT TIMING→INPUT AUTO SIZING (Input side) /
	OUTPUT AUTO SIZING (Output side)
Setting for	Input side : each input/input signal
	Output side : each output (COMMON TO OUTA AND OUTB)

This function adjusts output signal optimally, and as a result, the following settings will be initialized automatically.
A long buzzer will sound when the initialization is completed by pressing the MENU/SET key.

[Table 7.2] Items to be initialized

Items to be initialized	Input side	Output side
Aspect ratio, ovescan	Initialized	-
Display position, display size, masking	Initialized	Initialized

7.4.10 Background color

Menu	Top→OUTPUT TIMING→BACKGROUND COLOR
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	R / G / B: 0 to 255 [Default]R / G / B: 0 (black)

You can set the background color of output video.
If you set "LINK" to "ON", only settings of "R" can be set, and "G" and "B" change relatively.

7.4.11 Test pattern

Menu	Top→OUTPUT TIMING→TEST PATTERN
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	[Fig. 7.5]
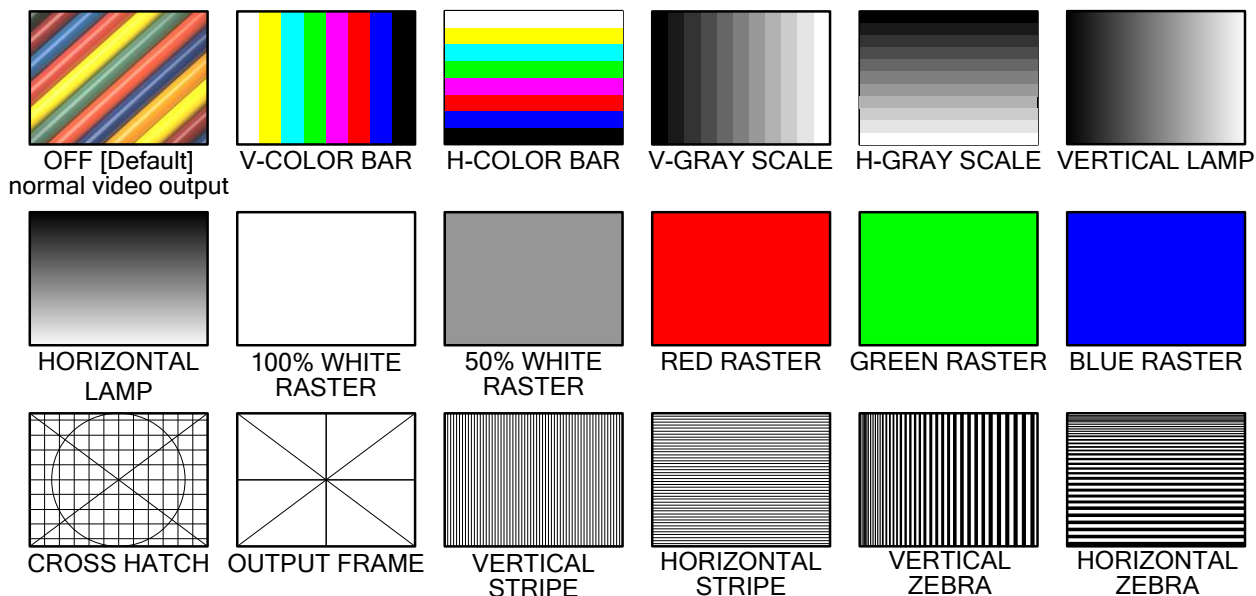
[Fig. 7.5] Test pattern

You can select a test pattern to be output instead of displaying video.
All settings of "**7.5 Quality setting**" will be invalid while a test pattern is displayed.

For "OUTPUT FRAME": use this pattern if edges are cut off due to enlargement display on the sink device.
Settings of "**7.4.6 Display position**" and "**7.4.7 Display size**" in the output side will be adjusted in order to display the test pattern on full screen.

For test patterns other than "OUTPUT FRAME": video is output on full screen with the resolution set in "**7.4.1 Output resolution**" and the settings of "**7.4.6 Display position**", "**7.4.7 Display size**" and "**7.4.8 Masking**" will be invalid.

You can scroll "COLOR BAR","GRAY SCALE","LAMP", and "ZEBRA" by using arrow keys (▶, ▲, ▼). The scroll speed can be set by 3 pixels/a frame up to 30 pixels/ a frame with ▲ and ▼ keys.
You can check the residual image (resolution of moving picture) by displaying "ZEBRA".

7.5 Quality setting

Setting items for input channels are for correcting color bias.
Image quality to be output can be set for each input side (input channels) and output side (output channels) as follows.
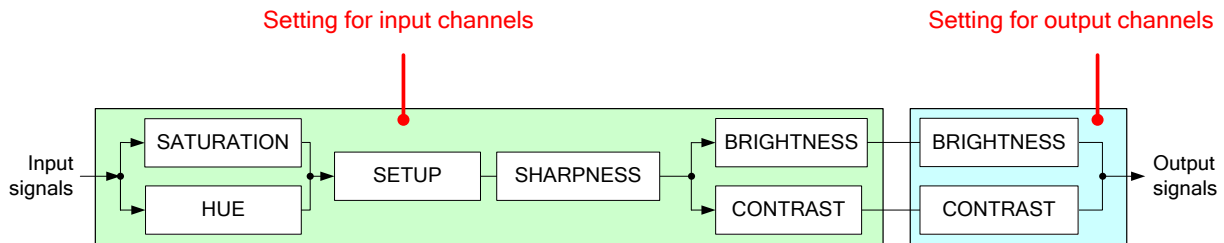
[Fig. 7.6] Video correction

7.5.1 Sharpness

Menu	Top→IMAGE EFFECT→INPUT SHARPNESS
Setting for	Each input/input signal
Setting value	-5 to +15 [Default]:0

7.5.2 Brightness

Menu	Top→IMAGE EFFECT→INPUT BRIGHTNESS (Input side)	
	/OUTPUT BRIGHTNESS (Output side)	
Setting for	Input side	: Each input/input signal
	Output side	: Each output (COMMON TO OUTA AND OUTB)
Setting value	80% to 120% [Default]:100%	

7.5.3 Contrast

Menu	Top→IMAGE EFFECT→INPUT CONTRAST (Input side) / OUTPUT CONTRAST (Output side)	
Setting for	Input side	: Each input/input signal
	Output side	: Each output (COMMON TO OUTA AND OUTB)
Setting value	R / G / B	: 0% to 200% [Default]:R / G / B: 100%

If you set "LINK" to "ON", only settings of "R" can be set, and "G" and "B" change relatively.

7.5.4 HUE

Menu	Top→IMAGE EFFECT→INPUT HUE
Setting for	Each input/input signal
Setting value	0° to 359° [Default]: 0°

7.5.5 Saturation

Menu	Top→IMAGE EFFECT→INPUT SATURATION
Setting for	Each input/input signal
Setting value	0% to 200% [Default]:100%

7.5.6 Black level

Menu	Top→IMAGE EFFECT→INPUT SETUP LEVEL
Setting for	Each input/input signal
Setting value	-10.0% to +10.0% (by 0.5%) [Default]: ±0.0%

7.5.7 Default color

Menu	Top→IMAGE EFFECT→IN DEFAULT COLOR (Input side) / OUT DEFAULT COLOR (Output side)
Setting for	Input side : Each input/input signal Output side : Each output (COMMON TO OUTA AND OUTB)

You can initialize settings of the following items.
A long buzzer will sound when the initialization is completed by pressing the MENU/SET key.

[Table 7.3] Items to be initialized

Items to be initialized	Input side	Output side
Brightness, contrast	Initialized	Initialized
Sharpness, hue, saturation, black level	Initialized	-

7.6 Input settings

7.6.1 No-signal input monitoring

Menu	Top→INPUT SETTING→INPUT VIDEO DETECT
Setting for	Each input (only digital input)
Setting value	OFF,2000ms to 15000ms (by 100 ms.) [Default]: 10000ms

If you change the settings of EDID of the MSD or turn off/on the MSD, the source device may not output video signal.

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 signal to when the MSD requests the source device to output video signal.

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".

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".
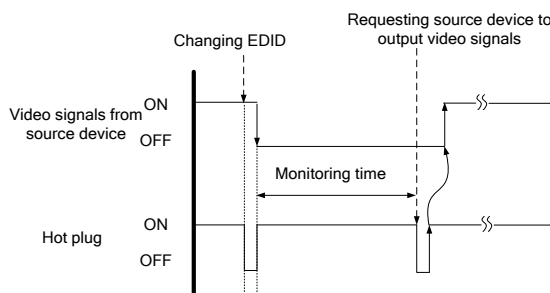
[Fig. 7.7] Monitoring absence of input   **[Fig. 7.8] Repeating reset**
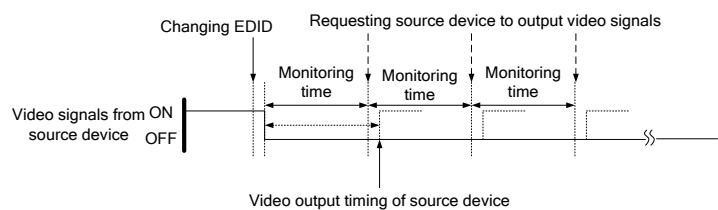
7.6.2 HDCP input enabled/disabled

Menu	Top→INPUT SETTING→HDCP INPUT ENABLE
Setting for	Each input (only digital input)
Setting value	ENABLE [Default], DISABLE

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

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 sink device that is not HDCP compliant, select "DISABLE" to disable the encryption of HDCP output from the source device.

7.6.3 Input equalizer

Menu	Top→INPUT SETTING→INPUT EQUALIZER
Setting for	Each input (only digital input)
Setting value	ON [Default],OFF

HDMI input connector has an equalizer circuit to correct attenuated signal caused when a long cable is connected. If you set this menu to "ON", signal is 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 signal cannot be corrected appropriately. In such a case, set this menu to "OFF".

7.6.4 Signal type of analog input

Menu	Top→INPUT SETTING→ANALOG INPUT TYPE
Setting for	Each input/input signal (only analog input)
Setting value	

- ・AUTO : Automatic [Default]
- ・RGB   : Analog RGB
- ・YPbPr : Analog YPbPr
- ・VIDEO AUTO : Video automatic
- ・VIDEO   : Composite video
- ・Y/C   : S video

You can set the signal type that is input from the analog video input connector.

If you select "AUTO", the type of input signal is detected automatically. In cases where the detection fails and video is not output correctly, set the input type manually. With "AUTO", the automatic detection of S-Video may fail. If both composite video and S-Video are input at the same time, select "VIDEO AUTO"; if only S-Video is input, select "Y/C".

For video of a monochrome camera or VHS tape with a bad recording condition or the like, automatic detection may fail. In these cases, select "VIDEO AUTO", "VIDEO" or "Y/C".

7.6.5 Automatic detection of input video interruption

Menu   Top→INPUT SETTING→INPUT OFF CHECK
Setting for   Each input
Setting value   ON [Default], OFF

The MSD can stop outputting video immediately after input video signal is 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.

- **7.8.5 Window transition effect**
- **7.8.6 Window transition speed**
- **7.8.7 Wipe color**

If you select "ON" and input video (VHS tapes or the like) that has a bad record condition, outputting video will be ON/OFF repeatedly due to distorted synchronous idles. In this case, set this menu to "OFF".

Even if you set this item to "ON", distorted video cannot be corrected completely when input video signal is lost. Especially if you set "**7.8.5 Window transition effect**" to an option other than "CUT", noises or black bars may be output at the time of fading out or wiping out.

7.6.6 Selecting signal of DVI input connector

Menu   Top→INPUT SETTING→INPUT5 TYPE
Setting value   DIGITAL [Default], ANALOG

* This menu is only for MSD-701/702.

7.6.7 Priority of DVI input channel automatic switching

Menu   Top screen → INPUT SETTING → AUTO SWITCHING
Setting for   Each input and output (common to OUTA and OUTB)
Setting value

Item	Set value	Default
Output channel (OUT)	1, 2	1
Input channel (IN)	1 to 7	1
Priority (PRI)	1 (high) to 7 (low), OFF	OFF

When the input signal is changed from OFF to ON, channels can automatically be switched according to the priority based on the current input channel. Video and audio are switched simultaneously regardless of the channel switching mode setting.
Input channels whose setting is "OFF" are not switched automatically. Select a value other than "OFF" for priority ('PRI") in order to enable the function.
Make sure to press the "MENU/SET" key to apply the settings; otherwise, they are not changed.

7.6.8 Masking time after automatic switching of input channel

Menu   Top screen → INPUT SETTING → AUTO SWITCHING MASK
Setting for   Each output (common to OUTA and OUTB)
Setting value 0s000ms to 999s999ms   [Default: 0s000 ms]

Set the time from when input channel is switched automatically until when the next automatic switching is performed.
The automatic switching is not performed during the set time.
【See:**7.6.7 Priority of DVI input channel automatic switching**】

7.7 Setting input timing

You can set input timing of analog input video if signal is input.

Since the MSD loads the optimal table from the built-in tables and adjusts the input timing automatically, you do not need to set this menu. However, if signal which are not registered in the MSD tables are input or if part of the output video is cut off by using the standard table registered in the MSD, set the input timing manually. For digital inputs, you do not need to set the input timing, but if part of the video is cut off, adjust the input timing finely.

[Table 7.4] Settable items

Function	Analog input	Digital input
Automatic measurement	Partly 1	Cannot be set
The total number of horizontal dots	Partly 1, Partly 2	Partly 2
Start position	Can be set	Can be set
Active area	Can be set	Can be set
Automatic measurement of start position	Can be set	Cannot be set
Automatic setting of input timing	Can be set	Cannot be set
Loading device data	Partly 3	Can be set
Registering device data	Partly 1	Cannot be set
Tracking	Partly 1	Cannot be set

Partly 1: can be set only if analog RGB / analog YPbPr signal is input.
Partly 2: only displayed if analog video signal is input or for digital input.
Partly 3: can be set only if the device data of input signal is registered in the
            MSD.

7.7.1 Automatic measurement

Menu	Top→INPUT TIMING→AUTO SETUP
Setting for	Each input/input signal
Setting value	

・NORMAL MODE [Default]	・4:3	・5:3	・16:10
・NEXT ASPECT	・5:4	・16:9	

Analog RGB/analog YPbPr input video is measured to set "**7.7.2 The total number of horizontal dots**", "**7.7.3 Start position**", "**7.7.4 Active area**", and "**7.7.9 Tracking**" automatically.

Normally, select "NORMAL MODE" (Automatic measurement of start position and active area). If edges of video are not displayed correctly, use this mode to set the start position and active area automatically.

If the total number of horizontal dots is not correct, the aspect ratio is not matched even though automatic measurement is set to perform with the "NORMAL MODE". In this case, select "NEXT ASPECT" (Auto measurement taking into account aspect ratio) for the measurement function. If the aspect ratio of the input signal is known, you can directly specify the aspect ratio to correctly perform the automatic measurement. If input signal is not registered in the MSD, use this function.

Press the "MENU/SET" key to perform automatic measurement.

●Can be measured:
  Input video contacts the circumscribed rectangle.
  Brightness of input video is 25% or more.

●Cannot be measured:
  Right and left sides of input video do not touch the circumscribed rectangle.
  Brightness of input video is 24% or less.

Input video   Valid display area   Input video   Input video
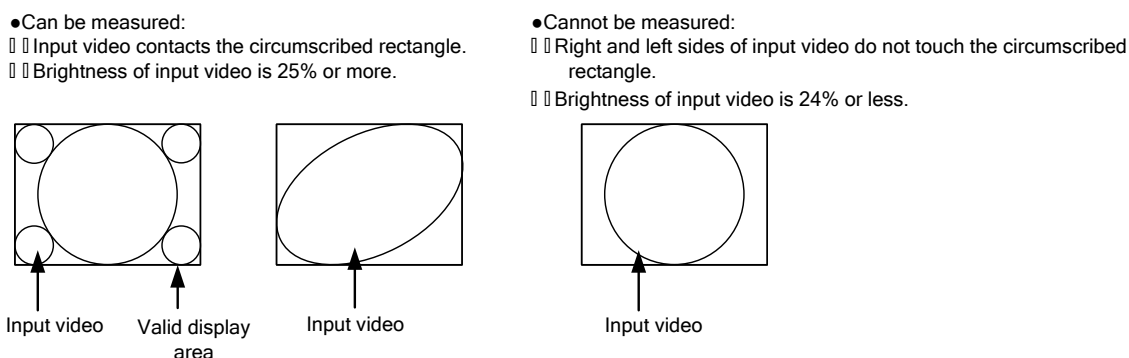
[Fig. 7.9] Conditions of automatic measurement

Note:

In case the aspect ratio does not match or video is displayed on the position far from the correct position, set the input timing in "**7.7.2 The total number of horizontal dots**", "**7.7.3** Start position", and "**7.7.4** Active area".

■ **Operation from input channel selection key**

You can execute the automatic measurement not only from this menu but also by pressing an input selection key for 2 seconds or longer. By pressing an input selection key for 2 seconds, the auto measurement mode with "NORMAL MODE" will be enabled. After that, pressing the same key for 3 seconds or longer, the auto measurement mode with "NEXT ASPECT" will be enabled. (This auto measurement mode can be enabled also by pressing the input key for 5 seconds or longer continuously.) Once you perform the function, from the next time, it can be performed simply by pressing the key without pressing it for several seconds. This mode can be canceled 5 seconds after the last auto measurement is executed.

・ MSD-501 / 502: IN4 or IN5 key
・ MSD-701 / 702: IN5, IN6, or IN7 key (IN5 is for analog)

2 sec.   5 sec.   7 sec.

2 sec.
Automatic measurement starts (NORMAL MODE)

Pressing and holding the key

5 sec.
Automatic measurement starts (NEXT ASPECT)

2 sec.
Terminates if no operation is performed for 5 seconds

Automatic measurement starts if you press the key within 5 seconds.
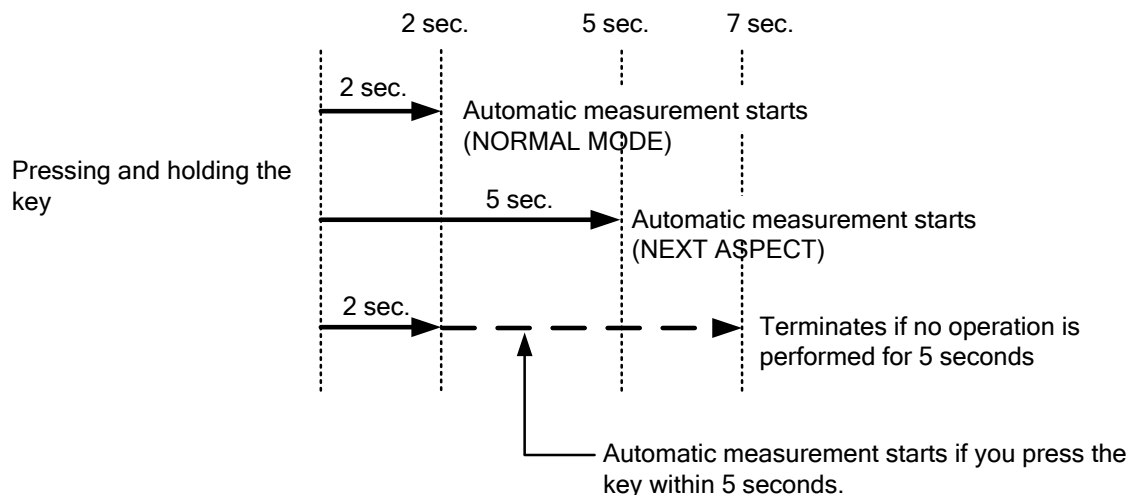
[Fig. 7.10] Automatic measurement using input channel selection key

7.7.2 The total number of horizontal dots

Menu	Top→INPUT TIMING→H TOTAL DOTS
Setting for	Each input/input signal
Setting value	400DOT to 4125DOT (sampling block must be within 13 MHz to 162 MHz)
	[Default] varies depending on the input signal.

You can set the total number of horizontal dots of analog RGB/analog YPbPr input video.
If other signal is input, the total number only can be displayed but not set.

7.7.3 Start position

Menu	Top→INPUT TIMING→H START (Horizontal) / V START (Vertical)
Setting for	Each input/input signal
Setting value	

Function	Setting value
Horizontal start position	64DOT to 2900DOT (The total number of horizontal dots－Horizontal active area or less)
Vertical start position	10LINE to 2048LINE (The total number of vertical lines－Vertical active area or less)

[Default] varies depending on the input signal.

You can set the horizontal/vertical starting position.

Setting value must be as follows. If the set value exceeds the value, the starting position will be set the limit value within the settable range automatically.

Horizontal : The total number of horizontal dots > Horizontal active area > Horizontal starting position
Vertical   : The total number of vertical lines > Vertical active area > Vertical starting position

7.7.4 Active area

Menu	Top→INPUT TIMING→H DISPLAY (Horizontal) / V DISPLAY (Vertical)
Setting for	Each input/input signal
Setting value	

Function	Setting value
Horizontal active area	64DOT to 2900DOT (The total number of horizontal dots－64 or less)
Vertical active area	10LINE to 2048LINE (The total number of vertical lines－10 or less)

[Default] varies depending on the input signal.

You can set the horizontal/vertical active area of input video.
The horizontal setting value must be [The total number of horizontal dots > Horizontal active area]. If the set value exceeds the limit value by changing the total number of horizontal dots, the horizontal active area will be set to the limit value within the set range automatically.

7.7.5 Automatic measurement of start position

Menu	Top→INPUT TIMING→AUTO START POS
Setting for	Each input/input signal
Setting value	ALL OFF : not measuring all inputs from the input automatically
	OFF : not measuring the current input signal automatically
	ON : measuring the current input signal automatically [Default]

Notes:

■ The MSD monitors continuously the upper left of analog input video signal and it automatically matches the upper left of the input video and the upper left of the screen.

■ For motion images, some content may not be displayed on the full screen, and the display position may be moved every time the setting of the automatic measurement is applied. In such a case, set this menu to "OFF". As "OFF" and "ON" are saved for each input resolution, it can be set according to the input video. If you do not want to perform this function for all resolution, select "ALL OFF".

■ Only the start position is set by automatic measurement of this menu. If "**7.7.2 The total number of horizontal dots**" and "**7.7.4 Active area**" do not match, the lower right may be cut off or blackout may be output. In this case, adjust the whole screen by following "**7.7.1 Automatic measurement**". As the set value must not exceed the value set in "**7.7.3 Start position**", some input videos are displayed with blackout at the left or top side.

■ This menu is valid only if **[Fig. 7.9] Conditions of automatic measurement** is satisfactory.

■ Even if you set this menu to "ON", the manual setting will be applied and the automatic measurement is not executed if you set any of the following menus: "**7.7.2 The total number of horizontal dots**", "**7.7.3 Start position**", and "**7.7.4 Active area**". If you set "**7.7.9 Tracking**", the manual setting is applied, and tracing is not set automatically when the automatic measurement is executed.
When you execute "**7.7.1 Automatic measurement**", settings of this menu will be valid again.

7.7.6 Automatic setting of input timing

Menu	Top→INPUT TIMING→UNKNOWN TIMING
Setting value	AUTO SETUP ON [Default], AUTO SETUP OFF

The MSD loads the optimal table from the built- in table and converts signal. However, if unregistered signal is input, the input timing must be set. By setting this menu to "AUTO SETUP ON", "**7.7.1 Automatic measurement**" is executed and the input timing is set automatically if signal that cannot be detected by the MSD are input for the first time.

Note:

If automatic measurement finds inconsistency of aspect ratio, please perform "**7.7.1 Automatic measurement**" manually or set the input timing in "**7.7.2 The total number of horizontal dots**", "**7.7.3 Start position**", and "**7.7.4 Active area**".

7.7.7 Loading device data

Menu	Top→INPUT TIMING→LOAD
Setting for	Each input/input signal

Device data whose input timing is registered can be loaded according to the input signal.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 7.5] Items to be loaded

Input signal	Item
Analog	Registered device data will be loaded. Use this menu in the following cases: • Several device data with the same frequency of synchronous signal and different input timings is registered. • You want to set the input timing again.
Digital	The value that is automatically detected by the MSD will be set. Use this menu to restore the input timing to the original value.

7.7.8 Registering device data

Menu	Top→INPUT TIMING→SAVE
Setting for	Each input/input signal

You can save up to 99 input timing settings to the device data.
From the next time, when the same signal is input to other channel, video will be displayed with the registered timing.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.7.9 Tracking

Menu	Top→INPUT TIMING→TRACKING
Setting for	Each input/input signal
Setting value	0 to 63 [Default]:0

You can adjust the tracking of analog RGB/analog YPbPr input video.

7.8 Output settings

7.8.1 Output equalizer

Menu	Top→OUTPUT SETTING→OUTPUT EQUALIZER
Setting for	Each output (only OUTA)
Setting value	OFF [Default],LOW,MIDDLE,HIGH

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

[Table 7.6] Output equalizer

Cable length	Shorter than10 m/32.8 ft.	10 m/32.8 ft. or longer
Equalizer setting	OFF to MIDDLE	LOW to HIGH

(IDK's cable, AWG 24, was used.)

7.8.2 Output mode

Menu	Top→OUTPUT SETTING→OUTPUT MODE
Setting for	Each output (each OUTA / OUTB)
Setting value	

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

You can select an output mode.
Set the mode to "HDMI YCbCr4:4:4 MODE" to output video with the optimal mode automatically even if a sink device that does not support HDMI component signal or DVI signal is connected. If you want to output video with HDMI RGB signal or DVI signal forcibly, set the desired mode.
The MSD checks signal types in order of the table below and output signal with the first matched signal type.

[Table 7.7] Output mode priority

Output mode	Signal supported by sink device			
	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

7.8.3 Synchronous signal output with no input video

Menu	Top→OUTPUT SETTING→SYNC OUTPUT
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	ON [Default], OFF

You can set whether synchronous signal is output when no video signal is input from the selected input, or when "OFF" is selected for the input. If you set this menu to "ON", you can prevent the sink device from being switched to the standby mode.

7.8.4 Output video with no input video

Menu	Top→OUTPUT SETTING→VIDEO OUTPUT
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	

・BLUE [Default]　　　　　・BACKGROUND COLOR　　　　・BLACK

You can set the color of the video to be output when no video signal is input from the selected input. If you set "**7.8.3 Synchronous signal output with no input video**" to "OFF", no video is displayed on the sink device since no synchronous signal is output.

7.8.5 Window transition effect

Menu	Top→OUTPUT SETTING→VIDEO SWITCHING
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	

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

You can select a window transition effect for when the video inputs is switched.
The setting will be valid also when "**7.6.5 Automatic detection of input video interruption**" is set to "ON".

7.8.6 Window transition speed

Menu	Top→OUTPUT SETTING→SWITCHING SPEED
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	100ms to 2000ms (per 10 ms.) [Default]: 350 ms.

You can set the window transition speed for FADE OUT/IN or WIPE OUT/IN when the input channel is switched.
The setting will be valid also when "**7.6.5 Automatic detection of input video interruption**" is set to "ON".

7.8.7 Wipe color

Menu   Top→OUTPUT SETTING→WIPE COLOR
Setting for   Each output (COMMON TO OUTA AND OUTB)
Setting value R / G / B: 0 to 255 [Default]: R / G / B: 0 (black)

You can set the wipe color while switching video input when the input channel is switched.
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).

7.8.8 Video output connector

Menu   Top→OUTPUT SETTING→OUTPUT CONNECTOR
Setting for   Each output (each OUTA / OUTB)
Setting value ON [Default], OFF

The MSD outputs the same video to HDMI output connector and digital signal output connector (for extension), and you can select ON/OFF for each connector. If you set one of them to "OFF", you can check the video in the other output (simplified preview function).

7.8.9 HDCP output

Menu   Top→OUTPUT SETTING→HDCP OUTPUT MODE
Setting for   Each output (each OUTA / OUTB)
Setting value ALWAYS   : HDCP is output at all time.   [Default]
              DISABLE   : HDCP is not authorized (only video and audio without HDCP are
                                     output)
              HDCP INPUT ONLY   : HDCP is output only if input signal has HDCP.

You can set the HDCP output for when a sink device supporting HDCP is connected.
Normally set this menu to "ALWAYS".

Notes:
- For "HDCP INPUT ONLY", some sink devices may not output video or audio temporarily due to failure of the HDCP authentication when HDCP is switched from OFF to ON.
- When a sink device without HDCP is connected, only video and audio without HDCP are output regardless of the setting of this menu.

7.8.10 The number of HDCP retries

Menu	Top→OUTPUT SETTING→HDCP ERROR RETRY
Setting for	Each output (each OUTA / OUTB)
Setting value	ETERNITY : retry until succeeded [Default], 0 to 100 : 0 to 100 times

If a sink device with HDCP is connected and you set "**7.8.9 HDCP**" to "HDCP INPUT ONLY" or "ALWAYS", HDCP is authorized regardless of the status of input signal. Normally, set this menu to "ETERNITY" to retry the authentication automatically after the first authentication fails. However, you can set the number of retries manually. (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.)

The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.8.11 Deep Color

Menu	Top→OUTPUT SETTING→DEEP COLOR OUTPUT
Setting for	Each output (each OUTA / OUTB)
Setting value	24-BIT COLOR [Default], 30-BIT COLOR

You can select the color depth of HDMI signal.
"30-BIT COLOR": signal is output with "30-BIT COLOR" only if a sink device supporting Deep Color is connected. If a sink device that does not support Deep Color is connected, signal is 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".

7.8.12 CEC connection

Menu	Top→OUTPUT SETTING→CEC CONNECTION
Setting for	Each output (each OUTA / OUTB)
Setting value	

・NOT CONNECTED [Default]   ・SELECTED CHANNEL
・IN1 to IN3 (MSD-501 / 502)   ・IN1 to IN4 (MSD-701 / 702)

You can set which I/O to be connected when a device supporting CEC is connected.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

Notes:
■ Using CEC may cause negative effects. If you do not use CEC, set this menu to "NOT CONNECTED."
   If the status of the sink 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.
■ 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.

7.8.13 HDCP re-authentication

Menu	Top→OUTPUT SETTING→HDCP AUTHENTICATION
Setting for	Each output (each OUTA / OUTB)

If a sink 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). Press the MENU/SET key to perform the re-authentication.

7.9   Audio settings

HDMI digital audio supports the following formats. Set audio in response to devices connected to the HDMI output connector and digital signal output connector for extension.

Only "2 channel linear PCM" can be input by factory default. If you want to use "Multi channel linear PCM" or bit stream signal (compressed audio), set "**7.10.5 Audio format**" and "**7.10.6** Speaker configuration".

[Table 7.8] Audio format

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

If Multi channel linear PCM signal are input to digital audio, two channels set in "**7.9.9 Multi channel audio output**" or down-mixed audio is output to analog audio and sink devices that do not support multi linear PCM.
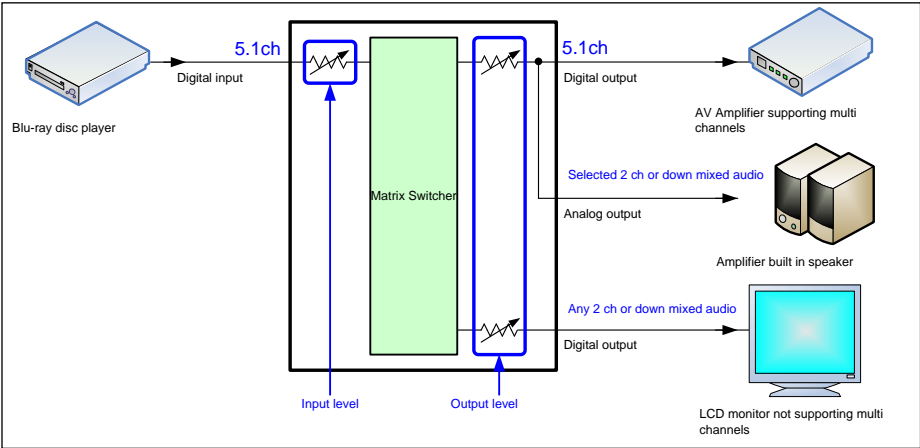
[Figure 7.1] I/O of multi-channel signals

If bit stream signal (compressed audio) such as Dolby Digital is input to HDMI digital audio, these input audio signal is output to digital audio as they are. They are not output to analog audio, and audio volume cannot be adjusted.
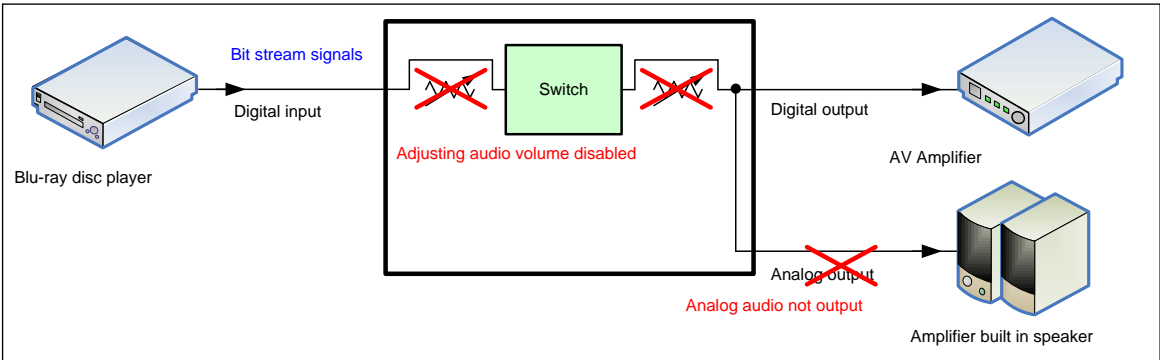
[Figure 7.2] Inputting/Outputting bit stream signal

7.9.1 Output level

Menu	Top→AUDIO→OUTPUT LEVEL
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	-60dB to +10dB [Default] ±0dB

You can set the audio output level.
If you change the output level while audio output mute is set to "ON", mute is canceled.

7.9.2 Output mute

Menu	Top→AUDIO→OUTPUT MUTE
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	OFF [Default], ON

You can enable or disable the audio output mute.

7.9.3 Input selection

Menu	Top→AUDIO→AUDIO INPUT SELECT
Setting for	Each input (only digital input)
Setting value	AUTO [Default], ANALOG, DIGITAL

If you select "AUTO," digital audio is output automatically when HDMI signal with audio signal is input; analog audio is output in other cases.
If you select "AUTO" while both digital and analog audio signals are input, the digital audio is output. While no HDMI signal is 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.

7.9.4 Input level

Menu	Top→AUDIO→INPUT OFFSET
Setting for	Each input/input signal
Setting value	-60dB to ±0dB [Default]: ±0dB

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

7.9.5 Lip sync

Menu	Top→AUDIO→OUTPUT LIP SYNC (Output side)　/ INPUT LIP SYNC (Input side)
Setting for	Output side　: Each output (COMMON TO OUTA AND OUTB)
	Input side　　: Each input/input signal
Setting value	0FRAME to 8FRAME　[Default]: 0FRAME

You can adjust the gap between video (motion) and audio (sound).

Up to eight frames can be set for each input/output channel.

7.9.6 Sampling frequency

Menu	Top→AUDIO→SAMPLING FREQUENCY
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	

- ・AUTO-A [Default]　　・32kHz　　　・48kHz　　　・96kHz
- ・AUTO-B　　　　　　　・44.1kHz　　・88.2kHz　　・192kHz

You can set the sampling frequency of digital audio output.

■If you select "AUTO-A" or "AUTO-B":

"AUTO-A": outputs digital audio with the maximum sampling frequency supported by the connected sink device to OUTA output connector.

"AUTO-B": outputs digital audio with the maximum sampling frequency supported by the connected sink device to OUTB output connector.

At this time, the sampling frequency that is actually output is displayed in parentheses. In case EDID cannot be loaded from the sink device, the sampling frequency that was used the last time is selected with "*" on its right side.

```
[OUT1 FREQUENCY]
AUTO-A(48kHz)      ◄◆►
```
```
[OUT1 FREQUENCY]
AUTO-A(48kHz)*     ◄◆►
```

[Fig. 7.11] Left: maximum sampling frequency; right: sampling frequency used last time

7.9.7 Audio output connector

Menu   Top→AUDIO→OUTPUT CONNECTOR
Setting for   Each output (COMMON TO OUTA AND OUTB)
Setting value

Setting value	Analog audio output connector	HDMI output connector	Digital signal output connector for extension
ANALOG&DIGITAL [Default]	Can be output	Partly*	Partly*
ANALOG	Can be output	Cannot be output	Cannot be output
DIGITAL	Cannot be output	Partly*	Partly*

*: Limited by "**7.9.8 Digital audio output connector**".

7.9.8 Digital audio output connector

Menu   Top→AUDIO→DIGITAL OUTPUT
Setting for   Each output (each OUTA / OUTB)
Setting value ON [Default], OFF

You can control audio output of HDMI output and digital signal output connector for extension.
The MSD output the same audio to both HDMI output and digital signal output connector for extension, and you can turn ON/OFF audio output from each connector.

7.9.9 Multi channel audio output

Menu   Top→AUDIO→MULTI AUDIO
Setting for   Each output (COMMON TO OUTA AND OUTB)
Setting value
    ・DOWN MIX [Default]
    ・CH1/CH2 STEREO   ・CH7/CH8 STEREO   ・CH5/CH6 MONO
    ・CH3/CH4 STEREO   ・CH1/CH2 MONO   ・CH7/CH8 MONO
    ・CH5/CH6 STEREO   ・CH3/CH4 MONO

You can set audio to be output to a sink 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.
You can select audio from "DOWN MIX" (multi-channel audio is downmixed), stereo audio, and monaural audio.

7.9.10 Test tone

Menu	Top→AUDIO→TEST TONE
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	

Test tone:

OFF [Default],1kHz ,400Hz

Speaker:

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

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

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

【See: **7.10.6 Speaker configuration**】

7.10 EDID (Extended Display Identification Data)

You can set or customize EDID to be sent to the source device. Change the setting as needed.

■**Setting EDID**

(1) If you use copied EDID, copy the target EDID from the sink device.

(2) Set the EDID that will be sent to the source device.

(3) If you use built-in EDID, customize the data as usage.
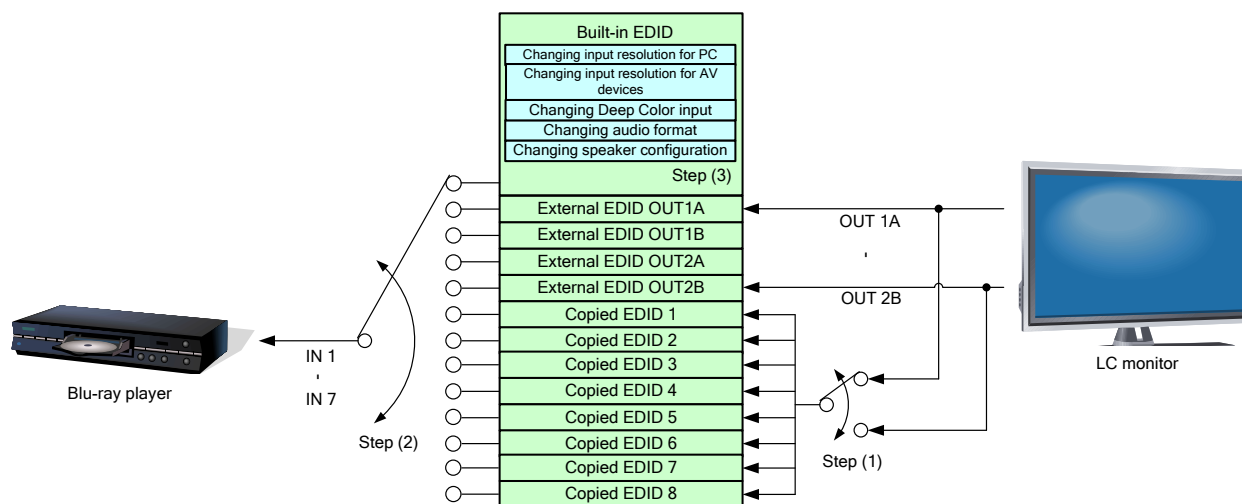
[Fig. 7.12] Setting EDID

7.10.1 EDID

Menu	Top→EDID→EDID DATA
Setting for	Each input (only digital input)
Setting value	

・INTERNAL EDID [Default]

・OUT1A MONITOR   ・OUT2A MONITOR

・OUT1B MONITOR   ・OUT2B MONITOR

・COPY DATA1 to COPY DATA8

You can set the EDID to be sent to the source device from built-in EDID ("INTERNAL EDID"), connected sink device's EDID ("MONITOR") and copied EDID ("COPY DATA").

EDID copied from a sink device will be displayed if any.

The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

【See:**7.10.7 Copying EDID**】

7.10.2 Resolution for PCs

Menu   Top→EDID→PC RESOLUTION
Setting for   Each input
Setting value

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

[Default]   MSD-501 / 502: IN1 to IN3: 1080p(1920x1080);   IN4 to IN5: UXGA(1600x1200)
                    MSD-701 / 702: IN1 to IN5: 1080p(1920x1080);   IN6 to IN7: UXGA(1600x1200)

You can set the resolution requested to be output from DVI devices (such as PCs) or analog RGB devices. This setting will also be applied for controlling output resolution when AV devices (such as Blu-ray players) are connected via HDMI. For digital input, only "INTERNAL EDID" is selected for "**7.10.1 EDID**".
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

Timing of 720p, 1080i, and 1080p is the same as that of HD signal 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 7.9] **Supported resolution**   Y: Supported   N: Not supported

Input Resolution settings \ 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	Y	Y	Y	Y	N	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	Y	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	N	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

7.10.3 Input resolution for AV devices

Menu   Top→EDID→AV RESOLUTION
Setting for   Each input (only digital input)
Setting value
　　　・AUTO [Default]　・480p　　　・1080i
　　　・UNUSED　　　　・720p　　　・1080p

You can set the resolution requested to be output from AV devices (such as Blu-ray players).
This setting will be valid if "INTERNAL EDID" is selected for "**7.10.1 EDID**".
Normally, set this menu to "AUTO" to set resolution for AV devices according to "**7.10.2 Resolution for PCs"** automatically.

"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 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 "**7.10.2 Resolution for PCs**" 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 "**7.10.2 Resolution for PCs**" or this menu.

The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 7.1] Input resolutions when "AUTO" is selected

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 1080p	1920 x 1200	2048 x 1152
AV resolution	480p		720p												1080i	1080p		

Note:
If you select "UNUSED", the settings of "**7.10.4 Deep Color**", "**7.10.5 Audio format**", and "**7.10.6 Speaker configuration**" will be disabled and audio is not output because the source device outputs signal through DVI mode.

7.10.4 Deep Color

Menu   Top→EDID→DEEP COLOR INPUT
Setting for   Each input (only digital input)
Setting value 24-BIT COLOR [Default], 30-BIT COLOR

You can set the color depth to be output from the source device.
This menu is valid only if you select "INTERNAL EDID" for "**7.10.1 EDID** " and you select a resolution other than "UNUSED" for " **7.10.3 Input resolution for AV devices**".

If you select "30-BIT COLOR", 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".
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.10.5 Audio format

Menu   Top→EDID→AUDIO FORMAT
Setting for   Each input (only digital input)
Setting value

Audio format	ON / OFF	Maximum sampling frequency (kHz)
PCM	Cannot be set	32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 (48)
Dolby Digital	Can be set (OFF)	ON: 32 / 44.1 / 48 (48)
AAC	Can be set (OFF)	ON: 32 / 44.1 / 48 / 88.2 / 96 (48)
Dolby Digital+	Can be set (OFF)	ON: 32 / 44.1 / 48 (48)
DTS	Can be set (OFF)	ON: 32 / 44.1 / 48 / 96 (48)
DTS-HD	Can be set (OFF)	ON: 44.1 / 48 / 88.2 / 96 / 176.4 / 192 (192)
Dolby TrueHD	Can be set (OFF)	ON: 44.1 / 48 / 88.2 / 96 / 176.4 / 192 (96)

Default values are shown in parentheses.

You can set the audio format and maximum sampling frequency to be output from a source device.
This menu will be valid only if you select "INTERNAL EDID" for "**7.10.1 EDID**" and you select a resolution other than "UNUSED" for "**7.10.3 Input resolution for AV devices**".
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.10.6 Speaker configuration

Menu	Top→EDID→SPEAKER
Setting for	Each input (only digital input)
Setting value	Setting mode : AUTO [Default], MANUAL

Each speaker   : ON, OFF

The number of speakers: 1 to 8

[Table 7.10] Default speaker configuration

The number of speakers	FL/ FR	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 [Default]	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			
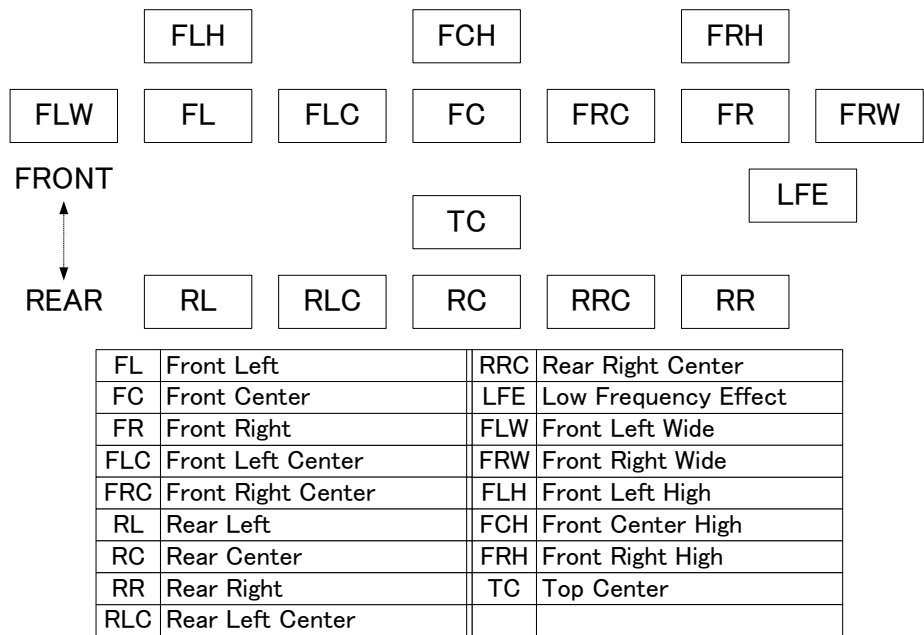
[Fig. 7.13] Speaker configuration

You can set the speaker configuration of multi channel audio.
This menu is valid only if you select "INTERNAL EDID" for "**7.10.1 EDID**", you select a resolution other than "UNUSED" for "**7.10.3 Input resolution for AV devices**".

If you select "AUTO" for the setting mode and set the number of speakers, the speaker configuration will be set to the default setting 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. If the number of speakers exceeds the available value, the "DATA INVALID" message is displayed and the settings will not be applied.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.10.7 Copying EDID

Menu	Top→EDID→MONITOR EDID COPY
Setting value	OUT1A, OUT1B, OUT2A, OUT2B

EDID of the sink device is loaded and registered to the MSD.
Up to eight EDID can be registered.
To register an EDID, press the "MENU/SET" key.

7.11 RS-232C communication setting

The RS-232C connector of the MSD can output communication command control from PCs and can output control command to external devices from the MSD. The operation mode will be switched according to "**7.11.2 Operation mode**".

The RS-232C connector of HDC receiver that is connected to digital signal output connector for extension only can output control command to external devices.

Communication between the RS-232C connector of the MSD and the RS-232C connector of the HDC receiver that is connected to a digital signal output connector for extension can be performed by the setting of "**7.11.3RS-232C**".

【See: **7.13 Setting control command**】
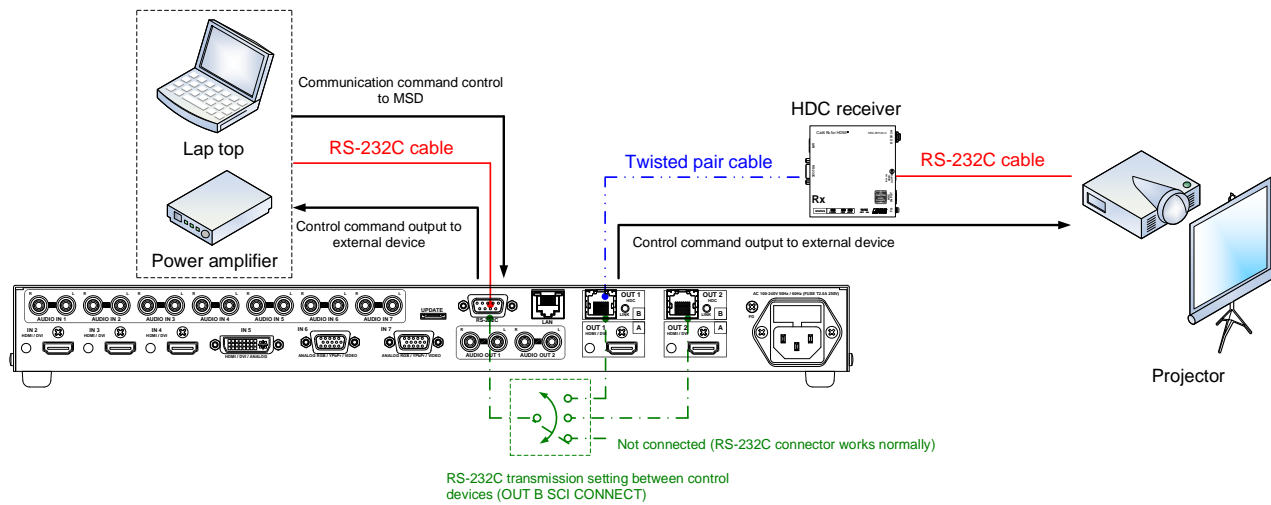
[Fig. 7.14] RS-232C communication

7.11.1 RS-232C communication

Menu   Top→COM PORT→PARAMETERS
Setting for   Each RS-232C connector, OUT1B connector, OUT2B connector
Setting value

Setting item	Setting value	Default
Baud rate [bps]	4800, 9600, 19200, 38400	9600
Data bit length [bit]	8, 7	8
Parity check	NONE, EVEN, ODD	NONE
Stop bit [bit]	1, 2	1

You can set RS-232C communication.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.11.2 Operation mode

Menu   Top→COM PORT→FUNCTION
Setting for   Only RS-232C connector
Setting value RECEIVER [Default], TRANSMITTER

You can set the operation mode to "RECEIVER" mode in which the MSD is controlled externally or "TRANSMITTER" mode in which the MSD controls peripheral devices.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.11.3 RS-232C transmission between control devices

Menu   Top→COM PORT→OUT B SCI CONNECT
Setting value

Setting	Operation
OFF [Default]	The RS-232C connector of the MSD works according to the setting of "**7.11.2 Operation mode**".
OUT1B	Communicates between the RS-232C connector of the MSD and the RS-232C connector of the HDC receiver that is connected to a digital signal output connector for extension.
OUT2B	The RS-232C connector of the MSD cannot be used for communication command control to the MSD from PCs or control command output to external devices from the MSD.

You can set the connection between the RS-232C connector of the MSD and the RS-232C connector of the HDC receiver that is connected to a digital signal output connector for extension.

【See: **7.11 RS-232C**】

7.12 LAN communication

The LAN connector of the MSD and the LAN connector of the HDC receiver that is connected to a digital signal output connector for extension are all connected by switching hub. All LAN connectors can be used for outputting communication command control from PCs and for outputting control command to external devices from the MSD.

Operation mode will be switched according to the setting of "**7.12.2 Operation mode**". The MSD has eight connections that can be set individually.

The LAN connector and the LAN connector of HDC receiver connected to digital signal output connector for extension are communicated bidirectionaly via the switching hub.

【See: **7.13 Setting control command**】
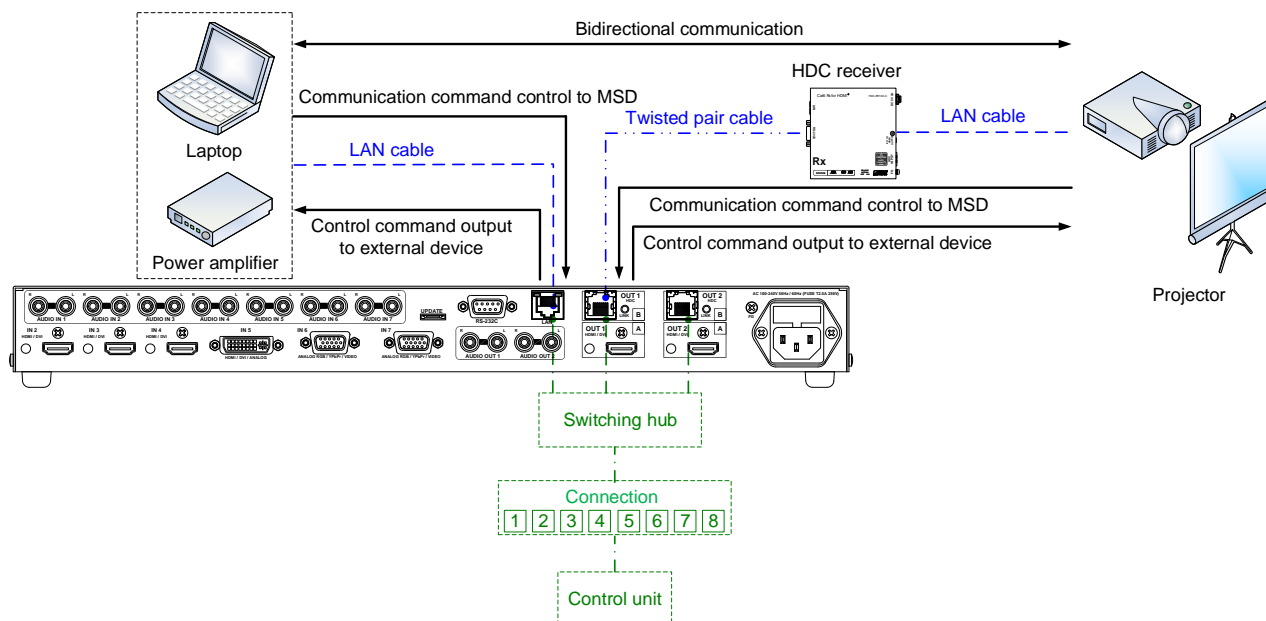
[Fig. 7.15] LAN communication

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 peripheral devices connected over LAN from the MSD, keep several fixed IP addresses.

7.12.1 IP address/subnet mask/gate way address

Menu	IP address: Top→LAN→IP ADDRESS
	Subnet mask: Top→LAN→SUBNET MASK
	Gateway address: Top→LAN→GATEWAY ADDRESS
Setting value	[Default]: IP address: 192.168.1.199
	Subnet mask: 255.255.255.0
	Gateway address: 192.168.1.200

You can set IP address, subnet mask, and gateway address.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.12.2 Operation mode

Menu	Top→LAN→FUNCTION
Setting for	Each connection
Setting value	

Setting	Operation mode	
	Receiver mode	Transmitter mode
Operation mode	RECEIVER [Default]	TRANSMITTER
Destination IP address	Not necessary	0.0.0.0 to 255.255.255.255 [Default] 192.168.1.198
PJLink protocol connection	Not necessary	ON: Use OFF: Not use [Default]
Destination connection port number[*1]	Not necessary	1 to 65535 [Default]: 1100
PJLink protocol password[*2]	Not necessary	20,30 to 39 in ASCII code (in hex) 41 to 5A, 61 to 7A [Default]: 20 (space)

[*1]: If selecting "ON" for PJLink protocol, the target port number is fixed at "4352".

[*2]: Up to 32 characters. If you do not want the password authentication, you do not need to set the item.

You can set the LAN operation mode consisting of "RECEIVER" mode that controls the MSD externally and "TRANSMITTER" mode that controls peripheral devices from the MSD.
If you select "TRANSMITTER" mode, you need to set the information of connecting device.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.12.3 TCP port number

| Menu | Top→LAN→PORT NUMBER |

Menu   Top→LAN→PORT NUMBER
Setting for   Each connection
Setting value

For	Setting value
Communication command control	23,1100,6000 to 6999
WEB browser control	80,5000 to 5999

[Default]   Connections 1 to 3 = 1100; Connections 4 to 6 = 23;
           Connections 7, 8 = 80

You can set the TCP port number to control the MSD externally.
This setting will valid if "RECEIVER" is selected for "**7.12.2 Operation mode**".
Each connection will be divided into connections for communication command control and WEB browser depending on the set port numbers.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.12.4 MAC address

Menu   Top→LAN→MAC ADDRESS

You can display the MAC address.

7.13 Setting control command

You can control external devices (for example, turning ON/OFF projectors) via RS-232C, LAN, or CEC.
You can register up to 32 commands in the MSD. Registered control commands will be associated with one of 37 execution conditions. You can associate commands in order of you want to execute. When execution conditions are met, those commands will be performed in the order. The loop back function allows you to control the MSD itself.
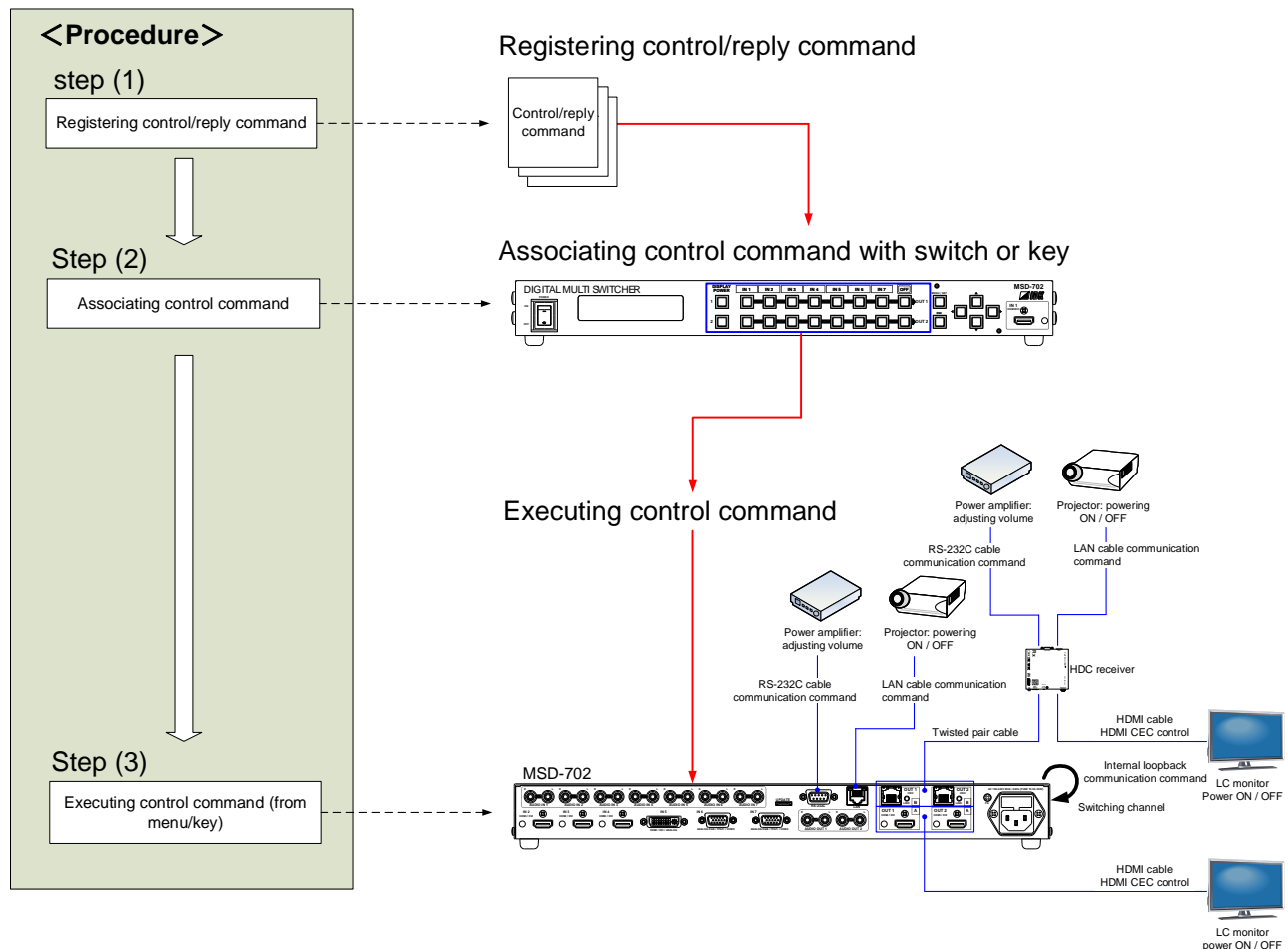
[Fig. 7.16] Executing control command

■ **Control command via RS-232C / LAN communication**

Control commands can be sent from RS-232C connector/LAN connector of the MSD or HDC receiver connected to digital signal output connector for extension.

Before executing control command, set the operation mode of the connector to "TRANSMITTER".

【See: **7.11.2 Operation mode**】
【See: **7.12.2 Operation mode**】

To output control command from the RS-232C connector of the MSD, set "**7.11.3 RS-232C**" to "OFF".
To output control command from the RS-232C connector of HDC receiver, set "**7.11.3 RS-232C**" to a connector other than the destination output connector for extension.
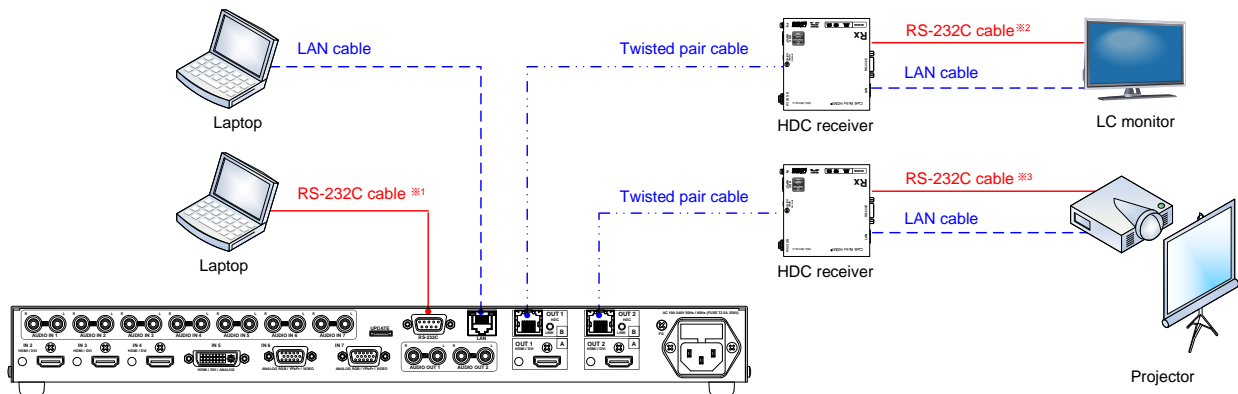
※1 To output control command from the RS-232C connector of the MSD, set "7.11.3 RS-232C transmission between control devices" to "OFF".
※2 To output control command from the RS-232C connector of the HDC receiver connected to OUT1B, set "7.11.3 RS-232C transmission between control devices" to other than "OUT1B".
※3 To output control command from the RS-232C connector of the HDC receiver connected to OUT2B, set "7.11.3 RS-232C transmission between control devices" to other than "OUT2B".

[Fig. 7.17] Outputting control command (MSD-702)

■ **Screen display during control command execution**

When a control command is executed, the user setting for the text of "MEMO" is displayed (1), and if the reply command is received, the "MEMO" text registered for the reply command is also displayed (2) for one second (when the control command that is used for checking the reply command is executed).

The received data is displayed (3) for two seconds (when the control command that is used for displaying the received data is executed).

Examples:

(1) "SCREEN UP" is registered in the MEMO and the control command is executed.

(2) A reply command, "SCREEN OK", is displayed.

(3) "PROJECTOR LAMP" is registered in the MEMO and "%1LAMP=1000 1⏎" is received.

(4) Reply command could not be received and retry over occurs.

(1) Only control command

```
SEND:SCREEN UP
```

(2) Control command (upper)
   Reply command（lower)

```
SEND:SCREEN UP
RECV:SCREEN OK
```

(3) Received data is displayed.

```
SEND:PROJECTOR LAMP
RECV:%1LAMP=1000 1⏎
```

(4) Reply command cannot be
   received and a retry error occurs.

```
SEND:SCREEN UP
RETRY OVER ERROR
```

[Fig. 7.18] Screen display

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.

7.13.1 Registering/editing control command

Menu   Top→PRESET COMMAND→COMMAND EDIT
Setting for   Each command
Setting value [Table 7.11] Setting value of control command

You can create and edit up to 32 control commands.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

**[Table 7.11] Setting value of control command**

Item	Setting		Description	Range
	COM	CEC		
PORT	yes	yes	Select "COM" or "CEC".	COM: Communication command [Default] CEC: HDMI CEC control
COM SIZE	yes	no	Set the number of bytes to be sent starting with the first byte.	0BYTE to 30BYTE [Default]: 0BYTE
DELAY	yes	yes	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.	0ms to 999s999ms [Default] 0ms
Communicati on port	yes	no	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. ・RS:RS-232C[*5] ・OUT1B RS: RS-232C of OUT1B ・OUT2B RS: RS-232C of OUT2B ・LOOP BACK: Internal loop back ・LAN1 to LAN8: LAN connection 1 to 8[*6]	OFF [Default] ON
COMMAND INPUT MODE	yes	no	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	yes	no	Set the command from the first byte according to the number of bytes set in "COM SIEZE" (up to 30 bytes).	0A, 0D, 20 to 7D in ASCII, 00 to FF in hex [Default]: 20 (space)

[Table 7.12] Setting value of control command

Item	Setting		Description	Range
	COM	CEC		
RECV DISPLAY	yes	no	Set whether received data is displayed or not.	OFF [Default] ASCII HEX
DELIMITER*1	yes	no	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 *2	yes	no	Set whether reply command that may be returned is checked or not.	CHECK NOT CHECK [Default]
TIME OUT*3 *4	yes	no	Set the timeout time for reply command to a sent command.	0ms to 99s999ms [Default]: 0ms
RETRY *3 *4	yes	no	Set the number of retries to resend the same command again if no valid response is replied.	0 to 99 (times) [Default]: 0
INTERVAL *3 *4	yes	no	Set the retry interval to resend the command.	0ms to 99s999ms [Default] 0ms
ERROR*3 *4	yes	no	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*7	no	yes	Set the CEC control for the sink devices connected to OUT1A / OUT2A / OUT1B / OUT2B.	-: not control [Default] POWER OFF POWER ON
Process for CEC error	no	yes	Set whether the next command is executed or not if no response is replied from the sink device that is controlled with CEC.	STOP [Default] EXEC: continue
MEMO	yes	yes	Register a note up to 14 characters. The registered note is displayed when the control command is executed.	20 to 7D in ASCII codes except for 2C (,) [Default] 20 (space)

*1   If you set "RECV DISPLAY" to "OFF", you cannot set this item.

*2   If you set "RECV DISPLAY" to "ASCII" or "HEX", you cannot set this item.

*3   If you set only "LOOP BACK" of communication ports to "ON", you do not need to set this item.

*4   If you set all "RCV CHECK" to "NOT CHECK", you do not need to set this item.

*5   If you set "RS:RS-232C" to "ON", set "**7.11.2 Operation mode**" to "TRANSMITTER".

*6   If you set any LAN connections for "LAN1" to "LAN8" to "ON", set "**7.12.2 Operation mode"** to "TRANSMITTER".

*7   CEC: only power ON/OFF of the sink device can be controlled.

■ **Setting loop back function**

The MSD sends a communication command back to the MSD itself using the loop back function. It replies "OK" if processed normally while replying "NG" if parameter or command is incorrect. To check the reply command, set reply command 31 and 32 to "CHECK".

■ **Setting PJLink**

The MSD supports PJLink, which is a standard protocol to control projectors.

To use PJLink, select the LAN port for "COM port" so that you can select PJLink command when entering the send command data.

【See:7.12.2 Operation mode (P.69)】

[Table 7.13] PJLink command (class1) list

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; (CR): delimiter

You can specify the input number from 1 to 9, but types and the number of selectable input connectors differ depending on the 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 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

[Table 7.15] Individual reply command of status acquisition commands

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	*1	(CR)			RGB selected
2	%	1	I	N	P	T	=	2	*1	(CR)			VIDEO selected
3	%	1	I	N	P	T	=	3	*1	(CR)			DIGITAL selected
4	%	1	I	N	P	T	=	4	*1	(CR)			STORAGE selected
5	%	1	I	N	P	T	=	5	*1	(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	=	*2	*3	*4	*5	*6 *7 (CR)	
Get time and status of lamp													
1	%	1	L	A	M	P	=	*8	(SP)	*9	(CR)		
Get list of input switching													
1	%	1	I	N	S	T	=	*10	(CR)				
Get projector name													
1	%	1	N	A	M	E	=	*11	(CR)				
Get manufacturer name													
1	%	1	I	N	F	1	=	*12	(CR)				
Get product name													
1	%	1	I	N	F	2	=	*12	(CR)				
Get other information (optional)													
1	%	1	I	N	F	O	=	*12	(CR)				

*1   Input number, which is any of "1" to "9", but types and the numbers of selectable input connectors differ depending on connected projectors.

*2   Fan error.

*3   Lamp error

*4   Temperature error

*5   Cover open error

*6   Filter error

*7   Other errors

   *2 to *7   0: Error not detected or no detect error function, 1: Warning, 2: error

*8   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.).

*9   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"*

*10 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.20 to FF in hex; up to 64 characters.

*11 20 to 7F in hex; up to 32 characters.

7.13.2 Registering/editing reply command

Menu	Top→PRESET COMMAND→RECV COMMAND EDIT
Setting for	Each command
Setting value	[Table 7.16]

You can create and edit up to 32 reply commands.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 7.16] Setting value of control command

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 code 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. Settable if "COMMAND INPUT MODE" is set to "HEX"; if "ASCII" is selected, "FF" is set automatically.)	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 code except for 2C (,) [Default]: All: Spaces

Those default values do not apply to reply commands 31 and 32.

■ **Setting loop back function**

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.

[Table 7.17] Default value of reply command

Number	SIZE	PROCESS	DATA	MASK	MEMO
1	0 byte	EXEC	All: 00	All: FF	All: 20 (space)
2	0 byte	EXEC	All: 00	All: FF	All: 20 (space)
:	:	:	:	:	:
30	0 byte	EXEC	All: 00	All: FF	All: 20 (space)
31	2 bytes	EXEC	OK	All: FF	OK
32	2 bytes	STOP	NG	All: FF	NG

■ **Setting PJLink**

See "**Setting PJLink**".

■ **Mask data**

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
```

7.13.3 Command link

Menu	Top→PRESET COMMAND→COMMAND LINK
Setting for	[Table 7.18] Control command execution condition
Setting value	OFF [Default], COMMAND 1 to COMMAND 32

The MSD has 37 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.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.
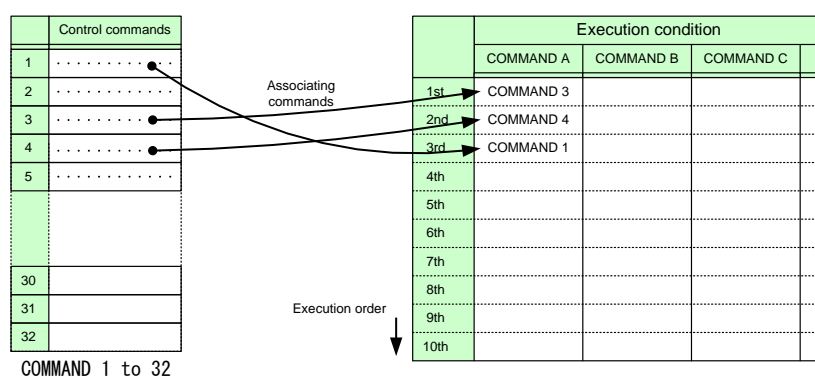
[Fig. 7.19] Associating control command

[Table 7.18] Control command execution condition

Execution condition	Function	Execution condition	Function
POWER ON	Controlling power switch		
DISPLAY1 POWER ON DISPLAY1 POWER OFF	Controlling sink device power of OUT1	DISPLAY2 POWER ON DISPLAY2 POWER OFF	Controlling sink device power of OUT2
VIDEO:OUT1-IN1to VIDEO:OUT1-IN7, VIDEO:OUT1-OFF	Selecting video input channel of OUT1	VIDEO:OUT2-IN1to VIDEO:OUT2-IN7, VIDEO:OUT2-OFF	Selecting video input channel of OUT2
AUDIO:OUT1-IN1to AUDIO:OUT1-IN7, AUDIO:OUT1-OFF	Selecting audio input channel of OUT1	AUDIO:OUT2-IN1to AUDIO:OUT2-IN7, AUDIO:OUT2-OFF	Selecting audio input channel of OUT2

7.13.4 Command execution

Menu	Top→PRESET COMMAND→COMMAND EXECUTION
Setting value	CMD 1 to CMD 32

You can execute the registered control commands (CMD 1 to CMD 32).
Only registered control command numbers are displayed as settable values. To execute the control command, press the "MENU/SET" key.

【See: **7.13.1Registering/editing control command**】

7.13.5 Invalid time during control command execution

Menu	Top→PRESET COMMAND→INVALID TIME
Setting value	0s000ms to 999s999ms [Default]: 0s000ms

You can set the waiting time from starting control command execution to receiving the next command. Use this menu to prevent repeated execution caused by pressing the control command execution key twice.

The longer time either of control command execution time or the time set in this menu will be applied as the invalid operation time. 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 the parallel input. However, even during invalid operation time, for controlling power of sink devices and switching inputs, you can control sink devices' power and can then switch input only for different outputs, in order to operate several outputs successively.

7.13.6 Initializing registered commands and associations

Menu	Top→PRESET COMMAND→INITIALIZE
Setting value	

CMD 1 to CMD 32: control command
RCV 1 to RCV 32: reply command
POWER ON -: control command association

You can initialize the following commands and associations:

- ▪ Control commands registered in "**7.13.1 Registering/editing** control command **(P.74)** "

- ▪ Reply commands registered in "**7.13.2 Registering**/editing reply command **(P.79)**"

- ▪ Associations of control commands registered in "**7.13.3 Command link (P.82)**"

Use this menu to delete or set them from the first step again.

A long buzzer will sound when the initialization is completed by pressing the MENU/SET key.

7.13.7 Blinking time of sink device power switch

Menu	Top→PRESET COMMAND→FLASH TIME
Setting value	

EXECUTION: Blinks while a control command is being executed   [Default]
OFF: Not blink
1sec. to 1000sec.: Blinks for the specified time (1 to 1000 sec.)

You can set the blink time of command execution keys and power switch of sink devices during command execution.

7.14 Preset memory

7.14.1 Loading cross point

Menu   Top→PRESET MEMORY→LOAD CROSS POINT
Setting value No.1 to No.7

You can load the I/O channel settings of video and audio saved in the cross point memory.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the
MENU/SET key to update the setting.

7.14.2 Saving cross point

Menu   Top→PRESET MEMORY→SAVE CROSS POINT
Setting value No.1 to No.7

You can save the I/O channel settings of video and audio into the cross point memory.
Up to seven cross point memories can be saved with their name (up to 10 characters). If you set "---" (not
control) for "**7.14.3 Editing cross point**", a writing method (CONTINUE or DELETE) can be selected.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the
MENU/SET key to update the setting.

■Writing method
・"CONTINUE": "---" (not control) will be kept in the cross point memory.
・"DELETE": the current input channel settings will be overwritten.

Current input channel setting

| OUT1 = Input channel 1 |
| OUT2 = Input channel 2 |

"CONTINUE"
[Default]

"---" (not control) will be kept.

| OUT1 = Input channel1 |
| OUT2 = Not control |

Current cross point memory1

| OUT1 = Input channel 3 |
| OUT2 = Not control |

"DELETE"

Input channel settings will be overwritten.

| OUT1 = Input channel1 |
| OUT2 = Input channel2 |
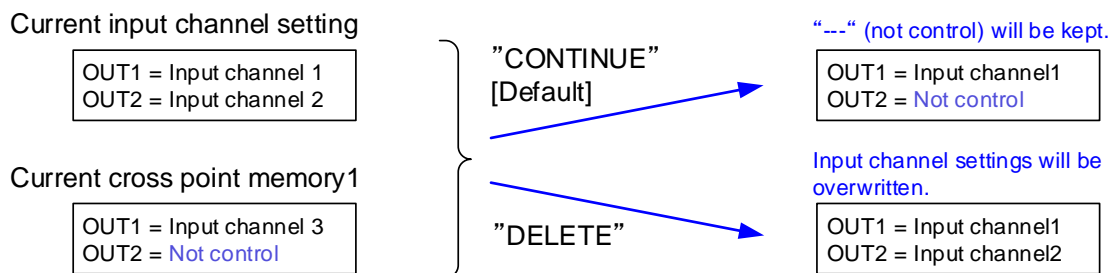
[Fig. 7.20] Saving cross point

7.14.3 Editing cross point

Menu	Top→PRESET MEMORY→EDIT CROSS POINT
Setting for	Each cross point memory
Setting value	

Setting item	Setting value	Default
Output channel	OUT1,OUT2	OUT1
Video input channel	---,1 to 7,OFF	---
Audio input channel	---,1 to 7,OFF	---
Memory name	20 to 7D of ASCII code	20 (space)

You can edit the settings of the cross point memory.
First, select the memory number and press the MENU/SET key, and then edit settings.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

■ Not controlling channel

"---": if you select "---" when setting input channel of V or A, it is set to "not control". Output with the setting will not be switched.

[Fig. 7.21] Loading edited cross point memory

7.14.4 Loading all settings

Menu	Top→PRESET MEMORY→LOAD ALL SETTING
Setting value	No.1 to No.8

You can load all settings saved in the preset memory.
Once you perform this operation, all settings related to video and audio I/O except for some environmental settings will be updated. 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.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.14.5 Saving all settings

| Menu | Top→PRESET MEMORY→SAVE ALL SETTING |
| Setting value | No.1 to No.8 |

You can save up to eight preset memories (up to 10 characters) of the following settings:
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 7.19] Settings can be saved in preset memory

Menu	Item
Selecting input channel	Selecting input channel
Setting position, size, and masking	Output resolution, Aspect ratio of sink device, Aspect ratio, Aspect ratio control, Overscan, Display position, Display size, Masking, Background color, Test pattern
Quality setting	Sharpness, Brightness, Contrast, HUE, Saturation, Black level
Input settings	No-signal input monitoring, HDCP input enabled/disabled, Input equalizer, Signal type of analog input, Automatic detection of input video interruption, Selecting signal of DVI input connector
Setting input timing	The total number of horizontal dots, Start position, Active area, Automatic measurement of start position, Automatic setting of input timing, Tracking
Output settings	Output equalizer, Output mode, Synchronous signal output with no input video, Output video with no input video, Window transition effect, Window transition speed, Wipe color, Video output connector, HDCP output, The number of HDCP retries, Deep Color, CEC connection
Audio settings	Output level, Output mute, Input selection, Input level, Lip sync, Sampling frequency, Audio output connector, Digital audio output connector, Multi channel audio output, Test tone
EDID (Extended Display Identification Data)	EDID, Resolution for PCs, Input resolution for AV devices, Deep Color, Audio format, Speaker configuration

7.14.6 Startup setting

Menu	Top→PRESET MEMORY→START UP
Setting value	

Item	Setting value	Operation at startup
Last channel	LAST CHANNEL [Default]	Starts with the setting las time the MSD powered off.
Preset memory	PRESET MEMORY 1 to PRESET MEMORY 8 [*]	Starts 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.
Cross point memory	CROSS POINT 1 to CROSS POINT 7	Starts 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 OFF	Channel setting will be OFF. For settings other than channel setting, starts up with the settings of the last MSD power off.

*Only registered preset memory numbers are displayed.

You can set the memory loading at startup.

7.15 Setting bitmap

7.15.1 Sending bitmap file

You can set the bitmap image to be displayed on the sink device. Up to four bitmaps can be registered. IDK's logo is displayed by factory default.

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 sink device.

■ **Conditions of bitmap file**
The MSD supports DIB (Device Independent Bitmap) with a header generally used for Windows, and those files have to meet the following requirements:

[Table 7.20] Conditions of bitmap file

Item	condition
File header	"BITMAPFILEHEADER"
Information header	"BITMAPCOREHEADER"(for OS/2) / "BITMAPINFOHEADER"(for Windows)
The number of colors	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 (8 bits); 3 bytes per pixel for 16.77 million colors (TRUE COLOR, 24 bits).
Compression format	No compression (BI_RGB), 8 bit-run-length compression (BI_RLE8), 4 bit-run-length compression (BI_RLE4)

■ **Transferring bitmap file**
You can use browser, RS-232C or LAN communication.

From browser
To send bitmap files to the MSD via WEB browser, such as Microsoft Internet Explorer, enter "/bitmap.html" after the IP address in the address bar of the WEB browser.

[Table 7.21] Input example

Port number for WEB browser	Input example in address bar
80 (normal)	http://192.168.1.199/bitmap.html
Other than 80 (5000 to 5999)	http://192.168.1.199:5000/bitmap.html (example: 5000)

When an IP address is entered, the following window will be displayed. Use the window to send the bitmap file.

When the bitmap file is sent correctly, the message, "BITMAP SAVE NOW PLEASE WAIT" is displayed on the VFD screen and the bitmap file is being saved. Do not turn off the MSD while the message is displayed. If the bitmap file is not send correctly, an error message (see below) will be displayed.

① : Select the register number of the bitmap file (if dividing memory area).
② : Select the bitmap file.
③ : Send the bitmap file by clicking the SEND button.

Completed normally
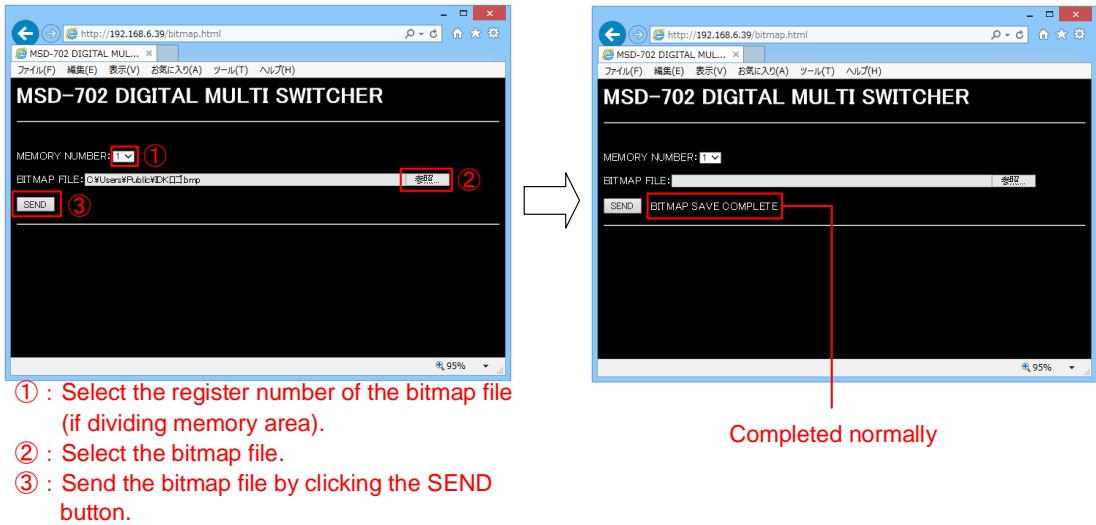
[Fig. 7.22] Transferring bitmap file
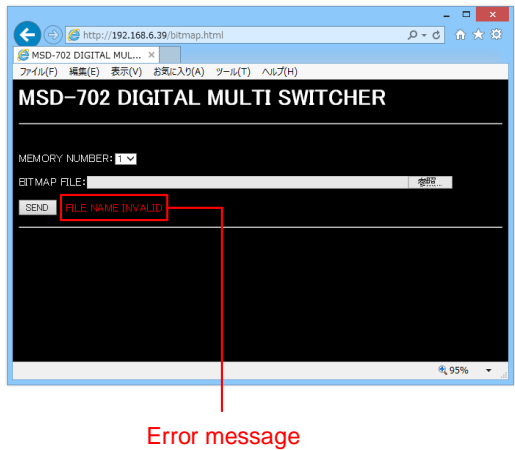
Error message

[Fig. 7.23] Error message

From RS-232C or LAN communication

Use terminal software, such as Tera Term, that supports binary format in order to send bitmap files.

Example:

Sending a bitmap file via RS-232C communication using Tera Term.

If the bitmap was divided, select the bitmap number you want to write before sending the bitmap file.

Use "@SBNcommand" (refer to the Command Guide) to select a bitmap number.

Select "hardware".

Select the target file.

Check "Binary".
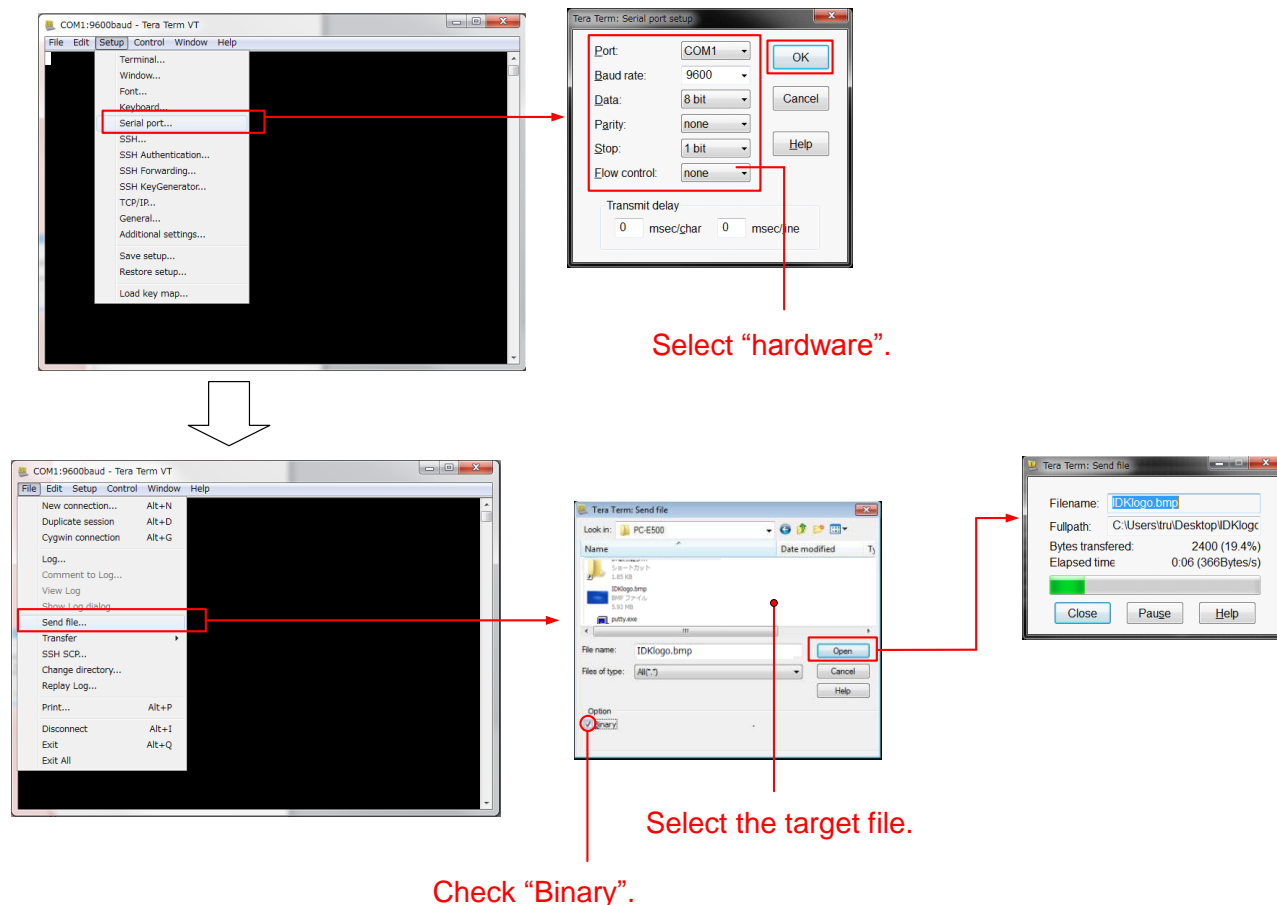
[Fig. 7.24] Sending bitmap file via RS-232C communication

When bitmap file is sent correctly, the message, "BITMAP SAVE NOW PLEASE WAIT", is displayed on the VFD screen and the bitmap file is being saved. Do not turn off the MSD while the message is displayed or until "Bitmap update complete" is replied.

If the bitmap file is not send correctly, an error message below will be displayed.

Error message

Error message		Error description
Browser	RS-232C/LAN communication	
FILE NAME INVALID	—	The file name was specified incorrectly.
FILE DATA INVALID	File format error	The MDS does not support this file.
FILE DATA SIZE OVER	File size error	The resolution exceeds the maximum resolution.
MEMORY ALLOCATE ERROR	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.
—	Time out	Send bitmap data consecutively. If the interval is 2 seconds or longer, an error causes.

7.15.2 Outputting bitmap image

Menu   Top→BITMAP→BITMAP OUTPUT
Setting for   Each output (COMMON TO OUTA AND OUTB)
Setting value OFF [Default], ON

You can enable/disable the bitmap image output.
If several bitmaps are registered, select the bitmap number you want to output.

7.15.3 Background color

Menu   Top→BITMAP→BACKGROUND COLOR
Setting for   Each output/bitmap
Setting value R / G / B: 0 to 255   [Default]: R / G / B: 255 (white)

You can set the background color of bitmap.
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).

7.15.4 Aspect ratio

Menu	Top→BITMAP→ASPECT
Setting for	Each output/bitmap
Setting value	

●AUTO [Default]   ●FULL   ●THROUGH

Bitmap (1024x768)

(1920x1080)   (1920x1080)   (1920x1080)
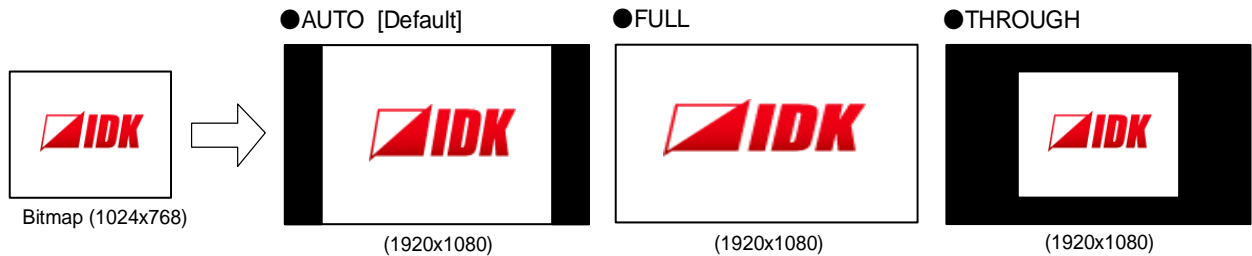
[Fig. 7.25] Setting aspect ratio

You can set the aspect ratio of bitmap.
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.

7.15.5 Display position

Menu	Top→BITMAP→POSITION
Setting for	Each output/bitmap
Setting value	

●TOP-LEFT   ●TOP-RIGHT

●CENTER
[Default]

●BOTTOM-LEFT   ●BOTTOM-RIGHT
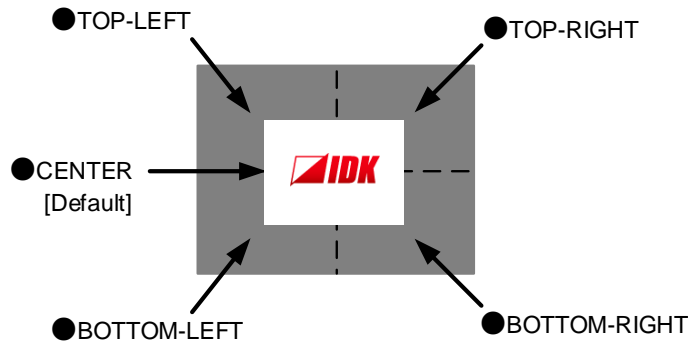
You can set the display position of the bitmap.

7.15.6 Input channel assignment

Menu	Top→BITMAP→CHANNEL ASSIGN
Setting for	Each input/Each output (COMMON TO OUTA AND OUTB)
Setting value	OFF [Default], ON

A bitmap can be treated as an input video source by assigning the bitmap to any input that is not currently being used. Set "**7.15.2 Outputting** bitmap image **(P.91)"** to "OFF".
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.
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

7.15.7 Bitmap output at startup

Menu	Top→BITMAP→POWER ON BITMAP
Setting for	Each output (COMMON TO OUTA AND OUTB)
Setting value	OFF [Default], ON

You can enable or disable bitmap output at the time of startup.

7.15.8 Dividing memory area

Menu   Top→BITMAP→DIVIDE MEMORY
Setting value   The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

 [Table 7.22] Dividing memory area

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 = 64K bytes; 128 blocks = 8M bytes in total
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 7.22] Dividing memory area

Setting item	Setting value	Default
MODE (dividing mode)	RESIZE,DELETE,AUTO	RESIZE
NUMBER (the number of partitions)	1 to 4	1
DISPLAY (displaying method)	BLOCK,BYTE	BLOCK
End block position	0 to 127	127

■ Dividing mode
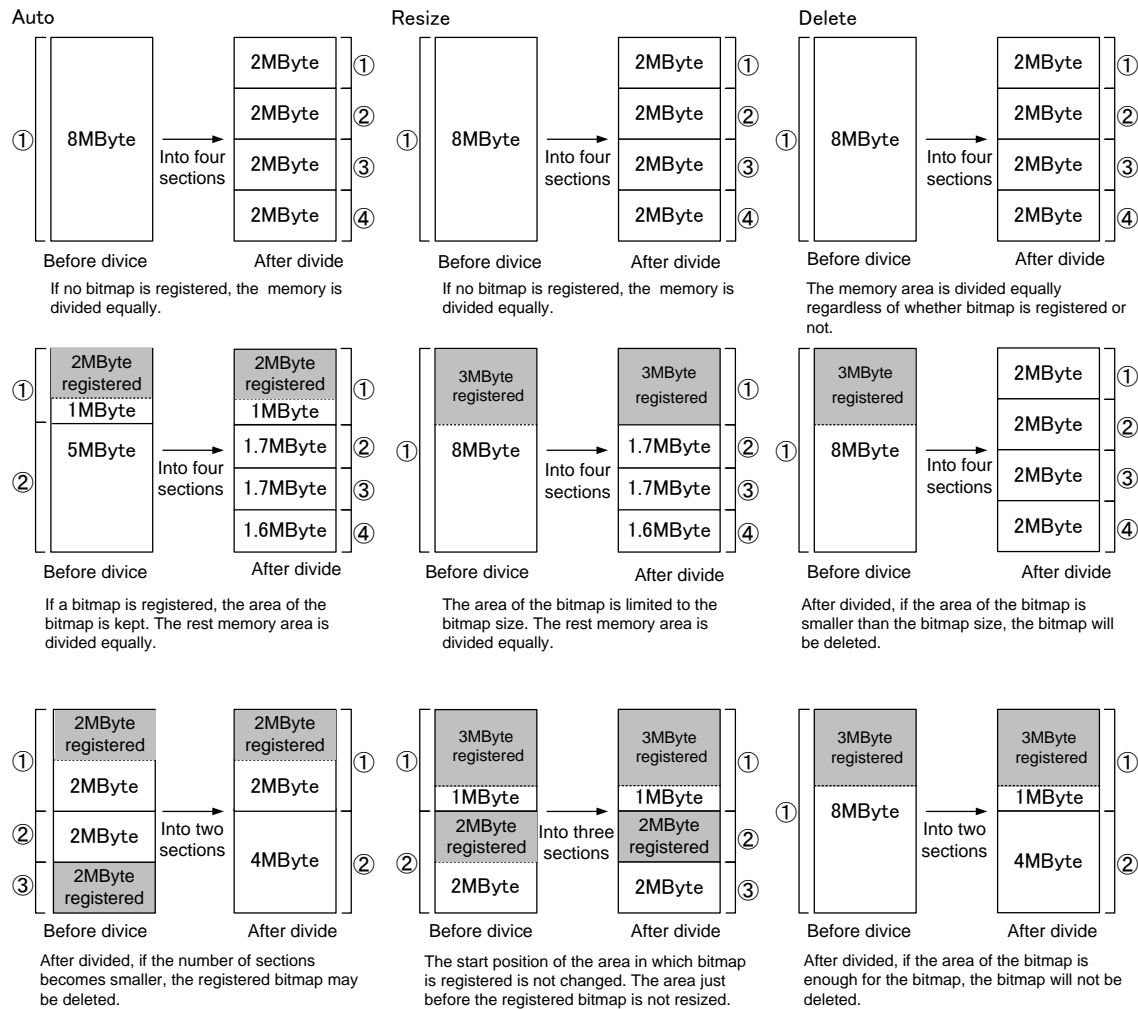
[Fig. 7.26] Dividing mode

■ **Displaying method**

"BLOCK"

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 the currently-registered bitmap is deleted because of specifying the size directly, an "S" or "E" is displayed in the upper right.

"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.

If the currently-registered bitmap is deleted because of specifying the size directly, an "S" or "E" is displayed in the upper right.

[BLOCK]

```
[BITMAP1 BLOCK]  ◄◆►
  0- 63( 23)→  0- 63
```
① ② ③　④ ⑤

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 (=64 bytes) and end block position or size of the bitmap is rounded up by 1 block.

*2 The size can be specified directly.

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.

⑨　　　　　⑩

```
[BITMAP2 BLOCK]S ◄◆►
 64-127(120)→ 60-10
```
```
[BITMAP2 BLOCK] E◄◆►
 64-127(120)→ 64-11
```

[Fig. 7.27]"BLOCK" and "BITE"

7.15.9 Input image capture

Menu   Top→BITMAP→VIDEO CAPTURE
Setting value

Setting item	Setting value	Default
Output channel	OUT1,OUT2	OUT1
Register number	No.1 to No.4	No.1

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 sink 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 "**7.4.1 Output resolution**" to smaller value and capture the images.)

To freeze the input video temporarily, press the "MENU/SET" key. To register the frozen video, select "YES" and then press the "MENU/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 "MEMORY SIZE OVER" will be displayed after you press the "MENU/SET" key. In such a case, registration will not be executed.

From browser

You can save input video captured via a WEB browser, such as Microsoft Internet Explorer.
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.

【See: **7.12.1 IP address/subnet mask/gate way address**】
【See: **7.12.3 TCP port number**】

[Table 7.23] Input example

Port number for WEB browser	Input example in address bar
80 (normal)	http://192.168.1.199/capture.html
Other than 80 (5000 to 5999)	http://192.168.1.199:5000/capture.html (example: 5000)

When an IP address is entered, the following window will be displayed. Use the window to send the bitmap file.

When the bitmap file is sent correctly, the message, "BITMAP SAVE NOW PLEASE WAIT" is displayed on the VFD screen and the bitmap file is being saved. Do not turn off the MSD while the message is displayed. If the bitmap file is not send correctly, an error message below will be displayed.

A: Selects register number (for dividing memory area)
B: FREEZE ON: pauses
    FREEZE OFF: releases the pause
C: Starts the capture.
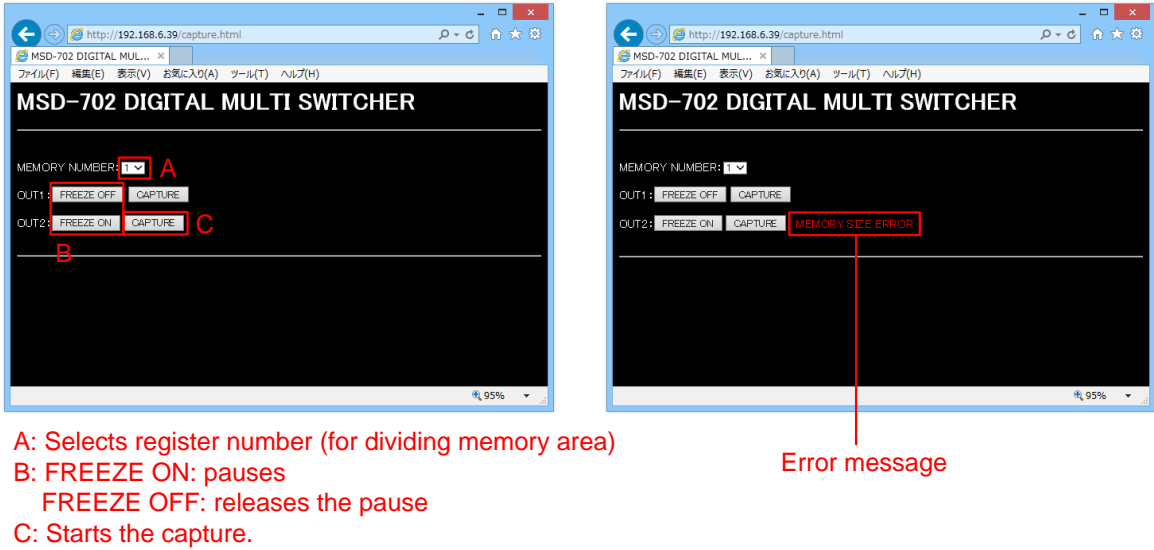
Error message

[Fig. 7.28] Capturing

Error message

[Table 7.24] Error message

Message	Description
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.

7.16 Startup settings

7.16.1 DISPLAY POWER keys

Menu   Top→POWER ON SETTING→DISPLAY POWER
Setting for   Each output (COMMON TO OUTA AND OUTB)
Setting value OFF [Default], ON

You can set whether to turn on sink devices for when the MSD is powered on.
ON: when the MSD is powered on, commands associated with DISPLAY POWER keys will be executed.

【See: **7.13.3 Command link**】

7.16.2 Key lock

Menu   Top→POWER ON SETTING→KEY LOCK
Setting value AUTO [Default], UNLOCK, LOCK

You can set key lock for when the MSD is powered on.
AUTO: the previous key lock mode will be applied.

【See: **7.17.1 Key lock mode**】

7.17 Other settings

7.17.1 Key lock mode

Menu   Top→OTHERS→KEY LOCK MODE
Setting for   Each CHANNEL, CHANNEL MODE, MENU,DISPLAY POW
Setting value LOCK [Default], UNLOCK

You can set the key lock mode for each key group on the front panel. The front panel consists of three groups of keys as shown below.

If you select "LOCK" for "CHANNEL MODE", operations from the "SWITCHING MODE" menu and Top screen ("NORMAL" setting) will be locked by pressing the hold the "ESC" key.

【See: 6.3.2 **Setting and canceling key lock**】
【See: **7.3 Channel switching mode**】
【See: **7.17.6 Top VFD screen**】
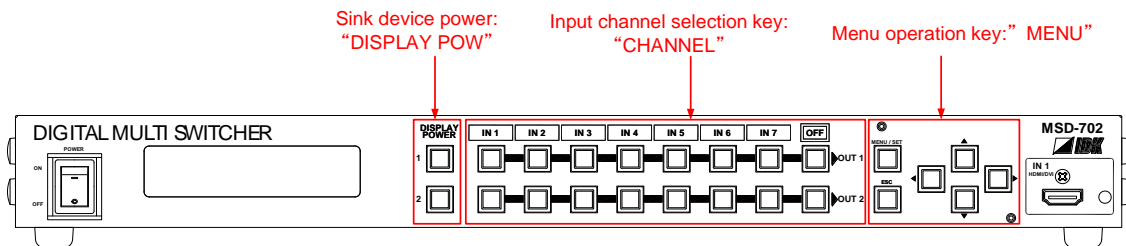
[Fig. 7.29] Front key group (Fig.: MSD-702)

7.17.2 Buzzer

Menu   Top→OTHERS→BUZZER
Setting value ON [Default], OFF

You can turn ON/OFF the buzzer function (sounding every time you press a front panel key).

7.17.3 Power saving

Menu   Top→OTHERS→POWER SAVE
Setting value ON [Default], OFF

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%.

7.17.4 DISPLAY POWER key pressing time

Menu	Top→OTHERS→POWER SWITCH ON
Setting value	0ms to 5000ms (by 10ms) [Default]: 0ms

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.

7.17.5 Input channel automatic linking   ONLY FOR MSD-502/702

Menu	Top→OTHERS→INPUT CHANNEL LINK
Setting value	VIDEO: OFF [Default], OUT1, OUT2
	AUDIO: OFF [Default], OUT1, OUT2

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 " **6.2 Selecting** input channel **(P.23)**". This function is convenient to adjust each input channel based on specific sink devices or AV amplifiers.
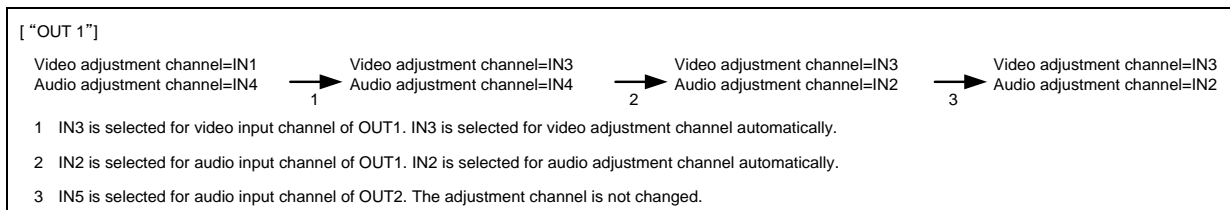
[Fig. 7.30] Automatic channel selection

[Table 7.25] Video

Menu	Description
Setting position, size, and masking	Aspect ratio, Aspect ratio control, Overscan, Display position, Display size, Masking, Automatic sizing
Quality setting	Sharpness, Brightness, Contrast, HUE, Saturation, Black level, Default color
Input settings	Signal type of analog input
Setting input timing	Automatic measurement, The total number of horizontal dots, Start position, Active area, Loading device data, Registering device data, Tracking
Other settings	Input signal status

[Table 7.26] Audio

Menu	Description
Audio settings	Input level, Lip sync
Other settings	Input signal status

7.17.6 Top VFD screen

Menu	Top→OTHERS→TOP DISPLAY
Setting value	[Fig. 7.31] Top

NORMAL [Default]

```
MSD-702
          [ V&A ]⬍
```

AUDIO VOLUME

```
[OUT1 AUDIO]      MUTE
  0dB              ◄⬍►
```

You can enable/disable the mute function everytime pressing the "ESC" key.

INPUT STATUS

```
IN1 2 3 4 5 6 7
⬍ H̄  D   R Y V
```

MONITOR STATUS

```
OUT1A 1B 2A 2B
⬍   S  0  E
```
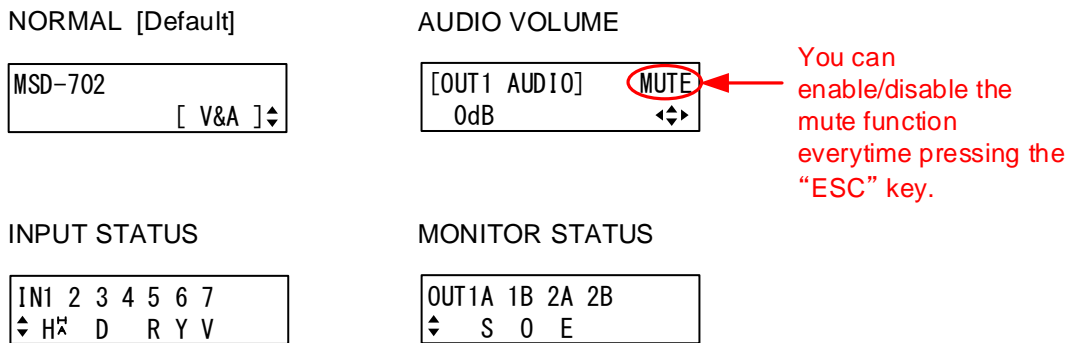
[Fig. 7.31] Top screen

You can select what will be displayed on the top screen.
To display input signal status and sink device status, use "▲" and "▼" keys.

【See: **7.17.7 Input signal status**】
【See: **7.17.8 Sink device status**】

7.17.7 Input signal status

Menu	Top→OTHERS→INPUT STATUS

You can display the input signal status that is from video input connectors.

[Table 7.27] Input signal status

	All input channel	Video status of each input channel	Audio status of each input channel
Screen	```IN1 2 3 4 5 6 7``` ```⬍ H̄ D R Y V```	```[IN1 FORMAT] 24``` ```1080p 59.94Hz H̄```	```[IN1 AUDIO] M⬍``` ```LINEAR PCM 48kHz```
Upper	Input channel	Input channel, color depth	Input channel, multi-channel audio information
Lower	Type of input signal, Other information	Format of video input signal, Type of input signal, Other information	Type of audio input signal

■ **Input signal type**

[Table 7.28] Input signal type

Alphabet	Signal	Alphabet	Signal
H	HDMI signal	R	Analog RGB signal
D	DVI signal	Y	Analog YPbPr signal
No alphabet	No signal is input.	V	Analog composite video signal
		S	Analog S video signal

■ **Other information**

Only for digital input

Upper: "H": signal is protected by HDCP.

Lower: "A": audio is embedded.

■ **Color depth**

24: 24-BIT COLOR, 30: 30-BIT COLOR

■ Format of video input signal

[Table 7.29] Format of video input signal

Example	Signal type	Items to be displayed
1080p 59.94Hz	SDTV / HDTV signal	Format type, vertical synchronous frequency
800 x 600 60.00Hz	RGB signal	Horizontal / Vertical resolution, vertical synchronous frequency
NTSC	Composite video signal or S video signal	Format type
56.83kHz 60.02Hz	Signal that cannot be recognized.	Horizontal / Vertical synchronous frequency
NO SIGNAL	No video signal is 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]        ▲▼
1920x1400  60.00HzED
```

■ **Multi-channel audio information**

If multi-channel audio signal is input, an "M" is displayed on the upper right.

■ **Type of audio input signal**

[Table 7.30] Type of audio input signal

Example	Signal type
LINEAR PCM 48kHz	Linear PCM, sampling frequency
COMPRESSED AUDIO	Compressed audio (such as Dolby Digital, DTS)
NO SIGNAL	No audio signal is input.

7.17.8 Sink device status

Menu	Top→OTHERS→MONITOR STATUS

You can display the status of sink device connected to video output connectors.

[Table 7.31] Sink device status

	All video output connector	Details of each video output connector
Screen	```OUT1A 1B 2A 2B``` ```‡ S N E```	```[OUT1A MONITOR] H24‡``` ```HDCP SUPPORT AAA```
Upper	Video output channel	Output channel, output signal, color depth
Lower	HDCP authentication status	HDCP authentication status, error code

■ **Output signal, color depth**

H24: 24-BIT COLOR of HDMI signal   H30: 30-BIT COLOR of HDMI signal   D: DVI signal

■ **HDCP authentication status**

[Table 7.32] HDCP authentication status

Alphabet	HDCP authentication status	Description
S	HDCP SUPPORT	HDCP-compliant sink device is connected.
N	HDCP NOT SUPPORT	Non-HDCP-compliant sink device is connected.
E	HDCP ERROR	HDCP-compliant sink device is connected, but the authentication failed.
C	HDCP CHECK NOW	Status of sink 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	Cat6 / Cat5e cable is disconnected (displayed only for 1 second)[*]
O	Cat6 NO LINK	Cat6 / Cat5e cable is not connected.[*]
	UNCONNECTED	No sink device is connected.

*For status of OUT1B and OUT2B

■ **Error code**

From the left, statuses of video output, digital audio output, and analog audio output are displayed.
 (Example: AAA)

[Table 7.33] Error code

Code	Video output	Audio output
	If any number or character is not displayed, video or audio is output correctly.	
1	"**7.8.8 Video output connector**" is set to "OFF".	"**7.9.2 Output mute**" is set to "ON".
2	Displayed only for digital input. DDC power supply is not input. (If no source device is connected, this status is displayed).	
3	No video signal is input.	No audio signal is input [*1]
4	Displayed only for digital input. Video or audio output of source device is in a Mute status.	
5	Displayed only for digital input. Signal with HDCP are input, but the sink device does not support HDCP. (This may also be displayed while authenticating HDCP).	
6	Displayed only for digital input. The source device does not output required information (packets) for outputting video or audio.	
7	Signal 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 sink devices supporting compressed audio).
8	—	"**7.9.7 Audio output connector**" is set to "OFF".
9	—	"**7.8.2 Output mode**" is set to "**DVI MODE**" or a sink device that does not support audio is connected. [*2]
A	Input is set to "OFF".	
B	—	"**7.9.8 Digital audio output connector**" is set to "OFF".

[*1] Input status of analog audio signal 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 output connectors.

7.17.9 Displaying EDID of sink device

Menu	Top→OTHERS→EDID STATUS

You can display EDID information of the sink device that is connected to the video output connector.

[Table 7.34] EDID information of sink device

	1	2 (left: HDMI-compliant device; right: DVI device)	
Screen	[OUT1A]xxxx 1920x1080 148.50MHz⇕	[OUT1A]HDMI RGB/YCbCr422/444 ⇕	[OUT1A] DVI ⇕
Upper	Monitor name	HDMI	-
Lower	Resolution, dot clock	Sampling structure RGB,YCbCr 4:2:2,YCbCr 4:4:4	DVI

	3	4	5
Screen	[OUT1A] 24BIT COLOR ⇕	[OUT1A] 32/44.1/48/96kHz ⇕	[OUT1A]16/20/24BIT 8CHANNEL COMPRESSED
Upper	-	-	Audio bit length
Lower	Color depth	Audio sampling frequency	The number of audio channels, compressed audio COMPRESSED

7.17.10 Displaying version

Menu	Top→OTHERS→VERSION

You can display the product name and firmware version.

8 Product specification

Specifications and appearance are subject to change without notice.

All nominal levels are at ±10%.

		Item	Description	
Input	Video	HDMI/DVI	MSD-501/502	MSD-701/702
			3 inputs Connector: HDMI Type A (19 pin), female	5 inputs 　DVI-I connector is for switching digital/analog Connector: HDMI Type A (19 pin), female × 4,　DVI-I (29 pin), female × 1
			HDMI Deep Color (*1)/DVI 1.0 TMDS single link, HDCP 1.4　TMDS clock: 25 MHz to 225 MHz Built-in Digital Cable EQ, EDID emulation cable	
		Analog	MSD-501/502	MSD-701/702
			2 inputs Connector: HD (15-pin) HD・female × 2	3 inputs 　DVI-I connector is for switching HDMI/DVI Connector: DVI-I (29 pin)・female × 1 , 　　　　　　　D-sub15 pin HD・female × 2
			Composite video /Y/C/Analog RGB/Analog YPbPr (automatic recognition) Composite video: 1.0V[p-p]/75 Ω Y/C:1.0 V[p-p] (Y)/0.286 V[p-p] (C)/75 Ω Analog RGB: 0.7 V[p-p] (1.0 V[p-p], Sync on Green)/75 Ω 　　　　　　　HS/VS TTL level, CS TTL level, Sync on Green Analog YPbPr:1.0 V[p-p](Y) / 0.7 V[p-p] (Pb・Pr) / 75 Ω EDID emulation	
		Supported format	Analog :NTSC / PAL Analog　/HDMI/DVI:VGA to QWXGA (Dot clock: 25 MHz to 165 MHz) 　　　　　　　*WUXGA/QWXGA: only Reduced Blanking is supported Analog　/HDMI/DVI:480i/480p/576i/576p/720p/1080i/1080p	
	Audio	Digital audio	MSD-501/502	MSD-701/702
			3 inputs 　For switching analog audio L/R Connector: HDMI Type A (19 pin)・female	5 inputs 　For switching analog audio L/R Connector: HDMI Type A (19 pin)・female×4, 　　　　　　DVI-I (29 pin)・female×1
			Multi-channel linear PCM: up to 8 channels Sampling frequency: 32 kHz to 192 kHz, Sample size: 16 bit to 24 bit Standard level: -20 dBFS　Input level: up to 0 dBFS	
		Analog audio	MSD-501/502	MSD-701/702
			5 inputs 　IN1 to IN3: for switching analog/digital audio Connector: RCA pin jack	7 inputs 　IN1 to IN5: for switching analog/digital audio Connector: RCA pin jack
			Stereo L/R imbalance signal Input impedance: 24 kΩ　Standard level: -10 dBu　Input level: up to +10 dBu	
Output	Video	HDMI / DVI	MSD-501/502	MSD-701/702
			1 output / 2 outputs 　Distribution of digital signal output Connector: HDMI Type A (19 pin)・female	1 output/2 outputs 　Distribution of digital signal output Connector: HDMI Type A (19 pin)・female
			HDMI Deep Color (*1)/DVI 1.0 TMDS single link, HDCP 1.4, Built-in Digital Cable EQ	
		Digital signal for extension (HDBaseT)	MSD-501/502	MSD-701/702
			1 output / 2 outputs (*2) 　Distribution of HDMI /DVI output Connector: RJ-45 (*3) Cable: Cat6 STP / UTP straight, 　　　Cat5e STP / UTP straight (*4)	1 output / 2 outputs (*2) 　Distribution of HDMI /DVI output Connector: RJ-45 (*3) Cable: Cat6 STP / UTP straight, 　　　Cat5e 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	

Item			Description	
Output	Audio	Digital audio	MSD-501/502	MSD-701/702
			1 output / 2 outputs × 2 distribution for each Connector: MSD-501 　　　　HDMI Type A (19pin)・female × 1, 　　　　RJ-45 × 1 　　　MSD-502 　　　　HDMI Type A (19pin)・female × 2, 　　　　RJ-45 × 2	1 output / 2 outputs ×2 distribution for each Connector: MSD-701 　　　　HDMI Type A (19pin)・female × 1, 　　　　RJ-45 × 1 　　　MSD-702 　　　　HDMI Type A (19pin)・female × 2, 　　　　RJ-45 × 2
			Multi-channel linear PCM: up to 8 channels Sampling frequency: 32 kHz to 192 kHz　Sample size: 16 bit to 24 bit Standard level: -20 dBFS　Output level: up to 0 dBFS	
		Analog audio	MSD-501/502	MSD-701/702
			1 output/2 outputs Connector: RCA pin jack	1 output/2 outputs Connector: RCA pin jack
			Stereo L/R imbalance signal Output impedance: 75 Ω,　Standard level: -10 dBu　Output level: up to +10 dBu	
		Lip resync.	Up to 16 frames	
	Cable maximum extension distance		Digital input: Up to 32.8 ft. to 98.43 ft./10 m to 30 m (*5) Digital output: HDMI / DVI up to 32.8 ft. to 164.04 ft./10 m to 50 m (*5)　Digital signal for extension: up to 328.08 ft./100 m (*6)	
Function-o on	Analog video processing unit		3D Y/C separation	
	Scan converter		Aspect Ratio Control, Seamless Switching (*7), Picture adjustment (brightness, contrast, display position, display size), Motion adaptive I/P conversion	
	Others		Volume adjustment (volume of input and output ports can be set separately) Audio breakaway enables independent audio and video switching Cross-point memory　(storage for 7 settings) Preset memory (8 settings and startup settings) Last memory Anti-Snow (*8) Connection Reset (*9) External control commands (32 commands) Front panel security key lock	
External control	RS-232C		1 port: D-sub 9 pin connector・Male	
	LAN		1 port: RJ-45 connector 10Base-T/100Base-TX (Auto Negotiation), Auto MDI / MDI-X	
	External control		Outputting command from RS-232C,LAN, or digital signal output from extension to external devices PJLink (class1), Controlling power supply of sink device through CEC (*10)	
Others	Power		AC to 100 V - 240 V ±10%,50 Hz/60 Hz±3 Hz	
	Power consumption (approx.)		MSD-501: 35 W MSD-502: 43 W MSD-701: 38 W MSD-702: 48 W	
	Dimension		16.93 (W)" x 1.73 (H)" x 11.81 (D)"/430 (W) x 44 (H) x 300 (D) mm (EIA rack 1U and projections are not included)	
	Weight		MSD-501:4.2 kg MSD-502:4.2 kg MSD-701:4.3 kg MSD-702:4.3 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 (5.9 ft./1.8 m), Power supply cable (5.9 ft./1.8 m), rack mounting bracket Cable clamp: 　MSD-501: × 3 　MSD-502: × 4 　MSD-701: × 4 　MSD-702: × 5	
	Option		1U rack mounting bracket (RM-OFS100)	

(*1)　This product supports 30 bits/pixel Deep color (10 bit/component). It does not support xvYCC, Automatic Lip Sync, 3D, ARC, or HEC. (Lip sync can be adjusted manually.)

(*2)　Digital twisted pair output does not support DVI signal with HDCP. If you need to extend DVI signal with HDCP, please use the IDK's　HDC-RD100 as a receiver.

(*3)　Digital twisted pair output 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)　Transmission distance depends on connected devices. The information above is maximum transmission distance when a cable made by IDK (AWG24) is used and signal

(1080p 60 Hz 24bit/pixel (8bit/component)) are transmitted (both inputs and outputs of this product). When a connected device does not match to this product or other

manufacturers' cables are used, video signal can be unstable or cannot be output, even though the transmission distance is within the information 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 has one black frames or back color.

(*8)　The anti-snow feature automatically fixes snow noise that is a specific symptom of HDCP-compliant signal and mainly occurs at start-up. This feature does not work when

snow noise has already occurred during startup or when it occurs due to a bad condition of the transmission line.

(*9)   For digital systems, some problems, such as an HDCP authentication error, can often be recovered by physically disconnecting and reconnecting the digital cables. However, the Connection Reset feature will fix these problems automatically, without the need to physically remove and insert the cables. It creates the same condition as if the cable were physically disconnected and reconnected. This feature only works for this device's output. If other devices are connected between this device's output and sink device, this feature may be invalid.

(*10) The sink device need to support CEC. Some sink devices cannot be controlled by the MSD through CEC.

9 Troubleshooting

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 sink 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 "**7.17.8 Sink device status**". (Since the MSD has multiple output connectors, check the error code of the output connector that does not output video.) ･Error code 1: 　Set "**7.8.8 Video output connector**" to "ON". ･Error code 2: 　Check if the source device is connected and turned on. ･Error code 3: 　Signal is not input. Check [1] to [6] on the next page. ･Error code 4: 　A problem may occur in the source device or HDCP authentication. Check [2], [5] and [6]. ･Error code 5: 　With using a sink device that is not HDCP compliant, only video without content protection (such as analog input and 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 video depending on the result. Since the MSD supports HDCP, output video cannot be output if the sink devicet is not HDCP compliant. In that case, you can disable HDCP input from the source device in "**7.6.2 HDCP input enabled/disabled**" in order to display the video. ･Error code 6 and 7: 　A problem occurs in the source device. ･Error code A: 　Set "**6.2 Selecting input channel**" to a value other than "OFF". ･If no error code is displayed: 　Set "**7.4.11 Test pattern**" to a pattern other than "OFF". If any test pattern is not output, check [5] to [7]. If a test pattern is output, the source device may not output video.	－

Problem	Cause/Check item/Solution	Page
Digital input video is not output.	[1] The set time for monitoring a no-signal input may be too short.	41
	[2] Change the settings of input equalizer.	42
Analog input video is not output.	[3] Change the input signal type.	42
Video is not output	[4] If the source device has multiple output connectors, check the video output settings of the device.	—
Video is dissappeared, interrupted, or has noise.	[5] 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, signal might have been degraded due to the long haul transmission. We have high-quality cables, cable boosters and extenders. Please contact us as needed.	—
	[6] When high-speed signal (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 signal in "**7.17.7 Input signal status**" and can limit resolution and color depth of input signal according to the EDID setting. You can also specify output resolution and check the color depth of the output signal in "**7.17.8 Sink device status**" and limit the output signal color depth.	61, 62, 63
Input video and test pattern are not output.	[7] 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 signal. 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.	33
Video is interrupted.	If you set "**7.6.5 Automatic detection of input video interruption**" to "ON", false detection may occur. Change the setting to "OFF".	43
Video is interrupted or has noise	If the problem occurs only with specific digital input, change settings of the input equalizer.	42

Problem	Cause/Check item/Solution	Page
Video from HDMI/DVI output is choppy or has noise.	If the problem occurs in all input channels or at the time of displaying a test pattern and and a long cable is connected for output, then change the output equalizer setting.	50
Video from HDBaseT output is choppy or has noise.	If the problem occurs in all input channels or at the time of displaying a test pattern, the twisted pair cable may be affected by external noise. Check the twisted pair cable.	20
Video from analog input is displayed in black-and-white or green.	Change the input signal type.	42
VHS reproduction or fast-forward is choppy when analog composite video or analog S-Video is input.	Automatic detection of input signal failed. Set the input signal type manually to "VIDEO AUTO", "VIDEO", or "Y/C".	42
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 the video size and position of the output. If the problem occurs even if "CROSS HATCH" is output to all outputs, check [8] to [13].	38 35, 36
Part of video is cut off or black is displayed at edge(s).	[8] Check the overscan setting.	35
	[9] Settings of the display position or size are not changed? **Note:** Display position and size can be set for each input or output.	35, 36, 33

	[10] If aspect ratios of the input signal and output resolution do not match, video may be cut off automatically or black may be displayed at edge(s) 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 ratios are not the same, you can select a) or b) below:
	    a) video will be cut off
	    b) black will be displayed at edge(s)
		34
		
		35

	[11] If vertical and horizontal frequencies are displayed in "**7.17.7 Input signal status"**, signal that is not registered in the built-in data of the MSD was be input. If "**7.7.6 Automatic setting of input timing**" is set to "AUTO SETUP ON", input timing is measured when new signal is input. However, if correct video is not input, the measurement may fail. In this case, measure the input timing manually and register the device data.	45, 49

Problem	Cause/Check item/Solution	Page
Part of video is cut off or black is displayed at edge(s).	[12] For analog input, set the automatic measurement of input timing in **"7.7.1 Automatic measurement"**. The automatic measurement shows that video is cut off or black is displayed at edges, set the total number of the horizontal dots, scanning start position, and the active area. For digital input, start position and active area do not have to be set. Only when video edges are cut off 1 to 2 dots, set those items. (For digital input, the total number of horizontal dots cannot be set).	47 to 47
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.	[13] Do he 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 "**7.17.7 Input signal status**" match? If not, set the EDID and PC resolution. If the copy of the built-in LCD monitor in the laptop is output, the resolution of the LCD monitor is applied for outputting the video to the external monitor, and black bars may appear at edges. The problem can be solved by enlarging the display or displaying only to the external monitor.	42
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.	34
	Check the set aspect ratio of the input signal.	34
	Check the monitor setting of the source device (such as 4:3, 16:9, letter box and the like).	-
	For analog input, signal that cannot be recognized by the MSD and wrong aspect ratio may be applied. Perform the automatic measurement in the "NEXT ASPECT" mode.	45
Video flickers.	If interlace signal is input to a sink device that does not support interlace signal, the video may blink. Check the output resolution of the sink device.	33
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".	41
It takes a long time to output video after video input is switched.	If you set the HDCP output to "HDCP INPUT ONLY", some sink 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".	52
Video from a PC of analog input is displayed with bright-and- dark vertical stripes	Set the total number of horizontal dots. If you change the total number of horizontal dots, you may sometimes have to set the start position of scanning and the active area.	47

Problem	Cause/Check item/Solution	Page
Light shadows appear on fine lines of video from an analog input PC.	Adjust the tracking.	49
Fluctuation appears on the analog input video.	Adjust the tracking.	49
Automatic measurement of input timing fails.	In order to enable this menu, the input video must have 25% or more brightness and its edges (all sides) need to be in contact with the circumscribed rectangle in the effective display area.	45
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.	34
	Check the set aspect ratio of the input signal.	34
	Check the monitor setting of the source device (such as 4:3, 16:9, letter box and the like).	-
	For analog input, signal that cannot be recognized by the MSD and wrong aspect ratio may be applied. Perform the automatic measurement in the "NEXT ASPECT" mode.	45
Video flickers.	If interlace signal is input to a sink device that does not support interlace signal, the video may blink. Check the output resolution of the sink device.	33
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".	41
It takes a long time to output video after video input is switched.	If you set the HDCP output to "HDCP INPUT ONLY", some sink 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".	52
Video from a PC of analog input is displayed with bright-and- dark vertical stripes	Set the total number of horizontal dots. If you change the total number of horizontal dots, you may sometimes have to set the start position of scanning and the active area.	47
Light shadows appear on fine lines of video from an analog input PC.	Adjust the tracking.	49
Fluctuation appears on the analog input video.	Adjust the tracking.	49
Automatic measurement of input timing fails.	In order to enable this menu, the input video must have 25% or more brightness and its edges (all sides) need to be in contact with the circumscribed rectangle in the effective display area.	45
Display position of analog input video changes on its own.	If the function that automatically adjusts the display position (upper left of the screen) works by automatic measurement, the video may move on its own. In this case, disable the adjusting position function.	48

Problem	Cause/Check item/Solution	Page
Part of the bitmap is cut off, or bitmap is not displayed on the full screen.	If the bitmap resolution and output resolution do not match, the bitmap may be partially cut off or may not be displayed on the full screen, depending on settings of the aspect ratio and display position. In this case, set the aspect ratio and display position as necessary.	92, 92
●Audio input		
Audio is not output.	If audio is not output, first check the error code in "**7.17.8 Sink device status**". (The MSD has multiple output connectors. Find the error code of the output connector that does not output audio.) ・Error code 1: 　Turn "**7.9.2 Output mute**" to "OFF". ・Error code 2: 　Ensure that the source device is connected and turned on. ・Error code 3: 　Signal is not input. Check [14], [15], [17] and [18]. ・Error code 4: 　There may be problems in the source device side or HDCP authentication. Check [14]. ・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 signal with content protection is input. Some HDMI/DVI devices will check if the connected device is HDCP compliant and determines whether to output HDCP signals or not. As the MSD is HDCP compliant, 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 "**7.6.2 HDCP input enabled/disabled**". ・Error code 6: 　There are problems in the source 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 signal output from the source device can be controlled by setting EDID. ・Error code 8: 　Turn "**7.9.7 Audio output connector**" to "ON". ・Error code 9: 　Set "**7.8.2 Output mode**" to a mode other than "DVI MODE". If the sink device does not support HDMI signal, the MSD outputs DVI signal automatically. Check which signal is supported by the sink device. ・Error code A: 　Set "**6.2 Selecting input channel**" to a value other than "OFF" ・Error code B: 　Set "**7.9.8 Digital audio output connector**" to "ON". ・If any error code is not displayed: 　Check [14] to [18]. The source device may not be outputting audio.	63

Problem	Cause/Check item/Solution	Page
Audio is not output from digital input.	[14] Is video being output correctly? If not, check [1], [2], [5] and [6].	—
	[15] Is DVI signal output from the source device? You can check the input signal type in "**7.17.7 Input signal status**". DVI signal may be output depending on EDID settings.	62
	[16] 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).	102
	Audio signal output from the source device can be controlled by setting EDID.	63
Audio of input connectors is not output. (MSD-501/502: Audio IN1 to IN3, MSD-701/702: Audio IN1 to IN5)	[17] Is "**7.9.3 Input selection**" set to "AUTO"? If not, change the setting to "AUTO" in order to switch the audio automatically.	56
Audio is not output.	[18] If the source device has multiple output connectors, check the audio output settings of the selected output 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 "**7.17.7 Input signal status**".	55, 63
Audio is output from analog output connectors but not from digital output connectors.	If the output resolution is set to a value other than "AUTO-A" and " AUTO-B", make sure that the resolution that can be output from the sink device or AV amplifier is selected. If a PC output resolution (VGA to QWXGA) is selected, some sink devices and AV amplifiers cannot output audio.	33
	If the sampling frequency is set to a value other than "AUTO-A" and "AUTO-B", make sure that the sampling frequency is supported by the sink device or AV amplifier. Some LCD monitors may not output audio whose sampling frequency is high (88.2 kHz or higher).	57
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.	63
	In order to output compressed audio of multi-channel, set the number of speakers.	64
	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.	64
Only audio of a specific scene is not output from digital input	Is "DOWN MIX" is set for multi-channel audio output? For multi-channel audio, since channels changes depending on scenes, audio may not output if audio is not included in the set channel.	58

Problem	Cause/Check item/Solution	Page
●Key operation		
Keys do not operate.	Make sure that keys are not locked.	25
	Since no control command is registered by factory default, "DISPLAY POWER" keys do not work. Register and associate control commands in order to enable these keys.	74, 82
	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.	83
	Check the set time of "POWER SWITCH ON" that prevent accidental operation.	101
	Immediately after start-up, all keys are disabled until the connection of the sink device is completed.	23
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.	24
●Communication command control		

Communication command control from the PC to the MSD cannot be performed.	Are the following items set correctly?
	  For RS-232C: baud rate and data length
	  For LAN: IP address or subnet mask
		66, 69 to 70

	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.	67, 69
	For RS-232C communication, set "**7.11.3 RS-232C transmission between control devices**" to "OFF". The MSD cannot be controlled from the RS-232C connector of the HDC receiver connected to the HDBaseT output connector.	66
"@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.	83
	Immediately after start-up, communication command controls are disabled until connection of the sink device is confirmed.	23
●Sending control command function		
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.	74
	Is the registered control command linked to the desired control command execution condition?	82
	Is COM PORT's FUNCTION set to "RECIEVER" mode? In order to send the control command, set the communication port to "TRANSMITTER" mode. If using LAN, set the IP address and other settings of the connected device.	67, 69
	For RS-232C communication, check the settings in" **7.11.3 RS-232C transmission between control devices**".	－

Problem	Cause/Check item/Solution	Page
"RETRY OVER ERROR" is displayed and control command is not sent completely.	Is the registered reply command correct?	79
	Make sure that the setting of "TIME OUT" for checking control commands is not too short.	74
Control through CEC cannot be performed.	Does the cable support CEC? To use CEC, use an HDMI cable that support CEC.	—
	Does the sink device support CEC? Is the HDMI link function of the sink device set to be enabled? Enable the HDMI link control of the sink device and the function which powers on the sink device from external devices of the sink device.	
●Others		
Input signal temporarily disappear when input channel is switched.	When the CEC connection changes, EDID may change. In this case, input signal is interrupted. Check the connection settings.	54
Devices cannot be controlled through CEC.	Are HDMI cables supporting CEC being used?	54
	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. The problem occurs in all connectors?
2. Connect the devices using genuine cables without connecting the MSD.

The problem still cannot be solved? Please contact us for assistance.

10 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.
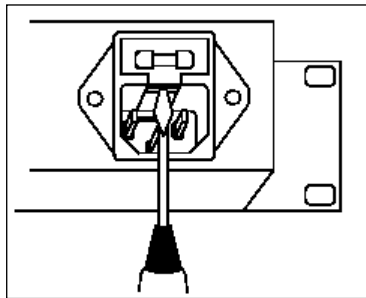
[Figure 10.1] Fuse holder

4. Replace the current fuse with the spare fuse.
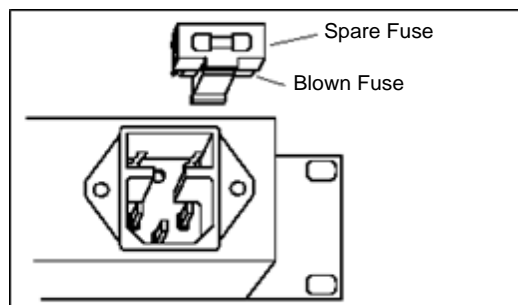
[Figure 10.2] Replacing fuses

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.

User's guide of MSD-501/502/701/702

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