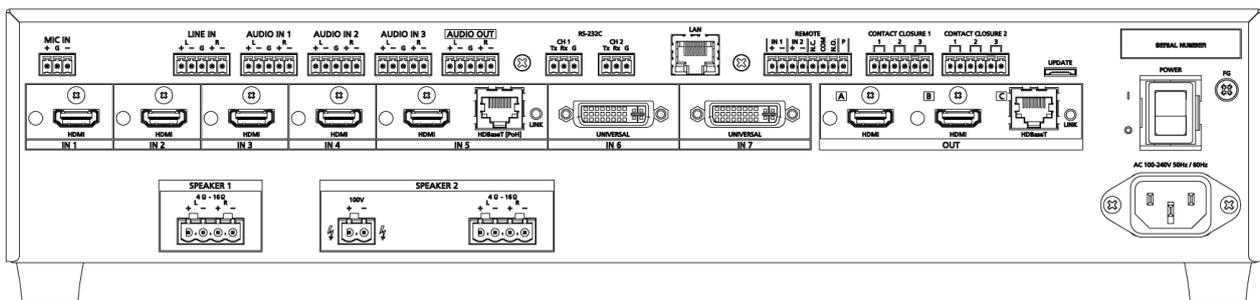
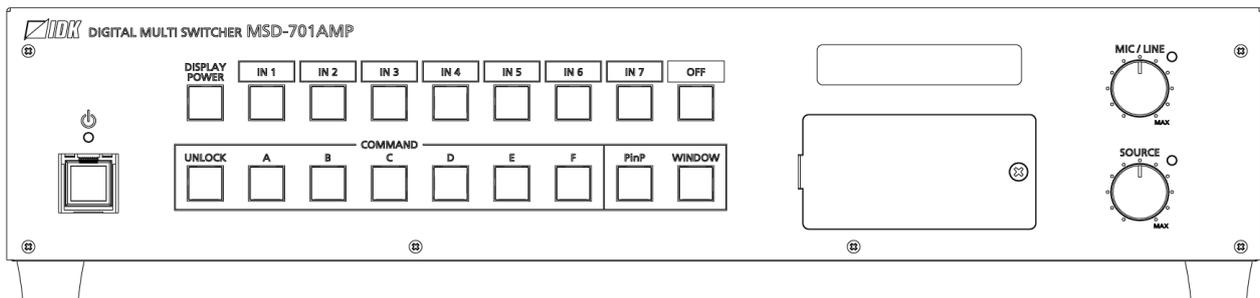


## Digital Multi Switcher with Integrated Audio Power Amplifier

# MSD-701AMP

<User Guide>

Ver.1.3.0



- Thank you for choosing our product.
- To ensure the best performance of this product, please read this user guide fully and carefully before using it and keep this manual together with the product for future reference as needed.

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## Before reading this manual

- All rights reserved.
- Some information contained in this User guide such as exact product appearance, diagrams, menu operations, and so on may differ depending on the product version.
- This User guide is subject to change without notice. You can download the latest version from IDK's website at: <http://www.idkav.com>

The reference manual consists of the following two volumes:

- User 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 his 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 heed all warnings/cautions.

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

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

## **Warning**

### ■ For lifting heavy products:

 <b>Instruction</b>	<ul style="list-style-type: none"> <li>● <b>Lifting must be done by two or more personnel.</b></li> </ul> <p>To avoid injury: When lifting the product, bend your knees, keep your back straight and get close to it with two or more persons.</p>
---	--

### ■ For installing and connecting products:

 <b>Prohibited</b>	<ul style="list-style-type: none"> <li>● <b>Do not place the product upon a surface that may give way or that may become unstable.</b></li> </ul> <p>Install the product in a secure and stable place to prevent it from falling and possibly causing injury.</p> <ul style="list-style-type: none"> <li>● <b>Secure the product if installing in locations prone to vibration or movement.</b></li> </ul> <p>Otherwise, it may move unexpectedly or it may fall and lead to injury.</p>
 <b>Instruction</b>	<ul style="list-style-type: none"> <li>● <b>Installation work must be performed by professionals.</b></li> </ul> <p>The product is intended to be installed by skilled technicians. For installation, please contact a system integrator or IDK. Improper installation may lead to the risk of fire, electric shock, injury, or property damage.</p> <ul style="list-style-type: none"> <li>● <b>Insert the power plug into an outlet that is unobstructed.</b></li> </ul> <p>Unobstructed access to the plug enables unplugging the product in case of any extraordinary failure, abnormal situation or for easy disconnection during extended periods of non-use.</p> <ul style="list-style-type: none"> <li>● <b>Insert the power plug into an appropriate outlet completely.</b></li> </ul> <p>If the plug is partially inserted, arcing may cause the connection to overheat, increasing the risk of electrical shock or fire. Do not use a damaged plug or connect to a damaged outlet.</p> <ul style="list-style-type: none"> <li>● <b>Unplug the product from the AC power source during installation or service.</b></li> </ul> <p>When connecting peripheral devices to this product, unplug all involved devices from outlets. Ground potential differences may cause fire or other difficulties.</p>

### ■ For operating products:

 <b>Prohibited</b>	<ul style="list-style-type: none"> <li>● <b>Keep out any foreign objects.</b></li> </ul> <p>To avoid fire or electric shock, do not permit foreign objects, such as metal and paper, to enter the product from vent holes or other apertures.</p> <ul style="list-style-type: none"> <li>● <b>For power cable/ plug:</b></li> </ul> <ul style="list-style-type: none"> <li>• Do not scratch, heat, or modify, including splicing or lengthening them.</li> <li>• Do not pull, place heavy objects on them, or pinch them.</li> <li>• Do not bend, twist, tie or clamp them together forcefully.</li> </ul> <p>Misuse of the power cable and plug may cause fire or electric shock. If power cables/plugs become damaged, contact your IDK representative.</p>
 <b>Do not disassemble</b>	<ul style="list-style-type: none"> <li>● <b>Do not repair, modify or disassemble.</b></li> </ul> <p>Since the product includes circuitry that uses potentially lethal, high voltage levels, disassembly by unauthorized personnel may lead to the risk of fire or electric shock. For internal inspection or repair, contact your IDK representative.</p>
 <b>Do not touch</b>	<ul style="list-style-type: none"> <li>● <b>Do not touch the product and connected cables during electrical storms.</b></li> </ul> <p>Contact may cause electric shock</p>
 <b>Instruction</b>	<ul style="list-style-type: none"> <li>● <b>Clean the power plug regularly.</b></li> </ul> <p>If the plug is covered in dust, it may increase the risk of fire.</p>

# Warning

■ **If the following problem occurs:**



- **Unplug immediately if the product smokes, makes unusual noise, or produces a burning odor.**  
If you continue to use the product under these conditions, it may cause electric shock or fire.
- **Unplug immediately if the product is damaged by falling or having been dropped.**  
If you continue to use the product under these conditions, it may increase the risk of electrical shock or fire. For maintenance and repair, contact your IDK representative.
- **Unplug immediately if water or other objects are directed inside.**  
If you continue to use the product under these conditions, it may increase the risk of electrical shock or fire. For maintenance and repair, contact your IDK representative.



# Caution

## ■ For installing and connecting products:

 <p><b>Prohibited</b></p>	<ul style="list-style-type: none"> <li>● <b>Do not place the product in a location where it will be subjected to high temperatures.</b> If the product is subjected to direct sunlight or high temperatures while under operation, it may affect the product's performance and reliability and may increase the risk of fire.</li> <li>● <b>Do not store or operate the product in dusty, oil smoke filled, or humid place.</b> If the product is placed near humidifiers or in a dusty area, it may increase the risk of fire or electric shock.</li> <li>● <b>Do not block the vent holes.</b> If ventilation slots are blocked, it may cause the product to overheat, affecting performance and reliability and may increase the risk of fire.</li> <li>● <b>Do not place or stack heavy items on the product.</b> Failure to observe this precaution may result in damage to the product and other property and may lead to the risk of personal injury.</li> <li>● <b>Do not exceed ratings of outlet and wiring devices.</b> Exceeding the rating of an outlet may increase the risk of fire and electric shock.</li> </ul>
 <p><b>No wet hands</b></p>	<ul style="list-style-type: none"> <li>● <b>Do not handle power plug with wet hands.</b> Failure to observe this precaution may increase the risk of electrical shock.</li> </ul>
 <p><b>Instruction</b></p>	<ul style="list-style-type: none"> <li>● <b>Use and store the product within the specified temperature/humidity range.</b> If the product is used outside the specified range for temperature and humidity continuously, it may increase the risk of fire or electric shock.</li> <li>● <b>Do not place the product at elevations of 1.24 mi. (2,000 m) or higher above sea level.</b> Failure to do so may shorten the life of the internal parts and result in malfunctions.</li> <li>● <b>When mounting the product into the rack, provide sufficient cooling space.</b> Mount the product in a rack meeting EIA standards, and maintain spaces above and below for air circulation. For your safety as required, attach an L-shaped bracket in addition to the panel mount bracket kit to improve mechanical stability.</li> <li>● <b>Never insert screws without the rubber feet into the threaded holes on the bottom of the product.</b> Never insert screws without the rubber feet into the threaded holes on the bottom of the product. Doing so may lead to damage when the screws contact electrical circuitry or components inside the product. Reinstall the originally supplied rubber feet using only the originally supplied screws.</li> </ul>

## ■ For operating products:

 <p><b>Prohibited</b></p>	<ul style="list-style-type: none"> <li>● <b>Use only the supplied power cable and AC adapter.</b></li> <li>● <b>Do not use the supplied power cable and AC adapter with other products.</b> If non-compliant adapter or power cables are used, it may increase the risk of fire or electrical shock.</li> </ul>
 <p><b>Unplug</b></p>	<ul style="list-style-type: none"> <li>● <b>If the product won't be used for an extended period of time, unplug it.</b> Failure to observe this precaution may increase the risk of fire.</li> <li>● <b>Unplug the product before cleaning.</b> To prevent electric shock.</li> </ul>
 <p><b>Instruction</b></p>	<ul style="list-style-type: none"> <li>● <b>If cooling fan stops, power off the product and contact us.</b> Failure to do so may rise internal temperature and increase the risk of malfunction, fire, or electric shock.</li> <li>● <b>Clean the vent holes regularly.</b> If the vent holes of the cooling fan is covered in dust, internal temperature rises and it may increase the risk of malfunction, fire, or electric shock.</li> </ul>

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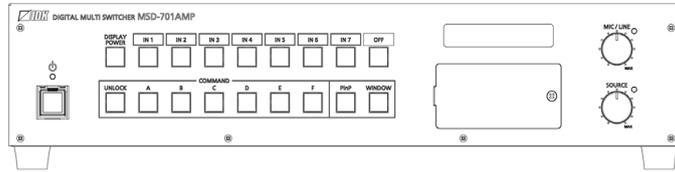
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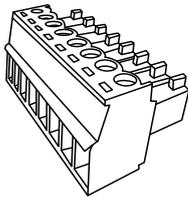
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# 1 Included items

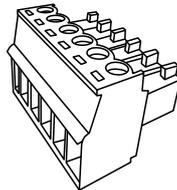
Ensure that all items illustrated below are included in the package.  
If any items are missing or damaged, please contact IDK.



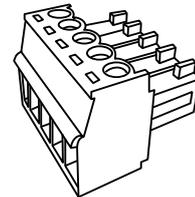
One (1) main unit (MSD-701AMP)



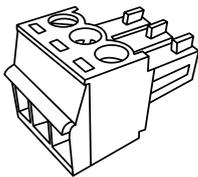
One (1) 8-pin captive screw connector



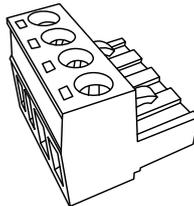
Two (2) 6-pin captive screw connectors



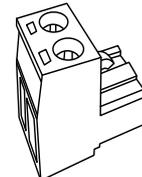
Five (5) 5-pin captive screw connectors



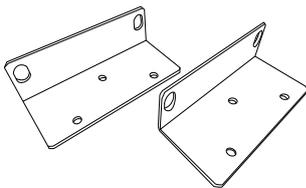
Three (3) 3-pin captive screw connectors



Two (2) 4-pin captive screw connectors, 5.08 mm



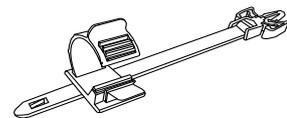
One (1) 2-pin captive screw connector, 5.08 mm



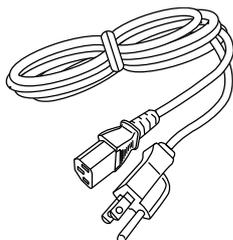
Two (2) rack mounting brackets



Six (6) M4 screws



Seven (7) cable clamps



One (1) power cord, 5.9 ft. (1.8 m)

[Fig. 1.1] Included items

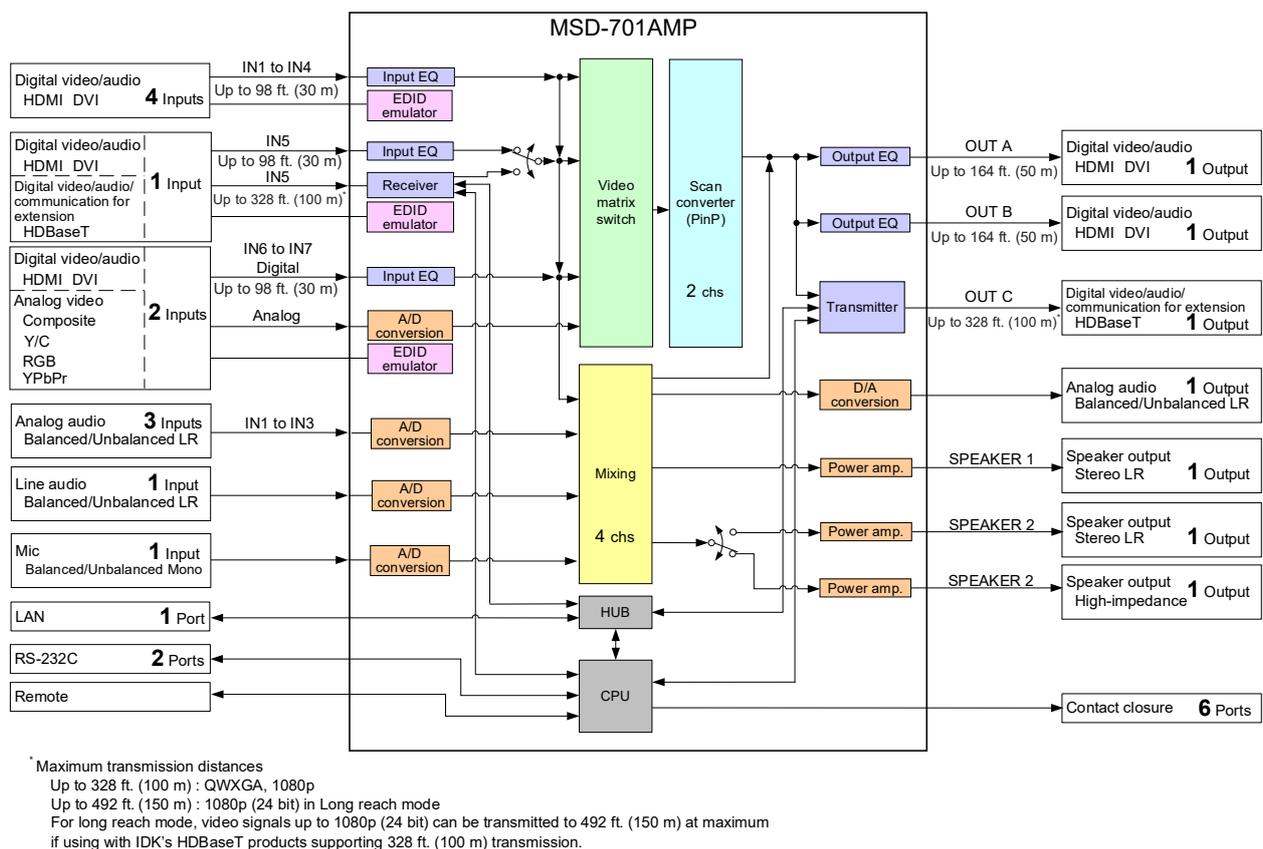
## 2 About MSD-701AMP

The MSD-701AMP is a seven-input digital presentation switcher with built-in audio power amplifier. The seven digital and two analog inputs accept a wide variety of video formats including HDMI, DVI, HDBaseT, Composite video, RGB, and YPbPr. Input video signals are converted to HDBaseT and HDMI signals at up to QWXGA or 1080p. Two selected input video signals can be displayed on a single screen in picture-in-picture or side-by-side layouts.

Up to three audio can be mixed: one of digital audio/analog audio, one mic, and one line. Audio is output to digital connectors, an analog connector, and two speakers. Enhanced audio features include compressing, limiter, and seven-band equalizer for mic input and tone controls for speaker output.

The MSD-701AMP can be configured remotely from RS-232C and LAN. External devices can be controlled via RS-232C, LAN, CEC, or contact closure by registering control commands.

Additionally, the MSD-701AMP includes button security lockout and button caps to prevent accidental or inappropriate changes.



[Fig. 2.1] Diagram

## 3 Features

---

### ■ Video

- Up to 1080p/QWXGA (Reduced Blanking)
- Motion adaptive interlaced/progressive conversion
- Two video combinations: PinP and side-by-side
- Scan conversion
- Aspect ratio control
- Seamless switching with one black frame
- Analog/Digital conversion
- Each video output OFF
- Anti-snow
- Up to 492 ft. (150 m) over Cat6 cable in Long reach mode<sup>\*1</sup>

### ■ Control input

- RS-232C
- LAN
- External button switch

### ■ Control output

- Control command output (e.g. controlling projectors)
- PJLink
- CEC (Control sink device power)
- Contact closure
- Power distribution unit control

### ■ Audio

- Embedding/De-embedding
- Volume adjustment (Input/Output)
- Mic/Line level control
- Source volume control
- Lip Sync
- Audio Downmix
- Sampling rate conversion
- Audio mixing
- Compressor
- Limiter
- 7-band equalizer
- Tone control
- Automatic feedback suppressor
- High-impedance speaker output

### ■ Others

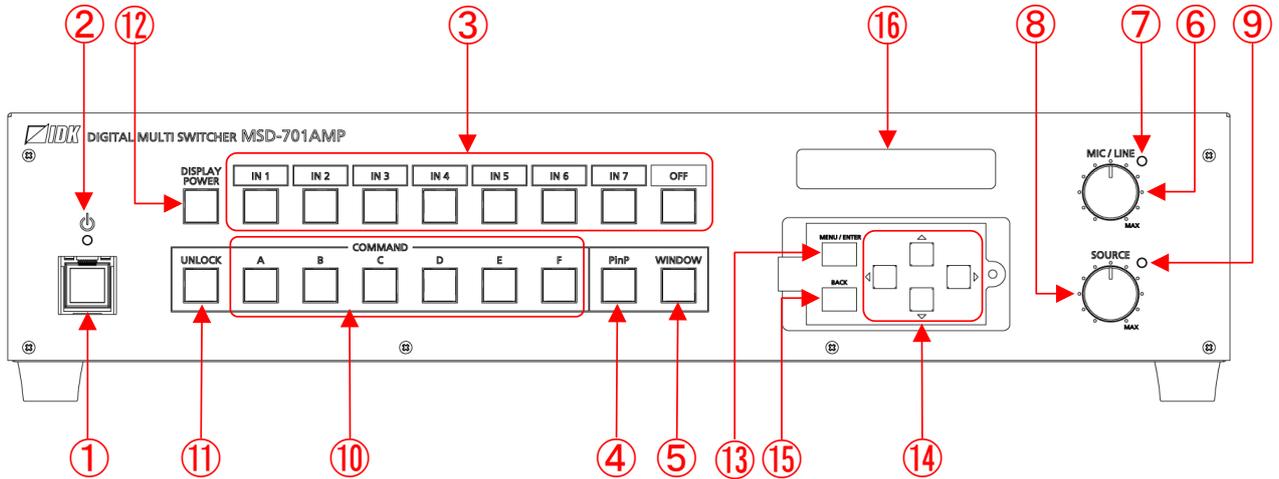
- PoH (HDBaseT input)
- EDID emulation
- WEB browser control
- Input channel automatic switching
- Audio breakaway for independent audio and video switching
- Crosspoint memory
- Preset memory
- Last memory
- Connection Reset
- Button security lockout
- System check
- HDBaseT: RS-232C, LAN and CEC are supported
- Standby button

<sup>\*1</sup> For long reach mode, video signals up to 1080p (24 bit) can be transmitted to 492 ft. (150 m) at maximum if using with IDK's HDBaseT products supporting 328 ft. (100 m) transmission.

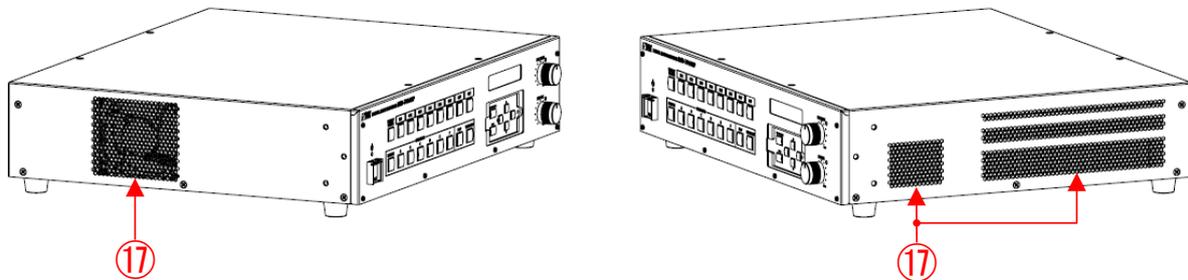
## 4 Panels

### 4.1 Front/Side panels

#### ● Front panel



#### ● Side panels

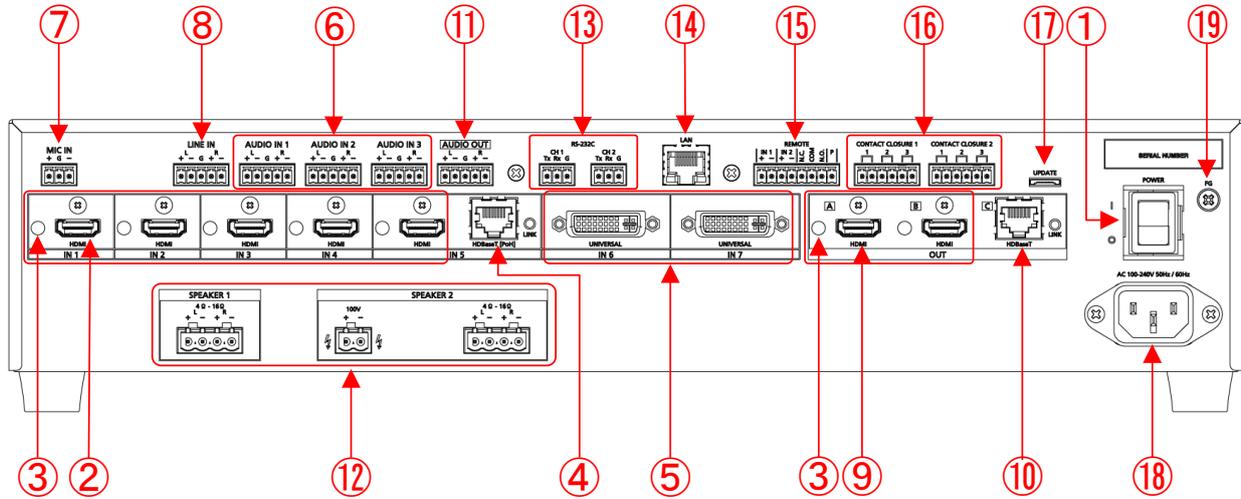


[Fig. 4.1] Front/side panel drawings

**[Table 4.1] Front/side panel features**

#	Feature	Description
①	Standby button	Powers on the MSD or sets the MSD to Standby state. Works when Main power switch (POWER) is powered on.
②	Power indicator	Shows power status. Lights green : Powered on Lights amber : Standby Does not light : powered off
③	Input selection buttons	Selects an input.
④	PinP button	Enables/disables combination window and switches patterns.
⑤	WINDOW button	Selects window input channel when combination window is enabled.
⑥	MIC/LINE volume knob	Adjusts mic/line volume.
⑦	MIC/LINE LED	Lights green : Operates normally Lights amber : Mic audio is clipped. Lights red : SPEAKER 1 output stops abnormally. Does not light : Muted
⑧	SOURCE volume knob	Adjusts selected digital/analog audio input.
⑨	SOURCE LED	Lights green : Operates normally Lights amber : SPEAKER 1 or SPEAKER 2 output is clipped. Lights red : SPEAKER 2 output stops abnormally. Does not light : Muted
⑩	COMMAND buttons	Executes control commands or crosspoint memory.
⑪	UNLOCK button	Light green : Control command can be executed. Light amber : Crosspoint memory can be recalled. Does not light : Control command and crosspoint recall cannot be executed.
⑫	DISPLAY POWER button	Powers on/off sink devices.
⑬	MENU/ENTER button	Selects menus, edits, controls, and saves settings.
⑭	Navigation buttons	Navigates menu or changes values of adjustable features.
⑮	BACK button	Available only in menu page. Goes back to the previous page.
⑯	Front display	Displays menus and settings.
⑰	Ventilation holes	Prevents internal temperature raise. Do not block ventilation holes.

## 4.2 Rear panel



[Fig. 4.2] Rear panel drawings

[Table 4.2] Rear panel features

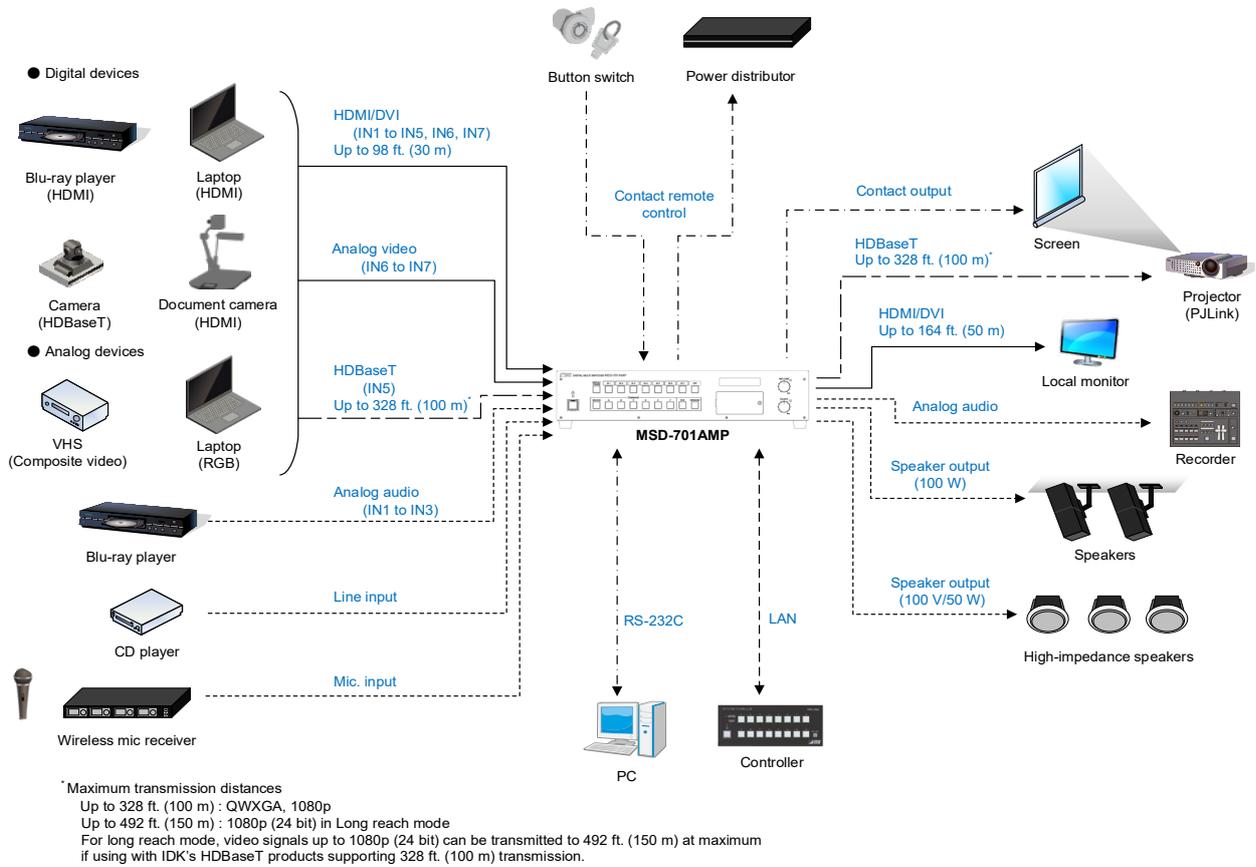
[1/2]

#	Feature	Description
①	Main power switch (POWER)	Controls the main power.
②	HDMI input connectors	Input connectors for HDMI and DVI signals to interface source devices, such as Blu-ray players.
③	HDMI cable fixing holes	Retain HDMI cables by inserting cable clamps.
④	HDBaseT input connector	Input connector for HDBaseT signals Connects to a transmitter over a category cable. Provides power to HDBaseT transmitter supporting PoH.
⑤	Universal input connectors	Input connectors for digital video, digital audio, and analog video signals. Interfaces with DVI-I or DVI-D cable. Each accepts HDMI, DVI, analog RGB, analog YPbPr (SDTV/HDTV), composite video (NTSC/PAL), Y/C (NTSC/PAL) <b>【See: 7.2.4 DVI-I input connector】</b>
⑥	Analog audio input connector	Input connectors (5-pin captive screw connector) for analog audio signals
⑦	MIC input connector	Input connector for mic Connector type is 3-pin captive screw connector.

[2/2]

#	Feature	Description
⑧	LINE input connector	Input connector for line audio Connect audio mixer, CD player, or the like. Connector type is 5-pin captive screw connector.
⑨	HDMI output connectors	Output connectors for HDMI and DVI signals, interfaces sink devices such as LC monitors and projectors.
⑩	HDBaseT output connectors	Output connector for HDBaseT signal Connects to a remote receiver over a category cable.
⑪	Analog audio output connector	Analog audio output connector interfaces amplifiers and mixers Connector type is 5-pin captive screw connector.
⑫	SPEAKER output connector	Output connectors for speakers SPEAKER 1 : 4-pin captive screw connector 5.08 mm SPEAKER 2 : 4-pin captive screw connector 5.08 mm Or 2-pin captive screw connector (100-V high impedance speakers)
⑬	RS-232C connector	3-pin captive screw connector for RS-232C serial control
⑭	LAN connector	For external control by communication commands or web browsers
⑮	REMOTE connector	I/O connector for following power control: <ul style="list-style-type: none"> <li>▪ Button switch (input)</li> <li>▪ Receiving emergency stop signal (input)</li> <li>▪ Power distribution unit (output)</li> </ul> Connector type is 8-pin captive screw connector.
⑯	CONTACT CLOSURE connector	For external device control by dry contact closure Connector type is 6-pin captive screw connector.
⑰	Maintenance connector	Factory use only
⑱	Power supply connector	For use with supplied power cable
⑲	Frame ground	Use for bonding chassis to local ground. An M4 screw is used.

## 5 System Configuration Example



[Fig. 5.1] System configuration example

## 6 Installation

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### 6.1 Precautions

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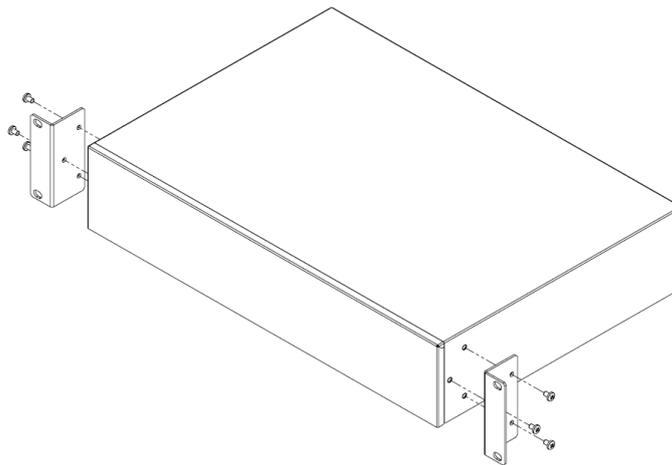
When installing the MSD, observe the following precautions; otherwise, the internal temperature increases and it may affect the product lifetime and operation.

- Do not stack or place one MSD directly on top of another MSD.
- Do not block vent holes.
- To provide adequate ventilation, maintain sufficient clearances around the MSD (1.2 in. (30 mm) or more).
- Consider installing the MSD in an environment compatible with the maximum temperature indicated in the specification sheet 32°F to 104°F (0°C to +40°C).

### 6.2 Rack mounting brackets

---

Attach the rack mounting brackets to the MSD chassis using the supplied M4 screws.



[Fig. 6.1] Attaching rack mounting brackets

**Note:**

The standard screw tightening torque is 1.47 N·m (about 15.0 kgf·cm).

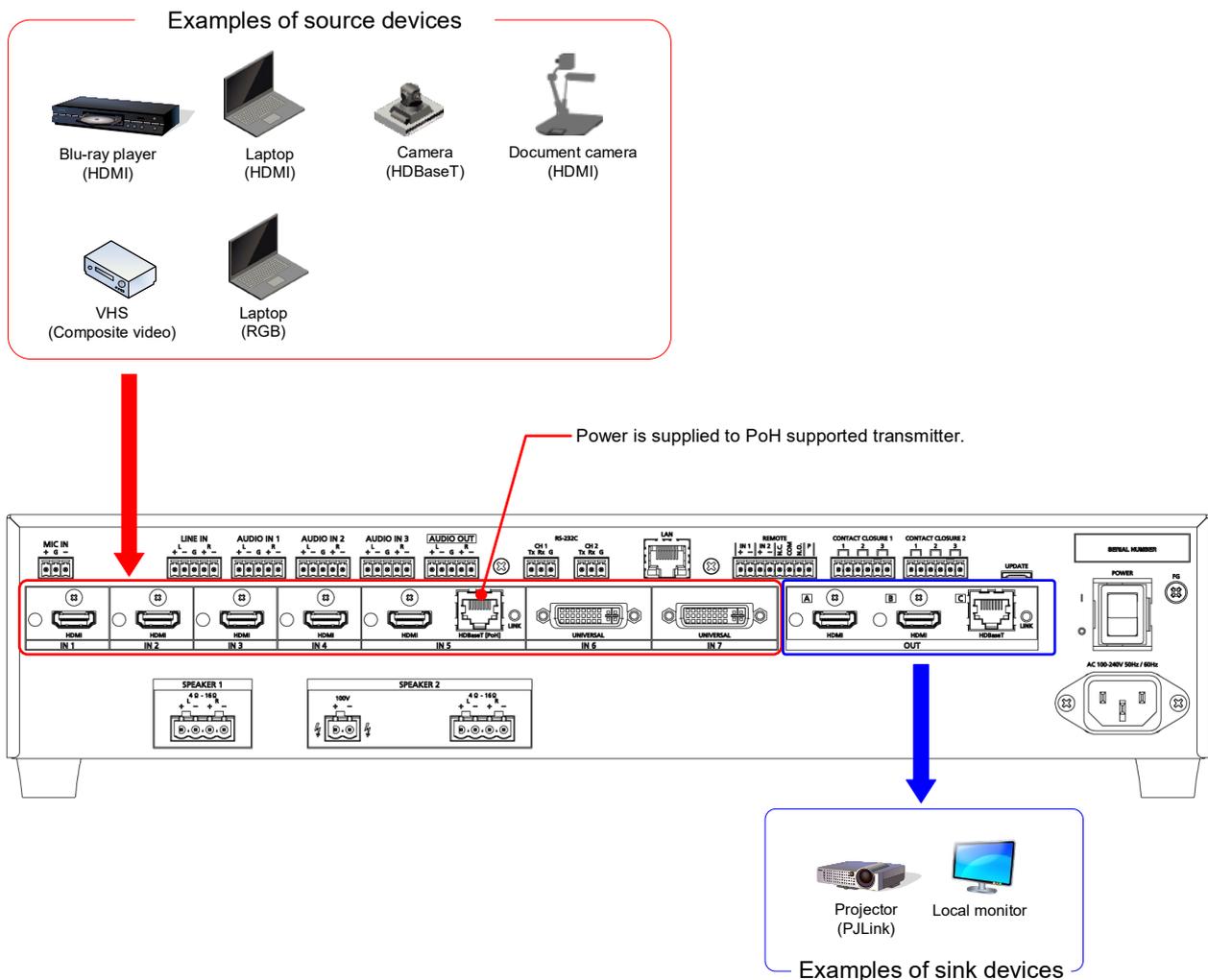
## 7 Connection Details

### 7.1 Precautions

When connecting the MSD to external devices, observe the following precautions.

- Read manuals for the external devices.
- Before connecting cables to the MSD or an external device, dissipate static electricity by touching grounded metal such as equipment racks before handling signal cables. Failure to observe this precaution may result in ESD (electrostatic discharge) damage.
- Power all units off before connecting cables.
- Be sure to fully seat all plugs and connections and dress cables to reduce stress on connectors.

### 7.2 Connecting video devices

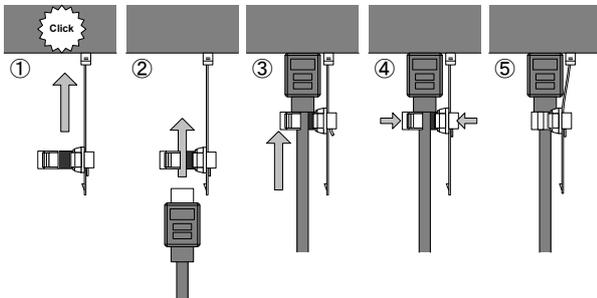


[Fig. 7.1] Connecting video devices

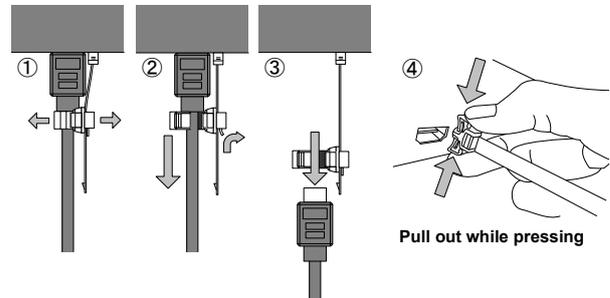
## 7.2.1 Securing HDMI cable

Secure HDMI cables using cable clamps to prevent connectors from being accidentally pulled out of ports.

Securing HDMI cable using cable clamp



Removing HDMI cable and cable clamp



[Fig. 7.2] Securing and removing cable clamp

## 7.2.2 HDBaseT input and output connectors

Both HDBaseT input and output connector support long reach mode. The HDBaseT input connector also supports PoH.

With long reach mode, video signals up to 1080p (24 bit) can be transmitted to 492 ft. (150 m) at maximum if using with IDK's HDBaseT products supporting 328 ft. (100 m) transmission.

PoH enables DC power transmission to HDBaseT supported transmitters.

### ■ For HDBaseT input

#### Setting long reach mode:

- 9.7.6 HDBaseT input long reach mode
- 9.13.2 Input resolution
- 9.13.6 Deep Color

#### Setting PoH:

- 9.7.7 HDBaseT power supply

### ■ For HDBaseT output

#### Setting long reach mode:

- 9.4.1 Output resolution
- 9.5.8 HDBaseT output long reach mode
- 9.5.9 Deep Color output

【See: 8.3.1 Selecting menu】

### 7.2.3 Category cable

To ensure the best performance with category cables, select a high quality category cable type, ensuring that proper pinning and pairing requirements are observed.

- Cat5e UTP/STP and Cat6 UTP/STP can be used, but we recommend CAT.5E HDC cable\* for optimal performance.
- If using STP cables, connect the FG connector to a local electrical ground bonding point. Without bonding FG to ground, the shielding feature may not effectively eliminate interference. If using UTP cables, it is still recommend that the FG connector be used.
- The STP cables are less affected by interference or external noise than UTP cables.
- Connectors for long-haul transmission are the same as that of eight-core modular connector used for Ethernet, but the transmission system is not the same so that it cannot be connected to Ethernet.
- The maximum transmission distance of a category cables is the shorter distance of the maximum transmission distances of transmitter/receiver/sink device connected to the MSD.
- Pin assignments: T568A or T568B straight
- Do not pull the cable using excessive force. The allowable tension of the category cable is 110 N.
- Do not bend the cable at a sharp angle. Keep the bend radius four times of the cable diameter or larger.
- Do not clamp or tie the cable tightly; leave some space allowing the cable to move slightly.
- If you use multiple category cables, we recommend keeping a distance between the cables or not to place the cables closely in parallel.
- Keep the category cable running as straight as possible. Looping or coiling the cable, causes it to be more easily affected by noise; especially when using longer cable run lengths.
- Do not place the cable in an electrically noisy environment, since high-speed impulsive noise may couple into the category cable. Use of a high-output radio transmission device near the MSD or remote receivers may interfere with or interrupt video and or audio signals.
- If the total transmission distance from the transmitter to receiver is 328 ft. (100 m) or less, up to two cable interconnection points can be used. Products supporting Cat6A (10GBase-T) are recommended.
- Use 24 AWG or heavier gauge cable for PoH applications.
- The table below shows supported transmission distance for each category.  
Note that specified distances may shorten depending on the conditions within the actual environment.

**[Table 7.1] Transmission distance**

Noise influence	Category		Transmission distance	TMDS clock	Recommended cable
Easily affected	UTP	Cat5e	164 ft. (50 m)	$\leq 225$ MHz	For 164 ft. (50 m) or longer: CAT.5E HDC*, Cat5e STP, and Cat6 UTP/STP cables
		Cat6	328 ft. (100 m)		
Less affected	STP	Cat5e* Cat6	492 ft. (150 m)	Long reach mode $\leq 148$ MHz (1080p (24 bit) or less)	CAT.5E HDC, Cat5e STP, and Cat6 STP cables

\* The CAT.5E HDC cable is a double-shielded category cable optimized for video signal transmission. The double-shielded structure protects the video signal from external interference. It is certified to 500 MHz bandwidth at distances up to 328 ft. (100 m) and verified to meet requirements specified by HDBaseT Alliance.

**Note:**

If there is a problem in the transmission path, video or audio may be interrupted. Check the “[Table 7.1]” above.

If the problem persists, it may be necessary to shorten the category cable.

## 7.2.4 DVI-I input connector

---

Female DVI-I (29-pin) connectors are used for DVI inputs.

Pin assignments for each signal type are shown “10.1 DVI input connector”.

**[Table 7.2] Supported cables**

Input signal type*	Supported cable
DVI signal	Use DVI-I or DVI-D cable. *Only signal-link is supported.
HDMI signal	Use HDMI-DVI conversion cable.
Analog RGB signal	Use conversion cable which has male DVI-I and female high-density D-sub (15-pin) conversion cable.
Analog YPbPr signal Composite video signal Y/C signal	Use conversion cables as needed for each signal.

\*Input signal type can be set from the following menus:

- 9.7.2 DVI input connector
- 9.7.8 Analog input signal parameters

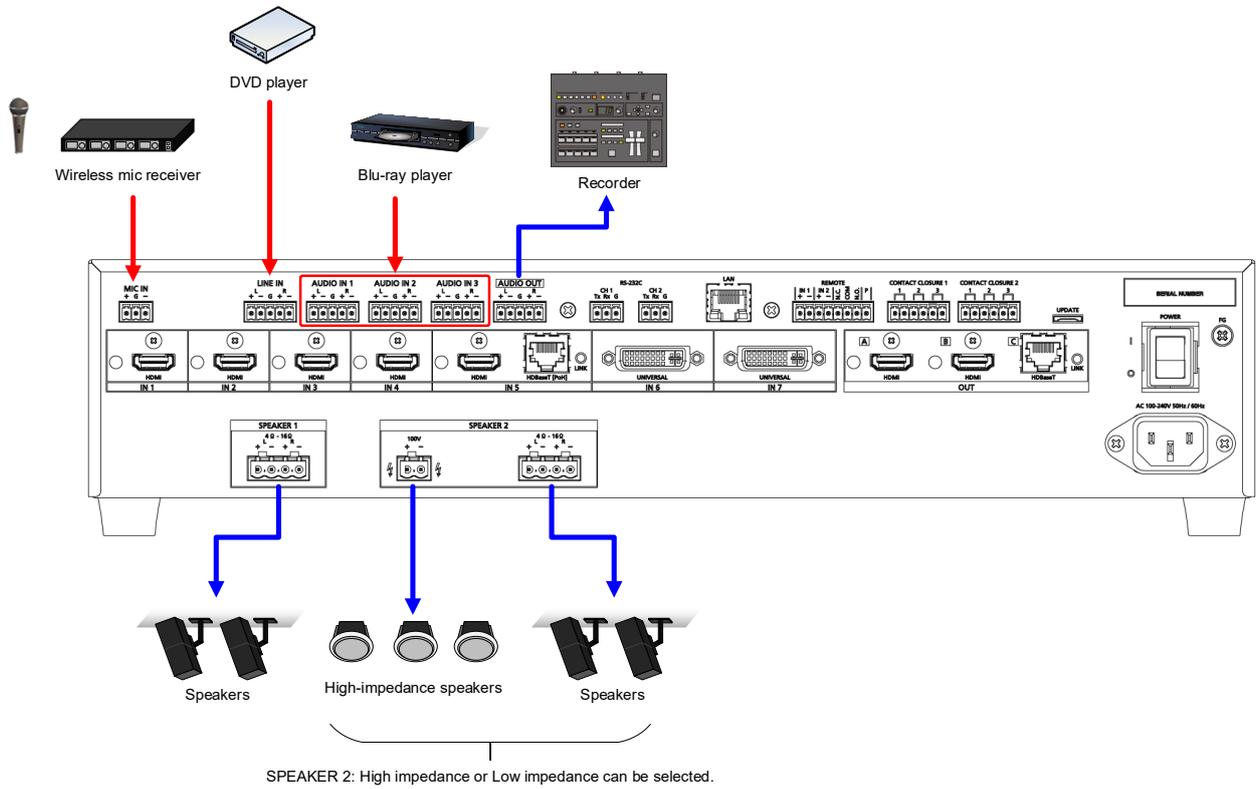
【See: 8.3.1 Selecting menu】

## 7.3 Connecting audio device

The MSD can be connected to the following audio devices:

Source device: Blu-ray disc players, DVD players, wireless mic Receivers and the like.

Sink devices : Speakers, recorder, and the like. High-impedance speakers can be connected to the SPEAKER 2 connector.



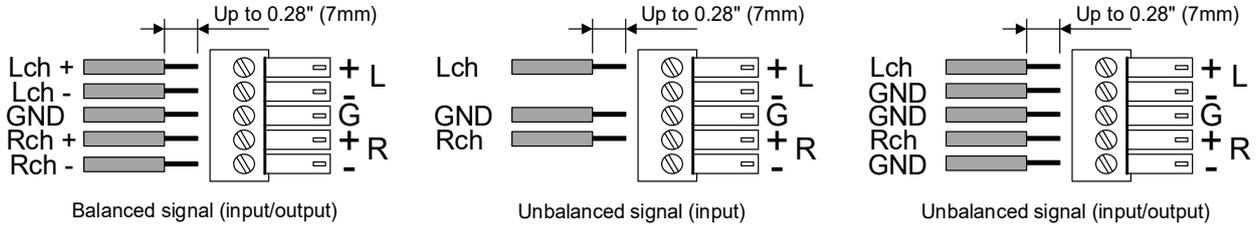
[Fig. 7.3] Connecting to audio devices

### 7.3.1 Audio/Line

Connect the supplied 5-pin captive screw connector to the MSD.

The MSD supports both balanced and unbalanced signals.

28 AWG to 16 AWG conductor gauge and a strip length of 0.28 in. (7 mm) are recommended.



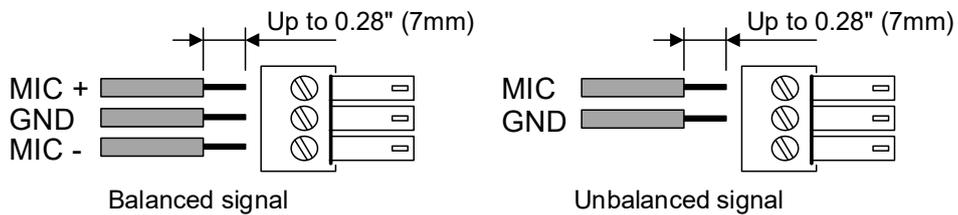
[Fig. 7.4] Connecting audio/line

### 7.3.2 Microphone

Connect the supplied 3-pin captive screw connector to the MSD.

The MSD supports both balanced and unbalanced signals.

28 AWG to 16 AWG conductor gauge and a strip length of 0.28 in. (7 mm) are recommended.



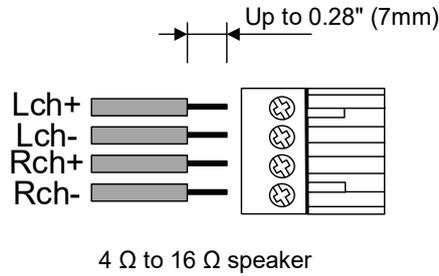
[Fig. 7.5] Connecting microphone

### 7.3.3 Speaker

■ **SPEAKER1 connector can be used for a 4 Ω to 16 Ω speaker**

Connect the supplied 4-pin captive screw connector (5.08 mm) to the MSD.

24 AWG to 12 AWG conductor gauge and a strip length of 0.28 in. (7 mm) are recommended.



[Fig. 7.6] Connecting speaker (SPEAKER1)

■ **SPEAKER2 connectors can be used for a 4 Ω to 16 Ω speaker or a 100 V (200 Ω to 10 kΩ) high-impedance speaker**

For 4 Ω to 16 Ω speaker:

Connect the supplied 4-pin captive screw connector (5.08 mm) to the MSD.

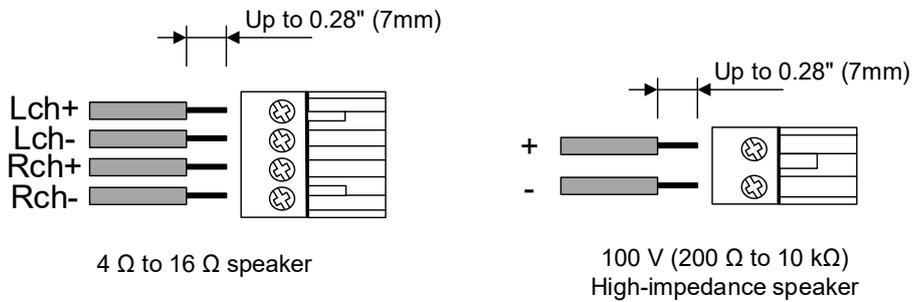
For 100 V (200 Ω to 10 kΩ) high-impedance speaker:

Connect the supplied 2-pin captive screw connector (5.08 mm) to the MSD.

24 AWG to 12 AWG conductor gauge and a strip length of 0.28 in. (7 mm) are recommended.

You can select a speaker in “9.11.13 SPEAKER 2 output”.

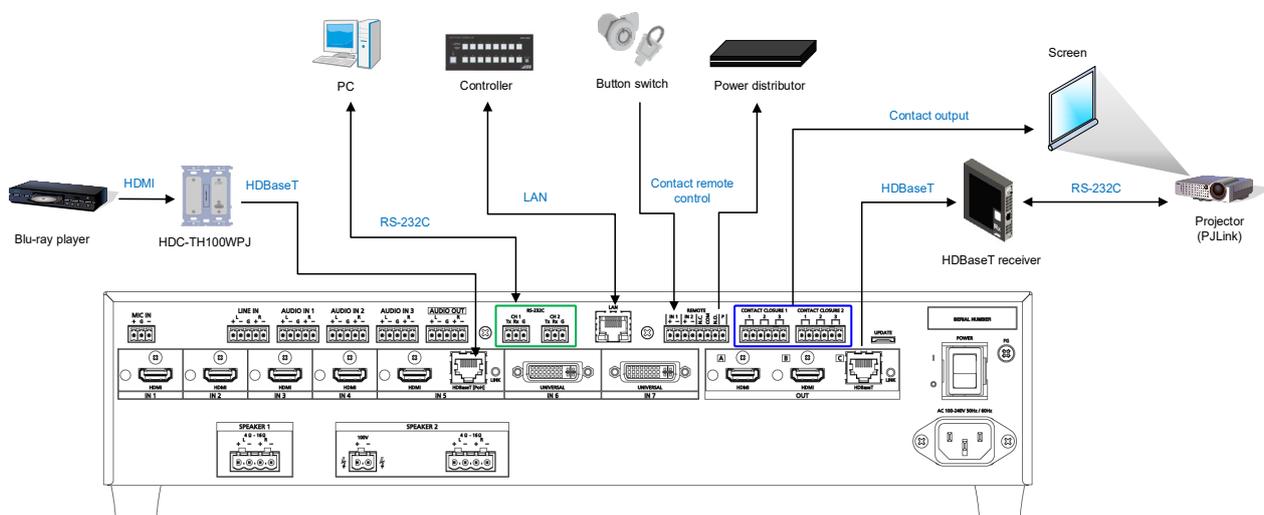
【See: 8.3.1 Selecting menu】



[Fig. 7.7] Connecting speaker (SPEAKER2)

## 7.4 Connecting control devices

The MSD can control devices that are connected to HDBaseT connectors can also be controlled via RS-232C or LAN.



[Fig. 7.8] Application example for control devices

### Note:

#### LAN loop problem

The MSD includes switching hub function. If the MSD communicates with a product having a switching hub over LAN, the network may be down due to loop problem.

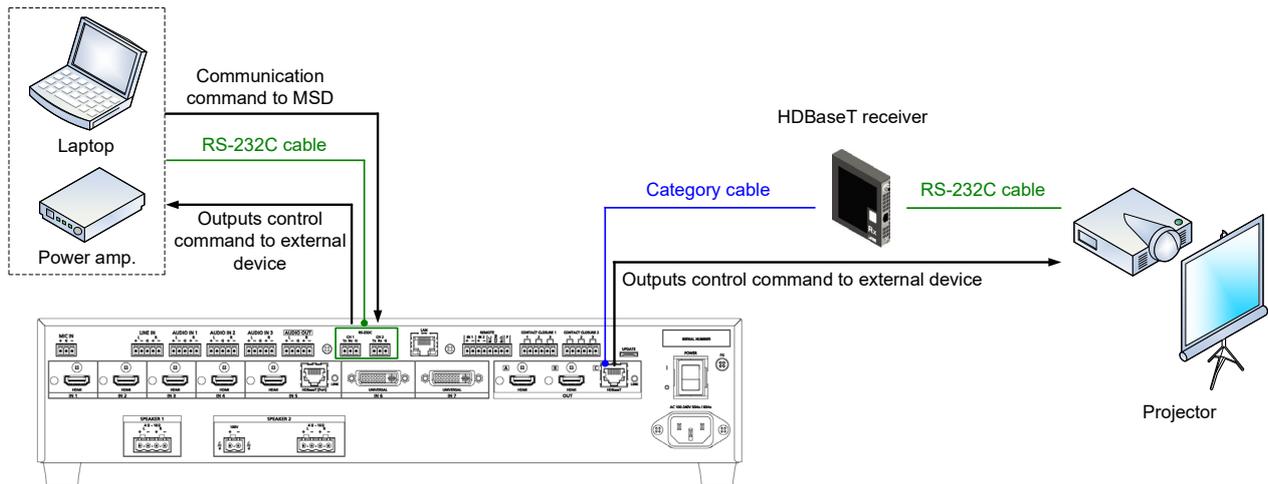
In case the loop problem occurs, set “**9.15.7 HDBaseT LAN**” to “OFF”.

## 7.4.1 RS-232C communication

The RS-232C connector, HDBaseT input connector, and HDBaseT output connector can communicate with control devices (communication commands) and external devices (control commands) over RS-232C communication. You can select TRANCEIVER mode or TRANSMITTER mode for each connector in “9.14.2 RS-232C operation mode”.

- 9.14.1 RS-232C communication
- 9.14.2 RS-232C operation mode

【See: 8.3.1 Selecting menu】



[Fig. 7.9] Example of RS-232C communication

### ■ Connecting RS-232C cable

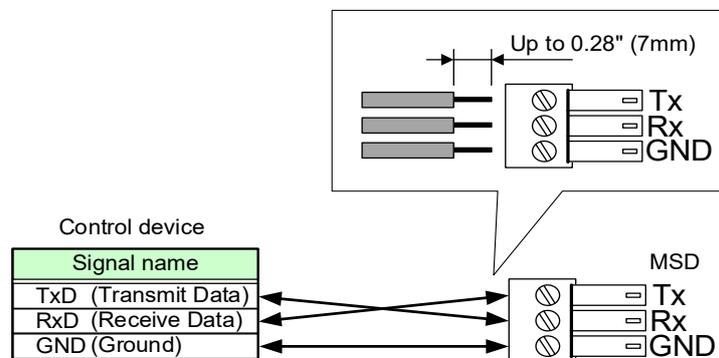
The MSD's RS-232C connection is supported by a 3-pin captive screw connector.

Insert and secure the wires from the RS-232C cable into the supplied 3-pin captive screw connector, and then insert the captive screw connector into the mating connector on the MSD.

28 AWG to 16 AWG conductor gauge is recommended.

The recommended wire strip length is 0.28 in. (7 mm).

Short RTS/CTS and DTR/DSR as needed.



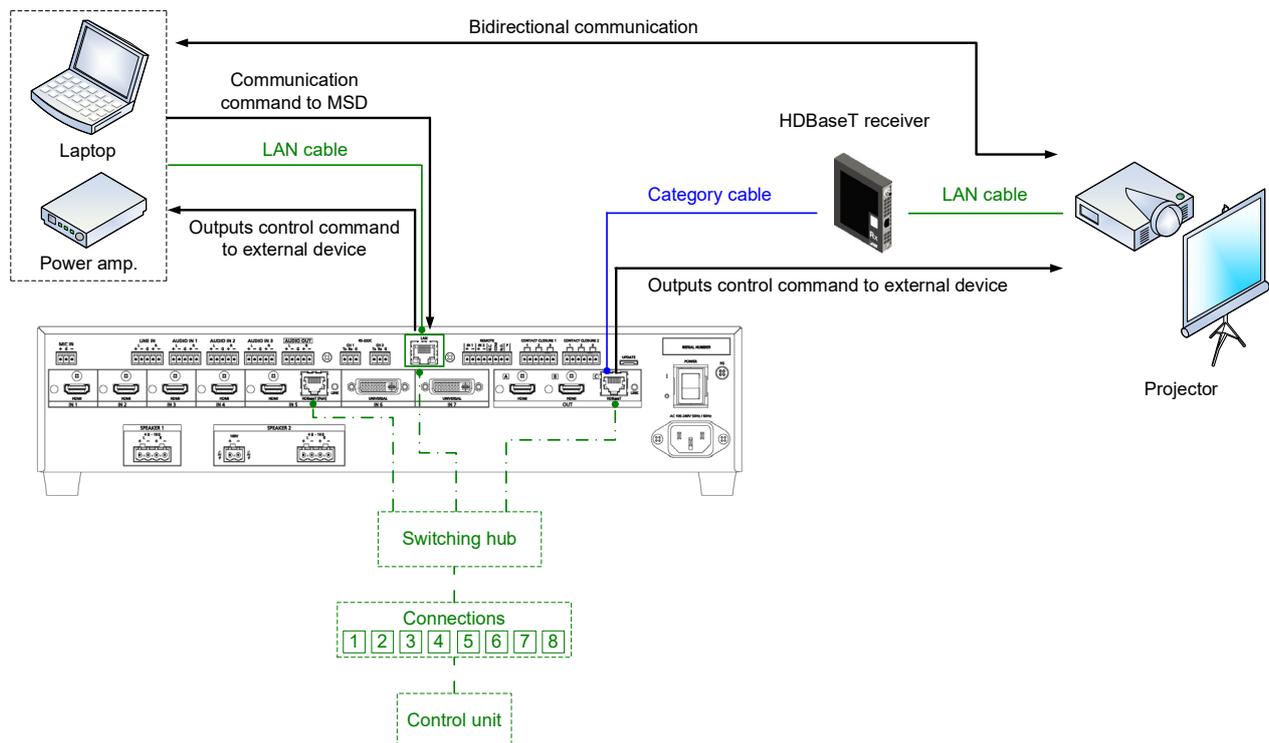
[Fig. 7.10] Connecting RS-232C cable to 3-pin captive screw connector

## 7.4.2 LAN communication

The internal switching hub enables connections between the MSD's LAN connector and LAN connectors of twisted pair cable transmitters and receivers that are connected to HDBaseT I/O connectors. Bidirectional communication is also available.

Communication control command from PC to the MSD and control command output from the MSD to external devices can be executed from all LAN ports. Operation mode will be switched according to the setting of "9.15.6 LAN operation mode". The MSD has eight connections that can be set individually.

【See: 8.3.1 Selecting menu】



[Fig. 7.11] Example of LAN communication

### ■ DHCP

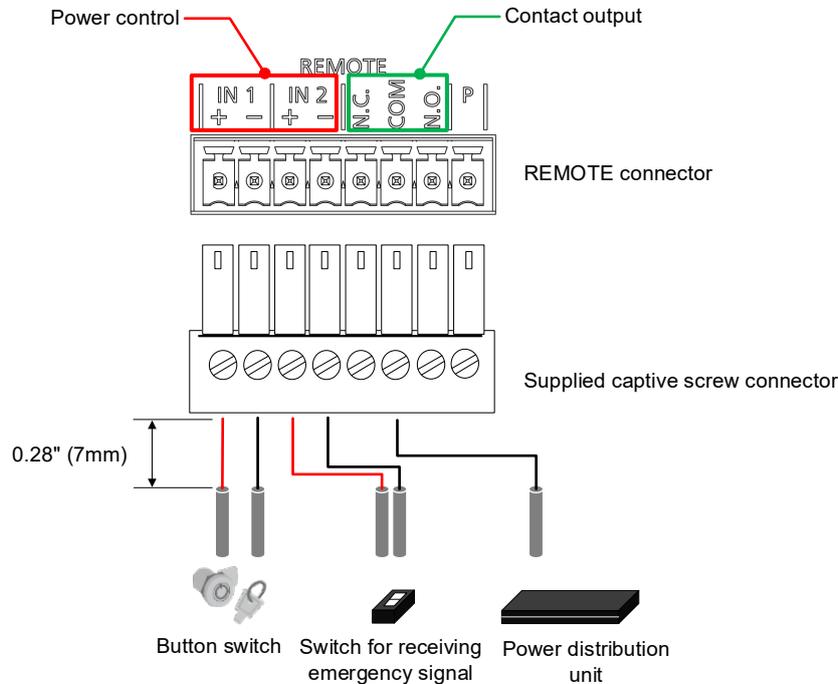
The MSD does not support automatic acquisition of IP address using DHCP (Dynamic Host Configuration Protocol). If you use the MSD in a network with DHCP, use a fixed IP address. If controlling peripheral devices connected over LAN from the MSD, use multiple fixed IP addresses.

### 7.4.3 REMOTE connector

The MSD includes two inputs for controlling MSD's power status and one contact output for controlling external power distribution unit.

Connect the supplied 8-pin captive screw connector to the MSD.

28 AWG to 16 AWG conductor gauge and a strip length of 0.28 in. (7 mm) are recommended.



**[Fig. 7.12] Connecting external devices to REMOTE connector**

#### ■ REMOTE IN1

Connects to an external button switch to control MSD's power.

+ terminal and – terminal    Open (DC 5 V): Standby    Close (0.5 mA): Power ON

【See: 9.17.1 Power control mode】

#### ■ REMOTE IN2

Receives emergency stop signal.

The MSD is powered on if specified voltage (DC 5 V to DC 30 V) is input to + terminal and – terminal.

【See: 9.17.2 Emergency stop】

#### ■ REMOTE OUT (Contact output)

Controls power distribution unit by outputting non-voltage contact signal.

N.C. (Normally Close): Closed during standby    N.O. (Normally Open): Opened during standby

Rated voltage: DC 24 V 1 A

#### ■ REMOTE P

Outputs specified voltage (DC 12 V, 1 kΩ resistance)

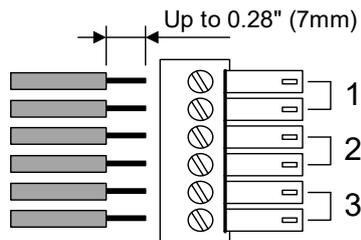
## 7.4.4 Contact closure

The MSD has a total of six independently controlled contact closure channels for external control. Each connector supports three channels. The maximum load is 1 A at 24 VDC per contact.

Connect a cable to the 6-pin captive screw connector, and then insert into the appropriate connector on the MSD.

28 AWG to 16 AWG conductor gauge is recommended.

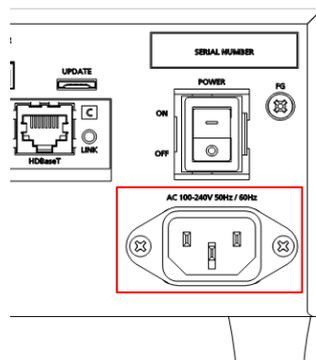
The recommended wire strip length is 0.28 in. (7 mm).



[Fig. 7.13] Connecting cable to 6-pin captive screw connector

## 7.5 Connecting power cord

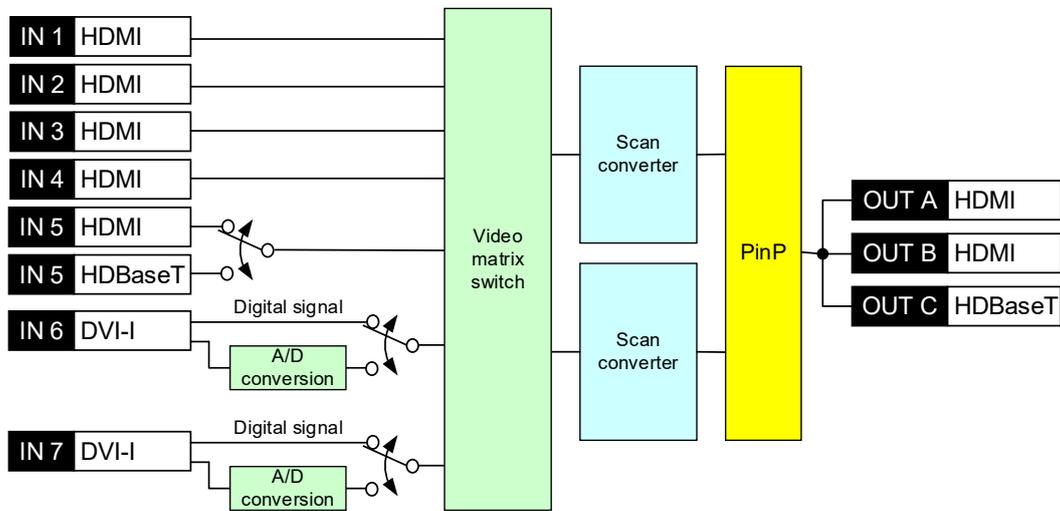
Connect the supplied power cord.



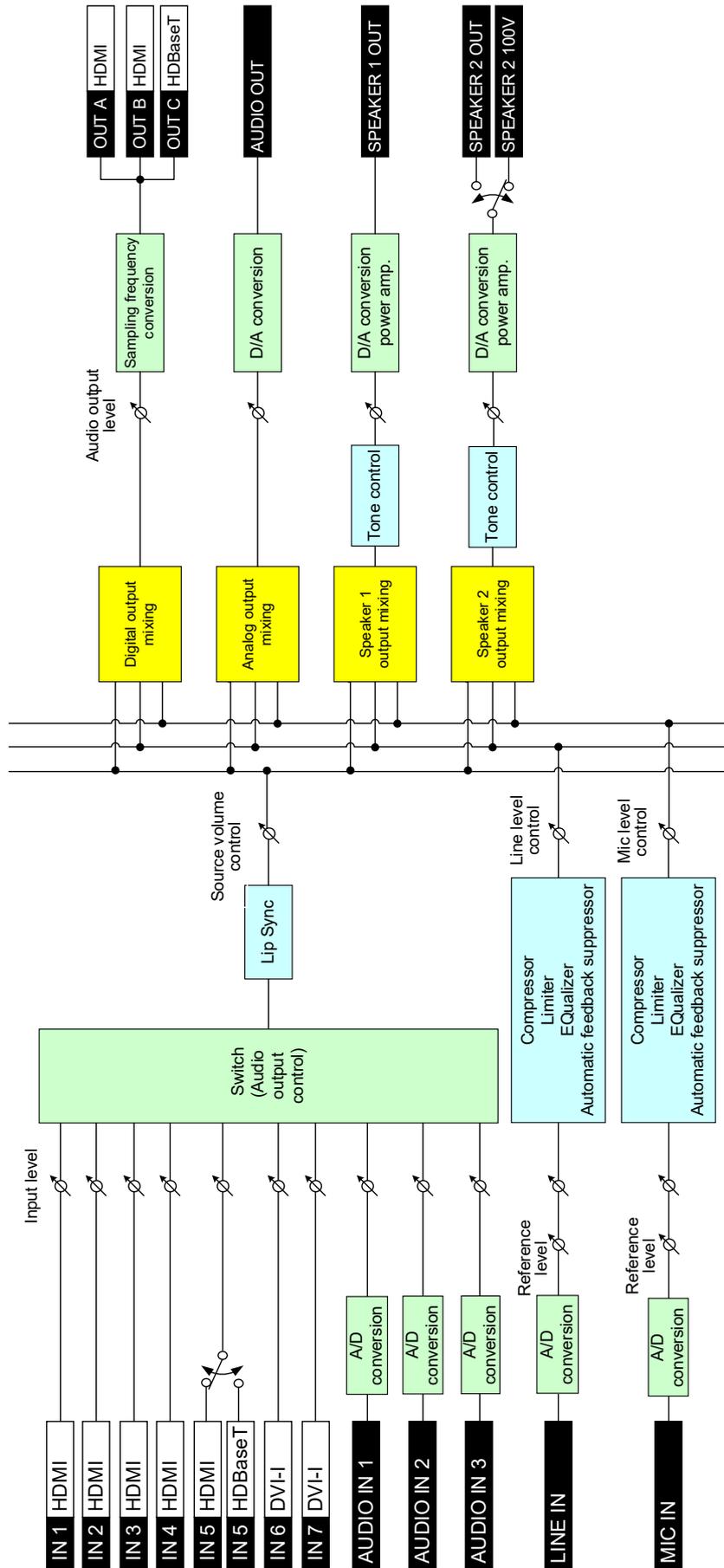
[Fig. 7.14] Connecting power cord

## 8 Operation

The following figures show how video and audio signals are converted and transmitted.



[Fig. 8.1] Video signal transmission



[Fig. 8.2] Audio signal transmission

## 8.1 Powering on/off

Turn on the “POWER” switch of the rear panel to power on or the MSD or change to standby state. Use the “Standby” button to switch standby state and powered on state.

**[Table 8.1] Power status**

Status	Power indicator	POWER switch	Standby button
Powered off	Does not light	OFF	---
Standby	Lights amber	ON	OFF (Does not light)
Powered on	Lights green	ON	ON (Lights)

If the REMOTE connector (IN1) is used, the “Standby” button does not light.

【See: 9.17.1 Power control mode】

**Tips:**

- The MSD power can be controlled by the “Standby” button, RS-232C or LAN during standby state.
- Start-up power status can be set in “9.20.1 Power state”.

【See: 9.20.1 Power state】

## 8.2 Powering up period

After powering on the MSD from a power-off condition, there is a short initialization delay before the first communication command can be received and executed. Predictable behavior during power up can be maintained by observing the recommended delay periods listed below.

**[Table 8.2] Power up period**

Operation	Delay period
Receiving communication command	6 seconds
Receiving front panel operation	8 seconds or longer

**Note:**

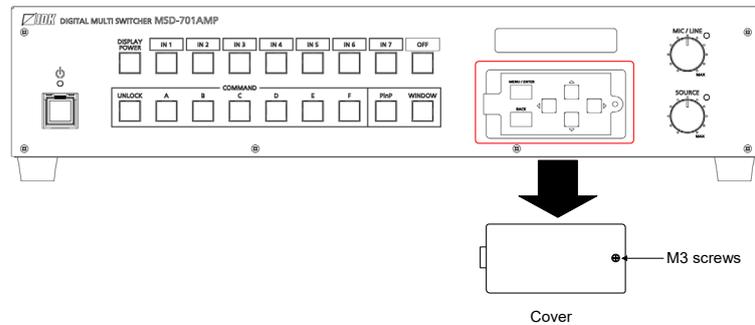
If “9.19.6 Start-up bitmap output” is set to “ON”, the delay period for the front panel operation may be longer.

## 8.3 Front panel operations

### 8.3.1 Selecting menu

To select menu:

1. Remove the cover from the front panel.



[Fig. 8.3] Removing cover

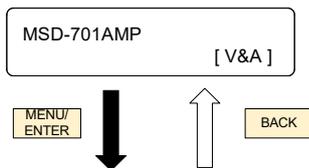
2. Press the “MENU/ENTER” button.
3. Select the desired menu using “arrow” buttons.
4. Press the “MENU/ENTER” button again to proceed to the following hierarchy.

For some menus, if the LED blinks. You need to press the “MENU/ENTER” button to apply settings.

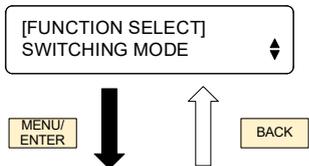
Illuminated buttons can be selected.

- “MENU/ENTER” button : Displays menu on the front display.
- “Arrow” buttons (▲ · ▼ · ◀, and ▶): Navigates menu.
- “BACK” button : Returns to the previous hierarchy.

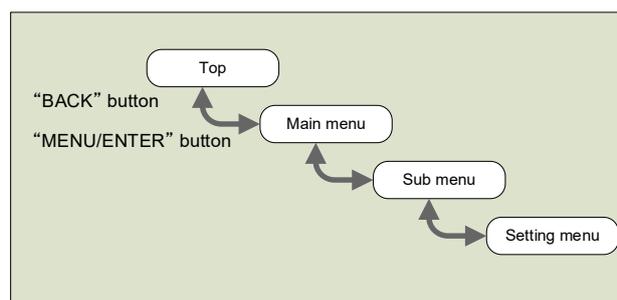
#### ● Top



#### ● Main menu



#### ● Sub menu (Setting menu)



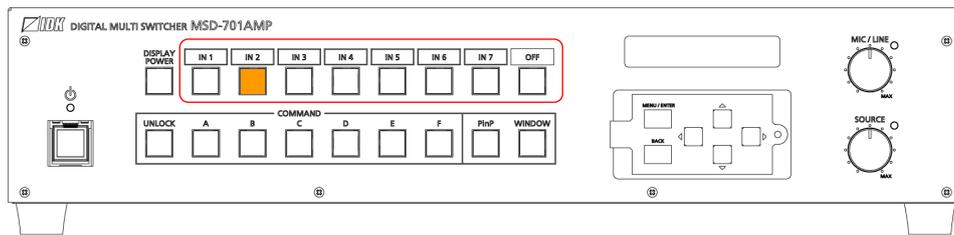
[Fig. 8.4] Selecting menu

**Notes:**

- The MSD menu consists of setting menus and advanced setting menus. 【See: 9.1 Menu】
- To avoid losing settings, do not interrupt power to the MSD while “NOW SAVING” is displayed; otherwise, the setting information may be lost.

### 8.3.2 Selecting input channels

Press the desired “input channel selection” button to output the video and audio you want to output. The button lights amber when selected.



[Fig. 8.5] Selecting input channel (Example: IN2)

### 8.3.3 Selecting video and audio separately

Audio breakaway enables the audio to be separated from the video.

To enable audio breakaway:

1. Set “9.3 Channel switching mode” to “AUDIO”.
2. Press the desired “input channel” button for audio. The selected “input channel” lights red.

The buttons light different colors to indicate where video and audio ties are/not the same:

- Amber : Audio is not broken away; video and audio are tied.
- Green (for video) and Red (for audio) : Audio is broken away.



[Fig. 8.6] Setting audio breakaway (Example: Audio is broken away to IN6)

### 8.3.4 Controlling mic/line volume

Rotate the “MIC/LINE” knob clockwise to increase the level or anticlockwise to decrease the volume.  
Setting range: MIN (-100 dB) to MAX (0 dB)

The MIC/LINE knob setting can be assigned to mic or line separately.

【See: 9.12.8 MIC/LINE volume knob】

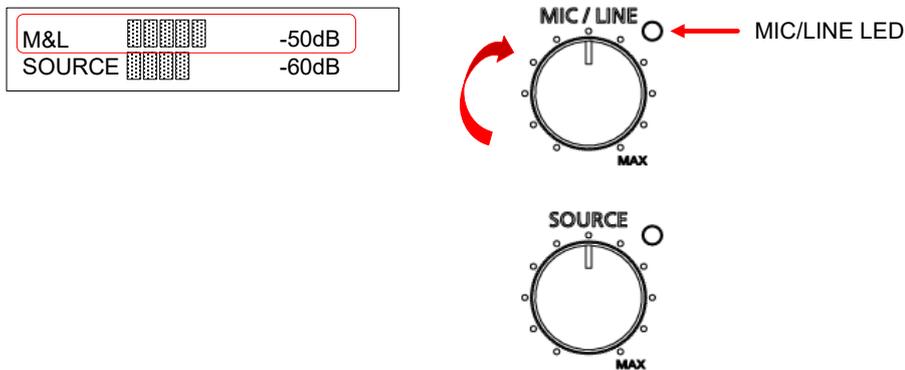
The MIC/LINE LED shows status of MIC and SPEAKER 1.

- Immediately after an abnormality of speaker output is detected (LED lights red), the MSD stops outputting audio signal of the speaker. Since overcurrent may cause the problem, decrease the output volume slightly.

【See: 9.11.2 Audio output level】

- If the MIC/LINE LED lights amber, mic input is clipped. Adjust the mic audio input reference level.

【See: [Table 4.1] Front/side panel features】



【Fig. 8.7】 Controlling mic/line volume (Example: Setting to -50 dB)

### 8.3.5 Controlling source audio volume

Rotate the "SOURCE" knob clockwise to increase the level or anticlockwise to decrease the volume.  
Setting range: MIN (-100 dB) to MAX (0 dB)

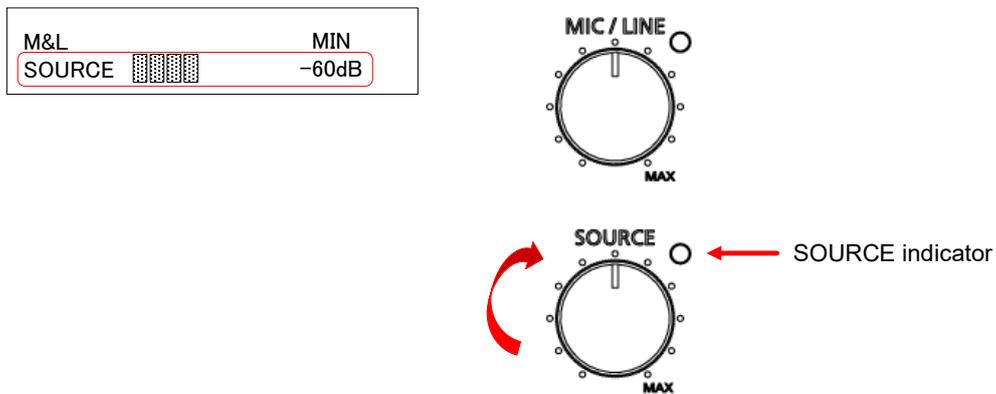
【See: 9.11 Output audio】

The SOURCE LED shows status of SPEAKERS.

- Immediately after an abnormality of speaker output is detected (LED lights red), the MSD stops outputting audio signal of the speaker. Since overcurrent may cause the problem, decrease the output volume slightly.
- If the SOURCE LED lights amber, SPEAKER 1 or SPEAKER 2 output is clipped. Decrease the output volume slightly.

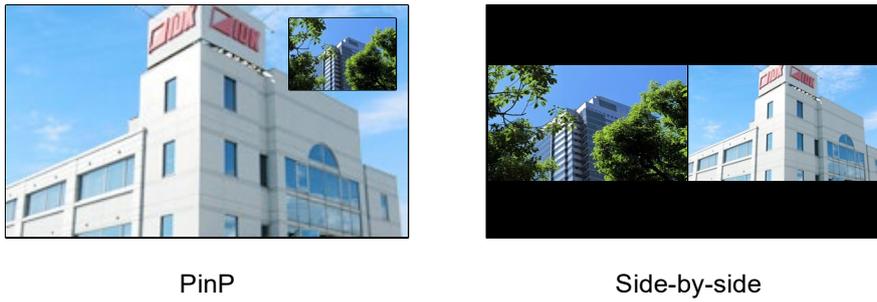
【See: 9.11.2 Audio output level】

【See: [Table 4.1] Front/side panel features】



[Fig. 8.8] Controlling source volume (Example: Setting to -60 dB)

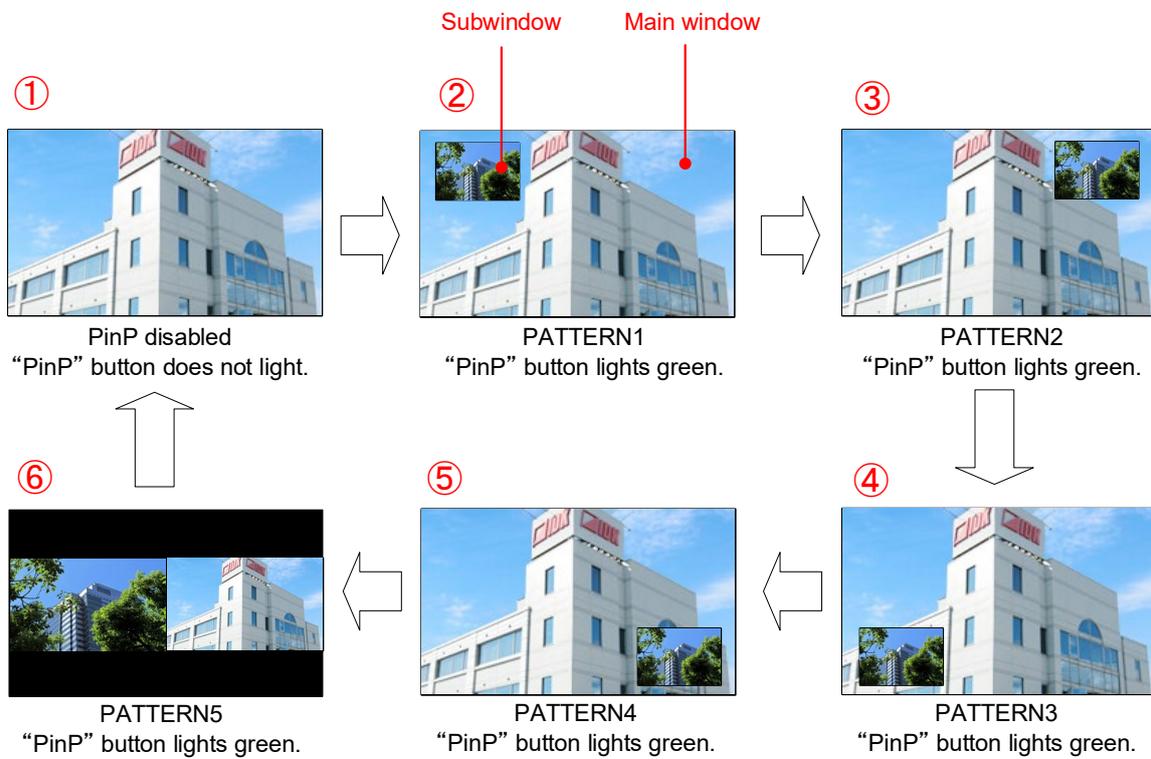
### 8.3.6 Enabling window combination



[Fig. 8.9] Pattern 1 and Pattern 5

**To set window combination:**

1. Select a layout pattern from 6 patterns below using the “PinP” button.

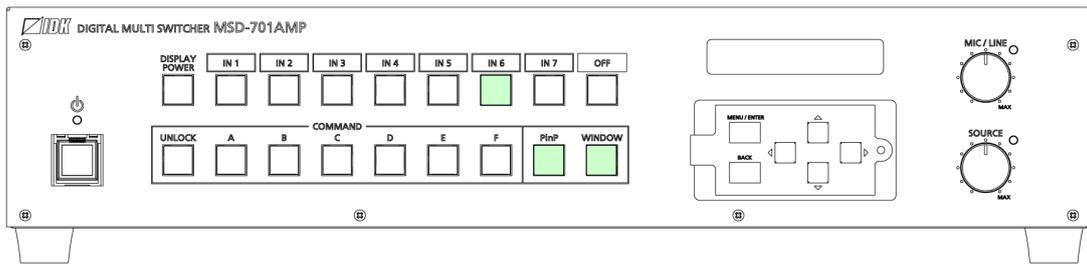


[Fig. 8.10] Selecting layout

- Assign a video using the “WINDOW” button and input channel selection buttons.

“WINDOW” button does not light : Main window will be switched.

“WINDOW” button light green : Subwindow will be switched.

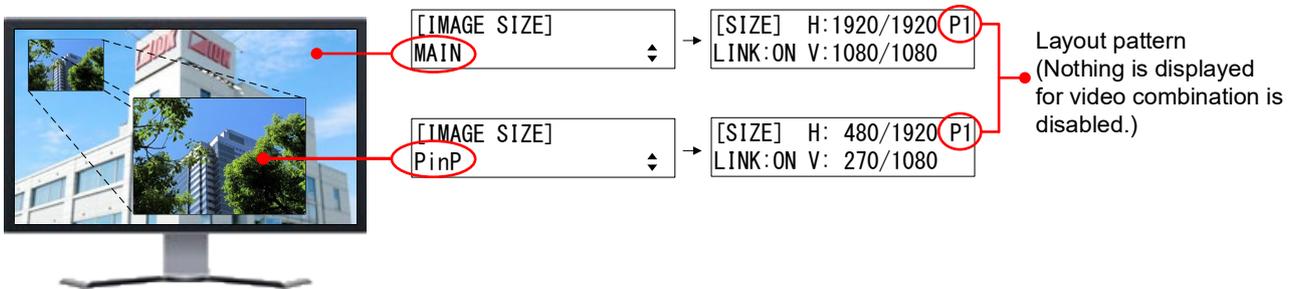


**[Fig. 8.11] Assigning window (Example: Subwindow)**

- Adjust window position, size or cropping from menu. Select “IMAGE SIZE” menu and select “MAIN” or “PinP”.

“MAIN” : For main window

“PinP” : For subwindow



**[Fig. 8.12] Adjusting position and size**

4. Set the following items as needed.

**[Table 8.3] Settable menus for video combination**

Menu	Description	Applied for each pattern separately	Applied to all pattern
Output position, size, and masking	Aspect ratio for sink device	N/A	✓
	Image position	✓	N/A
	Image size	✓	N/A
	Cropping	✓	N/A
	Image Initialization	✓	N/A
Output	Output video with no input video	N/A	✓
	Window transition effect	N/A	✓
	Window transition speed	N/A	✓
Input channel automatic switching	Signal ON priority	N/A	✓
	Signal OFF priority	N/A	✓
	Ignoring duration after automatic switching	N/A	✓
Picture controls	Output brightness	N/A	✓
	Output contrast	N/A	✓
	Output gamma	N/A	✓
	Output video correction initialization	N/A	✓
Preset memory	Editing crosspoint <sup>*1</sup>	N/A	✓
	Recalling all settings <sup>*2</sup>	N/A	✓
Bitmap	Bitmap image	N/A	✓
	Aspect ratio	N/A	✓
	Assigning input channel	N/A	✓
	Start-up bitmap output	N/A	✓
Status	Sink device status	N/A	✓

<sup>\*1</sup> PinP enabled/disable, setting PinP channel

<sup>\*2</sup> PinP enabled/disable, setting PinP channel and layout pattern.

### 8.3.7 Registering/Executing control commands

External devices that are connected to the MSD can be controlled by registering commands to the following buttons:

- “Standby” button
- “Input channel selection” button
- “COMMAND” buttons
- “DISPLAY POWER” button

No control commands are registered by default.

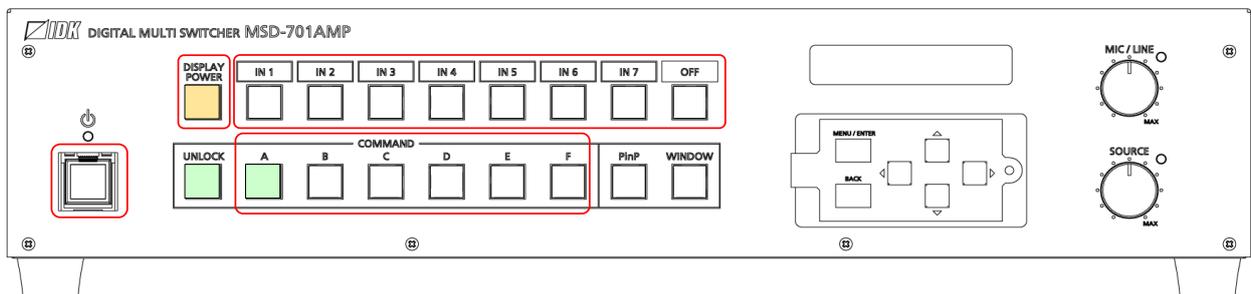
**To execute a control command that is registered to a “COMMAND” button:**

1. Press the “UNLOCK” button.
2. The registered “COMMAND” buttons light green.
3. Select and press the desired button.

**To execute a control command that is registered to the “DISPLAY POWER” button:**

1. Press the “DISPLAY POWER” button.
2. The “DISPLAY POWER” button blinks amber while the command is being executed.
3. After POWER ON command is executed, the button lights amber.  
After POWER OFF command is executed, the button turns off.

【See: 9.16 Control command】



**[Fig. 8.13] Buttons for control commands**

**[Table 8.4] Control command registration**

Commands for controlling the MSD	UP to 32 commands
Execution conditions for control commands	Up to 40 conditions
Communication ports for control commands	RS-232C, IN5's RS-232C, OUT C's RS-232C, Internal loop back, LAN connections 1 to 8

### 8.3.8 Recalling crosspoint

Up to nine crosspoint can be saved to crosspoint.

【See: 9.18 Preset memory】

Crosspoint memories No.1 to 6 (COMMAND “A” to “F”) are linked to “COMMAND” buttons.

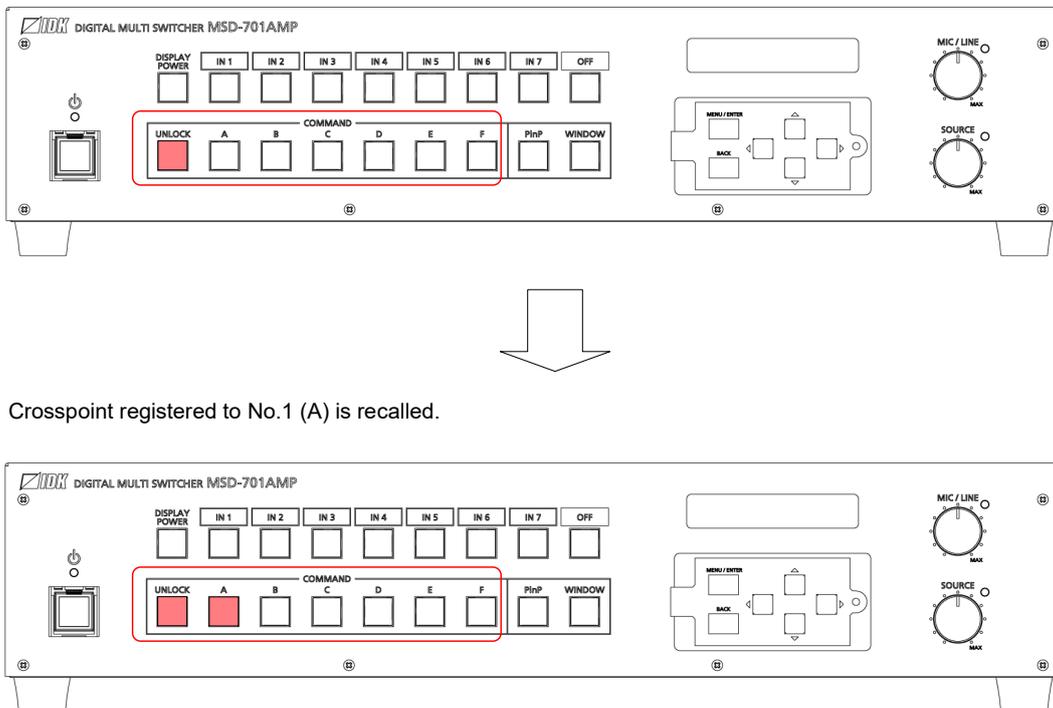
To recall crosspoint:

1. Press the “UNLOCK” button. The “UNLOCK” button light red.
2. Press the desired button.
3. When crosspoint recall is complete, the button lights red.

Crosspoint can be recalled from menu operation.

【See: 9.18.1 Recalling crosspoint】

Recalling crosspoint



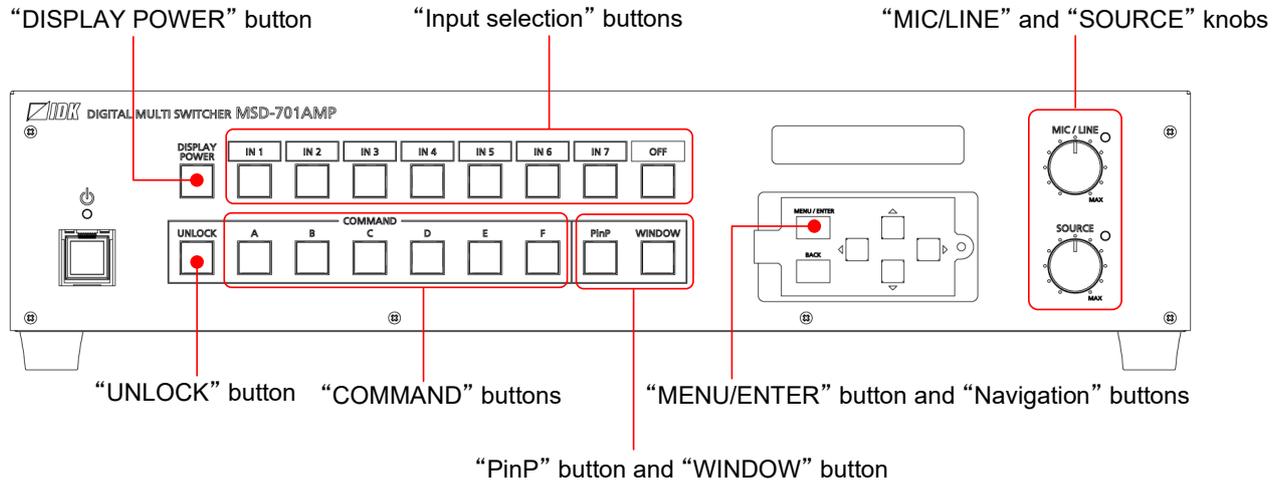
【Fig. 8.14】 Recalling crosspoint

### 8.3.9 Front panel security lockout

The front panel security lockout limits operation of the MSD from the front panel to prevent accidental changes to the controller settings.

【See: 9.21.1 Grouping front panel security lockout 】

【See: 9.20.4 Front panel security lockout 】



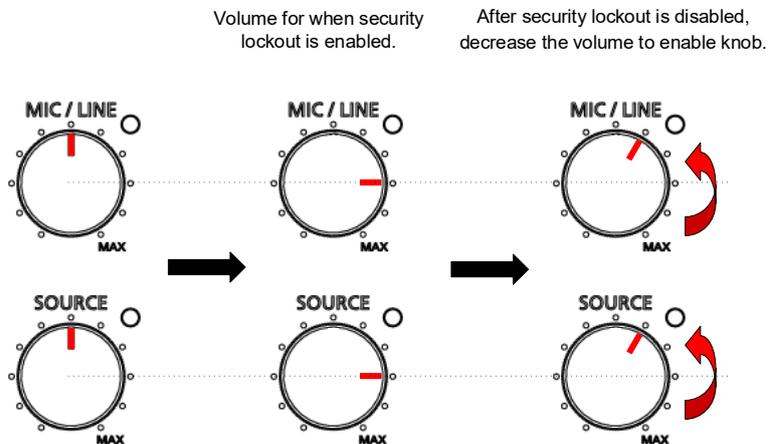
[Fig. 8.15] Buttons/Groups to be locked

**To enable/disable front panel security lockout:**

1. Press and hold the "BACK" button.
2. A message or "\*" is displayed on the front display.
  - Locked : "BUTTON LOCKED !" (For buttons)
  - "\*" appears on the right side of the value.
  - Unlocked : "BUTTON LOCKED RELEASE !"

**To disable knob security lockout:**

1. Press and hold the "BACK" button to release knob lockout.
2. Rotate the knob anticlockwise to decrease the volume to the value lower than the value for when front panel security lockout is enabled.
3. "\*" disappears.



[Fig. 8.16] Disabling knob lockout

### 8.3.10 Initialization

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All user configurable settings can be reset to their respective factory default values by powering the MSD on while simultaneously depressing the “BACK” button. Press and hold the “BACK” button until you hear a long beep tone.

【See: 9.23 Factory default】

**Note:**

When settings are initialized from the WEB browser, they can be initialized without changing LAN settings. Note that after returning to factory default, the previous setting values cannot be restored.

## 8.4 WEB browser operations

The MSD can be controlled, monitored, or configured remotely also via WEB browser.

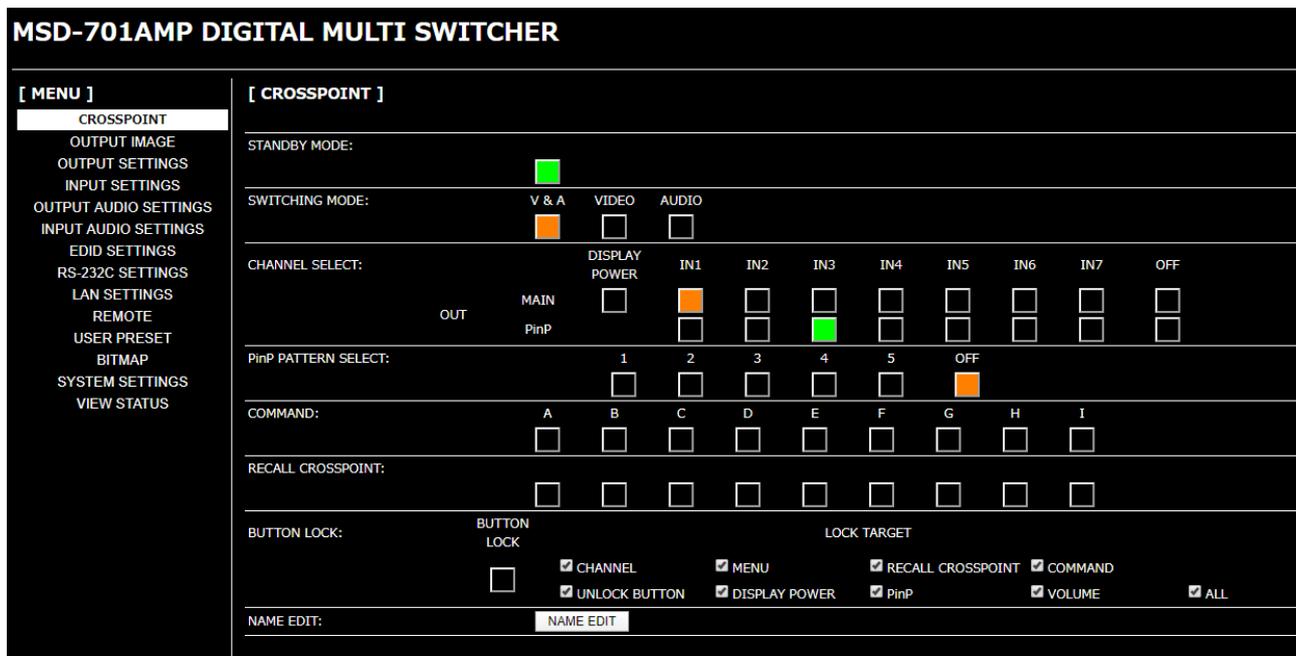
### 8.4.1 Starting WEB menu

To control the MSD from a WEB browser, enter the IP address that is programmed into the MSD in the address bar of the WEB browser. Note that the default IP address is 192.168.1.199. This default address is common among all MSD series products.

[See: 9.15 LAN]

[Table 8.5] Example URL

Port number of WEB browser	URL to be entered into address bar
80 (Normal)	http://192.168.1.199
Other than 80 (5000 to 5999)	http://192.168.1.199:5000 (e.g. #5000)

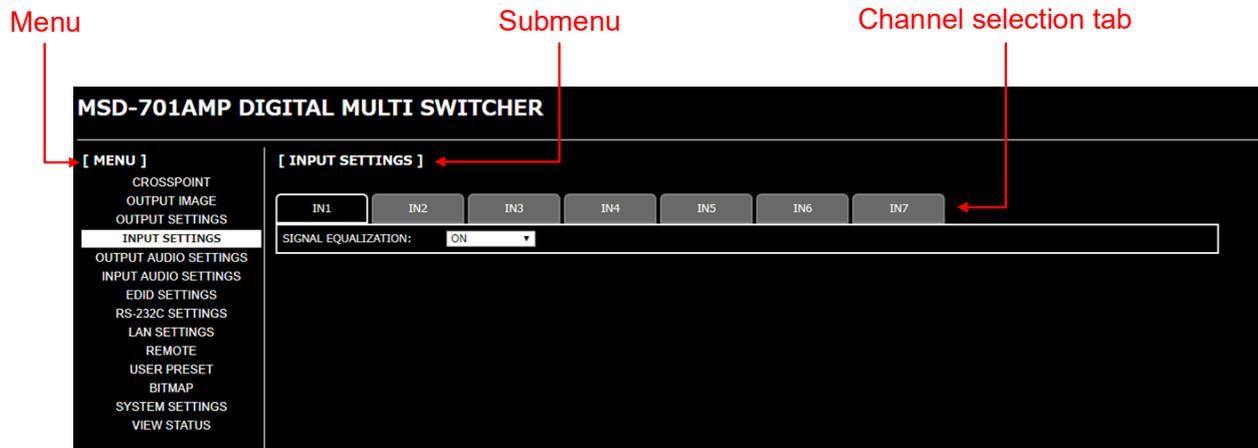


[Fig. 8.17] WEB menu

## 8.4.2 Form controls

To set values from WEB menu:

1. Select the desired item from the menu to display setting items in the submenu.
2. If there is a setting item that can be set for each channel, channel tab will be displayed.
3. Set items in the submenu by referring to the table below.



[Fig. 8.18] WEB menu

[Table 8.6] Form controls

Form control	Example	Description
Set/execution button	<input type="button" value="SET"/>	Click the button to execute the desired operation.
Pull down list	<input type="text" value="V&amp;A"/>	Use the down button to select the desired value.
Arrow button	<input type="text" value="10"/> <input type="button" value="▼"/> <input type="button" value="▲"/>	Use the up/down buttons to set the desired value. You also can enter the value directly.
Check box	<input checked="" type="checkbox"/> MENU	Enables and disables by clicking or unclicking the box.
Radio button	<input type="radio"/> OFF <input checked="" type="radio"/> ON	Select [OFF] or [ON].

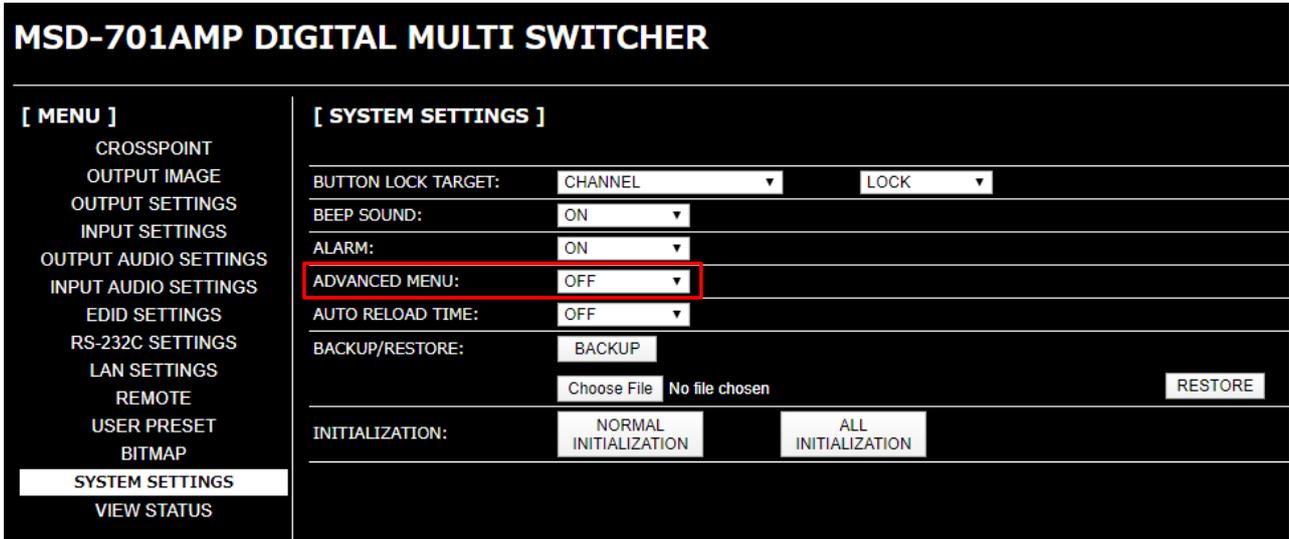
### 8.4.3 Normal/Advanced menu

The MSD menu consist of normal setting menus and advanced setting menus.

To set advanced setting menus:

1. Select [SYSTEM SETTINGS] from [MENU].
2. Set [ADVANCED MENU] to [ON]. It is set to [OFF] by default.

[See: 9.1 Menu]



[Fig. 8.19] Enabling advanced menu

### 8.4.4 Editing crosspoint name

To edit crosspoint name:

1. Click the [NAME EDIT] button from [CROSSPOINT] to open the [NAME EDIT] window.
2. Enter up to 10 one-byte characters.

You can edit the following names

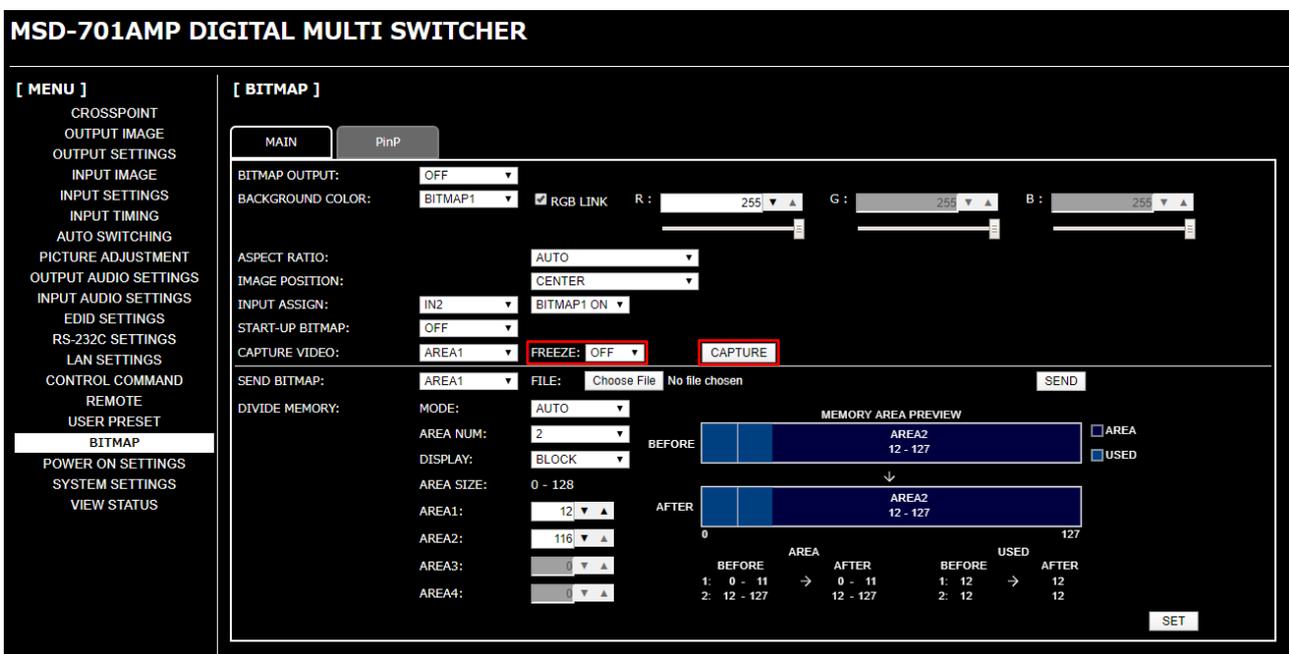
## 8.4.5 Registering bitmap

To register output video to bitmap memory:

1. Select [SYSTEM SETTINGS] from [MENU].
2. Set [ADVANCED MENU] to [ON].
3. Select [BITMAP] > [MAIN].
4. Set [FREEZE] to [ON] to freeze the output video temporarily.

If input channel is switched or input signal changes while [FREEZE] is processing, the video will be unfrozen.

5. Click [CAPTURE] to start writing video to the bitmap memory.  
Do not perform other WEB operations or power off the MSD during the operation.
6. A dialog box showing the end of processing appears. If the registration fails, an error message is displayed.



[Fig. 8.20] Registering output video

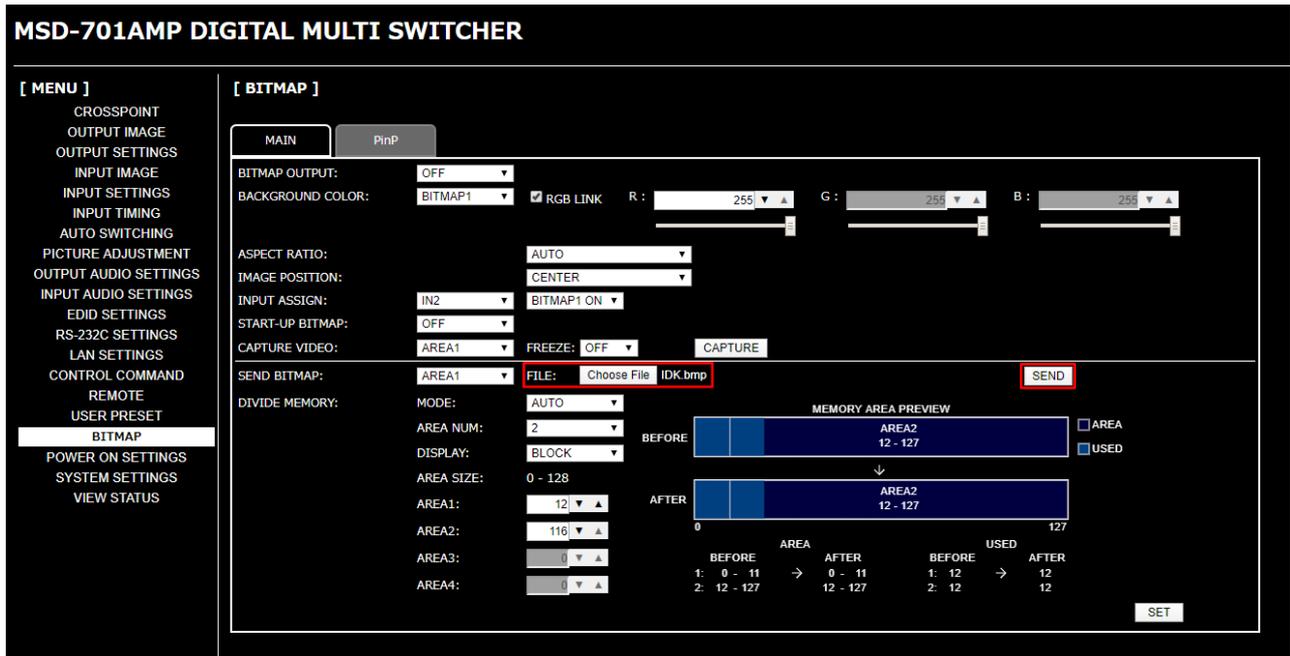
[Table 8.7] Bitmap registration error

Message	Description
Video Capture is not available because there is no input signal.	The video cannot be captured because no input video is displayed.
Memory Size Error is happened.	The data cannot be saved because the input video is bigger than reserved memory area.

To register bitmap file to bitmap memory:

1. Select [SYSTEM SETTINGS] from [MENU].
2. Set [ADVANCED MENU] to [ON].
3. Select [BITMAP] > [MAIN].
4. Select the desired bitmap file from [FILE].
5. Click [SEND] to register the bitmap file to bitmap memory.
6. If the registration fails, an error message is displayed.

【See: 9.19 Bitmap】



[Fig. 8.21] Registering bitmap file

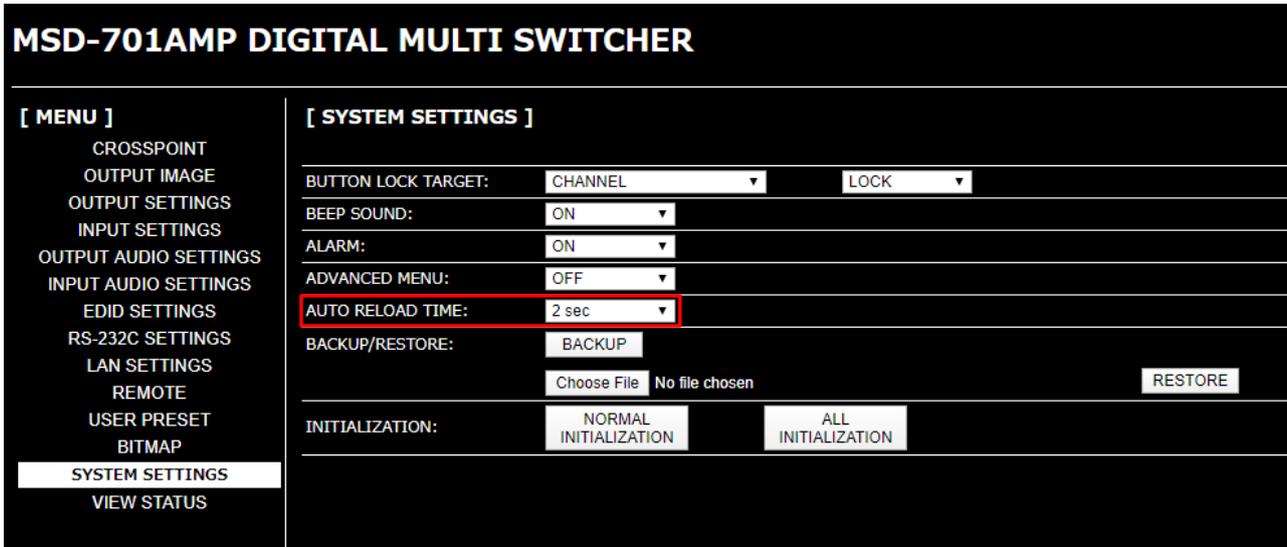
[Table 8.8] Bitmap transfer error message

Message	Description
File Name is invalid.	The specified file name is not correct.
File Format Error is happened.	The MSD does not support this file.
File Size exceeds the capacity.	The file exceeds the maximum resolution.
Memory Allocation Error is happened.	The memory for temporarily saving bitmap file could not be reserved. The error may possibly be solved by turning off the [POWER] switch, turning on the switch again, and sending the bitmap file again.

## 8.4.6 Automatic reload

To set automatic reload interval of [CROSSPOINT] and [VIEW STATUS] windows:

1. Select [SYSTEM SETTINGS] from [MENU].
2. Select the desired interval in 1-second increments (1 to 10 seconds) for [AUTO RELOAD TIME].  
If you select [OFF] for [AUTO RELOAD TIME] (default), [CROSSPOINT] and [VIEW STATUS] windows are not updated automatically.

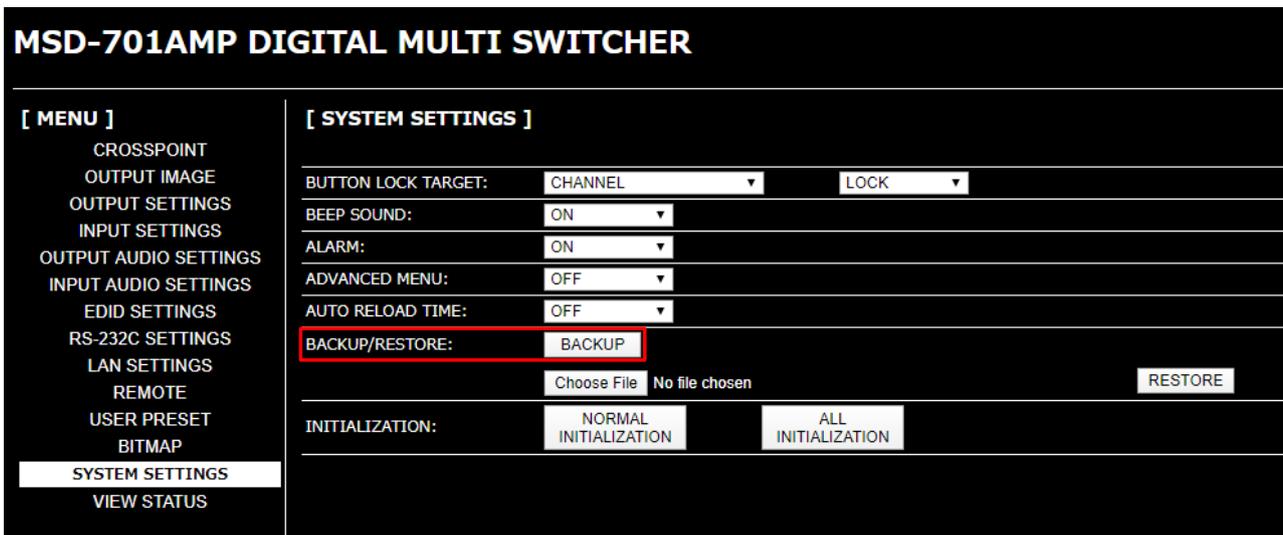


[Fig. 8.22] Setting automatic reload interval

## 8.4.7 Saving/Restoring settings

To save saved settings to a PC as a backup file:

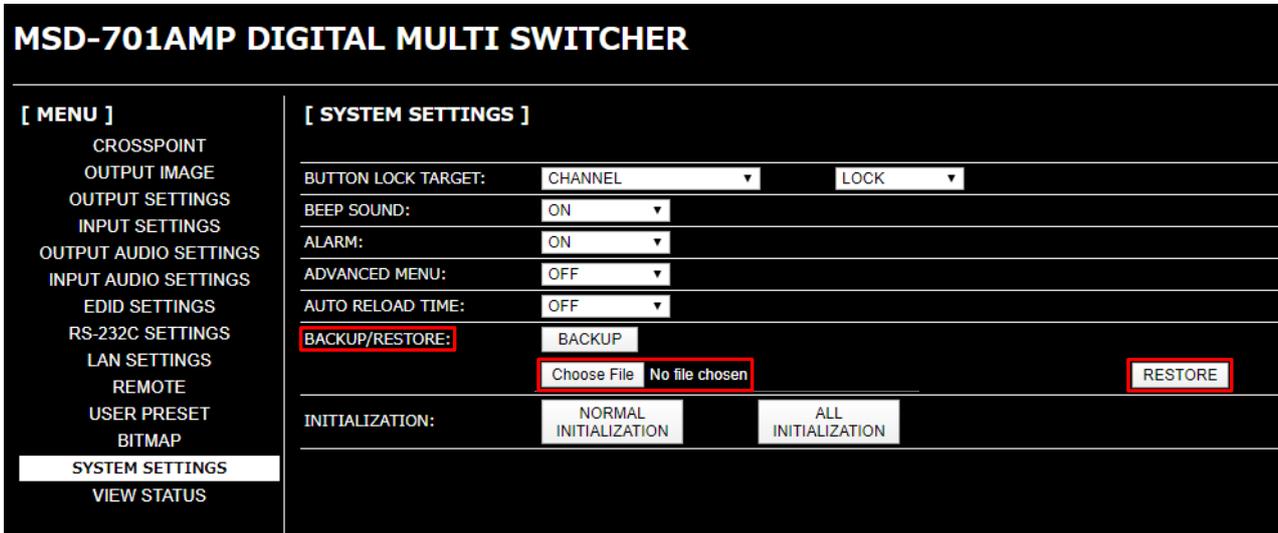
1. Select [SYSTEM SETTINGS] from [MENU].
2. Click the [BACKUP] button of [BACKUP/RESTORE].



[Fig. 8.23] Saving settings

To restore settings from PC:

1. Select [SYSTEM SETTINGS] from [MENU].
2. Select a file from [Choose File].
3. Click the [RESTORE] button of [BACKUP/RESTORE].  
Do not perform other WEB operations or power off the MSD during the operation.
4. If the restoration fails, an alert dialog appears during the operation.



[Fig. 8.24] Restoring settings

## 8.4.8 Initialization

To reset the MSD to factory defaults:

1. Select [SYSTEM SETTINGS] from [MENU].
2. For initializing settings except RS-232C and LAN communication settings: Click the [NORMAL INITIALIZE] button.

For initializing all settings including the communication settings: Click the [ALL INITIALIZE] button.

### Note:

Note that after resetting to factory defaults, the previous setting values cannot be restored.

[See: 9.23 Factory default]

The screenshot displays the web interface for the MSD-701AMP Digital Multi Switcher. The interface is divided into two main sections: [ MENU ] on the left and [ SYSTEM SETTINGS ] on the right. The [ MENU ] section lists various configuration options, with [ SYSTEM SETTINGS ] currently selected. The [ SYSTEM SETTINGS ] section contains several configuration items, each with a dropdown menu or a button. The 'INITIALIZATION' section is highlighted with a red box and contains two buttons: 'NORMAL INITIALIZATION' and 'ALL INITIALIZATION'. Other visible settings include 'BUTTON LOCK TARGET' (CHANNEL, LOCK), 'BEEP SOUND' (ON), 'ALARM' (ON), 'ADVANCED MENU' (OFF), 'AUTO RELOAD TIME' (OFF), and 'BACKUP/RESTORE' (BACKUP, RESTORE). The 'BACKUP/RESTORE' section also includes a 'Choose File' button and a 'No file chosen' status.

[ MENU ]		[ SYSTEM SETTINGS ]	
CROSSPOINT		BUTTON LOCK TARGET:	CHANNEL <input type="button" value="LOCK"/>
OUTPUT IMAGE		BEEP SOUND:	ON
OUTPUT SETTINGS		ALARM:	ON
INPUT SETTINGS		ADVANCED MENU:	OFF
OUTPUT AUDIO SETTINGS		AUTO RELOAD TIME:	OFF
INPUT AUDIO SETTINGS		BACKUP/RESTORE:	BACKUP <input type="button" value="RESTORE"/>
EDID SETTINGS			Choose File No file chosen
RS-232C SETTINGS		INITIALIZATION:	NORMAL INITIALIZATION ALL INITIALIZATION
LAN SETTINGS			
REMOTE			
USER PRESET			
BITMAP			
<b>SYSTEM SETTINGS</b>			
VIEW STATUS			

[Fig. 8.25] Initialization

## 9 Configuration and Control

### 9.1 Menu

The MSD menus consist of normal setting menus and advanced setting menus.

You can switch setting menu/advanced menu, using the “MENU/ENTER” button (“Top” → “SYSTEM SETTINGS” → “ADVANCED MENU”).

【8.4.3 Normal/Advanced menu】

PinP can be set from some menus. If PinP is selected, the current PinP layout pattern number is displayed on the front display. For initialization, all PinP layout patterns will be initialized.

“ALL” can be selected for some menus. Settings of smallest alphanumeric channel will be displayed.

#### 9.1.1 Normal setting menu

##### MSD-701AMP

<ul style="list-style-type: none"> <li>— SWITCHING MODE P.63 (Channel switching mode)</li> <li>— OUTPUT IMAGE P.63 (Output position, size, and masking)               <ul style="list-style-type: none"> <li>— RESOLUTION (Output resolution)</li> <li>— IMAGE POSITION (Image position)</li> <li>— IMAGE SIZE (Image size)</li> <li>— BACKGROUND COLOR (Background color)</li> <li>— TEST PATTERN (Test pattern)</li> <li>— IMAGE INITIALIZATION (Image Initialization)</li> </ul> </li> <li>— OUTPUT SETTINGS P.71 (Output)               <ul style="list-style-type: none"> <li>— OUTPUT SIGNAL (Output signal)</li> <li>— CONNECTION RESET (Connection Reset)</li> <li>— SIGNAL EQUALIZATION (Output equalizer)</li> <li>— HDBT LONG REACH MODE (HDBaseT output long reach mode)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>— INPUT SETTINGS P.83 (Input)               <ul style="list-style-type: none"> <li>— INPUT CONNECTOR (Input connector)</li> <li>— DVI-I: SIGNAL FORMAT (DVI input connector)</li> <li>— SIGNAL EQUALIZATION (Input equalizer)</li> <li>— HDBT LONG REACH MODE (HDBaseT input long reach mode)</li> <li>— HDBT POWER SUPPLY (HDBaseT power supply)</li> </ul> </li> <li>— OUTPUT AUDIO SETTINGS P.105 (Output audio)               <ul style="list-style-type: none"> <li>— OUTPUT SIGNAL (Audio output)</li> <li>— OUTPUT LEVEL (Audio output level)</li> <li>— TONE CONTROL (Tone control)</li> <li>— MUTE (Mute)</li> <li>— DIGITAL OUT MIXING (Digital output mixing)</li> <li>— ANALOG OUT MIXING (Analog output mixing)</li> <li>— SPEAKER1 MIXING (SPEAKER 1 output mixing)</li> </ul> </li> </ul>
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<ul style="list-style-type: none"> <li>—SPEAKER2 MIXING (SPEAKER 2 output mixing)</li> <li>—SPEAKER OUT (SPEAKER 2 output)</li> <li>—TEST TONE (Test tone)</li> </ul>	<ul style="list-style-type: none"> <li>—REMOTE P.144           <ul style="list-style-type: none"> <li>  (REMOTE connector)</li> <li>—STANDBY CONTROL (Power control mode)</li> <li>—EMERGENCY SHUTDOWN (Emergency stop)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>—INPUT AUDIO SETTINGS P.111           <ul style="list-style-type: none"> <li>  (Input audio)</li> <li>—INPUT SIGNAL (Audio input)</li> <li>—INPUT LEVEL OFFSET (Audio input level offset)</li> <li>—REFERENCE LEVEL (Audio input reference level)</li> <li>—COMPRESSOR (Compressor)</li> <li>—EQUALIZER (Equalizer)</li> <li>—FEEDBACK SUPPRESSOR (Automatic feedback suppressor)</li> <li>—FRONT VOLUME (MIC/LINE volume knob)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>—USER PRESET P.145           <ul style="list-style-type: none"> <li>  (Preset memory)</li> <li>—RECALL CROSSPOINT (Recalling crosspoint)</li> <li>—STORE CROSSPOINT (Saving crosspoint)</li> <li>—RECALL ALL SETTINGS (Recalling all settings)</li> <li>—STORE ALL SETTINGS (Saving all settings)</li> <li>—START-UP (Start-up setting)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>—EDID SETTINGS P.117           <ul style="list-style-type: none"> <li>  (EDID)</li> <li>—EDID SELECTION (EDID selection)</li> <li>—RESOLUTION (Input resolution)</li> <li>—SINK DEVICE EDID COPY (Copying EDID)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>—BITMAP P.149           <ul style="list-style-type: none"> <li>  (Bitmap)</li> <li>—BITMAP OUTPUT (Bitmap image)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>—RS-232C SETTINGS P.126           <ul style="list-style-type: none"> <li>  (RS-232C)</li> <li>—PARAMETERS (RS-232C communication)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>—SYSTEM SETTINGS P.158           <ul style="list-style-type: none"> <li>  (Configuring MSD)</li> <li>—BUTTON LOCK TARGET (Grouping front panel security lockout)</li> <li>—BEEP SOUND (Beep)</li> <li>—ALARM (Alarm)</li> <li>—ADVANCED MENU (Displaying advanced menu)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>—LAN SETTINGS P.127           <ul style="list-style-type: none"> <li>  (LAN)</li> <li>—IP ADDRESS (IP address)</li> <li>—SUBNET MASK (Subnet mask)</li> <li>—GATEWAY (Gateway address)</li> <li>—MAC ADDRESS (MAC address)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>—VIEW STATUS P.162           <ul style="list-style-type: none"> <li>  (Status)</li> <li>—SINK DEVICE STATUS (Sink device status)</li> <li>—SINK DEVICE EDID (Viewing sink device EDID)</li> <li>—INPUT STATUS (Input signal status)</li> <li>—SYSTEM STATUS (System status)</li> <li>—VERSION (Device information)</li> </ul> </li> </ul>

## 9.1.2 Advanced setting menu

### MSD-701AMP

#### SWITCHING MODE P.63

(Channel switching mode)

#### OUTPUT IMAGE P. 63

(Output position, size, and masking)

##### RESOLUTION

(Output resolution)

##### ASPECT RATIO

(Aspect ratio for sink device)

##### IMAGE POSITION

(Image position)

##### IMAGE SIZE

(Image size)

##### IMAGE CROP

(Cropping)

##### BACKGROUND COLOR

(Background color)

##### TEST PATTERN

(Test pattern)

##### IMAGE INITIALIZATION

(Image Initialization)

#### OUTPUT SETTINGS P.71

(Output)

##### OUTPUT SIGNAL

(Output signal)

##### NO SIGNAL IMAGE

(Output video with no input video)

##### HDCP OUTPUT MODE

(HDCP output)

##### HDCP RETRY

(HDCP retries)

##### CONNECTION RESET

(Connection Reset)

##### SIGNAL EQUALIZATION

(Output equalizer)

##### SIGNAL FORMAT

(Output format)

##### HDBT LONG REACH MODE

(HDBaseT output long reach mode)

##### DEEP COLOR

(Deep Color output)

##### VIDEO SWITCHING EFFECT

(Window transition effect)

##### SWITCHING EFFECT SPEED

(Window transition speed)

##### WIPE EFFECT COLOR

(Wipe color)

#### EDID ERR. OUTPUT MODE

(Sink device EDID check)

#### CEC CONNECTION

(CEC connection)

#### INPUT IMAGE P.78

(Input position, size, and cropping)

##### ASPECT RATIO

(Aspect ratio)

##### ASPECT RATIO CONTROL

(Aspect ratio control)

##### OVERSCAN

(Overscan)

##### IMAGE POSITION

(Image position)

##### IMAGE SIZE

(Image size)

##### IMAGE CROP

(Cropping)

##### IMAGE INITIALIZATION

(Image initialization)

#### INPUT SETTINGS P.83

(Input)

##### INPUT CONNECTOR

(Input connector)

##### DVI-I: SIGNAL FORMAT

(DVI input connector)

##### NO INPUT MONITORING

(No-signal input monitoring)

##### HDCP INPUT MODE

(HDCP input)

##### SIGNAL EQUALIZATION

(Input equalizer)

##### HDBT LONG REACH MODE

(HDBaseT input long reach mode)

##### HDBT POWER SUPPLY

(HDBaseT power supply)

##### ANALOG INPUT FORMAT

(Analog input signal parameters)

##### INTERRUPTION DETECTION

(Automatic detection of video input interruption)

##### SIGNAL SETTING MODE

(Fixing settings for each input signal)

**INPUT TIMING** P.90

- | (Input timing)
- ANALOG MEASUREMENT  
(Automatic measurement)
- H TOTAL PIXELS  
(The total number of horizontal pixels)
- H START POSITION  
(Horizontal start position)
- H ACTIVE  
(Horizontal active area)
- V START POSITION  
(Vertical start position)
- V ACTIVE  
(Vertical active area)
- START POSITION DETECT.  
(Automatic measurement of start position)
- UNREGISTERED SIGNAL  
(Automatic setting of input timing)
- INPUT TIMING INIT.  
(Initializing digital input timing)
- RECALL ANALOG SETTINGS  
(Recalling analog input timing)
- STORE ANALOG SETTINGS  
(Saving analog input timing)
- ANALOG SIGNAL TRACKING  
(Tracking)

**AUTO SWITCHING** P.99

- | (Input channel automatic switching)
- SIGNAL ON PRIORITY  
(Signal ON priority)
- SIGNAL OFF PRIORITY  
(Signal OFF priority)
- IGNORING DURATION  
(Ignoring duration after automatic switching)
- SWITCHING MODE  
(Channel switching mode of automatic switching)

**PICTURE ADJUSTMENT** P.102

- | (Picture controls)
- OUTPUT BRIGHTNESS  
(Output brightness)
- OUTPUT CONTRAST  
(Output contrast)
- OUTPUT GAMMA  
(Output gamma)
- OUTPUT SETTING INIT.  
(Output video correction initialization)
- INPUT SHARPNESS  
(Input sharpness)
- INPUT BRIGHTNESS  
(Input brightness)
- INPUT CONTRAST  
(Input contrast)

- INPUT HUE  
(Input hue)
- INPUT SATURATION  
(Input saturation)
- INPUT BLACK LEVEL  
(Input black level)
- INPUT SETTING INIT.  
(Input video correction initialization)

**OUTPUT AUDIO SETTINGS** P.105

- | (Output audio)
- OUTPUT SIGNAL  
(Audio output)
- OUTPUT LEVEL  
(Audio output level)
- TONE CONTROL  
(Tone control)
- MUTE  
(Mute)
- LIP SYNC  
(Output Lip Sync)
- SAMPLING FREQUENCY  
(Sampling frequency)
- DIGITAL OUT MIXING  
(Digital output mixing)
- ANALOG OUT MIXING  
(Analog output mixing)
- SPEAKER1 MIXING  
(SPEAKER 1 output mixing)
- SPEAKER2 MIXING  
(SPEAKER 2 output mixing)
- DOWNMIX  
(Multi-channel audio output)
- OUTPUT PRIORITY  
(Multi-channel audio output priority)
- SPEAKER OUT  
(SPEAKER 2 output)
- TEST TONE  
(Test tone)

**INPUT AUDIO SETTINGS** P.111

- | (Input audio)
- INPUT SIGNAL  
(Audio input)
- INPUT LEVEL OFFSET  
(Audio input level offset)
- REFERENCE LEVEL  
(Audio input reference level)
- COMPRESSOR  
(Compressor)
- EQUALIZER  
(Equalizer)
- FEEDBACK SUPPRESSOR  
(Automatic feedback suppressor)

<ul style="list-style-type: none"> <li>— LIP SYNC (Input Lip Sync)</li> <li>— FRONT VOLUME (MIC/LINE volume knob)</li> <li>— AUDIO STABLE WAIT (Stable input audio wait)</li> </ul>	<ul style="list-style-type: none"> <li>— <b>EDID SETTINGS</b> P.117 (EDID) <ul style="list-style-type: none"> <li>— EDID SELECTION (EDID selection)</li> <li>— RESOLUTION (Input resolution)</li> <li>— SINK DEVICE EDID COPY (Copying EDID)</li> <li>— SIGNAL FORMAT (HDMI/DVI)</li> <li>— FRAME RATE (Frame rate)</li> <li>— DEEP COLOR (Deep Color)</li> <li>— Linear PCM (LPCM audio)</li> <li>— AAC (AAC audio)</li> <li>— Dolby Digital (Dolby Digital audio)</li> <li>— Dolby Digital Plus (Dolby Digital Plus audio)</li> <li>— Dolby TrueHD (Dolby TrueHD audio)</li> <li>— DTS (DTS audio)</li> <li>— DTS-HD (DTS-HD audio)</li> <li>— SPEAKER CONFIGURATION (Speaker configuration)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>— <b>LAN SETTINGS</b> P.127 (LAN) <ul style="list-style-type: none"> <li>— IP ADDRESS (IP address)</li> <li>— SUBNET MASK (Subnet mask)</li> <li>— GATEWAY (Gateway address)</li> <li>— MAC ADDRESS (MAC address)</li> <li>— PORT NUMBER (TCP port number)</li> <li>— COMMUNICATION MODE (LAN operation mode)</li> <li>— HDBT COMMUNICATION (HDBaseT LAN)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>— <b>CONTROL COMMAND</b> P.130 (Control command) <ul style="list-style-type: none"> <li>— COMMAND REGISTER/EDIT (Registering/Editing control command)</li> <li>— REPLY REGISTER/EDIT (Registering/Editing reply command)</li> <li>— COMMAND LINK (Command link)</li> <li>— EXECUTE CTRL COMMAND (Command execution)</li> <li>— INITIALIZATION (Initializing registered command and link)</li> <li>— INVALID DURATION (Invalid duration at control command execution)</li> <li>— ILLUMINATE CMD BUTTON (COMMAND button illuminating condition)</li> <li>— BLINKING DURATION (Blinking at command button)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>— <b>RS-232C SETTINGS</b> P.126 (RS-232C) <ul style="list-style-type: none"> <li>— PARAMETERS (RS-232C communication)</li> <li>— COMMUNICATION MODE (RS-232C operation mode)</li> </ul> </li> </ul>			<ul style="list-style-type: none"> <li>— <b>REMOTE</b> P.144 (REMOTE connector) <ul style="list-style-type: none"> <li>— STANDBY CONTROL (Power control mode)</li> <li>— EMERGENCY SHUTDOWN (Emergency stop)</li> </ul> </li> </ul>

- USER PRESET P.145

- | (Preset memory)
- RECALL CROSSPOINT  
| (Recalling crosspoint)
- STORE CROSSPOINT  
| (Saving crosspoint)
- EDIT CROSSPOINT  
| (Editing crosspoint)
- RECALL ALL SETTINGS  
| (Recalling all settings)
- STORE ALL SETTINGS  
| (Saving all settings)
- START-UP  
| (Start-up setting)

- BITMAP P.149

- | (Bitmap)
- BITMAP OUTPUT  
| (Bitmap image)
- BACKGROUND COLOR  
| (Background color)
- ASPECT RATIO  
| (Aspect ratio)
- IMAGE POSITION  
| (Image position)
- INPUT ASSIGN  
| (Assigning input channel)
- START-UP BITMAP  
| (Start-up bitmap output)
- DIVIDE MEMORY  
| (Dividing memory area)
- CAPTURE VIDEO  
| (Input image capture)

- POWER ON SETTINGS P.156

- | (Startup)
- START-UP MODE  
| (Power state)
- DISPLAY POWER CMD. EXE.  
| (Command execution for DISPLAY  
POWER button)
- UNLOCK BUTTON MODE  
| (UNLOCK button)
- BUTTON LOCK  
| (Front panel security lockout)

- SYSTEM SETTINGS P.158

- | (Configuring MSD)
- BUTTON LOCK TARGET  
| (Grouping front panel security lockout)
- BEEP SOUND  
| (Beep)
- ALARM  
| (Alarm)
- ADVANCED MENU  
| (Displaying advanced menu)
- COMMAND BUTTON LOCK  
| (Automatic lockout of COMMAND button)
- POWER SAVE MODE  
| (Power saving)
- DISPLAY PWR PRESS TIME  
| (DISPLAY POWER button press dwelling  
time)
- TOP PAGE  
| (Top page)

- VIEW STATUS P.162

- | (Status)
- SINK DEVICE STATUS  
| (Sink device status)
- SINK DEVICE EDID  
| (Viewing sink device EDID)
- INPUT STATUS  
| (Input signal status)
- SYSTEM STATUS  
| (System status)
- FAN STATUS  
| (Fan status)
- VERSION  
| (Device information)



The following attributes are saved for each input signal.

**[Table 9.1] Attributes saved for each input signal**

9.6 Input position, size, and cropping	9.6.1 Aspect ratio 9.6.2 Aspect ratio control 9.6.3 Overscan 9.6.4 Image position 9.6.5 Image size 9.6.6 Cropping
9.7 Input	9.7.8 Analog input signal parameters
9.8 Input timing	9.8.2 The total number of horizontal pixels 9.8.3 Horizontal start position 9.8.4 Horizontal active area 9.8.5 Vertical start position 9.8.6 Vertical active area 9.8.7 Automatic measurement of start position 9.8.12 Tracking
9.10 Picture controls	9.10.5 Input sharpness 9.10.6 Input brightness 9.10.7 Input contrast 9.10.8 Input hue 9.10.9 Input saturation 9.10.10 Input black level
9.12 Input audio*	9.12.2 Audio input level offset 9.12.7 Input Lip Sync

\* Audio settings are saved for each input signal only if digital audio input is selected.

### 9.3 Channel switching mode

Video and audio signals can be switched simultaneously or separately.

Menu Top→SWITCHING MODE  
 Setting value V&A : Video & Audio [Default]  
 VIDEO : Video  
 AUDIO : Audio

【See: 8.3.3 Selecting video and audio separately】

## 9.4 Output position, size, and masking

Position, size, and masking attributes can be set for both the input ports and output ports of the MSD. Normally, it is preferable to set them for the input ports. If edges are cut off due to an enlarged display area by the sink device or if it is desired to modify the displayed area for all inputs at once, set the desired attributes for the output ports.

【See: 9.6 Input position, size, and cropping】

Video signals are output in the following order:

Background color → Main window → Subwindow

Some settings are saved for each combination pattern.

【See: [Table 8.3] Settable menus for video combination】

### 9.4.1 Output resolution

Menu	Top → OUTPUT IMAGE → RESOLUTION		
Setting value			
• 1080p 60Hz	• 480p 59.94Hz	• WXGA	(1360x768)
• 1080p 59.94Hz	• QWXGA (2048x1152)	• SXGA	(1280x1024)
• 1080p 50Hz	• WUXGA (1920x1200)	• QuadVGA	(1280x960)
• 1080i 60Hz	• VESAHD (1920x1080)	• WXGA	(1280x800)
• 1080i 59.94Hz	• WSXGA+ (1680x1050)	• WXGA	(1280x768)
• 1080i 50Hz	• UXGA (1600x1200)	• XGA	(1024x768)
• 720p 60Hz	• WXGA++ (1600x900)	• VGA	(640x 480)
• 720p 59.94Hz	• WXGA+ (1440x900)	• AUTO-C*	
• 720p 50Hz	• SXGA+ (1400x1050)	• AUTO-B*	
• 576p 50Hz	• WXGA (1366x768)	• AUTO-A*	[Default]

The optimal resolution will be selected automatically if you set this menu to “AUTO”.

480p/576p/720p/1080i/1080p are timing formats relating to the CEA-861 standard.

Other timing formats, such as XGA, WXGA, QWXGA, are compliant with VESA DMT or VESA CVT standard.

WUXGA and QWXGA are output formats that incorporate Reduced Blanking.

\* Video is output at the optimal resolution from EDID of sink device that is connected to the following connectors:

“AUTO-A”: OUT A (HDMI output connector)

“AUTO-B”: OUT B (HDMI output connector)

“AUTO-C”: OUT C (HDBaseT output connector)

The actual output resolution is displayed in parentheses. In case EDID cannot be obtained from the sink device, the resolution format that was last used is selected. This condition is indicated by an asterisk “\*” to the right side of the format data.



Outputting at optimal resolution



EDID cannot be loaded or optimal resolution cannot be output

## 9.4.2 Aspect ratio for sink device

Menu Top→OUTPUT IMAGE→ASPECT RATIO

Setting for MAIN, PinP

Setting value

- RESOLUTION\* [Default]      • 16:10                      • 16:9
- 5:3                                      • 5:4                              • 4:3

\* If you select “RESOLUTION”, the aspect ratio of the output resolution will be applied. If aspect ratios of the target sink device and the output resolution are different from each other, you can select one of the following aspect ratios for the sink device: “4:3”, “5:4”, “5:3”, “16:9”, and “16:10”.

## 9.4.3 Image position

Menu Top→OUTPUT IMAGE→IMAGE POSITION

Setting for MAIN, PinP for each PinP pattern

Setting value

Horizontal position : - Horizontal output size to + Horizontal output resolution [by 1 pixel]

Vertical position : - Vertical output size to + Vertical output resolution [by 1 line]

[Table 9.2] Default image position (at 1080p)

Pattern	Main (Horizontal/Vertical)	PinP (Horizontal/Vertical)
—	0/0	— (N/A)
P1	0/0	80/45
P2	0/0	1360/45
P3	0/0	80/765
P4	0/0	1360/765
P5	0/270	960/270

The image position is based on the upper left quadrant of the output video.

Image size should be kept bigger than image position. The image position is set within the range automatically if the set image position is bigger than the set image size.

PinP settings can be set for each pattern memory.

If PinP is set with PinP disabled, a message, “NOT AVAILABLE NOW”, appears.

## 9.4.4 Image size

Menu Top→OUTPUT IMAGE→IMAGE SIZE

Setting for MAIN, PinP for each PinP pattern

Setting value

Horizontal size : Horizontal output resolution ÷ 4 to Horizontal output resolution × 4 [by 1 pixel]

Vertical size : Vertical output resolution ÷ 4 to Vertical output resolution × 4 [by 1 line]

**[Table 9.3] Default image size (at 1080p)**

Pattern	Main (Horizontal/Vertical)	PinP (Horizontal/Vertical)
—	1920/1080	— (N/A)
P1	1920/1080	480/270
P2	1920/1080	480/270
P3	1920/1080	480/270
P4	1920/1080	480/270
P5	960/540	960/540

The video size is scaled based on the upper left quadrant of the output image position.

If you set "LINK" to "ON", only settings of "H" (Horizontal) can be set and "V" (Vertical) is set automatically while retaining the current aspect ratio.

【See: 9.4.3 Image position】

PinP settings can be set for each pattern memory.

If PinP is set with PinP disabled, a message, "NOT AVAILABLE NOW", appears.

**Note:**

Numbers following "/" show the output resolution.

## 9.4.5 Cropping

Menu Top→OUTPUT IMAGE→IMAGE CROP

Setting for MAIN, PinP for each PinP pattern

### Setting value

Left side cropping : Horizontal output position (0 or more) to Right side cropping [by 1 pixel]

Right side cropping : Left side cropping to Horizontal output position + Horizontal output size (Horizontal output resolution or less) [by 1 pixel]

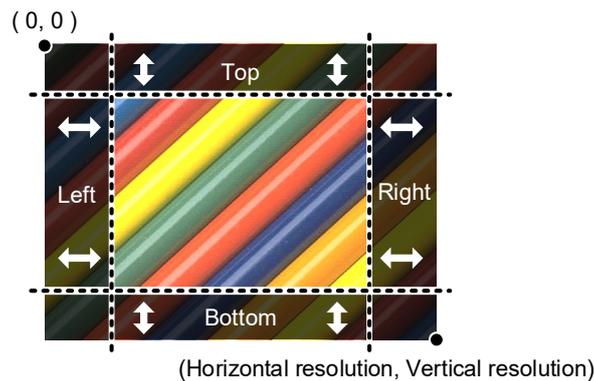
Top side cropping : Vertical output position (0 or more) to Bottom side cropping [by 1 line]

Bottom side cropping : Top side cropping to Vertical output position + Vertical output size (Vertical output resolution or less) [by 1 line]

**[Table 9.4] Default cropping value (at 1080p)**

Pattern	Main (Horizontal/Vertical)	PinP (Horizontal/Vertical)
—	0/1920/0/1080	— (N/A)
P1	0/1920/0/1080	80/560/45/315
P2	0/1920/0/1080	1360/1840/45/315
P3	0/1920/0/1080	80/560/765/1035
P4	0/1920/0/1080	1360/1840/765/1035
P5	0/960/270/810	960/1920/270/810

【See: 9.4.6 Background color】



**[Fig. 9.3] Output cropping**

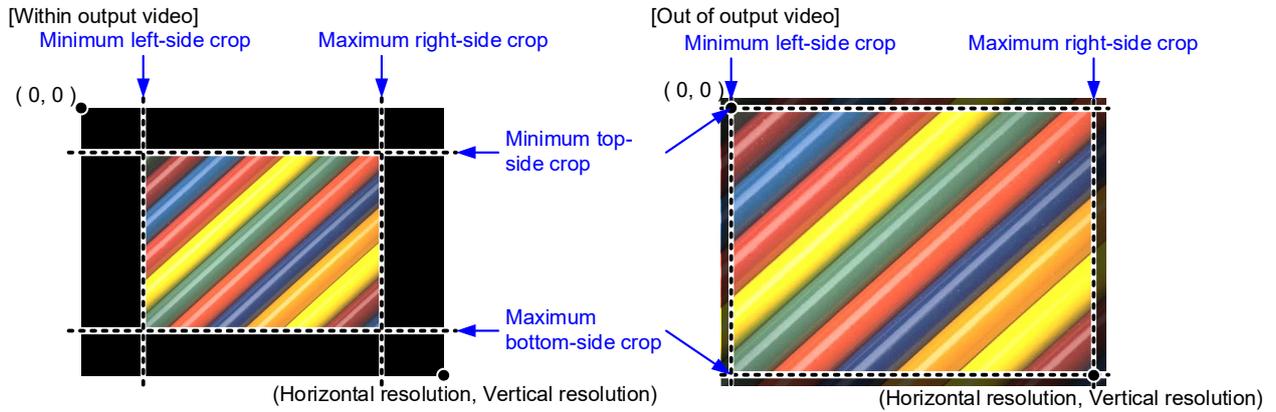
Settable cropping range depends on the following settings:

- 9.4.1 Output resolution
- 9.4.3 Image position
- 9.4.4 Image size

If output resolution, image position, or image size is changed, cropping setting is also changed automatically with the display range kept.

PinP settings can be set for each pattern memory.

If PinP is set with PinP disabled, a message, "NOT AVAILABLE NOW", appears.



[Fig. 9.4] Output cropping range

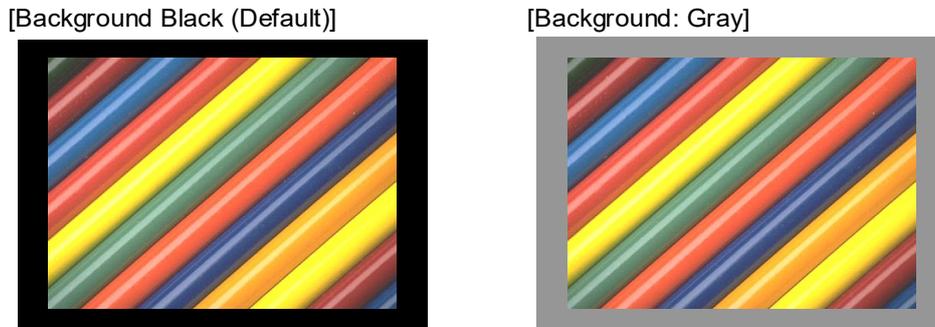
### 9.4.6 Background color

---

Menu	Top→OUTPUT IMAGE→BACKGROUND COLOR
Setting value	R/G/B: 0 to 255 [Default] R/G/B: 0 (Black)

You can set the background color of output video signal.

If you set "LINK" to "ON", only the setting for "R" can be adjusted, and in this mode, "G" and "B" will automatically track the setting of "R".

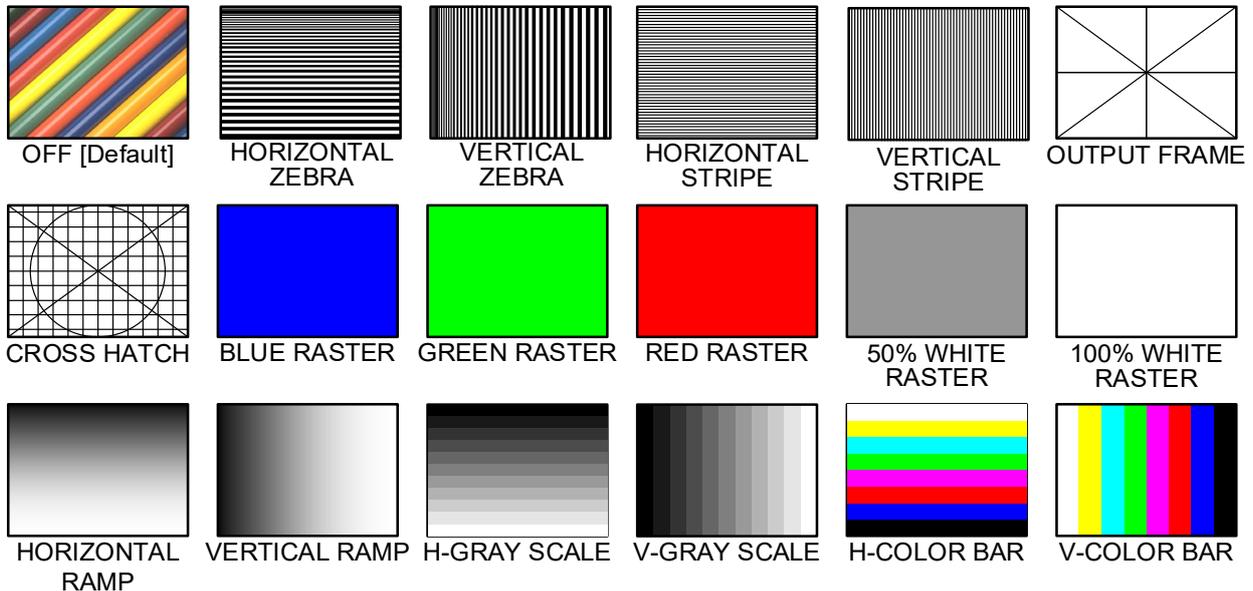


[Fig. 9.5] Background color

## 9.4.7 Test pattern

Menu Top→OUTPUT IMAGE→TEST PATTERN

Setting value



**[Fig. 9.6] Test pattern**

You can activate the MSD's internal test pattern generator and direct its signal to each output connector. All settings pertaining to picture controls will be invalid while a test pattern is displayed.

For test patterns other than "OUTPUT FRAME": Video is output on full screen with the resolution format as set in Output resolution and the settings of Image position, Image size, and Cropping will be invalid.

"OUTPUT FRAME": Select this pattern if part of image is not displayed on the sink device.

Setting parameters for Image position and Image size on the output side will be adjusted in order to present the test pattern appropriately on the display device.

Use "arrow" buttons (◀, ▶, ▲, ▼) to scroll through the available patterns "COLOR BAR", "GRAY SCALE", "RAMP", and "ZEBRA". Some test patterns can be configured to scroll across the screen either vertically or horizontally. Scrolling speed can be set in increments of 3 PIXEL/FRAME. Speed can be set up to 30 PIXEL/FRAME with "▲" and "▼" buttons. You can check the residual image (resolution of moving image) by displaying and scrolling the "ZEBRA" pattern.

【See: 9.10 Picture controls】

【See: 9.4 Output position, size, and masking】

【See: 9.4.1 Output resolution】

【See: 9.4.3 Image position】

【See: 9.4.4 Image size】

【See: 9.4.5 Cropping】

## 9.4.8 Image Initialization

---

Menu	Top→OUTPUT IMAGE→IMAGE INITIALIZATION
Setting for	ALL, MAIN, PinP [PinP OFF, PinP PATTERN1 to PinP PATTERN5] (To be initialized for each PinP pattern)
Setting value	NO [Default], YES

The following settings are initialized:

- 9.4.3 Image position
- 9.4.4 Image size
- 9.4.5 Cropping

If "ALL" is selected, output position, size and masking settings of the selected MAIN and PinP will be initialized.

Press the "MENU/ENTER" button to apply the setting, and you will hear a long beep sound.

If "PinP" is selected with PinP disabled, "NOT AVAILABLE NOW" will appear on the front display.

## 9.5 Output

Settings for video output and output connectors

### 9.5.1 Output signal

Menu Top→OUTPUT SETTINGS→OUTPUT SIGNAL  
 Setting for ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C  
 Setting value

**[Table 9.5] Output signal**

Setting value	Description
SOURCE [Default]	Input video signal
BLACK	Black video signal
OFF	Stops outputting synchronous signal and video signal

You can set video signals that are output from output connectors.

### 9.5.2 Output video with no input video

Menu Top→OUTPUT SETTINGS→NO SIGNAL IMAGE  
 Setting for MAIN, PinP  
 Setting value

**[Table 9.6] Video to be output when no signal is input**

Setting value	MAIN	PinP	Remarks
BLUE [Default]	✓	✓	
BLACK	✓	✓	
OFF	✓	N/A	Synchronous signal is not output
BACKGROUND COLOR	✓	N/A	Color set in “ <b>9.4.6 Background color</b> ” is output

You can set video to be output when no video signal is being presented to the selected input.

**[See: 9.4.6 Background color]**

### 9.5.3 HDCP output

---

Menu	Top→OUTPUT SETTINGS→HDCP OUTPUT MODE
Setting for	ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C
Setting value	

[Table 9.7] HDCP output mode

Setting value	Description
ALWAYS [Default]	Always outputs HDCP.
HDCP INPUT ONLY	Encrypts HDCP only if the input signal has HDCP. However, if an input is changed from one channel to another and HDCP authentication status is changed, the MSD starts HDCP authentication again. This action may temporarily delay the output of video and audio.
DISABLE	Does not encrypt HDCP. Only non-HDCP-compliant input signal can be output.

You can set the HDCP output for when an HDCP-compliant sink device is connected. Normally set this function to “ALWAYS”.

### 9.5.4 HDCP retries

---

Menu	Top→OUTPUT SETTINGS→HDCP RETRY
Setting for	ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C
Setting value	ETERNITY : Retries until succeed [Default] 0 to 100 : 0 to 100 times

You can set the number of HDCP retries.

If an HDCP-compliant sink device is connected and you set “**9.5.3 HDCP output**” to “ALWAYS” or “HDCP INPUT ONLY”, 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.)

Press the “MENU/ENTER” button to apply the setting.

## 9.5.5 Connection Reset

---

Menu	Top→OUTPUT SETTINGS→CONNECTION RESET
Setting for	HDMI OUT A, HDMI OUT B, HDBT OUTC
Setting value	NO [Default], YES

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 plug and unplug the cables. It creates the same condition as if the cable were physically disconnected and reconnected.

Press the “MENU/ENTER” button to perform this feature.

## 9.5.6 Output equalizer

---

Menu	Top→OUTPUT SETTINGS→SIGNAL EQUALIZATION
Setting for	ALL, HDMI OUT A, HDMI OUT B
Setting value	

[Table 9.8] Output equalizer setting

Setting value	Equalization	Cable length*	
		Shorter than 33 ft. (10 m)	33 ft. (10 m) or longer
OFF [Default]	No equalization	✓	N/A
LOW	Low	✓	✓
MIDDLE	Middle	✓	✓
HIGH	High	N/A	✓

\* IDK's cable (24 AWG) was used

Each HDMI output connector includes an equalizer that compensates for signal attenuation when long HDMI cables are connected.

**Note:**

If a cable equalizer, active cable, or the like is connected, the MSD may not equalize output correctly. In such a case, set this menu to “OFF”.

## 9.5.7 Output format

---

Menu	Top→OUTPUT SETTINGS→SIGNAL FORMAT	
Setting for	ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C	
Setting value	<ul style="list-style-type: none"> <li>• HDMI YCbCr 4:4:4 MODE [Default]</li> <li>• HDMI YCbCr 4:2:2 MODE</li> <li>• HDMI RGB MODE</li> <li>• DVI MODE</li> </ul>	

You can select an output signal mode and color space of the output video.

The MSD selects the optimal output mode for the connected sink device according to the following priority table:

Higher priority	HDMI YCbCr 4:4:4 MODE
↑	HDMI YCbCr 4:2:2 MODE
↓	HDMI RGB MODE
Lower priority	DVI MODE

**Note:**

If “DVI MODE” is selected, digital audio is not output.

## 9.5.8 HDBaseT output long reach mode

---

Menu	Top→OUTPUT SETTINGS→HDBT LONG REACH MODE	
Setting value	OFF : Long reach mode OFF Up to 328 ft. (100 m) [Default] ON : Long reach mode ON Up to 492 ft. (150 m)	

You can enable/disable long reach mode for HDBaseT output.

With long reach mode, up to 1080p (24 bit)/dot clock 148 MHz is supported when using with IDK's HDBaseT product.

Select a supported output format.

【9.4.1 Output resolution】  
【See: 9.5.9 Deep Color output】

## 9.5.9 Deep Color output

---

Menu	Top→OUTPUT SETTINGS→DEEP COLOR
Setting for	ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C
Setting value	24-BIT COLOR [Default], 30-BIT COLOR

You can select the color depth of HDMI signal.

“30-BIT COLOR”: signals are output with “30-BIT COLOR” only if a sink device supporting Deep Color is connected.

Since the transmission clock of “30-BIT COLOR” is faster than that of “24-BIT COLOR”, noise may occur if a poor-quality cable or long cable is connected. In those cases, the noise may be removed by selecting “24-BIT COLOR”.

## 9.5.10 Window transition effect

---

Menu	Top→OUTPUT SETTINGS→VIDEO SWITCHING EFFECT
Setting for	MAIN, PinP
Setting value	

**[Table 9.9] Transition effect**

Setting value	MAIN	PinP
FREEZE→FADE OUT-IN [Default]	✓	✓
FADE OUT-IN	✓	✓
CUT	✓	✓
BOTTOM→TOP WIPE	✓	N/A
TOP→BOTTOM WIPE	✓	N/A
RIGHT→LEFT WIPE	✓	N/A
LEFT→RIGHT WIPE	✓	N/A

You can select a window transition effect for when the video inputs are switched.

If Automatic detection of video input interruption is set to “ON” and input signal is disconnected, this setting will be applied.

【See: 9.7.9 Automatic detection of video input interruption】

## 9.5.11 Window transition speed

---

Menu	Top→OUTPUT SETTINGS→SWITCHING EFFECT SPEED
Setting for	ALL, MAIN, PinP
Setting value	100ms to 2000ms (by 10ms) [Default] 350ms

You can set the window transition speed for “FADE OUT/IN” or “WIPE OUT/IN” when input channels are switched.

The setting will also be applied when Automatic detection of video input interruption is set to “ON”.

【See: 9.7.9 Automatic detection of video input interruption】

## 9.5.12 Wipe color

Menu Top→OUTPUT SETTINGS→WIPE EFFECT COLOR  
 Setting value R/G/B: 0 to 255 [Default] R/G/B: 0 (Black)

You can set the background color for when video input channel is switched.

This menu can be set if “**9.5.10 Window transition effect**” is set to “WIPE”.

If you set “LINK” to “ON”, only Red (R) setting values can be changed, and setting values for Green (G) and Blue (B) will automatically be changed according to the settings of the Red (R).

【See: 9.5.10 Window transition effect】

## 9.5.13 Sink device EDID check

Menu Top→OUTPUT SETTINGS→EDID ERR. OUTPUT MODE  
 Setting for ALL, HDMI OUT A, HDMI OUT B, HDBT OUT C  
 Setting value

【Table 9.10】 Sink device EDID check

Setting value	Description
CHECKSUM DISABLE [Default]	Ignores EDID checksum error. In case of EDID load error, the sink device is treated as a DVI device.
ENABLE	In case of EDID load error or checksum error, the sink device is treated as a DVI device.
ALL DISABLE	Ignores sink EDID and follows the MSD's setting.

The MSD gets EDID from the sink device and determines if the sink device is an HDMI device or DVI device. However, if the MSD cannot get EDID for some reasons, problems such as no audio output and the like may occur. Select “CHECKSUM DISABLE” or “ALL DISABLE” to output video and audio signals.

**Note:**

This setting is applied when HDMI signal is input and “**9.5.7 Output format**” is set to a format other than DVI.

【See: 9.5.7 Output format】

## 9.5.14 CEC connection

Menu Top→OUTPUT SETTINGS→CEC CONNECTION

Setting for HDMI OUT A, HDMI OUT B, HDBT OUT C

Setting value

**[Table 9.11] CEC connection**

Setting value	Input to be connected
NOT CONNECTED [Default]	Not connected CEC is not used.
IN1 to IN4, HDMI IN5, HDBT IN5	Specified input channel
SELECTED CHANNEL	Selected input channel

You can set the CEC connection for when a CEC-supported device is connected to HDMI input connector. Press the “MENU/ENTER” button to apply setting.

### Notes:

- If you do not use CEC, select “NOT CONNECTED”.  
With CEC connection, if a sink device that is connected to an output connector is changed (for example, powering on/off) or CEC connection is changed, the MSD changes the address of the connected device. In that case, EDID may be changed automatically. In this case, the source device stops outputting video temporarily.
- CEC connections take place on a one-to-one basis. If you set multiple outputs to connect to the same input, a channel is selected automatically in alphabetical or numerical order and the other outputs will not be connected.

## 9.6 Input position, size, and cropping

Image position, size, and cropping are set from input side and output side. The input-side settings are based on the output resolution.

【See: 9.4 Output position, size, and masking】

### 9.6.1 Aspect ratio

Menu Top→INPUT IMAGE→ASPECT RATIO

Setting for IN1 to IN7 for each input signal

Setting value

**[Table 9.12] Restoring aspect ratio (For input signal)**

Setting value	TV signal	PC signal
THROUGH	Displays input pixels	
FULL	Provides a full screen output	
14:9 SIDE PANEL	14:9 SIDE PANEL	Follows input signal aspect ratio
4:3 SIDE PANEL	4:3 SIDE PANEL	
14:9 LETTER BOX	14:9 LETTER BOX	
16:9 LETTER BOX	16:9 LETTER BOX	
14:9	14:9	
16:9	16:9	
4:3	4:3	
AUTO-2	Follows sink device aspect ratio and its setting automatically.	
AUTO-1 [Default]	When letter box signal is input, video is output at the following aspect: “AUTO-1” : 16:9 or 14:9 “AUTO-2” : 4:3 Fixes mismatch in aspect ratio between a source and sink device automatically.	

You can set the aspect ratio for each video input.

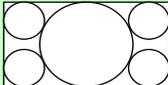
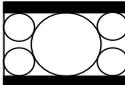
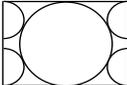
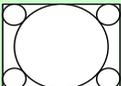
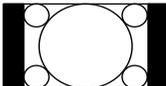
Normally, no problem occurs if you set the aspect ratio to “AUTO-1”, but some DVD players and other devices display subtitles or setup menus outside of the normal display area. In such cases, set this menu to “AUTO-2” to display the entire area of the video signals.

【See: 9.4.2 Aspect ratio for sink device】

【See: 9.6.2 Aspect ratio control】

## 9.6.2 Aspect ratio control

Menu	Top→INPUT IMAGE→ASPECT RATIO CONTROL
Setting for	IN1 to IN7 for each input signal
Setting value	L-BOX/S-PANEL : Letter box/side panel [Default] Centers the input video and outputs the set background color on blank space. S-CUT/TB-CUT : Side cut/top bottom cut Crops part of input video and does not output background color. 【See: 9.4.6 Background color】

Input signal	Output signal	
	L-BOX/S-PANEL [Default]	S-CUT/TB-CUT
16:9 content on a 4:3 sink device 	Letter box 	Side cut 
4:3 content on a 16:9 sink device 	Side panel 	Top/bottom cut 

[Fig. 9.7] Restoring aspect ratio

## 9.6.3 Overscan

Menu	Top→INPUT IMAGE→OVERSCAN
Setting for	IN1 to IN7 for each input signal
Setting value	100% to 115% [Default] NTSC/PAL/SDTV: 105%, HDTV/PC: 100%

You can create an enlarged display of the input video.

## 9.6.4 Image position

---

Menu  Top→INPUT IMAGE→IMAGE POSITION

Setting for  IN1 to IN7 for each input signal

Setting value

Horizontal position : -Horizontal input size to + Horizontal output resolution [by 1 pixel] [Default] 0

Vertical position : -Vertical input size to + Vertical output resolution [by 1 line] [Default] 0

You can change the position of the displayed video image.

The image position is based on the upper left quadrant of the output video.

Image size should be bigger than image position. If the image position exceeds the limitation, the image position will be set automatically to a value within the parametric limitation.

## 9.6.5 Image size

---

Menu  Top→INPUT IMAGE→IMAGE SIZE

Setting for  IN1 to IN7 for each input signal

Setting value

Horizontal size : Horizontal output resolution ÷ 4 to Horizontal output resolution × 4 [by 1 pixel]  
[Default] Horizontal output resolution

Vertical size : Vertical output resolution ÷ 4 to Vertical output resolution × 4 [by 1 line]  
[Default] Vertical output resolution

You can use these settings to control the size of displayed video image.

The video size is scaled based on the upper left quadrant of the input image position.

If you set "LINK" to "ON", only settings of "H"(Horizontal) can be set and "V" (Vertical) is set automatically while retaining the current aspect ratio.

**【See: 9.6.4 Image position】**

**Note:**

Numbers following "/" show the output resolution.

## 9.6.6 Cropping

Menu Top→INPUT IMAGE→IMAGE CROP

Setting for IN1 to IN7 for each input signal

Setting value

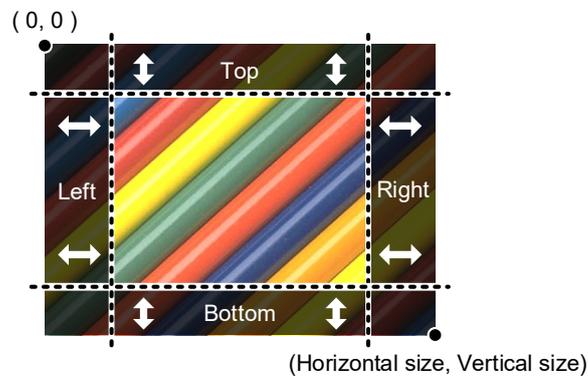
Left side cropping : Horizontal input position to Right side cropping [by 1 pixel]  
[Default] 0

Right side cropping : Left side cropping to Horizontal input position + Horizontal input size [by 1 pixel]  
[Default] Horizontal input size

Top side cropping : Vertical input position to Bottom side cropping [by 1 line]  
[Default] 0

Bottom side cropping : Top side cropping to Vertical input position + Vertical input size [by 1 line]  
[Default] Vertical input size

You can set the input cropping.



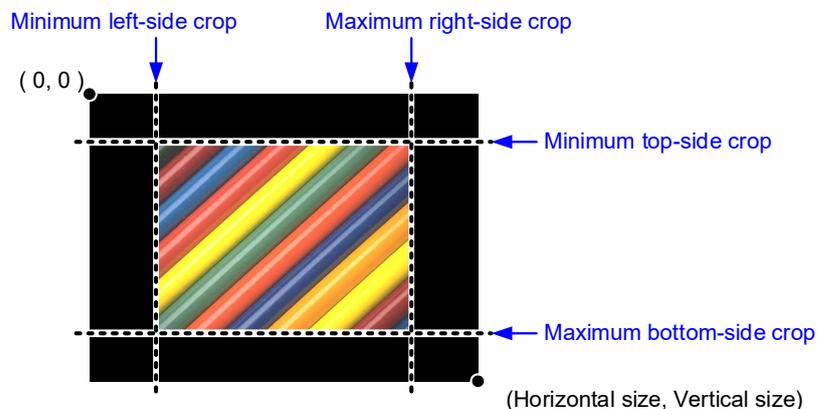
[Fig. 9.8] Input cropping

The settable values vary depending on the set image position and image size.

If image position or image size is changed, cropping setting is also changed automatically with the display range kept.

【See: 9.6.4 Image position】

【See: 9.6.5 Image size】



[Fig. 9.9] Setting input cropping

## 9.6.7 Image initialization

---

Menu	Top→INPUT IMAGE→IMAGE INITIALIZATION
Setting for	ALL, IN1 to IN7 for each input signal
Setting value	NO [Default], YES

The following settings are initialized:

- 9.6.1 Aspect ratio
- 9.6.3 Overscan
- 9.6.4 Image position
- 9.6.5 Image size
- 9.6.6 Crop

Press the “MENU/ENTER” button to apply the setting, and you will hear a long beep sound.

## 9.7 Input

---

Settings for video input and input connectors

### 9.7.1 Input connector

---

Menu	Top→INPUT SETTINGS→INPUT CONNECTOR
Setting value	HDMI : HDMI input connector [Default] HDBaseT : HDBaseT input connector

You can select an input of IN5 from HDMI connector or HDBaseT connector.

### 9.7.2 DVI input connector signal

---

Menu	Top→INPUT SETTINGS→DVI-I: SIGNAL FORMAT
Setting for	ALL, IN6, IN7
Setting value	DIGITAL (HDMI and DVI signals are input) [Default], ANALOG

**[Table 9.13] Selecting signal of DVI input connector**

Connector	Setting value
ALL	DIGITAL [Default], ANALOG
IN6	DIGITAL [Default], ANALOG
IN7	DIGITAL [Default], ANALOG

You can select signal format for DVI input.

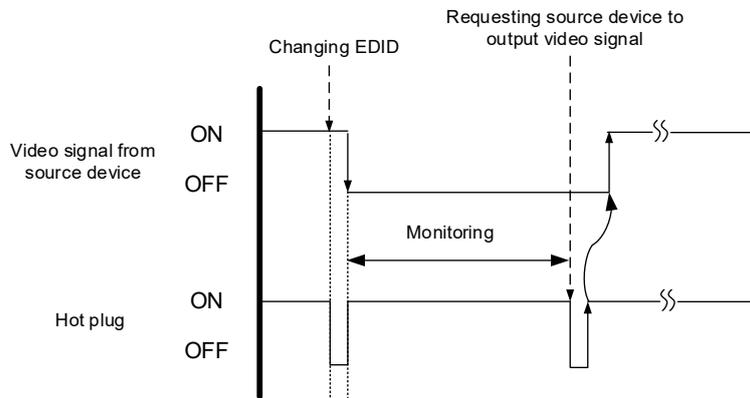
If selecting “ANALOG”, set the input signal format in “**9.7.8 Analog input signal parameters**”.

### 9.7.3 No-signal input monitoring

Menu	Top→INPUT SETTINGS→NO INPUT MONITORING
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)
Setting value	OFF, 2000ms to 15000ms (100ms steps) [Default] 10000ms

If you change the EDID settings of the MSD or power the MSD off/on, the source device may not output a video signal. Use this menu to set the monitoring time. This is the interval beginning when a source device is not outputting a signal; and ending at the point when the MSD requests an output from that source device.

If "ANALOG" is selected for "9.7.2 DVI input connector", "NOT AVAILABLE NOW" will appear on the front display.

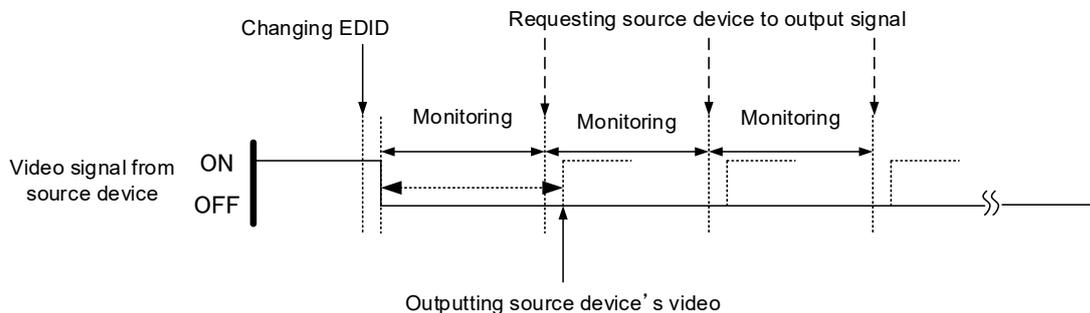


[Fig. 9.10] Monitoring absence of input

**Notes:**

If you are using the monitor power-saving or dual monitor features on your PC, set this feature to "OFF". This will avoid potentially unpredictable operation.

When using this feature, ensure that the "monitoring time" is set for a value greater than the amount of time needed for the source to provide an output signal.



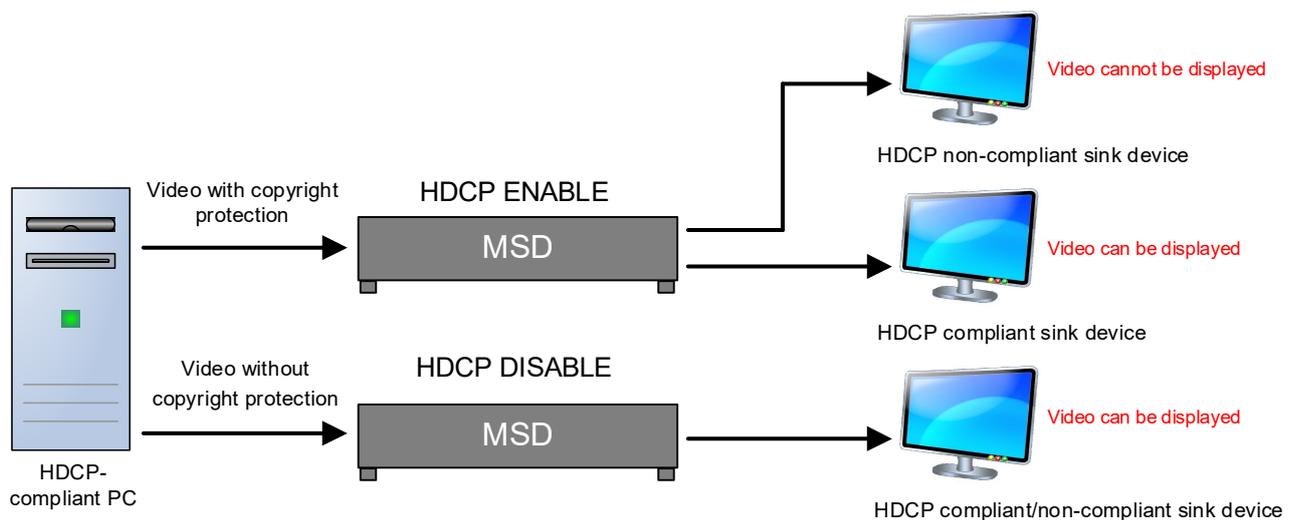
[Fig. 9.11] Repeating output reset

## 9.7.4 HDCP input

Menu	Top→INPUT SETTINGS→HDCP INPUT MODE
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)
Setting value	ENABLE : Enabling HDCP [Default] DISABLE : Disabling HDCP

Some source devices negotiate with the connected device to determine if HDCP encryption is supported. After this negotiation, the source device determines whether HDCP signal encryption is enforced or not. This process takes place with some source device, even if the content being presented is not copyright protected. The MSD is HDCP compliant, if it is connected to a display device that does not support HDCP, even unprotected AV content may not be successfully displayed. Under these circumstances and if the content is indeed not protected, the problem can be solved by setting this menu to “DISABLE.”

If “ANALOG” is selected for “9.7.2 DVI input connector”, “NOT AVAILABLE NOW” will appear on the front display.



[Fig. 9.12] HDCP-compliant and HDCP non-compliant sink device

## 9.7.5 Input equalizer

Menu	Top→INPUT SETTINGS→SIGNAL EQUALIZATION
Setting for	ALL, IN1 to IN5
Setting value	ON [Default], OFF

Each HDMI output connector includes an equalizer that compensates for signal attenuation when long HDMI cables are connected.

**Note:**

If a cable equalizer, active cable, or the like is connected, the MSD may not equalize output correctly. In such a case, set this menu to “OFF”.

## 9.7.6 HDBaseT input long reach mode

---

Menu	Top→INPUT SETTINGS→HDBT LONG REACH MODE
Setting for	HDBT IN5
Setting value	OFF : Long reach mode disabled. Up to 328 ft. (100 m) [Default] ON : Long reach mode enabled. Up to 492 ft. (150 m)

With long reach mode, up to 1080p (24 bit)/dot clock 148 MHz is supported when using with IDK's HDBaseT product. Set the HDC's EDID to 1080p or less or set the connected device's output to a supported signal format.

【See: 9.13.2 Input resolution】

【See: 9.13.6 Deep Color】

## 9.7.7 HDBaseT power supply

---

Menu	Top→INPUT SETTINGS→HDBT POWER SUPPLY
Setting for	HDBT IN5
Setting value	OFF [Default], ON

Set this menu to "ON" to supply power to PoH (IEEE 802.3af)-compliant HDBaseT transmitter. Press the "MENU/ENTER" button to apply the setting.

**Note:**

If a PoH (IEEE 802.3af)-compliant product is connected and powered on, the MSD may be damaged.

## 9.7.8 Analog input signal parameters

Menu	Top→INPUT SETTINGS→ANALOG INPUT FORMAT
Setting for	IN6 (Analog), IN7 (Analog) for each input signal
Setting value	

**[Table 9.14] Analog input signal parameters**

Setting value	Analog input signal parameters
AUTO [Default]	Automatic
Y/C	Y/C signal
VIDEO	Composite video signal
VIDEO AUTO	Detecting Composite video signal and Y/C signal automatically
YPbPr	Analog YPbPr signal
RGB	Analog RGB signal

You can set the type of analog video input signal.

If you select "AUTO", the type of input signals is detected automatically.

With "AUTO" mode, the automatic detection of Y/C may fail. If composite video or Y/C is input, select "VIDEO AUTO".

If "DIGITAL" is selected for "**9.7.2 DVI input connector**", "NOT AVAILABLE NOW" will appear on the front display.

**Note:**

For video from a monochrome camera or VHS tape with in poor condition or the like, automatic detection may fail. Under these circumstances, select "VIDEO AUTO", "VIDEO" or "Y/C".

## 9.7.9 Automatic detection of video input interruption

---

Menu	Top→INPUT SETTINGS→INTERRUPTION DETECTION
Setting for	ALL, IN1 to IN7
Setting value	ON [Default], OFF

The MSD stops outputting video immediately after input video signal is disconnected even for a moment. Use this feature to minimize switching artifacts produced by an external device connected to the MSD's input connector. The effect of this function is similar to switching the MSD's input.

- 9.5.10 Window transition effect
- 9.5.11 Window transition speed
- 9.5.12 Wipe color

### Notes:

- If you select "ON" and are using a video input (VHS tapes or the like) with a poor quality signal, it's possible that the output will flash on and off. This is due to sync signal distortion that can be interpreted as periods of time without signal presence. In this case, set this menu to "OFF".
- Even if you set this feature to "ON", distorted video cannot be corrected completely when input video signals are lost. Especially if you set "**9.5.10 Window transition effect**" to an option other than "CUT", noises or black bars may be output at the time of fading out or transitional wiping.

## 9.7.10 Fixing settings for each input signal

Menu Top→INPUT SETTINGS→SIGNAL SETTING MODE

Setting for IN1 to IN7

Setting value

**[Table 9.15] Input signal for output video**

Setting mode		Setting value	Description
SELECTED [Default]	ASPECT RATIO	OFF, ON(FIXED) [Default] OFF	Aspect ratio, analog input signal type and audio input level can be set individually.
	ANALOG FORMAT	OFF, ON(FIXED) [Default] ON(FIXED)	
	INPUT LEVEL OFFSET	OFF, ON(FIXED) [Default] ON(FIXED)	
ALL FIXED	—	—	Does not load all settings saved for each input signal but outputs the video with the current setting.

OFF : Settings saved for each input signal are used to format the video output.

ON(FIXED) : Current settings are used to format the video output.

The MSD continuously monitors the input signals. If a particular input signal that has been presented to the MSD before is input again, the MSD will output the signal at the same size and quality as during its previous use.

You can select the setting saved for each signal or the current setting.

**【See: 9.2 Input signal automatic detection】**

**[Table 9.16] Individual settings for each digital or analog signal**

Setting	Digital signal	Analog signal	Reference
ASPECT RATIO	Can be set	Can be set	9.6.1 Aspect ratio
ANALOG FORMAT	Cannot be set	Can be set	9.7.8 Analog input signal parameters
INPUT LEVEL OFFSET	Can be set	Cannot be set	9.12.2 Audio input level offset

## 9.8 Input timing

You can set the timing parameters for analog signal inputs.

The MSD recalls the optimal table from its built-in library of tables and adjusts the input timing automatically, you typically will not need to change settings in this menu. However, if signals which are not registered in the MSD tables are introduced to the input or if part of the video image is cut off while relying on the standard table registered in the MSD, you may optimize the input timing parameters manually.

For digital inputs, you typically do not need to manually set timing parameters, but if part of the video image is cut off, you may make fine adjustments as required.

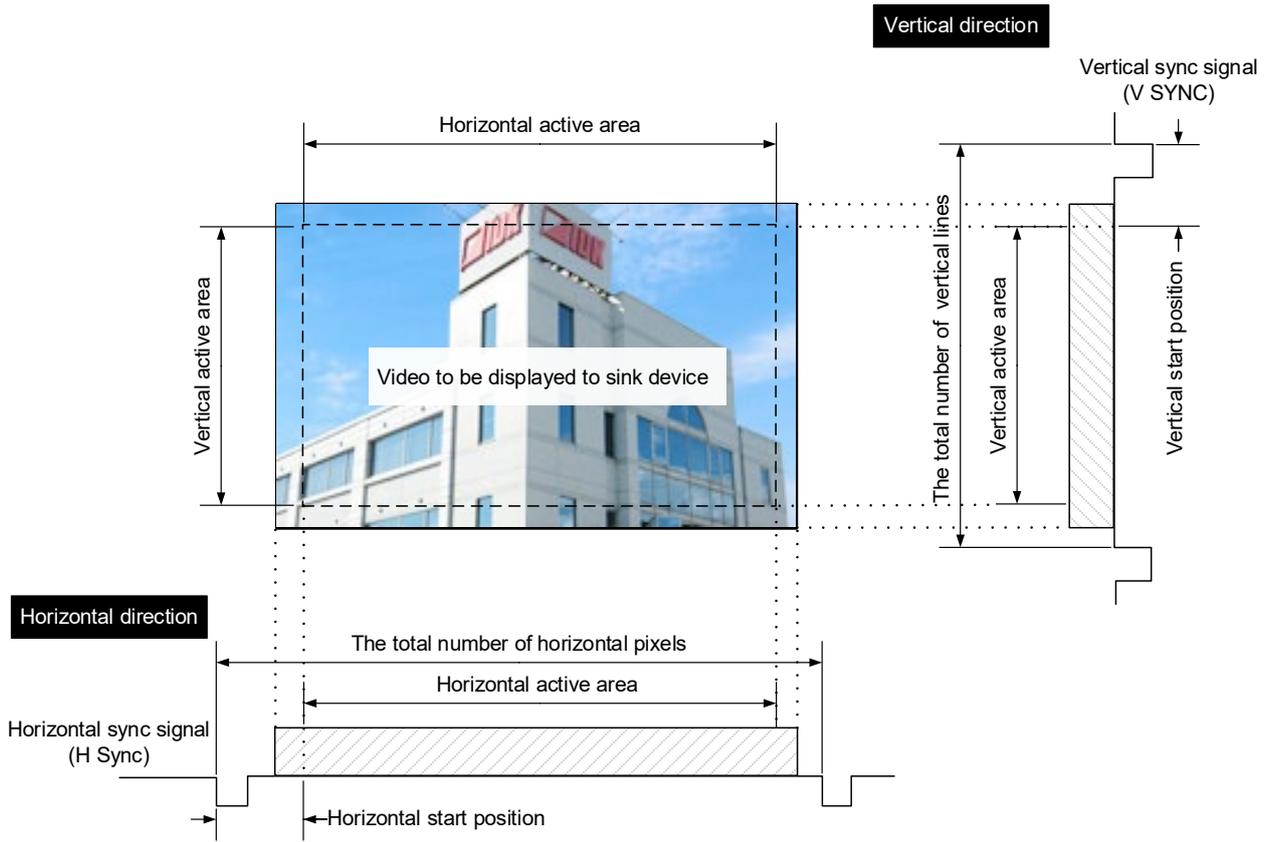
**[Table 9.17] Settable items**

Function	Analog input	Digital input
Automatic measurement	Partly 1	Cannot be set
The total number of horizontal pixels	Partly 1, Partly 2	Partly 2
Horizontal start position	Can be set	Can be set
Horizontal active area	Can be set	Can be set
Vertical start position	Can be set	Can be set
Vertical 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
Initializing digital input timing	Cannot be set	Can be set
Recalling analog input timing	Partly 3	Cannot be set
Saving analog input timing	Partly 1	Cannot be set
Tracking	Partly 1	Cannot be set

Partly 1 : Can be set only if analog RGB/analog YPbPr signals are input.

Partly 2 : Only displayed if analog video signals are input or for digital input.

Partly 3 : Can be set only if the device data of input signals are registered in the MSD.



[Fig. 9.13] Input area

## 9.8.1 Automatic measurement

Menu Top→INPUT TIMING→ANALOG MEASUREMENT

Setting for IN6 (Analog), IN7 (Analog) for each input signal

Setting value

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

Analog RGB/analog YPbPr input video is measured to set the following menu automatically.

- 9.8.2 The total number of horizontal pixels
- 9.8.3 Horizontal start position
- 9.8.4 Horizontal active area
- 9.8.5 Vertical start position
- 9.8.6 Vertical active area
- 9.8.12 Tracking

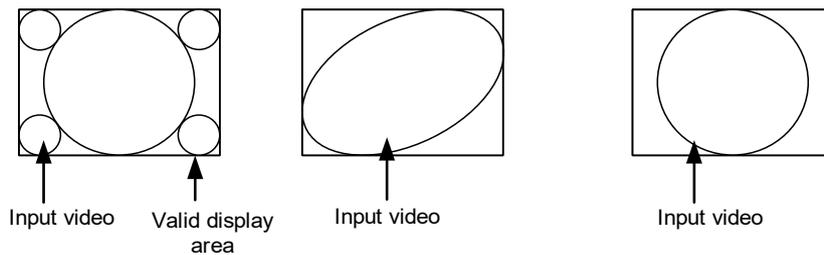
【See: 9.7.2 DVI input connector】

●Can be measured:

- Input video contacts the circumscribed rectangle.
- Brightness of input video is 25% or more.

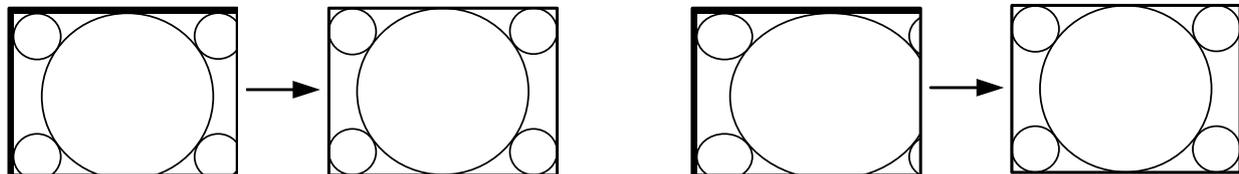
●Cannot be measured:

- Right and left sides of input video do not touch the circumscribed rectangle.
- Brightness of input video is 24% or less.



**[Fig. 9.14] Conditions of automatic measurement**

By selecting “NORMAL MODE”, the MSD performs automatic measurement of the 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 input video is not recognized correctly like above, it can adjust by executing “NORMAL MODE” automatic input measurement.

If the setting of active area is not correct and it cannot adjust only by start position, the active area is also adjusted by executing automatic input measurement.

**[Fig. 9.15] Automatic measurement by using “NORMAL MODE”**

If the total number of horizontal pixels is not correct, the aspect ratio is not matched even though automatic measurement is set to “NORMAL MODE”. In this case, select “NEXT ASPECT” (Auto measurement taking into account aspect ratio) for the measurement function. If you know the aspect ratio of the input signal, you can directly specify the aspect ratio to correctly perform automatic measurement.

If the input signals are not registered in the MSD, it is recommended to use this function.

If only start position is changed, “NORMAL END” is displayed. If active area is changed if “NORMAL MODE” is selected or if “NEXT ASPECT” or aspect ratio is specified directly, the set resolution is displayed.

[ANALOG MEASUREMENT] 1024x 768 60.00Hz
---

If there is no input signal on the selected input channel, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to perform automatic measurement.

**Note:**

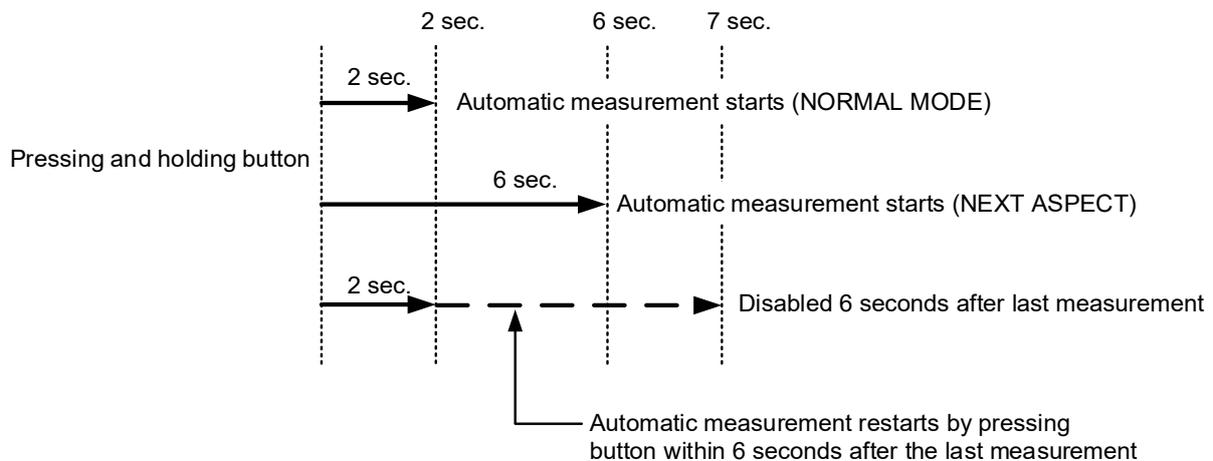
In case the aspect ratio does not match or the video is displayed in a position far from the correct position, set the following input timing:

- 9.8.2 The total number of horizontal pixels
- 9.8.3 Horizontal start position
- 9.8.4 Horizontal active area

■ **Operation from front buttons**

You can execute automatic measurement in “NORMAL MODE” by pressing for two seconds or longer. If you want to execute the automatic measurement in “NEXT ASPECT”, press the same button for four seconds or longer.

Once automatic measurement is executed, it will be executed just by pressing the desired Input selection button (you do not have to press and hold the button). Five seconds after the last automatic measurement, this mode will be disabled.



[Fig. 9.16] Automatic measurement using front button

## 9.8.2 The total number of horizontal pixels

Menu	Top→INPUT TIMING→H TOTAL PIXELS
Setting for	IN6 and IN7
Setting value	

[Table 9.18] The total number of horizontal pixels

Input signal (Analog RGB/Analog YPbPr)	Setting value
Interlaced signal	400DOT to 4125DOT [Default] varies depending on the input signal The sampling clock is within the range of 13 MHz to 81 MHz.
Non-interlaced signal	400DOT to 4125DOT [Default] varies depending on the input signal The sampling clock is within the range of 13 MHz to 162 MHz.

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

The settable values vary depending on the sampling block (Horizontal sync frequency × the total number of horizontal pixels) of input signal.

For other input signals, this menu cannot be set; only the total number of horizontal pixels is displayed on the front display.

If no signal is input or "DIGITAL" is selected for "9.7.2 DVI input connector", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.3 Horizontal start position

Menu	Top→INPUT TIMING→H START POSITION
Setting for	IN1 to IN7 for each input signal
Setting value	64PIXEL to 2900 PIXEL (The total number of horizontal pixels - Horizontal active area or less) [Default] Varies depending on the input signal.

You can set the horizontal start positions of input video.

If the set value exceeds the limitation mentioned below, the display start position will be set automatically to a value within the parametric limitation.

The total number of horizontal pixels > Horizontal active area > Horizontal start position

If no signal is input or "DIGITAL" is selected for "9.7.2 DVI input connector", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.4 Horizontal active area

---

Menu	Top→INPUT TIMING→H ACTIVE
Setting for	IN1 to IN7 for each input signal
Setting value	64 PIXEL to 2900 PIXEL (The total number of horizontal pixels - 64 or less) [Default] Varies depending on the input signal.

You can set the horizontal active area of input video.

For horizontal settings, the total number of horizontal pixels must be greater than the number representing the horizontal active area. Manually entered settings will be automatically limited to be within the MSD's accepted value range.

If no signal is input or "DIGITAL" is selected for "**9.7.2 DVI input connector**", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.5 Vertical start position

---

Menu	Top→INPUT TIMING→V START POSITION
Setting for	IN1 to IN7 for each input signal
Setting value	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 vertical start positions of input video.

If the set value exceeds the limitation mentioned below, the display start position will be set automatically to a value within the parametric limitation.

The total number of vertical lines > Vertical active area > Vertical start position

If no signal is input or "DIGITAL" is selected for "**9.7.2 DVI input connector**", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.6 Vertical active area

---

Menu	Top→INPUT TIMING→V ACTIVE
Setting for	IN1 to IN7 for each input signal
Setting value	10LINE to 2048LINE (The total number of vertical lines - 10 or less) [Default] Varies depending on the input signal.

You can set the vertical active area of input video.

If no signal is input or "DIGITAL" is selected for "**9.7.2 DVI input connector**", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.7 Automatic measurement of start position

Menu	Top→INPUT TIMING→START POSITION DETECT.
Setting for	IN6 (Analog), IN7 (Analog) for each 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]

PCs usually output video signals meeting the VESA standard, but some PCs output cut-off (a few dots from the VESA standard) signals. In such a case, if the video is output using the video format table in the MSD, the left edge may not be displayed or black line may be output.

If you set this menu to "ON", the MSD continually monitors analog input signals to identify the upper left portion of the image and then automatically adjusts formatting to place the image correctly on the display.

If "DIGITAL" is selected for "9.7.2 DVI input connector", "NOT AVAILABLE NOW" will appear on the front display.

### Notes:

- For motion images, some content may not be displayed full screen, and the image position may be moved each time the automatic setting measurement is applied. In such a case, set this menu to "OFF". As "OFF" and "ON" are saved for each input signal, it can be set according to the input signal. If you do not want this function for any resolution format, select "ALL OFF".
- Only the start position is set by the automatic measurement feature listed in this menu. If the total number of horizontal pixels and 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 automatic measurement. As the set value must not exceed the value set in start position, some video formats may be displayed with blackouts at the left side or top of the image.
- This menu can be set only if "[Fig. 9.14] Conditions of automatic measurement" is satisfactory.
- Even if you set this menu feature to "ON", manual settings will be applied and the automatic measurement is not executed if you set any of the following menus: the total number of horizontal pixels, start position, and active area. If you set tracking, the manual setting is applied, and tracking is not set automatically when the automatic measurement is executed. When you execute automatic measurement, setting values or this menu will be valid again.

【See: 9.8.1 Automatic measurement】

【See: 9.8.2 The total number of horizontal pixels】

【See: 9.8.3 Horizontal start position, 9.8.4 Horizontal active area】

【See: 9.8.5 Vertical start position, 9.8.6 Vertical active area】

【See: 9.8.12 Tracking】

## 9.8.8 Automatic setting of input timing

---

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

The MSD recalls the optimal table from the library of built-in tables and sets the input timing automatically. However, if unregistered analog signals are input, the input timing must be set. By setting this menu feature to "AUTO SETUP ON", automatic measurement is executed and the input timing is set automatically if analog signals that cannot be detected by the MSD are being introduced to a particular input for the first time.

If "DIGIATL" is selected for "9.7.2 DVI input connector" of IN6 and IN7, "NOT AVAILABLE NOW" will appear on the front display.

【See: 9.8.1 Automatic measurement】

### Note:

If automatic measurement results in aspect ratio inconsistencies, set the following menus:

- 9.8.2 The total number of horizontal pixels
- 9.8.3 Horizontal start position
- 9.8.4 Horizontal active area
- 9.8.5 Vertical start position
- 9.8.6 Vertical active area

## 9.8.9 Initializing digital input timing

---

Menu	Top→INPUT TIMING→INPUT TIMING INIT.
Setting for	IN1 to IN5, IN6 (Digital), IN7 (Digital) (To be initialized for each input signal)

Use this menu to restore default input timing.

Press the "MENU/ENTER" button to apply the setting.

If no signal is input or "ANALOG" is selected for "9.7.2 DVI input connector", "NOT AVAILABLE NOW" will appear on the front display.

## 9.8.10 Recalling analog input timing

---

Menu	Top→INPUT TIMING→RECALL ANALOG SETTINGS
Setting for	IN6 (Analog), IN7 (Analog) for each input signal

You can recall device information of registered analog RGB/analog YPbPr input video. Perform this menu when the synchronous signal frequency is the same and multiple device data having different input timings are registered or you want to set the input timing again.

Press the “MENU/ENTER” button to apply the setting.

If no signal is input or “DIGITAL” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

【See: 9.8.11 Saving analog input timing】

## 9.8.11 Saving analog input timing

---

Menu	Top→INPUT TIMING→STORE ANALOG SETTINGS
Setting for	IN6 (Analog), IN7 (Analog) for each input signal
Setting value	No. 1 to No.99

You can register up to 99 analog RGB/analog YPbPr input timing settings, and you can name each device data up to 14 characters using ASCII code 20 to 7D.

If you do not name the device table and press the “MENU/ENTER” button, the input resolution will be the device table name automatically. If the device table name is already registered and press “MENU/ENTER” button without specifying device table name, the input timing is saved to the device table name without changing the device table name.

From the next time, video will be displayed at the registered timing when the same signal is input to other channels.

Press the “MENU/ENTER” button to apply the setting.

If no signal is input or “DIGITAL” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

## 9.8.12 Tracking

---

Menu	Top→INPUT TIMING→ANALOG SIGNAL TRACKING
Setting for	IN6 (Analog), IN7 (Analog) for each input signal
Setting value	0 to 63 [Default] 0

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

If no signal is input or “DIGITAL” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

【See: 9.8.2 The total number of horizontal pixels】

## 9.9 Input channel automatic switching

When signal input status changes by such as removing or inserting cables, the MSD can switch the input channel automatically. The switching priority can be set for each input.

### 9.9.1 Signal ON priority

Menu	Top→AUTO SWITCHING→SIGNAL ON PRIORITY
Setting for	ALL, MAIN, PinP
Setting value	

**[Table 9.19] Automatic signal ON priority**

Windows	Setting value	
	Input connector (IN)	Priority
ALL	IN1 to IN7	OFF (Disabled) [Default], 1 (Highest) to 7 (Lowest)
MAIN		
PinP		

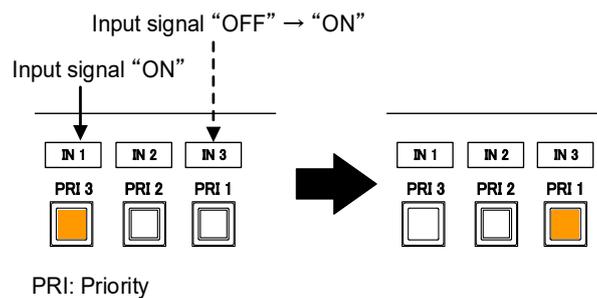
The MSD automatically selects the input channel when signal input status changes from “OFF” to “ON”. Press the “MENU/ENTER” button to apply the setting.

The MSD switches input signals automatically as follows:

- When input signal status of a channel changes from “OFF” to “ON” and that input channel has the same or a higher priority level than the currently-selected channel.

or

- When video is not input to the current input channel having higher priority than the input channel that changes from “OFF” to “ON”.



**[Fig. 9.17] Input channel automatic switching “OFF” to “ON”**

## 9.9.2 Signal OFF priority

Menu	Top→AUTO SWITCHING→SIGNAL OFF PRIORITY
Setting for	ALL, MAIN, PinP
Setting value	

[Table 9.20] Automatic signal OFF priority

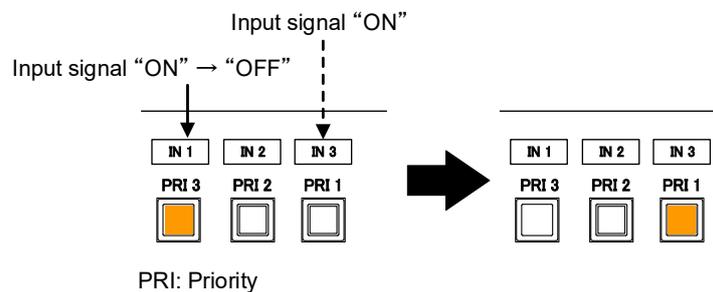
Windows	Setting value	
	Input connector (IN)	Priority
ALL	IN1 to IN7	OFF (Disabled) [Default], 1 (Highest) to 7 (Lowest)
MAIN		
PinP		

Selects alternate input channel when the input signal of currently-selected channel changes from “ON” to “OFF”.

Press the “MENU/ENTER” button to apply the setting.

The MSD switches input signal automatically as follows:

- Switches to the input channel having input signal and highest priority.
- or
- If some channels have the same priority, the MSD switches to the lower numbered input channel having an active input signal.



[Fig. 9.18] Input channel automatic switching “OFF” to “ON”

## 9.9.3 Ignoring duration after automatic switching

Menu	Top→AUTO SWITCHING→IGNORING DURATION
Setting for	ALL, MAIN, PinP
Setting value	0s000ms to 999s999ms [Default] 0s000ms

You can 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.

## 9.9.4 Channel switching mode of automatic switching

---

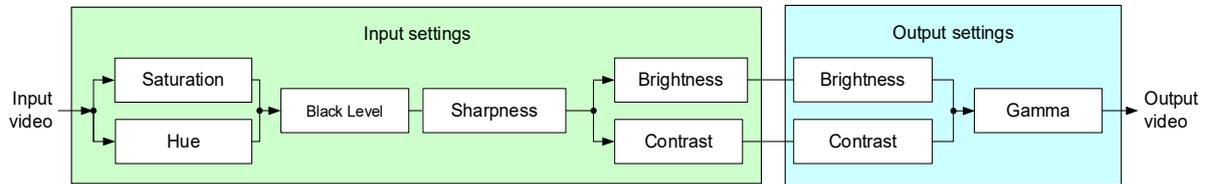
Menu	Top→AUTO SWITCHING→SWITCHING MODE
Setting value	V&A : Video & Audio [Default] VIDEO : Video AUDIO : Audio

You can set the channel switching mode when automatic switching is executed.  
This setting has priority regardless of channel switching mode that is set in  
**“9.3 Channel switching mode”**.

## 9.10 Picture controls

Setting items for input channels are for correcting color bias.

Image quality to be output can be set for each input channel and output channel as follows:



[Fig. 9.19] Picture controls

### 9.10.1 Output brightness

Menu	Top→PICTURE ADJUSTMENT→OUTPUT BRIGHTNESS
Setting for	ALL, MAIN, PinP
Setting value	80% to 120% [Default] 100%

You can set the brightness level for each output signal.

### 9.10.2 Output contrast

Menu	Top→PICTURE ADJUSTMENT→OUTPUT CONTRAST
Setting for	ALL, MAIN, PinP
Setting value	R/G/B: 0% to 200% [Default] R/G/B: 100%

You can set the contrast for the output video image.

If you set "LINK" to "ON", only the setting for "R" can be adjusted, and in this mode, "G" and "B" will automatically track the setting of "R".

### 9.10.3 Output gamma

Menu	Top→PICTURE ADJUSTMENT→OUTPUT GAMMA
Setting for	ALL, MAIN, PinP
Setting value	0.1 to 3.0 (by 0.1) [Default] 1.0

You can adjust the gamma curve independently or each output signal.

## 9.10.4 Output video correction initialization

---

Menu	Top→PICTURE ADJUSTMENT→OUTPUT SETTING INIT.
Setting for	ALL, MAIN, PinP
Setting value	NO [Default], YES: Initializes the following settings of output video: 9.10.1 Output brightness 9.10.2 Output contrast 9.10.3 Output gamma

Press the “MENU/ENTER” button to apply the setting, and you will hear a long beep sound.

## 9.10.5 Input sharpness

---

Menu	Top→PICTURE ADJUSTMENT→INPUT SHARPNESS
Setting for	IN1 to IN7 for each input signal
Setting value	-5 to 15 [Default] 0

You can set the desired level of sharpness for each input signal.

## 9.10.6 Input brightness

---

Menu	Top→PICTURE ADJUSTMENT→INPUT BRIGHTNESS
Setting for	IN1 to IN7 for each input signal
Setting value	80% to 120% [Default] 100%

You can set the brightness level for each input signal.

## 9.10.7 Input contrast

---

Menu	Top→PICTURE ADJUSTMENT→INPUT CONTRAST
Setting for	IN1 to IN7 for each input signal
Setting value	R/G/B: 0% to 200% [Default] R/G/B: 100%

You can set the contrast for the input video image.

If you set “LINK” to “ON”, only the setting for “R” can be adjusted, and in this mode, “G” and “B” will automatically track the setting of “R”.

### 9.10.8 Input hue

---

Menu	Top→PICTURE ADJUSTMENT→INPUT HUE
Setting for	IN1 to IN7 for each input signal
Setting value	0° to 359° [Default] 0°

You can set the color HUE for each input signal.

### 9.10.9 Input saturation

---

Menu	Top→PICTURE ADJUSTMENT→INPUT SATURATION
Setting for	IN1 to IN7 for each input signal
Setting value	0% (Monochrome) to 200% [Default] 100%

You can set the color saturation independently for each input signal.

### 9.10.10 Input black level

---

Menu	Top→PICTURE ADJUSTMENT→INPUT BLACK LEVEL
Setting for	IN1 to IN7 for each input signal
Setting value	-10.0% to 10.0% (by 0.5%) [Default] 0.0%

You can adjust the black level independently for each input signal.

### 9.10.11 Input video correction initialization

---

Menu	Top→PICTURE ADJUSTMENT→INPUT SETTING INIT.
Setting for	ALL, IN1 to IN7 (To be initialized for each input signal)
Setting value	NO [Default], YES: Initializes the following settings of output video: 9.10.5 Input sharpness 9.10.6 Input brightness 9.10.7 Input contrast 9.10.8 Input hue 9.10.9 Input saturation 9.10.10 Input black level

Press the “MENU/ENTER” button to apply the setting, and you will hear a long beep sound.

## 9.11 Output audio

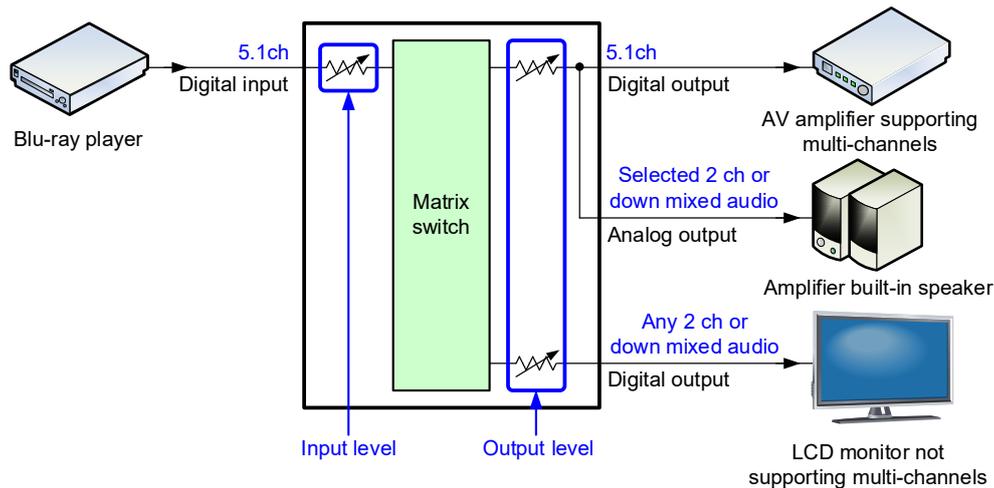
The following audio formats are supported:

Digital audio input/output: Multi-channel audio

Digital audio output, analog audio output, and speaker output: Downmixed audio

### ■ If multi-channel LPCM signal is input to digital audio:

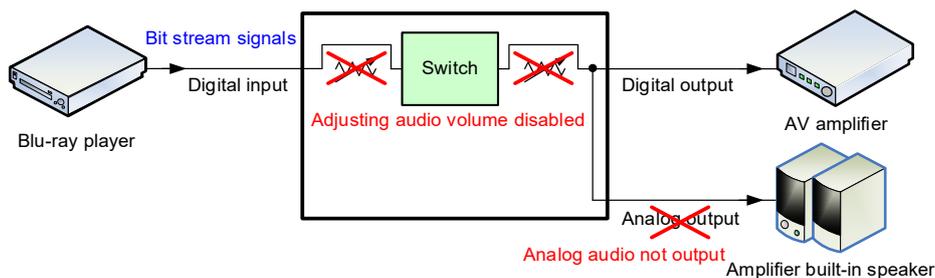
For sink device, analog audio, and speaker output that do not support multi-channel LPCM signal, 2-channels (ch) that are set in “9.11.11 Multi-channel audio output” or downmixed audio will be output.



[Fig. 9.20] Multi-channel LPCM input

### ■ If bitstream signal is input to digital audio:

Input audio is output to digital audio connector. It is not output to analog audio or speaker output; audio volume cannot be adjusted.



[Fig. 9.21] Bit stream signal input

## 9.11.1 Audio output

---

Menu	Top→OUTPUT AUDIO SETTINGS→OUTPUT SIGNAL
Setting for	OUT A, OUT B, OUT C, ANALOG, SPEAKER1, SPEAKER2
Setting value	ON [Default], OFF

You can set audio output control independently for each output connector.

## 9.11.2 Audio output level

---

Menu	Top→OUTPUT AUDIO SETTINGS→OUTPUT LEVEL
Setting for	DIGITAL, ANALOG, SPEAKER1, SPEAKER2
Setting value	-100dB to 10dB [Default] 0dB

You can set the audio output level on the “AUDIO VOLUME” page of the front display.

[DIGITAL] 0dBu
-------------------

If you change the output level while the audio output mute is set to “ON”, it will be unmuted.

If you set “**9.21.8 Top page**” to “AUDIO VOLUME”, you can change the output level from the top page.

【See: 9.11.4 Mute】

【See: 9.21.8 Top page】

### Note:

The front LEDs show the following problems:

**[Table 9.21] Audio output level**

LED	Lighting color	Meaning	Action
“MIC/LINE”	Red	SPEAKER 1 output stops abnormally.	To be fixed automatically, but decrease the output level.
“SOURCE”	Red	SPEAKER 2 output stops abnormally.	To be fixed automatically, but decrease the output level.
“SOURCE”	Amber	SPEAKER 1 output or SPEAKER 2 output is clipped.	Decrease the output level.

### 9.11.3 Tone control

---

Menu	Top→OUTPUT AUDIO SETTINGS→TONE CONTROL
Setting for	SPEAKER1, SPEAKER2
Setting value	

**[Table 9.22] Tone control**

Setting item	Setting value
TREBLE	-10dB to 10dB [Default] 0dB
BASS	-10dB to 10dB [Default] 0dB

You can adjust treble and bass values.

### 9.11.4 Mute

---

Menu	Top→OUTPUT AUDIO SETTINGS→MUTE
Setting value	OFF [Default], ON

You can mute/unmute the output audio.

You can mute/unmute all audio outputs on the “AUDIO VOLUME” page of the front display.

[DIGITAL]	MUTE
0dBu	

【See: 9.21.8 Top page】

### 9.11.5 Output Lip Sync

---

Menu	Top→OUTPUT AUDIO SETTINGS→LIP SYNC
Setting value	0ms to 128ms [Default] 0ms

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

For input Lip Sync, up to 128 ms. can be set as well. The total Lip Sync is up to 256.

【See: 9.12.7 Input Lip Sync】

## 9.11.6 Sampling frequency

---

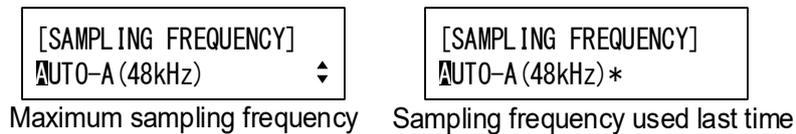
Menu	Top→OUTPUT AUDIO SETTINGS→SAMPLING FREQUENCY		
Setting value	<ul style="list-style-type: none"> <li>• 192kHz</li> <li>• 96kHz</li> <li>• 88.2kHz</li> </ul>	<ul style="list-style-type: none"> <li>• 48kHz</li> <li>• 44.1kHz</li> <li>• 32kHz</li> </ul>	<ul style="list-style-type: none"> <li>• AUTO-C</li> <li>• AUTO-B</li> <li>• AUTO-A [Default]</li> </ul>

You can set the sampling frequency of digital audio output.

### ■ “AUTO-A” or “AUTO-B” or “AUTO-C”

Outputting digital audio at the maximum sampling frequency supported by the sink device that is connected to OUT A (HDMI for AUTO-A) or OUT B (HDMI for AUTO-B) or OUT C (HDBaseT for AUTO-C).

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



## 9.11.7 Digital output mixing

---

Menu	Top→OUTPUT AUDIO SETTINGS→DIGITAL OUT MIXING
Setting for	DIGITAL INPUT, ANALOG INPUT, LINE INPUT, MIC INPUT
Setting value	ON [Default], OFF

You can set input audio to be mixed into digital audio output.

## 9.11.8 Analog output mixing

---

Menu	Top→OUTPUT AUDIO SETTINGS→ANALOG OUT MIXING
Setting for	DIGITAL INPUT, ANALOG INPUT, LINE INPUT, MIC INPUT
Setting value	ON [Default], OFF

You can set input audio to be mixed into analog audio output.

### 9.11.9 SPEAKER 1 output mixing

---

Menu	Top→OUTPUT AUDIO SETTINGS→SPEAKER1 MIXING
Setting for	DIGITAL INPUT, ANALOG INPUT, LINE INPUT, MIC INPUT
Setting value	ON [Default], OFF

You can set input audio to be mixed into SPEAKER 1.

### 9.11.10 SPEAKER 2 output mixing

---

Menu	Top→OUTPUT AUDIO SETTINGS→SPEAKER2 MIXING
Setting for	DIGITAL INPUT, ANALOG INPUT, LINE INPUT, MIC INPUT
Setting value	ON [Default], OFF

You can set input audio to be mixed into SPEAKER 2.

### 9.11.11 Multi-channel audio output

---

Menu	Top→OUTPUT AUDIO SETTINGS→DOWNMIX
Setting value	

- |                     |                  |                  |
|---------------------|------------------|------------------|
| • DOWNMIX [Default] | • CH3/CH4 MONO   | • CH5/CH6 STEREO |
| • CH7/CH8 MONO      | • CH1/CH2 MONO   | • CH3/CH4 STEREO |
| • CH5/CH6 MONO      | • CH7/CH8 STEREO | • CH1/CH2 STEREO |

When multi-channel LPCM audio is input, you can select output audio channels for analog audio output, speaker outputs, and a sink device that does not support multi-channel LPCM audio.

You can select audio from “DOWNMIX” (downmixed audio), “STEREO” (2-channel audio), or “MONO” (mixed 2-channel audio).

### 9.11.12 Multi-channel audio output priority

---

Menu	Top→OUTPUT AUDIO SETTINGS→OUTPUT PRIORITY
Setting value	MULTI (Multi-channel) [Default], 2CH (Downmix)

If outputting multi-channel LPCM to a sink device, the MSD checks whether the sink device supports multi-channel LPCM. If the sink device supports multi-channel LPCM, the MSD outputs audio with the format. If the sink device does not support the format, the MSD outputs audio according to the priority setting of multi-channel audio output.

If both multi-channel LPCM compliant sink devices and multi-channel LPCM non-compliant sink devices are connected to the MSD in a system:

“MULTI” is selected : Multi channel audio is output.

“2CH” is selected : Downmixed audio is output.

【See: 9.11.11 Multi-channel audio output】

### 9.11.13 SPEAKER 2 output

Menu  Top→OUTPUT AUDIO SETTINGS→SPEAKER OUT

Setting value

**[Table 9.23] SPEAKER 2 output**

Setting value	Description
4-16Ω(LO-Z) [Default]	Connects to stereo speakers 4-pin captive screw connector 5.08 mm
100V(HI-Z)	Connects to high impedance speakers 2-pin captive screw connector 5.08 mm

The MSD has two speaker connectors:

SPEAKER 1 : 4-pin captive screw connector 5.08 mm

SPEAKER 2 : 4 or 2-pin captive screw connector 5.08 mm; 100-V high impedance speaker can be connected.

### 9.11.14 Test tone

Menu  Top→OUTPUT AUDIO SETTINGS→TEST TONE

Setting value

**[Table 9.24] Test tone**

Setting value	Speaker
OFF [Default]	—
400Hz	<ul style="list-style-type: none"> <li>• ALL [Default]</li> <li>• REAR RIGHT CENTER</li> <li>• REAR LEFT CENTER</li> <li>• REAR RIGHT</li> <li>• REAR LEFT</li> <li>• FRONT CENTER</li> </ul>
1kHz	<ul style="list-style-type: none"> <li>• LOW FREQUENCY EFFECT</li> <li>• FRONT RIGHT</li> <li>• FRONT LEFT</li> <li>• REAR L/R CENTER</li> <li>• REAR L/R</li> <li>• FRONT L/R</li> </ul>

You can check the position of the speakers, since test tone also can be output only to specific speakers. For “LOW FREQUENCY EFFECT”, only test tone of 30 Hz is output.

【See: 9.13.14 Speaker configuration】

## 9.12 Input audio

---

### 9.12.1 Audio input

---

Menu	Top→INPUT AUDIO SETTINGS→INPUT SIGNAL
Setting for	ALL, IN1 to IN7
Setting value	DIGITAL [Default], ANALOG1, ANALOG2, ANALOG3

You can select audio input for each input channel.

【See: 9.7.2 DVI input connector】

### 9.12.2 Audio input level offset

---

Menu	Top→INPUT AUDIO SETTINGS→INPUT LEVEL OFFSET
Setting for	DIGITAL IN1 to DIGITAL IN7 for each input signal, ANALOG1, ANALOG2, ANALOG3, LINE, MIC
Setting value	-100dB to 10dB [Default] 0dB

You can set the audio input offset.

You can correct the gap in audio input levels of each input signal, since audio input levels can be set for each input port.

### 9.12.3 Audio input reference level

Menu  Top→INPUT AUDIO SETTINGS→REFERENCE LEVEL

Setting for  LINE, MIC

Setting value

[Table 9.25] Audio input reference level

Setting for	Setting value	Device
LINE	0dBu to -40dBu (by -10dBu) [Default] -10dBu	Line-level devices, such as mixtures, wireless microphone receiver
MIC	0dBu to -70dBu (by -10dBu) [Default] -60dBu	Microphone

You can set the reference level for line/mic input audio based on connected external device.

**Note:**

If the “MIC/LINE” LED lights amber, mic input is clipped. In such case, increase the audio input reference level.

### 9.12.4 Compressor

Menu  Top→INPUT AUDIO SETTINGS→COMPRESSOR

Setting for  LINE, MIC

Setting value

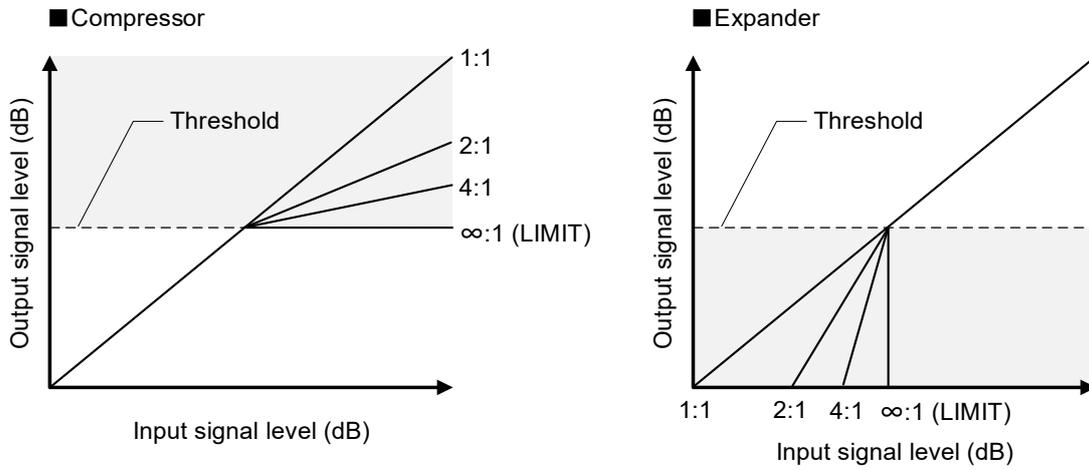
[Table 9.26] Input compressor

Setting item	Setting value	Description
THRESHOLD	-40dB to 0dB (by -4dB) [Default] 0dB	—
COMPRESSOR RATIO	1:1, 1.1:1, 2:1, 3:1, 4:1, 5.1:1, 6:1, 7.1:1, 8:1, LIMIT [Default] 1:1	Compression ratio for when input signal level exceeds threshold. “LIMIT” compresses the output signal level to the threshold
COMPRESSOR RELEASE	1ms to 1000ms (by 100ms) [Default] 1ms	Time for the compressor relaxes the compression when the signal has fallen below the threshold.
EXPANDER RATIO	1:1, 1.1:1, 2:1, 3:1, 4:1, 5.1:1, 6:1, 7.1:1, 8:1, LIMIT [Default] 1:1	Expansion ratio for when input signal has fallen below the threshold. “LIMIT” mutes output audio if input signal level
EXPANDER RELEASE	1ms to 1000ms (by 100ms) [Default] 1ms	Time for the compressor relaxes the expansion when the signal has exceeded the threshold.

Line and mic input level can be controlled to avoid audio distortion.

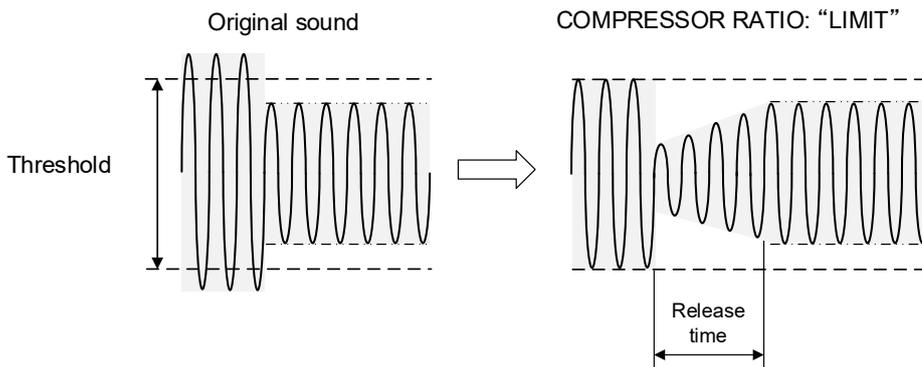
**Tip:**

If setting "COMPRESSOR RATIO" to "LIMIT" and setting "THRESHOLD" value, it can be used as a limiter.

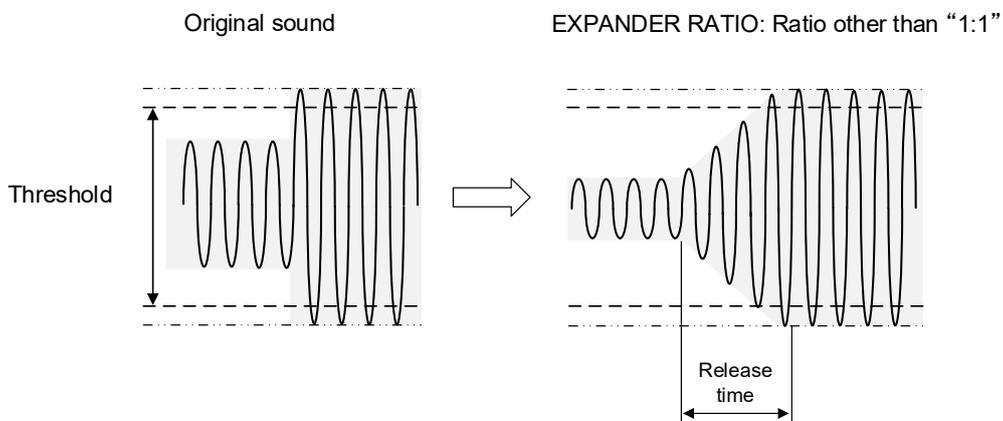


[Fig. 9.22] Compressor and Expander

■ Release time (Compressor)



■ Release time (Expander)



[Fig. 9.23] Releasing time

## 9.12.5 Equalizer

Menu	Top→INPUT AUDIO SETTINGS→EQUALIZER
Setting for	LINE, MIC
Setting value	

**[Table 9.27] Equalizer**

Setting item	Setting value	Description
FREQ	25Hz, 40Hz, 63Hz, 100Hz, 160Hz, 250Hz, 400Hz, 630Hz, 1k, 1.6k, 2.5k, 4k, 6.3k, 10k, 16k (2/3 octaves, 15 bands) [Default] EQUALIZER1 : 100Hz EQUALIZER2 : 250Hz EQUALIZER3 : 1k EQUALIZER4 : 1.6k EQUALIZER5 : 2.5k EQUALIZER6 : 4k EQUALIZER7 : 10k	The MSD has a 7-band equalizer; center frequency can be set for each channel.
GAIN	0dB, -3dB, -6dB, -9dB [Default] 0dB	Gain for selected frequency

You can adjust the input frequency characteristic of line/ mic and suppress audio feedback.

Select the frequency in which audio feedback occurs and set the lower gain level. If feedback noise occurs in multiple frequencies, set the lower gain level for each frequency respectively.

If automatic feedback suppressor is enabled, "AUTO" appears on the upper right of the front display. All equalizers of seven bands are used for automatic feedback suppressor.

To set equalizer manually, disable the feedback suppressor.

**【See: 9.12.6 Automatic feedback suppressor】**

[EQUALIZER]	AUTO
FREQ:100Hz	GAIN: 0dB ◀▶

**[Fig. 9.24] Feedback suppressor enabled**

## 9.12.6 Automatic feedback suppressor

Menu Top→INPUT AUDIO SETTINGS→FEEDBACK SUPPRESSOR

Setting for LINE, MIC

Setting value

**[Table 9.28] Feedback suppressor setting**

Setting item	Setting value	Description
—	ON, OFF [Default] OFF	Enables or disables feedback suppressor
GAIN	-3dB, -6dB [Default] -6dB	Selects suppression level
PEAK	-30dB to 0dB [Default] -5dB	Selects input detection level
DETECTED FREQUENCY	25Hz, 40Hz, 63Hz, 100Hz, 160Hz, 250Hz, 400Hz, 630Hz, 1kHz, 1.6kHz, 2.5kHz, 4kHz, 6.3kHz, 10kHz	Views frequency that is suppressed

You can suppress the feedback of line and mic. input automatically.

When frequencies that exceed the set “PEAK” is detected, they are suppressed at up to seven bands automatically based on the set “GAIN” level.

You can check which frequencies are being suppressed at “DETECTED FREQUENCY”. If multiple frequencies are detected, use ▲ and ▼ buttons to view those frequencies.

To initialize equalizer settings and refresh frequencies that are displayed at “DETECTED FREQUENCY”, press the “MENU/ENTER” button.

【See: 9.12.5 Equalizer】

## 9.12.7 Input Lip Sync

Menu Top→INPUT AUDIO SETTINGS→LIP SYNC

Setting for ALL, IN1 to IN7 for each input signal

Setting value 0ms to 128ms [Default] 0ms

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

For output Lip Sync, up to 128 ms. can be set as well. The total Lip Sync is up to 256.

【See: 9.11.5 Output Lip Sync】

### 9.12.8 MIC/LINE volume knob

---

Menu	Top→INPUT AUDIO SETTINGS→FRONT VOLUME
Setting value	LINE&MIC : Adjusting line and mic [Default], MIC : Adjusting only mic LINE : Adjusting only line

You can set which volume is adjusted by the front panel “MIC/LINE” volume knob.

### 9.12.9 Stable input audio wait

---

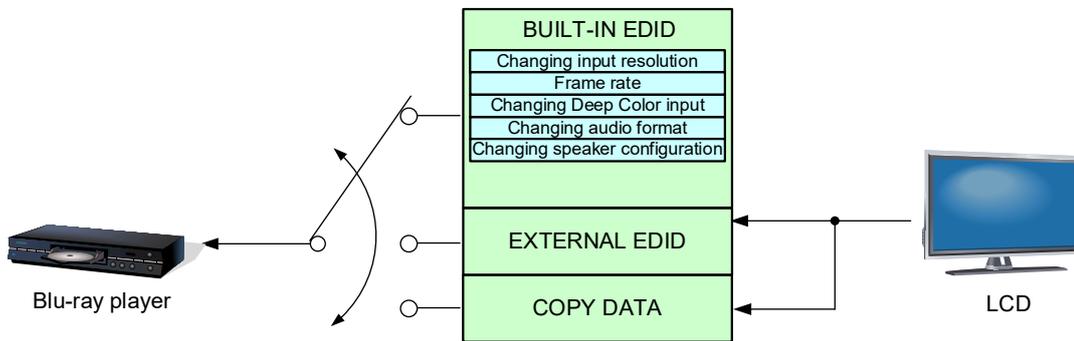
Menu	Top→INPUT AUDIO SETTINGS→AUDIO STABLE WAIT
Setting for	IN1 to IN7
Setting value	ON [Default], OFF

This feature is for waiting until input audio becomes stable in order to avoid popping noise when audio source is turned on or the like.

If initial sound cannot be output, disable this feature. In such a case, however, unstable input signal may become noise.

## 9.13 EDID

EDID can be set using the following data:



[Fig. 9.25] Setting EDID

### 9.13.1 EDID selection

---

Menu	Top→EDID SETTINGS→EDID SELECTION		
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)		
Setting value	<ul style="list-style-type: none"> <li>▪ BUILT-IN EDID [Default]</li> <li>▪ EXTERNAL EDID OUT A</li> <li>▪ EXTERNAL EDID OUT C</li> <li>▪ COPY DATA1 to COPY DATA8</li> <li>▪ EXTERNAL EDID OUT B</li> </ul>		

You can set the EDID that will be sent to source device.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

### 9.13.2 Input resolution

---

Menu	Top→EDID SETTINGS→RESOLUTION		
Setting for	ALL, IN1 to IN7		
Setting value	<ul style="list-style-type: none"> <li>▪ 1080p (1920x1080)</li> <li>▪ VESA1080p (1920x1080)</li> <li>▪ 1080i (1920x1080)</li> <li>▪ WSXGA+ (1680x1050)</li> <li>▪ UXGA (1600x1200)</li> <li>▪ WXGA++ (1600x900)</li> <li>▪ WXGA+ (1440x900)</li> <li>[Default] 1080p (1920x1080)</li> <li>▪ SXGA+ (1400x1050)</li> <li>▪ WXGA (1366x768)</li> <li>▪ WXGA (1360x768)</li> <li>▪ SXGA (1280x1024)</li> <li>▪ QuadVGA (1280x960)</li> <li>▪ WXGA (1280x800)</li> <li>▪ WXGA (1280x768)</li> <li>▪ 720p (1280x720)</li> <li>▪ VESA720p (1280x720)</li> <li>▪ XGA (1024x768)</li> <li>▪ SVGA (800x600)</li> <li>▪ QWXGA (2048x1152)</li> <li>▪ WUXGA (1920x1200)</li> </ul>		

You can set the supported video resolution.

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, this setting will be valid only if “BUILT-IN EDID” is selected. Press the “MENU/ENTER” button to apply the setting.

Timing of 720p, 1080i, and 1080p is the same as that of HD signal meeting the CEA-861 standard.

For other resolutions, timing parameters meet the VESA DMT or VESA CVT standards.

The maximum available resolution is set for EDID, but the lower resolutions are also supported.

Select the resolution supported by the connected PC.

【See: 9.13.1 EDID selection】

**[Table 9.29] Supported resolution**

Input resolution setting	Supported resolution																			
	640×480	800×600	1024×768	1280×720	VESA720p	1280×768	1280×800	1280×960	1280×1024	1360×768	1366×768	1400×1050	1440×900	1600×900	1600×1200	1680×1050	1920×1080i	1920×1080p	VESA1080p	
800x600	Y	Y	N	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	N
1280x720	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
VESA720p	Y	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	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x800	Y	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	Y	N	N	N	N	N	N	N	N	N	N	N	N
1280x1024	Y	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	N	Y	N	N	N	N	N	N	N	N	N	N
1366x768	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N
1400x1050	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N	N
1440x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	N	N
1600x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	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	Y	N	N	N	N	N
1680x1050	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N
1920x1080i	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N
1920x1080p	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N
VESA1080p	Y	Y	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y

Y: Supported, N: Not supported

### 9.13.3 Copying EDID

---

Menu	Top→EDID SETTINGS→SINK DEVICE EDID COPY
Setting for	OUT A, OUT B, OUT C
Setting value	No.1 to No.8

EDID of sink device is loaded and registered to the MSD.

Up to eight EDID profiles can be registered.

Set the name of the EDID using ASCII code 20 to 7D (up to 10 characters).

“COPY DATA + Copied data number” is saved if you do not change the name.

Press the “MENU/ENTER” button to apply the setting.

If no sink device is connected to the selected output channel, a message, “UNCONNECTED”, appears.

### 9.13.4 HDMI/DVI

---

Menu	Top→EDID SETTINGS→SIGNAL FORMAT
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)
Setting value	HDMI [Default], DVI

You can select EDID signal format.

For HDMI, video and audio settings will be applied.

For DVI, settings of input resolution and frame rate will be applied.

This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

【See: 9.13.2 Input resolution】

【See: 9.13.5 Frame rate】

### 9.13.5 Frame rate

---

Menu	Top→EDID SETTINGS→FRAME RATE
Setting for	ALL, IN1 to IN7
Setting value	60Hz [Default], 50Hz

You can set the video frequency that is output from source device.

This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.6 Deep Color

---

Menu	Top→EDID SETTINGS→DEEP COLOR
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)
Setting value	24-BIT COLOR [Default], 30-BIT COLOR

You can set the color depth to be output from the source device.

This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**” and “HDMI” is selected for “**9.13.4 HDMI/DVI**”.

If you select “30-BIT COLOR”, compared to “24-BIT COLOR”, “30-BIT COLOR” is transmitted using a higher clock frequency. The clock frequency may cause noise if a poor-quality or an excessively long cable is connected. In such a case, the noise may be removed by setting the color to “24-BIT COLOR”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.7 LPCM audio

---

Menu	Top→EDID SETTINGS→Linear PCM			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value	• 48kHz [Default]	• 44.1kHz	• 32kHz	• 192kHz
	• 176.4 kHz	• 96kHz	• 88.2kHz	

You can set the Maximum LPCM sampling frequency that is output from the source device.

This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.8 AAC audio

---

Menu	Top→EDID SETTINGS→AAC			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value	<ul style="list-style-type: none"> <li>• OFF [Default]                      • 96kHz                      • 88.2kHz                      • 48kHz</li> <li>• 44.1kHz                              • 32kHz</li> </ul>			

You can set the maximum AAC audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.9 Dolby Digital audio

---

Menu	Top→EDID SETTINGS→Dolby Digital			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value	<ul style="list-style-type: none"> <li>• OFF [Default]                      • 48kHz                      • 44.1kHz                      • 32kHz</li> </ul>			

You can set the maximum Dolby Digital audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.10 Dolby Digital Plus audio

---

Menu	Top→EDID SETTINGS→Dolby Digital Plus			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value	<ul style="list-style-type: none"> <li>• OFF [Default]                      • 48kHz                      • 44.1kHz                      • 32kHz</li> </ul>			

You can set the maximum Dolby Digital Plus audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.11 Dolby TrueHD audio

---

Menu	Top→EDID SETTINGS→Dolby TrueHD			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value				
	• OFF [Default]	• 192kHz	• 176.4kHz	• 96kHz
	• 88.2kHz	• 48kHz	• 44.1kHz	

You can set the maximum Dolby TrueHD audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.12 DTS audio

---

Menu	Top→EDID SETTINGS→DTS				
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)				
Setting value					
	• OFF [Default]	• 96kHz	• 48kHz	• 44.1kHz	• 32kHz

You can set the maximum DTS audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.13 DTS-HD audio

---

Menu	Top→EDID SETTINGS→DTS-HD			
Setting for	ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)			
Setting value				
	• OFF [Default]	• 192kHz	• 176.4kHz	• 96kHz
	• 88.2kHz	• 48kHz	• 44.1kHz	

You can set the maximum DTS-HD audio sampling frequency that is output from the source device. This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**”.

If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

### 9.13.14 Speaker configuration

Menu Top→EDID SETTINGS→SPEAKER CONFIGURATION

Setting for ALL, IN1 to IN5, IN6 (Digital), IN7 (Digital)

Setting value

**[Table 9.30] Speaker configuration**

Setting item	MODE (Setting mode)	NUMBER (Number of speakers)	Setting value for speaker configuration
Setting value	AUTO [Default]	1 to 8 [Default] 2	—
	MANUAL	Depends on configuration	ON, OFF 【See: [Table 9.31] Default speaker configuration】

You can set the speaker configuration for multi-channel audio.

This setting will be valid only if “BUILT-IN EDID” is selected for EDID in “**9.13.1 EDID selection**” and “HDMI” is selected for “**9.13.4 HDMI/DVI**”.

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 “**[Table 9.31] Default speaker configuration**”.

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.

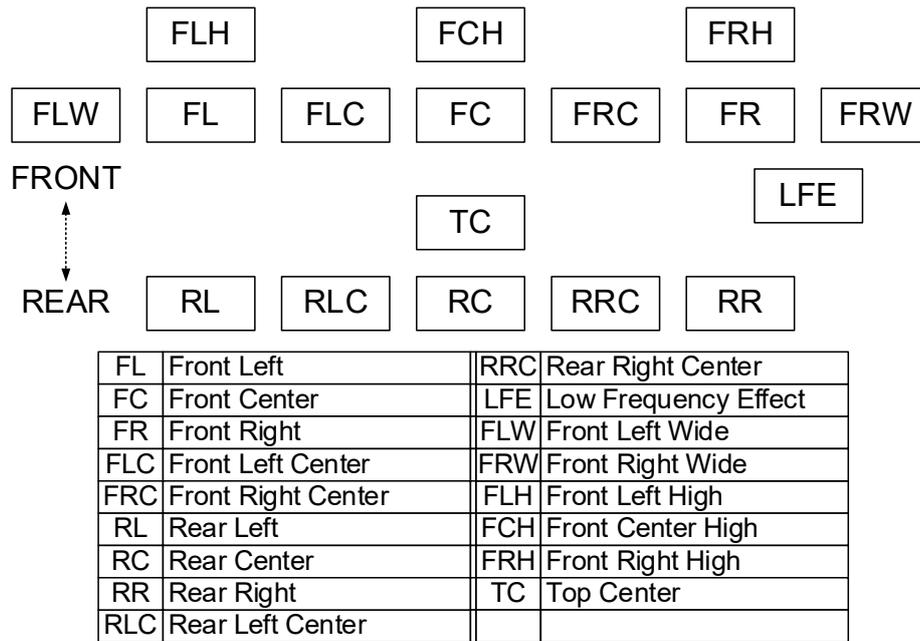
If “ANALOG” is selected for “**9.7.2 DVI input connector**”, “NOT AVAILABLE NOW” will appear on the front display.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.13.1 EDID selection】

**[Table 9.31] Default speaker configuration**

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



**[Fig. 9.26] Speaker configuration**

## 9.14 RS-232C

### 9.14.1 RS-232C communication

Menu Top→RS-232C SETTINGS→PARAMETERS

Setting for ALL, RS1, RS2, HDBT OUT C, HDBT IN5

Setting value

[Table 9.32] RS-232C communication

Connector	Parameter	Setting value	Default
ALL, RS1 <sup>*1</sup> , RS2 <sup>*2</sup> , HDBT OUT C, HDBT IN5	Baud rate [bps]	4800, 9600, 14400, 19200, 38400, 57600, 115200	9600
	Data bit length [bit]	8, 7	8
	Parity check	NONE, EVEN, ODD	NONE
	Stop bit [bit]	1, 2	1

<sup>\*1</sup>: RS-232C (CH1), <sup>\*2</sup>: RS-232C (CH2)

You can set the RS-232C communication.

Press the “MENU/ENTER” button to apply the setting.

### 9.14.2 RS-232C operation mode

Menu Top→RS-232C SETTINGS→COMMUNICATION MODE

Setting for ALL, RS1, RS2, HDBT OUT C, HDBT IN5

Setting value

[Table 9.33] RS-232C operation mode

Connector	Setting value	Default
ALL	RECEIVER, TRANSMITTER	RECEIVER
RS1 <sup>*1</sup>	RECEIVER, TRANSMITTER	RECEIVER
RS2 <sup>*2</sup>	RECEIVER, TRANSMITTER	RECEIVER
HDBT OUT C	RECEIVER, TRANSMITTER	TRANSMITTER
HDBT IN5	RECEIVER, TRANSMITTER	RECEIVER

<sup>\*1</sup>: RS-232C (CH1), <sup>\*2</sup>: RS-232C (CH2)

You can set the operation mode of the MSD’s RS-232C port to either “RECEIVER” mode, enabling the MSD to be is controlled externally via RS-232C, or “TRANSMITTER” mode, enabling the MSD to control peripheral devices via RS-232C.

Press the “MENU/ENTER” button to apply the setting.

## 9.15 LAN

---

### 9.15.1 IP address

---

Menu  Top→LAN SETTINGS→IP ADDRESS

Setting value  192.168.1.199 [Default]

You can set the IP address.

Press the “MENU/ENTER” button to apply the setting.

### 9.15.2 Subnet mask

---

Menu  Top→LAN SETTINGS→SUBNET MASK

Setting value  255.255.255.0 [Default]

You can set the subnet mask

Press the “MENU/ENTER” button to apply the setting.

### 9.15.3 Gateway address

---

Menu  Top→LAN SETTINGS→GATEWAY

Setting value  192.168.1.200 [Default]

You can set the gateway address.

Press the “MENU/ENTER” button to apply the setting.

## 9.15.4 MAC address

---

Menu  Top→LAN SETTINGS→MAC ADDRESS

You can display the MSD's MAC address.

## 9.15.5 TCP port number

---

Menu  Top→LAN SETTINGS→PORT NUMBER

Setting for  CONNECTION1 to CONNECTION8

Setting value

**[Table 9.34] TCP port number**

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

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

You can set the TCP port number to control the MSD externally.

This setting will be valid if "RECEIVER" is selected for "**9.15.6 LAN operation mode**".

Each connection will be divided into connections for communication command control and WEB browser depending on the set port numbers.

Press the "MENU/ENTER" button to apply the setting.

## 9.15.6 LAN operation mode

Menu Top→LAN SETTINGS→COMMUNICATION MODE

Setting for CONNECTION1 to CONNECTION8

Setting value

**[Table 9.35] LAN operation mode**

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

<sup>\*1</sup>For PJLink protocol connections, the target port number is fixed at "4352".

<sup>\*2</sup>For PJLink protocol connections, the maximum permissible number of characters is 32.

If you do not want password authentication, you do not have set a password.

You can set the LAN operation mode to either "RECEIVER" mode that controls the MSD externally or "TRANSMITTER" mode that controls peripheral devices from the MSD.

If you select "TRANSMITTER" mode, you need to set the parameters to support the connected device that will be controlled.

Press the "MENU/ENTER" button to apply the setting.

## 9.15.7 HDBaseT LAN

Menu Top→LAN SETTINGS→HDBT COMMUNICATION

Setting for HDBT IN5, HDBT OUT C

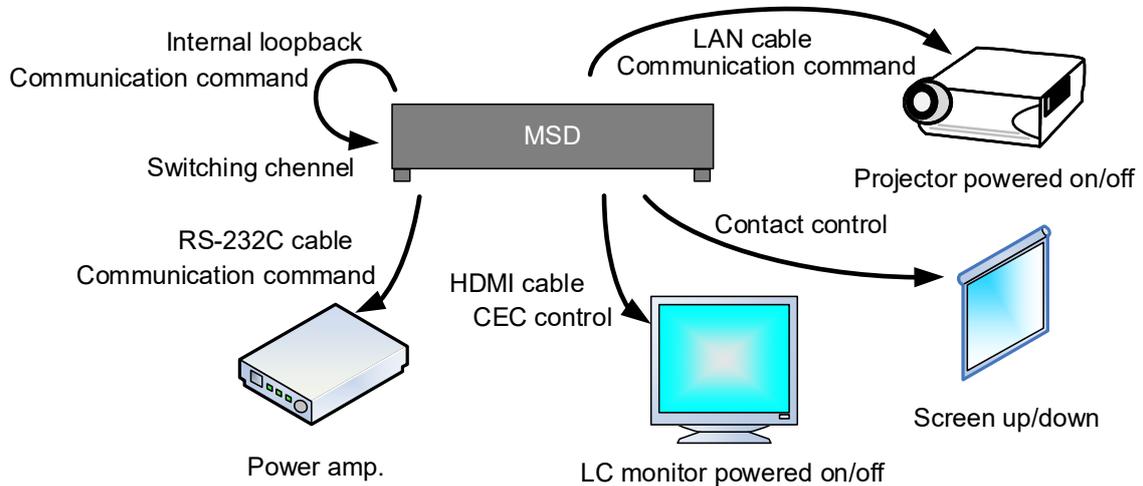
Setting value ON [Default], OFF

You can enable/disable the LAN capabilities of each HDBaseT I/O connector.

【See: 9.15 LAN】

## 9.16 Control commands

You can control external devices (for example, turning ON/OFF projectors) via RS-232C, LAN, or CEC. You can register up to 32 commands (CMD 1 to CMD32) in the MSD. Registered control commands will be associated with 40 execution conditions such as “COMMAND” buttons or switching video or audio.



**[Fig. 9.27] Control command example**

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

Control commands can be sent from MSD's RS-232C connector, LAN connector, or HDBaseT I/O connector. Before executing control command, set the operation mode of the connector to “TRANSMITTER”.

【See: 9.14.2 RS-232C operation mode】

【See: 9.15.6 LAN operation mode】

### ■ Screen display during control command execution

When a control command is executed, “MEMO” text registered for a control command is displayed (1). 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 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. 9.28] Front panel display**

If you configure multiple control commands, or if you display data received from multiple 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.

## 9.16.1 Registering/Editing control command

Menu Top→CONTROL COMMAND→COMMAND REGISTER/EDIT

Setting for CMD 1 to CMD32

Setting value [Table 9.36] Setting control command

You can register and edit up to 32 control commands.

Press the "MENU/ENTER" button to apply the setting.

**[Table 9.36] Setting control command**

Setting item	COM	CC	CEC	Description	Range
PORT	yes	yes	yes	Select "COM", "CC" or "CEC".	COM : Communication command [Default] CC : Contact closure CEC : HDMI CEC control
COM SIZE	yes	no	no	Set the number of bytes to be sent starting with the first byte.	0BYTE to 30BYTE [Default] 0BYTE
DELAY	yes	yes	yes	Set the waiting time to issue control commands. Use this item for devices such as projectors that requires time to cool down after powering off.	0ms to 999s999ms [Default] 0ms
Communication port	yes	no	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. - RS1 : RS-232C (CH1) <sup>*5</sup> - RS2 : RS-232C (CH2) <sup>*5</sup> - OUTC RS : OUT C RS-232C - IN5 RS : IN5 RS-232C - LOOP BAC : Internal loop back - LAN1 to LAN8 : LAN connection 1 to 8 <sup>*6</sup>	OFF : Not sending reply command [Default] ON : Sending reply command
COMMAND INPUT MODE	yes	no	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	no	Set the command from the first byte according to the number of bytes set in "COM SIZE" (up to 30 bytes).	0A, 0D, 20 to 7D in ASCII, 00 to FF in hex [Default] 20 (space)

**[Table 9.37] Setting control command (Cont'd)**

Setting item	COM	CC	CEC	Description	Range
RECV DISPLAY	yes	no	no	Set whether received data is displayed or not.	OFF [Default] ASCII HEX
DELIMITER <sup>*1</sup>	yes	no	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 : Not checking delimiter [Default] 00 to FF (Hex)
RCV CHECK <sup>*2</sup>	yes	no	no	Set whether reply command that may be returned is checked or not.	CHECK NOT CHECK [Default]
TIME OUT <sup>*3 *4</sup>	yes	no	no	Set the timeout delay for reply command to a sent command.	0ms to 99s999ms [Default] 0ms
RETRY <sup>*3 *4</sup>	yes	no	no	Set the number of retries to resend the same command again if no valid response is received.	0 to 99 (times) [Default] 0
INTERVAL <sup>*3 *4</sup>	yes	no	no	Set the retry interval to resend the command.	0ms to 99s999ms [Default] 0ms
ERROR <sup>*3 *4</sup>	yes	no	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
Contact closure control	no	yes	no	Set the contact closure control. If you select "toggle operation", it can invert the condition of contact (open/close).	- : Not controlling contact closure [Default] OFF : Opening contact ON : Closing contact TGL : Toggle
Pulse width	no	yes	no	Set the time of returning its original condition when you control the contact closure.	NONE : Eternity [Default] 100ms to 9990ms (by 10ms)
HDMI CEC control <sup>*7</sup>	no	no	yes	Set the CEC control for the sink devices connected to OUT C.	- : Not controlling CEC [Default] POWER OFF POWER ON
Process for CEC error	no	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	yes	Register a note containing 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" for 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 RS-232C operation mode to "TRANSMITTER".
- \*6 If you set any LAN connections for "LAN1" to "LAN8" to "ON", set LAN operation mode to "TRANSMITTER".
- \*7 CEC: only power ON/OFF of the sink device can be controlled.

【See: 9.14.2 RS-232C operation mode】

【See: 9.15.6 LAN operation mode】

### ■ 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 Class 1, which is a standard protocol to control projectors.

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

【See: 9.15.6 LAN operation mode】

**[Table 9.38] PJLink command (class1)**

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	*	(CR)	Switch input to RGB
5	%	1	I	N	P	T	(SP)	2	*	(CR)	Switch input to VIDEO
6	%	1	I	N	P	T	(SP)	3	*	(CR)	Switch input to DIGITAL
7	%	1	I	N	P	T	(SP)	4	*	(CR)	Switch input to STORAGE
8	%	1	I	N	P	T	(SP)	5	*	(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 two 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 9.39] Reply commands to PJLink command (class1)**

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 9.40] Individual reply command of status acquisition commands**

No.	Command										Description			
Reply command to power status commands														
1	%	1	P	O	W	R	=	0	(CR)		Standby			
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

For \*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 illuminated, 1: Illuminated

For devices containing multiple 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 multiple inputs, multiple statuses separated with a (SP) are sent. For example, for a device having two inputs, "%1INST= source number1 (SP) source number2CR" is sent.

\*11 20 to FF in hex: up to 64 characters

\*12 20 to 7F in hex: up to 32 characters

## 9.16.2 Registering/Editing reply command

Menu Top→CONTROL COMMAND→REPLY REGISTER/EDIT

Setting for CMD 1 to CMD32

Setting value [Table 9.41] Setting reply command

You can register and edit up to 32 reply commands.

Press the "MENU/ENTER" button to apply the setting.

**[Table 9.41] Setting reply 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.	EXEC [Default] RETRY : Resend commands STOP
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)
MASK	Each bit of the received data is ANDed to each bit of mask data, and the result will be compared with the 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 containing 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: Space

Default values in the table above 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 are checking reply commands.

**[Table 9.42] 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

The MSD supports PJLink Class 1, which is a standard protocol to control projectors.

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

**【See: 9.15.6 LAN operation mode】**

### ■ Mask data

Each bit of the received data is ANDed to each bit of mask data, and the result will be compared with the reply command data. Since "FF" is set by factory default, you do not need to change the mask data normally.

This feature is used to interpret the status of specific bits in received data and provides a reply that can be used to confirm or alter settings.

[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

```
DATA1:00 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
```

### 9.16.3 Command link

Menu	Top→CONTROL COMMAND→COMMAND LINK
Setting for	[Table 9.43] Control command execution condition
Setting value	OFF [Default], CMD 1 to CMD32

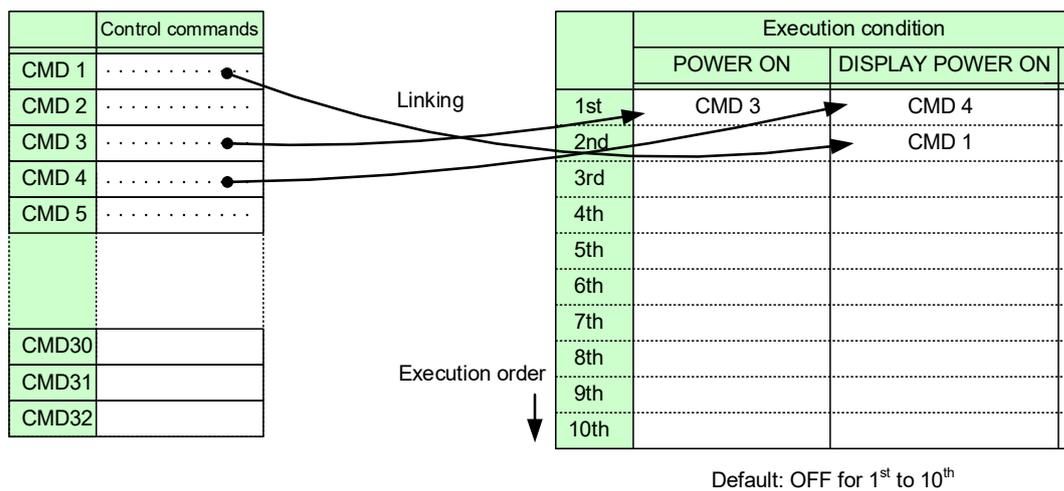
The MSD has command execution conditions. If these execution conditions are met, control commands which are associated beforehand will be executed. One execution condition can be associated to up to 10 commands. If multiple commands are associated, commands are executed in order of registration. If the same command is associated multiple times, it is repeatedly executed.

“COMMAND” button can be toggled.

Set “TOGGLE” to “ON” to enable PLANE-B, and then you can select execution plane (“AUTO”, “A(PLANE-A)”, or “B(PLANE-B)”) at the time of power ON from “STARTUP”.

If you select “AUTO”, the condition at the time of power OFF will be maintained.

Press the “MENU/ENTER” button to apply the setting.



[Fig. 9.29] Command link

[Table 9.43] Control command execution condition

Execution condition	Function	Execution condition	Function
POWER ON	Standby button	DISPLAY POWER ON	Controlling sink device power of OUT
STANDBY		DISPLAY POWER OFF	
COMMAND A to COMMAND I, PLANE-A	COMMAND button	VIDEO:IN1 SELECT to VIDEO:IN7 SELECT, VIDEO:OFF SELECT	Selecting video input channel of OUT
COMMAND A to COMMAND I, PLANE-B		AUDIO:IN1 SELECT to AUDIO:IN7 SELECT, AUDIO:OFF SELECT	Selecting audio input channel of OUT

## 9.16.4 Command execution

---

Menu	Top→CONTROL COMMAND→EXECUTE CTRL COMMAND
Setting value	CMD 1 to CMD 32, COMMAND A to COMMAND I

You can execute registered control commands (COMMAND A to COMMAND I) that can also be executed by specifying a command number (CMD 1 to CMD 32).

Only executable control commands are displayed.

Press the “MENU/ENTER” button to apply the setting.

COMMAND A to COMMAND F can be executed from front panel buttons.

【See: 9.16.1 Registering/Editing control command】

## 9.16.5 Initializing registered command and link

---

Menu	Top→CONTROL COMMAND→INITIALIZATION
Setting value	CMD 1 to CMD32 : Control command
	REPLY1 to REPLY32 : Reply command
	POWER ON to AUDIO:OFF SELECT : Control command association

You can initialize the following commands and associations:

- 9.16.1 Registering/Editing control command
- 9.16.2 Registering/Editing reply command
- 9.16.3 Command link

Press the “MENU/ENTER” button to apply the setting, and you will hear a long beep sound.

## 9.16.6 Invalid duration at control command execution

Menu Top→CONTROL COMMAND→INVALID DURATION  
 Setting value 0s000ms to 999s999ms [Default] 0s000ms

You can set the wait time that starts at control command execution and must elapse prior to accepting user input to resend the command. Use this menu to prevent repeated execution caused by pressing the control command execution button 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 command from a command execution button, you cannot perform any operations from command execution buttons until the control command is completed. However, for “DISPLAY POWER” buttons and “CHANNEL SELECTION” buttons, even during the invalid duration, control command from different outputs can be executed.

## 9.16.7 COMMAND button illuminating condition

Menu Top→CONTROL COMMAND→ILLUMINATE CMD BUTTON  
 Setting for COMMAND A to COMMAND I  
 Setting value REGISTERED : Illuminates if a control command is registered <sup>\*1</sup> [Default]  
 EXECUTION : Illuminates while a control command is executed <sup>\*1\*2</sup>

<sup>\*1</sup>There are two planes (PLANE A and B) for each execution condition of “COMMAND” buttons A to F. If you register control commands for both planes, the control commands are executed alternatively every time you press the “COMMAND” button as follows.

[Table 9.44] Illuminating condition

Illuminating condition	If you register a command only for one plane	If you register commands for both two planes
REGISTERED	Illuminates if a control command is registered	Illuminates if PLANE A will be executed at the next press; blinks if PLANE B will be executed at the next press.
EXECUTION	Illuminates while a control command is being executed	Illuminates if PLANE A will be executed at the next press; turned off if PLANE B will be executed at the next press.

<sup>\*2</sup>If execution duration is 500 ms. or shorter, the button LED illuminates for 500 ms. It can also be blinks by changing the setting of “9.16.8 Blinking at command button”.

## 9.16.8 Blinking at command button

Menu Top→CONTROL COMMAND→BLINKING DURATION

Setting for COMMAND A to COMMAND F, DISPLAY POWER

Setting value

**[Table 9.45] Blinking at command button**

Setting for	Setting value	Default
COMMAND A	1sec. to 1000sec.:	OFF
COMMAND B	Blinks for the specified time (1 sec. to 1000sec.)	OFF
COMMAND C	OFF:	OFF
COMMAND D	Not blink	OFF
COMMAND E	EXECUTION:	OFF
COMMAND F	Blinks while a control command is being executed	OFF
DISPLAY POWER		EXECUTION

You can set the blinking duration of “COMMAND” buttons and “DISPLAY POWER” buttons during command execution.

While control commands are being executed, these buttons blink regardless of this menu’s setting.

## 9.17 REMOTE connector

### 9.17.1 Power control mode

Menu Top→REMOTE→STANDBY CONTROL

Setting value

[Table 9.46] Power control mode

Setting value	Description
FRONT [Default]	Powers on the MSD or sets the MSD to Standby state from the front panel button, “standby” button.
REMOTE	Powers on the MSD or sets the MSD to Standby state by an external button switch connecting to the “REMOTE” connector. When both side terminals of “REMOTE IN1” short out, the MSD is powered on.

You can select external button switch mode.

Press the “MENU/ENTER” button to apply the setting.

**Notes:**

Note for when you do not use an external button switch:

- If selecting “REMOTE” while “REMOTE IN1” terminal is not connected, the MSD becomes standby state. In case this occurs, first turn off the main power switch (“POWER”) on the rear panel. Then, press and hold the “UNLOCK” button and turn on the main power switch.
- To prevent the MSD from being in standby state, we recommend shorting out both side terminals of “REMOTE IN1”.

If selecting “REMOTE”, the LED of the “Standby” button turns off.

### 9.17.2 Emergency stop

Menu Top→REMOTE→EMERGENCY SHUTDOWN

Setting value DISABLE [Default], ENABLE

You can enable/disable the emergency stop feature.

The MSD becomes standby state if a stop signal from evacuation system is input to “REMOTE IN2” connector on the rear panel.

Press the “MENU/ENTER” button to apply the setting.

**Notes:**

Note for when you do not use stop signal for evacuation system:

- If selecting “ENABLE” while “REMOTE IN2” terminal is not connected, the MSD becomes standby state. In case this occurs, first turn off the main power switch (“POWER”) on the rear panel. Then, press and hold the “UNLOCK” button and turn on the main power switch.
- To prevent the MSD from being in standby state, we recommend shorting out + terminal of “REMOTE IN2” and P terminal.

## 9.18 Preset memory

All settings, including I/O channel settings of video and audio and image position are saved to preset memory: I/O channel settings of video and audio are saved to the MSD memory as crosspoint.

Up to eight preset memories and nine crosspoints can be saved.

### 9.18.1 Recalling crosspoint

Menu	Top→USER PRESET→RECALL CROSSPOINT
Setting for	No.1 to No.9

You can recall the I/O channel settings saved in the crosspoint memory.

Crosspoint memories No.1 to No.6 can be recalled by pressing the “COMMAND” button when the “UNLOCK” button lights red.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.18.2 Saving crosspoint】

### 9.18.2 Saving crosspoint

Menu	Top→USER PRESET→STORE CROSSPOINT
Setting for	No.1 to No.9

You can save the I/O channel settings of video and audio into the crosspoint memory.

Up to 9 crosspoint memories can be saved with their name (up to 10 characters). If you set “---” (not control) for Editing crosspoint, a writing method (CONTINUE or DELETE) can be selected.

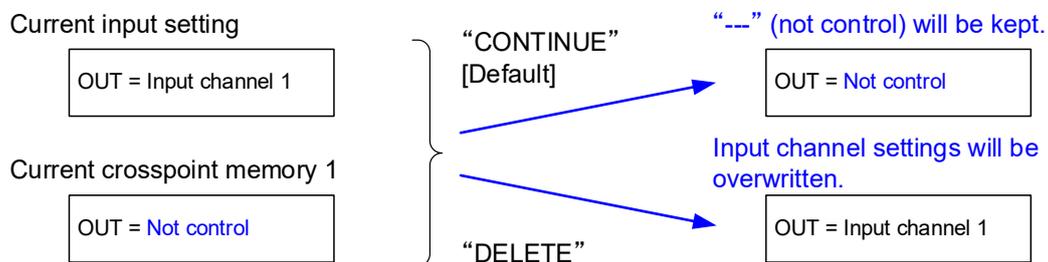
Press the “MENU/ENTER” button to apply the setting.

【See: 9.18.3 Editing crosspoint】

#### ■ For writing

“CONTINUE” : The setting (“---”) will be kept in the crosspoint memory.

“DELETE” : The current input channel settings will be overwritten.



【Fig. 9.30】 Saving crosspoint

### 9.18.3 Editing crosspoint

Menu Top→USER PRESET→EDIT CROSSPOINT

Setting for No.1 to No.9

Setting value

[Table 9.47] Editing crosspoint

Setting item	Setting value	Default
Output channel (OUT)	MAIN, PinP	MAIN
Video combination (PinP)	--- (not control), OFF, PATTERN1 to PATTERN5	---
Video input channel (VIDEO)	--- (not control), 1 to 7, OFF	---
Audio input channel (AUDIO)	--- (not control), 1 to 7, OFF	---
Memory name (NAME)	20 to 7D of ASCII code	20 (space)

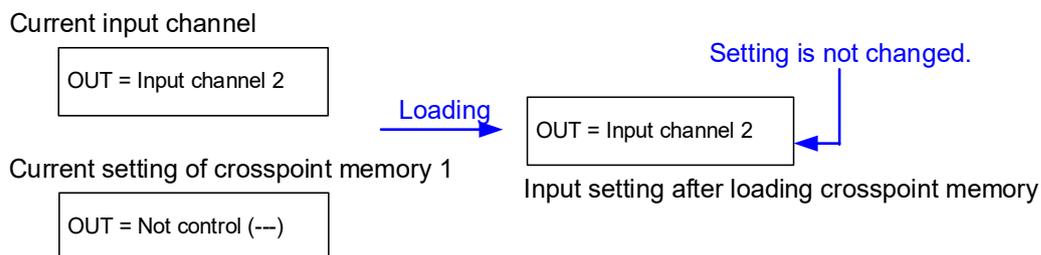
You can edit crosspoint memory settings.

First, select the memory number and press the “MENU/ENTER” button, and then edit the desired setting. Press the “MENU/ENTER” button to apply the setting.

#### ■ Not controlling channel

If you select “---” when setting input channel, channels are not controlled.

Outputs that are set not to be controlled are not switched when crosspoint memory is loaded.



[Fig. 9.31] Loading edited crosspoint memory

#### Note:

For PinP editing, only input channel and PinP ON/OFF can be set.

### 9.18.4 Recalling all settings

Menu Top→USER PRESET→RECALL ALL SETTINGS

Setting for No.1 to No.8

You can recall all settings saved in the preset memory.

This menu is not displayed if settings are not saved in memory.

Press the “MENU/ENTER” button to apply the setting.

【See: 9.18.5 Saving all settings】

## 9.18.5 Saving all settings

Menu	Top→USER PRESET→STORE ALL SETTINGS
Setting value	No.1 to No.8

You can save up to 8 preset memories and name these memories up to 10 characters from ASCII 20 to 7D. You can skip the naming procedure.

Press the “MENU/ENTER” button to apply the setting.

**[Table 9.48] Settings saved in preset memory**

Menu	Description
Selecting input channels	Selecting input channels (Video & Audio)
Output position, size, and masking	Output resolution, Aspect ratio for sink device, Image position, Image size, Cropping, Background color, Test pattern
Output	Output signal, Output video with no input video, HDCP output, HDCP retries, Output equalizer, Output format, HDBaseT output long reach mode, Deep Color output, Window transition effect, Window transition speed, Wipe color, CEC connection
Input position, size, and cropping	Aspect ratio, Aspect ratio control, Overscan, Image position, Image size, Cropping
Input	Input connector, DVI input connector, No-signal input monitoring, HDCP input, Input equalizer, HDBaseT input long reach mode, Analog input signal parameters, Automatic detection of video input interruption
Input timing	The total number of horizontal pixels, Horizontal start position, Horizontal active area, Vertical start position, Vertical active area, Automatic measurement of start position, Automatic setting of input timing, Tracking
Input channel automatic switching	Signal ON priority, Signal OFF priority, Ignoring duration after automatic switching, Channel switching mode of automatic switching
Picture controls	Output brightness, Output contrast, Output gamma, Input sharpness, Input brightness, Input contrast, Input hue, Input saturation, Input black level
Output audio	Audio output, Audio output level, Tone control, Mute, Output Lip Sync, Sampling frequency, Digital output mixing, Analog output mixing, SPEAKER 1 output mixing, SPEAKER 2 output mixing, Multi-channel audio output, Multi-channel audio output priority, SPEAKER 2 output, Test tone
Input audio	Audio input, Audio input level offset, Audio input reference level, Compressor, Equalizer, Input Lip Sync, MIC/LINE volume knob, Stable input audio wait
EDID	EDID selection, Input resolution, HDMI/DVI, Frame rate, Deep Color, LPCM audio, AAC audio, Dolby Digital audio, Dolby Digital Plus audio, Dolby TrueHD audio, DTS audio, DTS-HD audio, Speaker configuration

## 9.18.6 Start-up setting

Menu  Top→USER PRESET→START-UP

Setting value

**[Table 9.49] Start-up setting**

Setting value	Description
LAST CHANNEL [Default]	Starts with the settings last time the MSD powered off.
CHANNEL OFF	Turns channel OFF. For settings other than channel setting, settings last time the MSD powered off will be applied.
CROSSPOINT 1 to CROSSPOINT 9	Starts with the channel settings saved in the selected crosspoint memory. For settings other than channel settings, settings last time the MSD powered off will be applied.
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, settings last time the MSD powered off will be applied.

You can configure which settings will be applied at start-up.

## 9.19 Bitmap

You can set the bitmap image to be displayed on the sink device. Up to four bitmaps can be registered. IDK's logo is output by 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 must meet the following requirements:

**[Table 9.50] Bitmap file condition**

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 × Vertical resolution × The number of bytes per pixel] = 8,388,608 bytes or less. If you register multiple 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)

## 9.19.1 Bitmap image output

---

Menu	Top→BITMAP→BITMAP OUTPUT
Setting for	ALL, MAIN, PinP
Setting value	OFF [Default] ON (BITMAP1 ON to BITMAP4 ON)



[Fig. 9.32] Default bitmap image

You can enable/disable the bitmap image output.

If multiple bitmaps are registered, select the bitmap number you want to output.

## 9.19.2 Background color

---

Menu	Top→BITMAP→BACKGROUND COLOR
Setting value	

[Table 9.51] Background color

Setting item	Setting value	Description
Bitmap number	1 to 4	If more than one bitmap is registered, you can confirm the bitmap number at left of the second line on the front panel display.
LINK	ON [Default], OFF	“ON”: Only Red (R) can be set. Settings for Green (G) and Blue (B) will track the setting value selected for Red (R).
R	0 to 255 [Default] 255 (White)	-
G	0 to 255 [Default] 255 (White)	
B	0 to 255 [Default] 255 (White)	

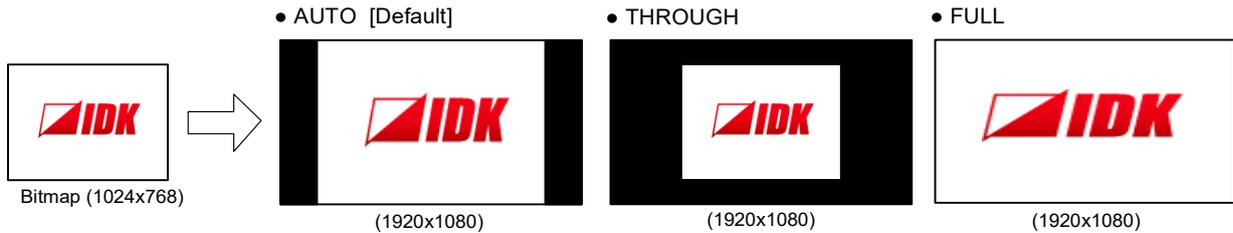
You can set the background color of the bitmap.

### 9.19.3 Aspect ratio

Menu	Top→BITMAP→ASPECT RATIO
Setting for	ALL, MAIN, PinP
Setting value	[Fig. 9.33] Setting aspect ratio

You can set the aspect ratio of bitmap.

If you select "AUTO", the aspect ratio is kept. However, if bitmap is larger than output resolution, only a portion of the bitmap is displayed.

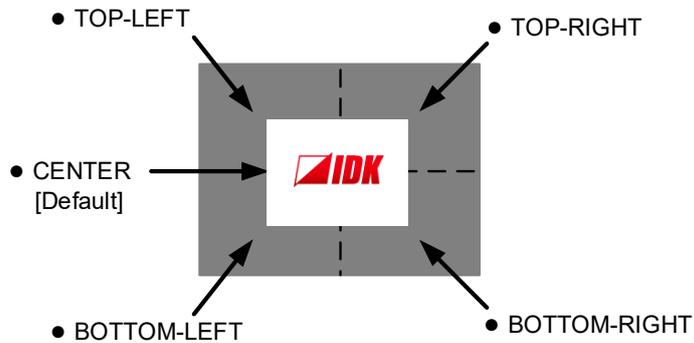


[Fig. 9.33] Setting aspect ratio

### 9.19.4 Image position

Menu	Top→BITMAP→IMAGE POSITION
Setting value	[Fig. 9.34] Position

You can set the image position of the bitmap.



[Fig. 9.34] Position

## 9.19.5 Assigning input channel

---

Menu	Top→BITMAP→INPUT ASSIGN
Setting for	Each input of output window (ALL, MAIN, PinP)
Setting value	OFF [Default], ON (BITMAP1 ON to BITMAP4 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 “**9.19.1 Bitmap image**” to “OFF” in order to assign the bitmap to an input channel.

If multiple bitmaps are registered, select the bitmap number to be output.

If you switch an input to a bitmap image, it takes longer than a switching transition between normal channels. In other words, it will take longer to display an output image and you cannot perform other operations until the bitmap is displayed.

Press the “MENU/ENTER” button to apply the setting.

## 9.19.6 Start-up bitmap output

---

Menu	Top→BITMAP→START-UP BITMAP
Setting for	ALL, MAIN, PinP
Setting value	OFF [Default], ON (BITMAP1 ON to BITMAP4 ON)

You can enable/disable presenting a bitmap output at startup.

## 9.19.7 Dividing memory area

---

Menu	Top→BITMAP→DIVIDE MEMORY
Setting value	

[Table 9.52] Dividing memory area

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

You can register up to four bitmaps within the available memory area by dividing the memory.

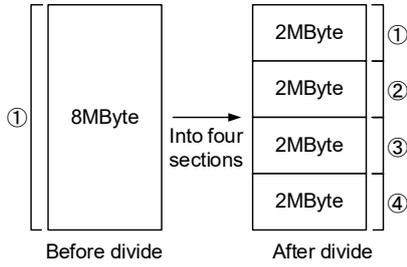
You can select one of three dividing modes or specify the size you want to divide manually.

Memory areas are controlled by blocks. 1 block = 65,536 bytes; 128 blocks = 8,388,608 bytes in total

Press the “MENU/ENTER” button to apply the setting.

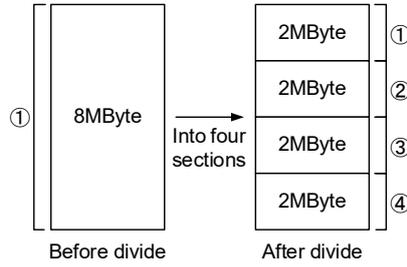
■ Dividing mode

● RESIZE



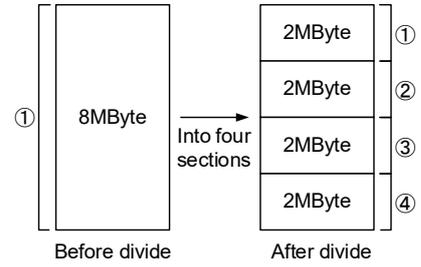
If no bitmap is registered, the memory is divided equally.

● AUTO

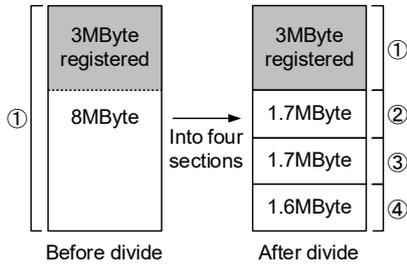


If no bitmap is registered, the memory is divided equally.

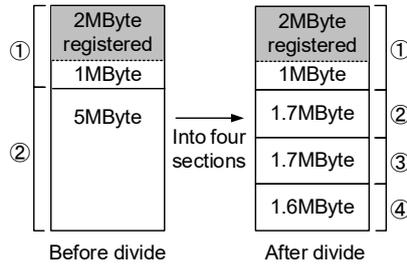
● DELETE



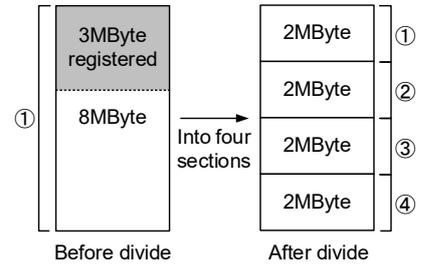
The memory area is divided equally regardless of whether bitmap is registered or not.



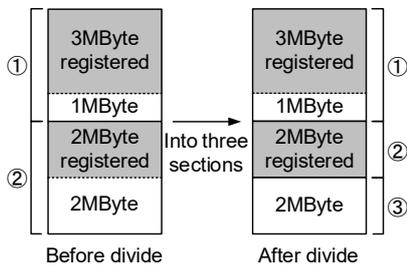
The area of the bitmap is limited to the bitmap size. The rest memory area is divided equally.



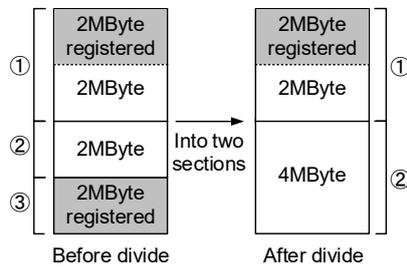
If a bitmap is registered, the area of the bitmap is kept. The rest memory area is divided equally.



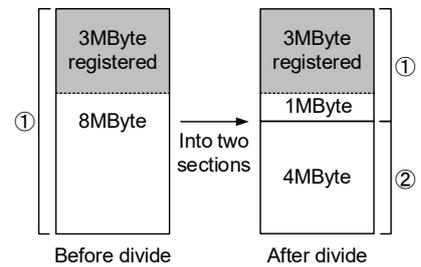
After divided, if the area of the bitmap is smaller than the bitmap size, the bitmap will be deleted.



The start position of the area in which bitmap is registered is not changed. The area just before the registered bitmap is not resized.



After divided, if the number of sections becomes smaller, the registered bitmap may be deleted.



After divided, if the area of the bitmap is enough for the bitmap, the bitmap will not be deleted.

[Fig. 9.35] Dividing mode

■ Displaying method

“BLOCK”

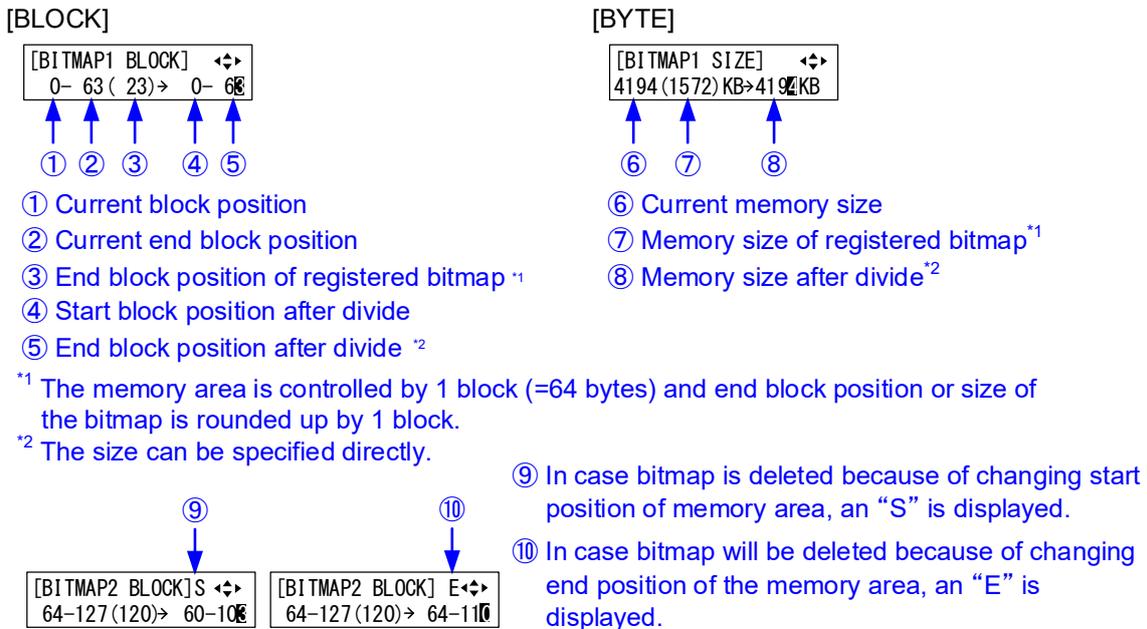
If you select “BLOCK” for “DISPLAY”, the current start and end block positions are displayed on the left of the front panel display. If a bitmap is registered, the final block position is displayed in parentheses. The start and end block positions after divide are displayed on the right. If you want 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 dividing 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.



[Fig. 9.36] “BLOCK” and “BYTE”

## 9.19.8 Input image capture

Menu Top→BITMAP→CAPTURE VIDEO

Setting for MAIN

Setting value

**[Table 9.53] Setting input image capture**

Setting item	Setting value
Register number	No.1 to No.4* [Default] No.1

\*Can be set if memory area is divided.

An input video can be treated as a bitmap by capturing and registering it. The maximum resolution is [Horizontal resolution × Vertical resolution × 3 (the number of bytes per pixel; “3” fixed)] 8,388,608 bytes or less. To register multiple bitmaps and captured images, the total resolution of all bitmaps and captured images should be 8,388,608 bytes or less (aspect ratio does not matter).

Captured images can be displayed at native size or may be enlarged, but cannot be reduced in size.

Larger resolutions require a longer loading time; it may take approximately six seconds at a maximum.

Registered images having a lower resolution than the target sink device.

You can register any images having a lower resolution by setting output resolution to smaller resolution and capturing the video.

To freeze the input video temporarily, press the “MENU/ENTER” button. To register the frozen image, select “YES” and then press the “MENU/ENTER” button again. To release freeze, press the “BACK” button. It can be released automatically when an input channel is switched or input signal changes.

If resolution of input video is too large compared to the reserved memory area, it can cause a significant memory shortage. In this case, message “MEMORY SIZE OVER” will be displayed after you press the “MENU/ENTER” button and registration will not be executed.

【See: 9.4.1 Output resolution】

【See: 9.19.7 Dividing memory area】

## 9.20 Startup

---

### 9.20.1 Power state

---

Menu  Top→POWER ON SETTINGS→START-UP MODE

Setting value

**[Table 9.54] Power state when POWER is on**

Setting value	Power state
AUTO [Default]	Power state before main [POWER] switch is powered off
ON	Powered on
OFF	Standby

You can set the MSD's standby state for when the main [POWER] switch on the rear panel is turned on.

**Note:**

“**[Table 9.54]**” is also applied when the power state is changed such as operating an external power supplier and recovering from power fail.

### 9.20.2 Command execution for DISPLAY POWER button

---

Menu  Top→POWER ON SETTINGS→DISPLAY POWER CMD. EXE.

Setting value  AUTO [Default], OFF, ON

You can set the DISPLAY POWER button state at the time of MSD start-up.

“AUTO” : The same state as it was before powering off the MSD or entering standby mode.

“OFF” : DISPLAY POWER buttons do not operate.

“ON” : Commands are executed if commands are registered in a DISPLAY POWER button.

**[Table 9.55] Command execution registered to DISPLAY POWER button**

	Condition	State
Setting value	DISPLAY POWER button state before the MSD is powered off or going into standby.	DISPLAY POWER button state after the MSD is powered on.
AUTO	OFF	OFF
	ON	ON
OFF	OFF	OFF
	ON	
ON	OFF	ON
	ON	

【See: 9.16.3 Command link】

### 9.20.3 UNLOCK button mode

Menu Top→POWER ON SETTINGS→UNLOCK BUTTON MODE

Setting value

**[Table 9.56] UNLOCK button status**

Setting value	Description	LED
AUTO [Default]	As it was before powering off the MSD or entering standby mode.	-
LOCK	Locks "COMMAND" buttons.	Does not light
RECALL CROSSPOINT	Enables crosspoint memory operation.	Lights red
COMMAND	Enables control command execution.	Lights green

You can set the "UNLOCK" button state at the time of MSD start-up.

### 9.20.4 Front panel security lockout

Menu Top→POWER ON SETTINGS→BUTTON LOCK

Setting value

**[Table 9.57] Button security lockout**

Setting value	Description
AUTO [Default]	As it was before powering off the MSD or entering standby mode.
LOCK	Enables front panel security lockout.
UNLOCK	Disables front panel security lockout.

You can select a front panel security lockout mode.

【See: 9.21.1 Grouping front panel security lockout】

【See: 8.3.9 Front panel security lockout】

## 9.21 Configuring MSD

### 9.21.1 Grouping front panel security lockout

Menu Top→SYSTEM SETTINGS→BUTTON LOCK TARGET

Setting value  

**[Table 9.58] Target buttons of security lockout**

Setting for	Target button	Setting value
CHANNEL	“Input channel selection” buttons	LOCK [Default], UNLOCK
MENU	“MENU/ENTER” button, “Navigation” buttons	LOCK [Default], UNLOCK
RECALL CROSSPOINT	Disables crosspoint memory to be recalled <ul style="list-style-type: none"> <li>▪ When “UNLOCK” button lights red: “COMMAND” buttons cannot be selected.</li> <li>▪ When “UNLOCK” button lights green or does not light: “UNLOCK” button will not become red</li> </ul>	LOCK [Default], UNLOCK
COMMAND	Disable control command to be execution <ul style="list-style-type: none"> <li>▪ When “UNLOCK” button lights green: “COMMAND” buttons cannot be selected.</li> <li>▪ When “UNLOCK” button lights red or does not light: “UNLOCK” button will not become green</li> </ul>	LOCK [Default], UNLOCK
UNLOCK BUTTON	“UNLOCK” button	LOCK [Default], UNLOCK
DISPLAY POWER	“DISPLAY POWER” button	LOCK [Default], UNLOCK
PinP	“PinP” button and “WINDOW” button	LOCK [Default], UNLOCK
VOLUME	“MIC/LINE” volume knob and “SOURCE” volume knob	LOCK [Default], UNLOCK

You can set front panel security lockout that prevents accidental changes to the controller settings.

**【See: 8.3.9 Front panel security lockout】**

## 9.21.2 Beep

---

Menu Top→SYSTEM SETTINGS→BEEP SOUND  
 Setting value ON [Default], OFF

You can enable/disable the beep tone function (sounding every time you press a front panel button).

## 9.21.3 Alarm

---

Menu Top→SYSTEM SETTINGS→ALARM  
 Setting value ON : Enabling [Default]  
 OFF : Disabling

You can enable/disable the alarm function for abnormal internal temperature or cooling fan.

\*\*\*\*\* ALARM \*\*\*\*\*  
 FAN TEMP

**[Fig. 9.37] Alarm page**

**[Table 9.59] Alarm description**

Displayed value	Description
FAN	Abnormality in cooling fan is detected.
TEMP	Abnormality in internal temperature is detected.

**Note:**

In case an alarm is output, the MSD may have problems. Please contact us.

### 9.21.4 Displaying advanced menu

---

Menu	Top→SYSTEM SETTINGS→ADVANCED MENU
Setting value	OFF : Displays normal setting menu [Default] ON : Displays advanced setting menu

You can switch menu display mode: Normal setting menu or Advanced setting menu.

### 9.21.5 Automatic lockout of COMMAND button

---

Menu	Top→SYSTEM SETTINGS→COMMAND BUTTON LOCK
Setting value	ON [Default], OFF

“ON”: Disables “COMMAND” button operation and turns off the “UNLOCK” button LED if “COMMAND” button function is not operated for 30 seconds.

To operate “COMMAND” button operation, first change the “UNLOCK” button mode.

### 9.21.6 Power saving

---

Menu	Top→SYSTEM SETTINGS→POWER SAVE MODE
Setting value	ON [Default], OFF

If you select “ON” and no button function is operated for 30 seconds, the display brightness is reduced to approximately 25%. When you operate any button, brightness returns to 100%.

### 9.21.7 DISPLAY POWER button press dwelling time

---

Menu	Top→SYSTEM SETTINGS→DISPLAY PWR PRESS TIME
Setting value	0ms to 5000ms (by 10ms) [Default] 0ms

You can set the button press dwelling time of the target “DISPLAY POWER” button to prevent the sink device from being powered off if the button is pressed accidentally.

## 9.21.8 Top page

Menu Top→SYSTEM SETTINGS→TOP PAGE  
 Setting value  

NORMAL [Default]

MSD-701AMP  
[ V&A ]

SINK DEVICE STATUS

OUT A B C  
S S

INPUT STATUS

IN1 2 3 4 5 6 7  
H<sup>x</sup> D H

AUDIO VOLUME

[DIGITAL] MUTE  
0dBu

You can mute/unmute by pressing the "BACK" button.

[Fig. 9.38] Top page of front panel display

For the top page, you can select one of four types above.

With input signal status and sink device status pages, the details of each signal can be displayed using "▲" and "▼" buttons.

【See: 9.22.1 Sink device status】

【See: 9.22.3 Input signal status】

## 9.22 Status

### 9.22.1 Sink device status

Menu Top→VIEW STATUS→SINK DEVICE STATUS

Values to be displayed

[Table 9.60] Sink device status

	All video output connector	Each video output connector
Display	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">           OUT A B C            S N N      ↕         </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;">           [OUT A STATUS] H24 Y444            HDCP SUPPORT      ↕         </div>
Upper	Video output channel	Output channel, output signal, color depth, output format
Lower	HDCP status	HDCP status, error code

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

#### ■ Output signal and color depth

H24 : HDMI, 24-BIT COLOR

H30 : HDMI, 30-BIT COLOR

D : DVI

#### ■ Output format

Y444 : YCbCr 4:4:4 MODE

Y422 : YCbCr 4:2:2 MODE

RGB : RGB MODE

#### ■ HDCP authorization status

[Table 9.61] HDCP authorization status

Character	HDCP status	Description
S	HDCP SUPPORT	HDCP 1.4-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 authorization failed.
C	HDCP CHECK NOW	Sink device status is being checked.
D	SYNC DEVICE DISCONNECT	Monitor was disconnected (displayed only for one second).
L	HDBaseT LINK DISCONNECT	Category cable was disconnected (displayed only for one second).
O	HDBaseT NO LINK	No category cable is connected.
	UNCONNECTED	No sink device is connected.

## ■ Error code

From the left to right, status of video output, digital audio output, and analog audio output is displayed.

[Table 9.62] Error code

Code	Video output	Audio output
	If any number or character is not displayed, video or audio is output correctly.	
1	" <b>9.5.1 Output signal</b> " is set to "BLACK".	" <b>9.11.4 Mute</b> " is set to "ON".
2	Displayed only for digital input. DDC power supply is not input. (If no source device is connected, this error code is displayed).	
3	No video signal is input.	No audio signal is input. <sup>*1</sup>
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 error code 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)	Signal that are not supported by the MSD are input. (Sampling clock is out of the range).
8	—	No audio is output. " <b>9.11.1 Audio output</b> " is set to "OFF".
9	—	" <b>9.5.7 Output format</b> " is set to "DVI MODE" or a sink device that does not support audio is connected. <sup>*2</sup>
A	Input channel is set to "OFF".	

<sup>\*1</sup>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.

<sup>\*2</sup>This status is only for HDMI output connectors.

## 9.22.2 Viewing sink device EDID

Menu            Top→VIEW STATUS→SINK DEVICE EDID

Values to be displayed           

[Table 9.63] Sink device EDID

No.	1	2	3
Display	[OUT A]xxxx 1920x1080 148.50MHz ↕	[OUT A] HDMI RGB/YCbCr422/444 ↕  [OUT A] DVI ↕	[OUT A] 24/30/36BIT COLOR ↕
Upper	Monitor name	HDMI or nothing is displayed	—
Lower	Resolution, dot clock	Sampling RGB: RGB 422 : YCbCr 4:2:2 444 : YCbCr 4:4:4 420 : YCbCr 4:2:0 Or Non-HDMI-supported sink device DVI : DVI device	Color depth

No.	4	5
Display	[OUT A] 32/44.1/48/96kHz ↕	[OUT A] 16/20/24BIT 8CHANNEL COMPRESSED ↕
Upper	—	Audio bit length
Lower	Audio sampling frequency	Number of audio channels, compressed audio supported/not supported

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

- HDMI supported sink device : No.1 to No.5 in the table above
- Non-HDMI-supported sink device : No.1 and No.2 in the table above

If no sink device is connected, the front panel display shows “UNCONNECTED”. If the MSD cannot read EDID from connected sink devices, the front panel display (No.1) shows “EDID READ ERROR”.

### 9.22.3 Input signal status

Menu        Top→VIEW STATUS→INPUT STATUS

Values to be displayed       

[Table 9.64] Input signal status

	All input channels	Video status of each input channel	Audio status of each input channel
Display	<div style="border: 1px solid black; padding: 5px; width: fit-content;">           IN1 2 3 4 5 6 7            H× D H R ↕         </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">           [IN1 FORMAT] 24            1080p 59.94Hz H×↕         </div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">           [IN1 AUDIO] M            Linear PCM 48kHz ↕         </div>
Upper	Input channel	Input channel, Deep Color	Input channel, multi-channel audio information
Lower	Input signal type, other information	Video signal format, input signal type, other information	Audio signal type

You can view the input signal status that is input from HDMI and DVI input connectors.

#### ■ Input signal type

[Table 9.65] 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 Y/C signal

#### ■ Other information

Only for digital input

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

Lower : "A" : audio is embedded.

#### ■ Deep Color

24 : 24-BIT COLOR

32 : 30-BIT COLOR

## ■ Input video signal format

[Table 9.66] Input video signal format

Example	Signal type	Description
1080p 59.94Hz	SDTV/HDTV signal	Format type, vertical sync frequency
800 x 600 60.00Hz	RGB signal	Horizontal/vertical resolution, vertical sync frequency
NTSC	Composite video signal or Y/C signal	Format type
56.83kHz 60.02Hz	Signal that cannot be recognized	Horizontal/vertical sync frequency
NO SIGNAL	No video signal is input.	

If the dot clock of the input signal exceeds the limitation, “E” is displayed on the left of the input signal type, and the video is not output.

[IN1 FORMAT]	24
2160p 30Hz	EH*

## ■ Multi-channel audio information

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

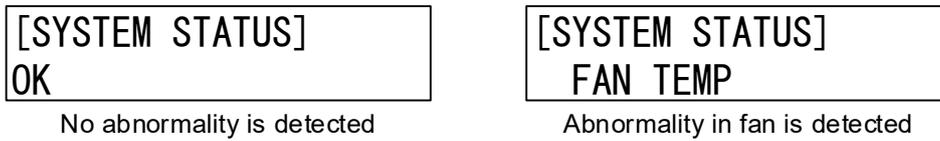
## ■ Input audio signal type

[Table 9.67] Input audio signal type

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

## 9.22.4 System status

Menu Top→VIEW STATUS→SYSTEM STATUS



[Fig. 9.39] System status

[Table 9.68] System error

Displayed value	Description
FAN	Abnormality in rotation speed is detected.
TEMP	Abnormality in internal temperature is detected.

You can view the internal temperature and fan status.

**Note:**

In case an alarm is output, the MSD may have problems. Please contact us.

## 9.22.5 Fan status

Menu Top→VIEW STATUS→FAN STATUS

Setting value

You can view fan rotation speed and fan status.

“O” means normal, and “x” means abnormal.

**Note:**

In case an alarm is output, the MSD may have problems. Please contact us.

## 9.22.6 Device information

Menu Top→VIEW STATUS→VERSION

Values to be displayed Model name and firmware version

You can view the model name and firmware version.

## 9.23 Factory default list

[1/5]

Menu		Factory default
SWITCHING MODE	—	V&A
OUTPUT IMAGE	RESOLUTION	AUTO-A
	ASPECT RATIO	MAIN, PinP: RESOLUTION
	IMAGE POSITION	@1080p [MAIN] —, P1 to P5: 0/0 [PinP] — : — (N/A), P1: 80/45, P2: 1360/45 P3: 80/765, P4: 1360/765, P5: 960/270
	IMAGE SIZE	@1080p [MAIN] —, P1 to P4: 1920/1080, P5: 960/540 [PinP] — : — (N/A), P1 to P4: 480/270 P5: 960/540
	IMAGE CROP	@1080p [MAIN] —, P1 to P4: 0/1920/0 1080, P5: 0/960/270/810 [PinP] — : — (N/A), P1: 80/560/45/315, P2: 1360/1840/45/315, P3: 80/560/765/1035, P4: 1360/1840/765/1035, P5: 960/1920/270/810
	BACKGROUND COLOR	R/G/B: 0 (Black)
	TEST PATTERN	Pattern outputting: OFF; Scrolling: OFF
	IMAGE INITIALIZATION	—
OUTPUT SETTINGS	OUTPUT SIGNAL	SOURCE
	NO SIGNAL IMAGE	BLUE
	HDCP OUTPUT MODE	ALWAYS
	HDCP RETRY	ETERNITY (retries until succeed)
	CONNECTION RESET	—
	SIGNAL EQUALIZATION	OFF
	SIGNAL FORMAT	HDMI YCbCr 4:4:4 MODE
	HDBT LONG REACH MODE	OFF
	DEEP COLOR	24-BIT COLOR
	VIDEO SWITCHING EFFECT	FREEZE→FADE OUT-IN
	SWITCHING EFFECT SPEED	350ms
	WIPE EFFECT COLOR	R/G/B: 0 (Black)
	EDID ERR. OUTPUT MODE	CHECKSUM DISABLE
	CEC CONNECTION	NOT CONNECTED

Menu		Factory default
INPUT IMAGE	ASPECT RATIO	AUTO-1
	ASPECT RATIO CONTROL	L-BOX/S-PANEL
	OVERSCAN	NTSC/PAL/SDTV: 105% HDTV/PC : 100%
	IMAGE POSITION	H/V: 0
	IMAGE SIZE	H/V: Output resolution pixels
	IMAGE CROP	L/T: 0, R/B: Output resolution pixels (No cropping)
	IMAGE INITIALIZATION	—
INPUT SETTINGS	INPUT CONNECTOR	HDMI
	DVI-I: SIGNAL FORMAT	DIGITAL
	NO INPUT MONITORING	10000ms
	HDCP INPUT MODE	ENABLE
	SIGNAL EQUALIZATION	ON
	HDBT LONG REACH MODE	OFF
	HDBT POWER SUPPLY	OFF
	ANALOG INPUT FORMAT	AUTO
	INTERRUPTION DETECTION	ON
	SIGNAL SETTING MODE	[Setting mode] SELECTED [Individual setting] ASPECT : OFF ANALOG TYPE : ON(FIXED) AUDIO LEVEL : ON(FIXED)
INPUT TIMING	ANALOG MEASUREMENT	NORMAL MODE
	H TOTAL PIXELS	0 (To be set automatically when signal is input)
	H START POSITION	0 (To be set automatically when signal is input)
	H ACTIVE	0 (To be set automatically when signal is input)
	V START POSITION	0 (To be set automatically when signal is input)
	V ACTIVE	0 (To be set automatically when signal is input)
	START POSITION DETECT.	ON
	UNREGISTERED SIGNAL	AUTO SETUP ON
	INPUT TIMING INIT.	—
	RECALL ANALOG SETTINGS	—
	STORE ANALOG SETTINGS	All 99 dives are not registered.
	ANALOG SIGNAL TRACKING	0 (To be set automatically when signal is input)
AUTO SWITCHING	SIGNAL ON PRIORITY	OFF
	SIGNAL OFF PRIORITY	OFF
	IGNORING DURATION	0s000ms
	SWITCHING MODE	V&A

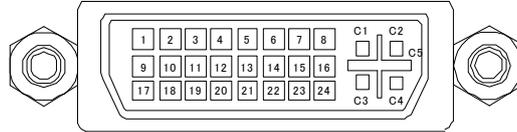
Menu		Factory default
PICTURE ADJUSTMENT	OUTPUT BRIGHTNESS	100%
	OUTPUT CONTRAST	R/G/B: 100%
	OUTPUT GAMMA	1.0
	OUTPUT SETTING INIT.	NO
	INPUT SHARPNESS	0
	INPUT BRIGHTNESS	100%
	INPUT CONTRAST	R/G/B: 100%
	INPUT HUE	0°
	INPUT SATURATION	100%
	INPUT BLACK LEVEL	0.0%
	INPUT SETTING INIT.	NO
OUTPUT AUDIO SETTINGS	OUTPUT SIGNAL	ON
	OUTPUT LEVEL	0dB
	TONE CONTROL	TREBEL : 0dB BASE : 0dB
	MUTE	OFF
	LIP SYNC	0ms
	SAMPLING FREQUENCY	AUTO-A
	DIGITAL OUT MIXING	ON
	ANALOG OUT MIXING	ON
	SPEAKER1 MIXING	ON
	SPEAKER2 MIXING	ON
	DOWNMIX	DOWNMIX
	OUTPUT PRIORITY	MULTI
	SPEAKER OUT	4-16Ω(LO-Z)
	TEST TONE	Test tone: OFF, Speaker: ALL
INPUT AUDIO SETTINGS	INPUT SIGNAL	DIGITAL
	INPUT LEVEL OFFSET	0dB
	REFERENCE LEVEL	LINE: -10dBu, MIC: -60dBu
	COMPRESSOR	THRESHOLD : 0dB COMPRESSOR RATIO : 1:1 COMPRESSOR RELEASE : 1ms EXPANDER RATIO : 1:1 EXPANDER RELEASE : 1ms
	EQUALIZER	FREQ : EQUALIZER1: 100Hz EQUALIZER2: 250Hz EQUALIZER3: 1k EQUALIZER4: 1.6k EQUALIZER5: 2.5k EQUALIZER6: 4k EQUALIZER7: 10k GAIN : 0dB

Menu		Factory default
INPUT AUDIO SETTINGS (Cont'd)	HOWLING SUPPRESSOR	OFF, GAIN: -6dB, PEAK: -5dB
	LIP SYNC	0ms
	FRONT VOLUME	LINE&MIC
	AUDIO STABLE WAIT	ON
EDID SETTINGS	EDID SELECTION	BUILT-IN EDID
	RESOLUTION	1080p(1920x1080)
	SINK DEVICE EDID COPY	All 8 COPY DATA is not registered.
	SIGNAL FORMAT	HDMI
	FRAME RATE	60Hz
	DEEP COLOR	24-BIT COLOR
	Linear PCM	48kHz
	AAC	OFF
	Dolby Digital	OFF
	Dolby Digital Plus	OFF
	Dolby TrueHD	OFF
	DTS	OFF
	DTS-HD	OFF
	SPEAKER CONFIGURATION	2ch (FL/FR)
RS-232C SETTINGS	PARAMETERS	Baud rate : 9600bps Data bit length : 8bit Parity check : NONE Stop bit : 1bit
	COMMUNICATION MODE	RS1, RS2, HDBT IN5 : RECEIVER HDBT OUT : TRANSMITTER
LAN SETTINGS	IP ADDRESS	192.168.1.199
	SUBNET MASK	255.255.255.0
	GATEWAY	192.168.1.200
	MAC ADDRESS	MAC address is displayed.
	PORT NUMBER	Connection 1 to 3: 1100 Connection 4 to 6: 23 Connection 7 to 8: 80
	COMMUNICATION MODE	RECEIVER
	HDBT COMMUNICATION	ON
CONTROL COMMAND	COMMAND REGISTER/EDIT	32 commands are not registered.
	REPLY REGISTER/EDIT	30 commands are not registered. (CMD31 and CMD32: Already registered)
	COMMAND LINK	38 commands are not registered.
	EXECUTE CTRL COMMAND	—
	INITIALIZATION	—
	INVALID DURATION	0s000ms
	ILLUMINATE CMD BUTTON	REGISTERED
	BLINKING DURATION	COMMAND A to COMMAND F: OFF DISPLAY POWER: EXECUTION

Menu		Factory default
REMOTE	STANDBY CONTROL	FRONT BUTTON
	EMERGENCY SHUTDOWN	DISABLE
USER PRESET	RECALL CROSSPOINT	ALL --- (Not controlled)
	STORE CROSSPOINT	—
	EDIT CROSSPOINT	Output channel (OUT) : MAIN Video combination (PinP) : — Video input channel (VIDEO): — Audio input channel (AUDIO): — Memory name (NAME) : 20 (space)
	RECALL ALL SETTINGS	—
	STORE ALL SETTINGS	—
	START-UP	LAST CHANNEL
	BITMAP	BITMAP OUTPUT
BACKGROUND COLOR		R/G/B: 255 (White)
ASPECT RATIO		AUTO
IMAGE POSITION		CENTER
INPUT ASSIGN		OFF
START-UP BITMAP		OFF
DIVIDE MEMORY		1 bitmap, 128 blocks memory
CAPTURE VIDEO		No.1
POWER ON SETTINGS	START-UP MODE	AUTO
	DISPLAY POWER CMD. EXE.	AUTO
	UNLOCK BUTTON MODE	AUTO
	BUTTON LOCK	AUTO
SYSTEM SETTINGS	BUTTON LOCK TARGET	LOCK
	BEEP SOUND	ON
	ALARM	ON
	ADVANCED MENU	OFF
	COMMAND BUTTON LOCK	ON
	POWER SAVE MODE	ON
	DISPLAY PWR PRESS TIME	0ms
	TOP PAGE	NORMAL (MSD-701AMP)
VIEW STATUS	SINK DEVICE STATUS	—
	SINK DEVICE EDID	—
	INPUT STATUS	—
	SYSTEM STATUS	—
	FAN STATUS	—
	VERSION	—

## 10 Specification

### 10.1 DVI input connector



[Fig. 10.1] Female DVI-I (29-pin)

[Table 10.1] Pin-assignments

Pin#	Input signal				
	HDMI/DVI	Analog RGB	Analog YPbPr	Composite video	Y/C
1	TMDS Data2-	N.C.	N.C.	N.C.	N.C.
2	TMDS Data2+	N.C.	N.C.	N.C.	N.C.
3	GND	N.C.	N.C.	N.C.	N.C.
4	N.C.	N.C.	N.C.	N.C.	N.C.
5	N.C.	N.C.	N.C.	N.C.	N.C.
6	DDC Clock	DDC Clock	N.C.	N.C.	N.C.
7	DDC Data	DDC Data	N.C.	N.C.	N.C.
8	N.C.	V-Sync	N.C.	N.C.	N.C.
9	TMDS Data1-	N.C.	N.C.	N.C.	N.C.
10	TMDS Data1+	N.C.	N.C.	N.C.	N.C.
11	GND	N.C.	N.C.	N.C.	N.C.
12	N.C.	N.C.	N.C.	N.C.	N.C.
13	N.C.	N.C.	N.C.	N.C.	N.C.
14	+5V Power	N.C.	N.C.	N.C.	N.C.
15	GND	N.C.	N.C.	N.C.	N.C.
16	Hot Plug Detect	N.C.	N.C.	N.C.	N.C.
17	TMDS Data0-	N.C.	N.C.	N.C.	N.C.
18	TMDS Data0+	N.C.	N.C.	N.C.	N.C.
19	GND	N.C.	N.C.	N.C.	N.C.
20	N.C.	N.C.	N.C.	N.C.	N.C.
21	N.C.	N.C.	N.C.	N.C.	N.C.
22	GND	N.C.	N.C.	N.C.	N.C.
23	TMDS Clock+	N.C.	N.C.	N.C.	N.C.
24	TMDS Clock-	N.C.	N.C.	N.C.	N.C.
C1	N.C.	Red	Pr/Cr	N.C.	N.C.
C2	N.C.	Green / SOG	Y	VIDEO	Y
C3	N.C.	Blue	Pb/Cb	N.C.	C
C4	N.C.	H-Sync / CS	N.C.	N.C.	N.C.
C5	N.C.	GND	GND	GND	GND

N.C.: No Connection, SOG: Sync On Green, CS: Composite Sync

## 10.2 Product specification

Item		Description
Input	Video	HDMI/DVI 7 inputs Switch-selectable between HDBaseT and HDMI/DVI (IN5 only) DVI connectors: Switch-selectable between digital and analog HDMI Deep Color (*1)/DVI 1.0 TMDS single link, HDCP 1.4 TMDS clock: 25 MHz to 225 MHz, TMDS data rate: 0.75 Gbps to 6.75 Gbps Built-in cable EQ, EDID emulation, CEC (HDMI connector only) Connector: 5 female HDMI Type A (19-pin), 2 female DVI-I (29-pin)
		HDBaseT 1 input Switch-selectable between HDBaseT and HDMI/DVI (IN5 only) HDBaseT (*1) HDCP 1.4 EDID emulation, RS-232C, LAN, CEC, PoH power supply (IEEE 802.3af) Connector: RJ-45 (*2) Cable: CAT.5E HDC, Cat5e UTP/STP, Cat6 UTP/STP (T568A/T568B straight-through) For PoH power feeding, please use a 24 AWG category cable or thicker cable.
		Universal Analog 2 inputs Switch-selectable between digital and analog Composite video/ Y/C/Analog RGB/Analog YPbPr (Auto-recognition) Composite video : 1.0 V[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 Connector: 2 female DVI-I (29-pin)
		Format
	Universal Analog VGA to QWXGA (Dot clock: 25 MHz to 165 MHz) For WUXGA/QWXGA, only Reduced Blanking is supported. NTSC / PAL 480i / 480p / 576i / 576p / 720p / 1080i / 1080p	
	Audio	Digital 7 inputs Switch-selectable between HDBaseT and HDMI/DVI (IN5 only) Multi-channel LPCM up to 8 channels Sampling frequency: 32 kHz to 192 kHz, Sample size: 16 bit to 24 bit Reference level: -20 dBFS, Max. input level: 0 dBFS Connector: 5 female HDMI Type A (19-pin), 1 RJ-45, 2 female DVI-I (29-pin)
		Analog 3 inputs Balanced/Unbalanced Stereo LR Input impedance: 48 kΩ balanced/24 kΩ unbalanced Reference level: -10 dBu, Max. input level: +10 dBu Connector: 3 captive screw (5-pin)
		Line 1 input Balanced/Unbalanced Stereo LR Input impedance: 48 kΩ balanced/24 kΩ unbalanced Reference level: 0 dBu to -40 dBu, Max. input level: +10 dBu Connector: Captive screw (5-pin)
		Mic 1 input Balanced/Unbalanced Mono Input impedance: 10 kΩ or more Reference level: 0 dBu to -60 dBu, Max. input level: +10 dBu Connector: Captive screw (3-pin)

Item		Description
Output	Video	HDMI/DVI 2 outputs Video can be distributed to HDMI/DVI outputs and an HDBaseT output simultaneously. HDMI Deep Color (*1)/DVI 1.0 TMDS single link, HDCP 1.4 TMDS clock: 27 MHz to 202.5 MHz, TMDS data rate: 0.81 Gbps to 6.075 Gbps Built-in cable EQ, CEC Connector: 2 female HDMI Type A (19-pin)
		HDBaseT 1 output Video can be distributed to HDMI/DVI outputs and an HDBaseT output simultaneously. HDBaseT (*1) HDCP 1.4 RS-232C, LAN, CEC Connector: RJ-45 (*2) Cable: CAT.5E HDC, Cat5e UTP/STP, Cat6 UTP/STP (T568A/T568B straight-through)
		Format VGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA / SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ / WXGA++ / UXGA / WSXGA+ / VESAHD / WUXGA / QWXGA For VESAHD/WUXGA/QWXGA, only Reduced Blanking is supported. 480p /576p / 720p / 1080i / 1080p
	Audio	Digital 3 outputs Audio can be distributed to HDMI/DVI outputs and an HDBaseT output simultaneously Multi-channel LPCM up to 8 channels Sampling frequency: 32 kHz to 192 kHz, Sample size: 16 bit to 24 bit Reference level: -20 dBFS, Max. output level: 0 dBFS Connector: 2 female HDMI Type A (19-pin), RJ-45
		Analog 1 output Balanced/Unbalanced Stereo LR Output impedance: 100 Ω balanced/50 Ω unbalanced Reference level: -10 dBu, Max. output level: +10 dBu Connector: Captive screw (5-pin)
		Speaker output 1 1 output Stereo LR Load impedance: 4 Ω to 16 Ω, 100 W + 100 W (4 Ω 1 kHz) Connector: Captive screw (4-pin) (5.08 mm)
		Speaker output 2 1 output Switch-selectable between Stereo LR and Mono (High-impedance output) [Stereo LR] Load impedance: 4 Ω to 16 Ω, 100 W + 100 W (4 Ω 1 kHz) Connector: Captive screw (4-pin) (5.08 mm) [Mono] High-impedance output Load impedance: 200 Ω to 10 kΩ, 50 W (200 Ω 100 V line) Connector: Captive screw (2-pin) (5.08 mm)
Maximum transmission distances	Digital input HDMI/DVI: 98 ft. (30 m) (*3) HDBaseT : 328 ft. (100 m), 492 ft. (150 m) (Long reach mode is used) (*4)	
	Digital output HDMI/DVI: 164 ft. (50 m) (*3) HDBaseT : 328 ft. (100 m), 492 ft. (150 m) (Long reach mode is used) (*4)	
Control	RS-232C 2 ports/captive screw (3-pin)	
	LAN 1 port/RJ-45 10Base-T/100Base-TX (Auto Negotiation), Auto MDI/MDI-X	
	Contact closure 6 ports/captive screw (6-pin) Non-voltage contact input up to DC 24 V 1 A	
	Remote control Remote IN 1 : Open-circuit voltage DC 5 V, short-circuit current 0.5 mA, external button switch Remote IN 2 : Voltage detection DC 5 V to DC 30 V, Receiving emergency stop signal Remote OUT : Non-voltage contact N.C./N.O., input up to DC 24 V 1 A, power distribution unit control Connector: Captive screw (8-pin)	
	External control RS-232C, LAN, HDBaseT, Contact closure, PLink (class1), CEC (Power control of sink device) (*10)	
Functions	Video Motion adaptive interlaced/progressive conversion, Aspect ratio control, Picture adjustment (brightness, contrast, image position, image size, etc.), Seamless Switching, Two video combinations: PinP and side-by-side, Pattern memory (5 settings), Each video output OFF	
	Audio Input level offset control, Output level control, Mic/Line level control, Source volume control, Lip Sync (Max. 256 ms.), Audio Downmix, Audio mixing, Compressor, Limiter, 7-band equalizer, Tone control, Automatic feedback suppressor	
	Others WEB browser control, Input channel automatic switching, Audio breakaway for independent audio and video switching, Crosspoint memory (9 settings), Preset memory (8 settings), Last memory, Anti-Snow, Connection Reset (*6), External control commands (32 commands), Button security lockout, System check, Standby switch	
General	Power 100 - 240 VAC ± 10%, 50 Hz/60 Hz ± 3 Hz	
	Power consumption About 108 Watts (1/8 MAX power)	
	Dimensions 16.9 × 3.5 × 13.8" (430 (W) × 88 (H) × 350 (D) mm) (2U high) (Excluding connectors and the like)	
	Weight 17 lbs. (7.7 kg)	
	Temperature Operating : 32°F to 104°F (0°C to +40°C) Storage : -4°F to +176°F (-20°C to +80°C)	
	Humidity Operating/Storage: 20% to 90% (Non Condensing)	

\*1 30 bit/pixel (10 bit/component) Deep Color is supported while x.v.Color, 3D, ARC, HEC, and HDR are not supported.

\*2 RJ-45 (HDBaseT connector) is only for extending digital video and audio signals over a Cat5e/Cat6 cable. Use it with IDK's HDBaseT Products. Do not use for LAN devices.

\*3 The maximum cable distance varies depending on the connected devices and was measured under following conditions:

• 1080p@60: When IDK's 24 AWG cable was used and signals of 1080p@60 24 bit/pixel (8 bit/component) was input or output.

The maximum cable distance depends on the connected devices. The distance may not be extended with some device combinations, cabling method, or other manufacturer's cable. Video may be disturbed or may not be output even if signals are within the range mentioned above.

\*4 The maximum transmission distance was obtained when IDK's CAT.5E HDC cable was used. The distance may not be extended with some device combinations, cabling method, or other manufacturer's cable. Video may be disturbed or may not be output even if signals are within the range mentioned above.

The shorter distance of connected HDBaseT product or sink device's maximum transmission distance.

Up to 492 ft. (150 m): 1080p (24 bit) in Long reach mode. For Long reach mode, use IDK's HDBaseT Products that supports 328 ft. (100 m) or longer.

\*5 The sink device must support CEC. Some sink devices cannot be controlled from the MSD through CEC.

\*6 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 plug and unplug the cables. It creates the same condition as if the cable were physically disconnected and reconnected. This feature only works for the MSD's output. If other devices are connected between the MSD's output and sink device, this feature may be invalid.

# 11 Troubleshooting

This chapter provides recommendations in case difficulties are encountered during MSD setup and operation.

In case the MSD does not work correctly, please check the following items first.

- Are the MSD and all devices connected to power and powered on?
- Are signal cables connected correctly?
- Are there any loose or partially mated connections?
- Are the interconnecting cables specified correctly to support adequate bandwidth?
- Are specifications of connected devices matched to each other?
- Are configuration settings for the connected devices correct?
- Is there any nearby equipment that may cause electrical noise/RF interference?

If the problem persists, review the following section for guidelines and recommendations. Refer to the 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 being output.	<p>Check the error code in “<b>9.22.1 Sink device status</b>”.</p> <p>(Since the MSD has multiple output connectors, check the error code for the output port that is not providing video.)</p> <ul style="list-style-type: none"> <li>• Error code 2: Check if the source device is connected and powered on.</li> <li>• Error code 3: No signal is input. Check [1] to [6] on the next page.</li> <li>• Error code 4: An error may be occurring in the source device or specifically with HDCP authentication. Check [2], [5] and [6].</li> <li>• Error code 5: If the display device or other connected AV signal component does not support HDCP, only content without content protection (such as from an analog input and test pattern) will be served. When content with protection is input, a black screen is output. Some HDMI/DVI devices query the connected device to determine HDCP compliance and whether or not to output an HDCP encrypted signal. Since the MSD is HDCP compliant, video may not be output if the MSD is connected to a sink device or AV amplifier that does not support HDCP. In this case and if the content is not protected, disable HDCP for that input port on the MSD. See “<b>9.7.4 HDCP input</b>” for details.</li> <li>• Error code 6 and 7: An error is occurring within the source device.</li> <li>• Error code A: Set “<b>8.3.2 Selecting input channels</b>” to a value other than “OFF”.</li> <li>• If no error code is displayed: Set “<b>9.4.7 Test pattern</b>” to any pattern (other than “OFF”). <ul style="list-style-type: none"> <li>- If none of the test patterns can be successfully presented on the sink device, check [5] to [7].</li> <li>- If a test pattern is presented on the sink device, the source device may not be providing a signal.</li> </ul> </li> </ul>	—

Problem	Cause/Check item/Solution	Page
Digital input video is not being output.	[1] The time setting for monitoring no-signal input may be too short.	84
	[2] Change the input equalizer setting.	85
Analog input video is not being output.	[3] Change the input signal type.	87
Video is not being output.	[4] If the source device has multiple output connectors, check the video output settings for the affected port of the source device.	—
Video has disappeared, is intermittent, or presents noise.	[5] If using a long cable for input or output, replace it with a 16.4 ft. (5 m) or shorter cable. Since the MSD has automatic cable length equalization, long cables can be successfully used, but the MSD's full performance may not be realized if the cable or connected peripheral devices are of inferior quality. If the error is solved by replacing the cable, the signal may have been degraded due to excessive attenuation or crosstalk. IDK offers high-quality cables, cable boosters and extenders. Please contact us as needed.	—
	[6] When high-speed signals (high resolution: such as UXGA, WUXGA, QWXGA, 1080p; DEEP COLOR signal) are presented to the input or provided by the output, video may not be displayed or noise may appear. This is largely dependent on cable quality and the characteristics of connected peripheral devices. If the problem occurs only when a specific input is selected, the problem is being caused by difficulties ahead of that input port. If it occurs for all inputs or when an internal MSD test pattern is displayed, the problem is related to the output side of the system. One possible solution is to change to a lower resolution format and/or disable Deep color. You can check the resolution and color depth of the input signal in <b>"9.22.3 Input signal status"</b> and you can also limit resolution and color depth of input signal as defined by the MSD's EDID configuration settings.  You can specify the output resolution and check the color depth of the output signal in <b>"9.22.1 Sink device status"</b> . It is also possible to limit the output signal color depth.	118, 121  118, 121
Input video and test pattern are not output.	[7] If you set the output resolution to other than "AUTO", check if the selected resolution is supported by the sink device.  As an example, if you select "1080i", video may not be presented by sink devices that do not support interlaced signals.  For TV output resolutions (480i to 1080p), check the vertical synchronous frequency. PC output resolutions (VGA to QWXGA) may not be compatible with LCD TVs.	64
Video is intermittent.	If you set <b>"9.7.9 Automatic detection of video input interruption"</b> to "ON", false detection may occur. Change the setting to "OFF".	88
Video from HDMI/DVI output is interrupted or has noise.	If the problem occurs in all input channels or when a test pattern is displayed, replace the output cable with a shorter one or of higher quality.	—

Problem	Cause/Check item/Solution	Page
Video from analog input is displayed in black-and-white or green.	Change the input signal type.	87
VHS reproduction or fast-forward is interrupted when analog composite video signal or analog Y/C signal is input.	Automatic detection of input signal failed. Set the input signal type manually to "VIDEO AUTO", "VIDEO", or "Y/C".	87
The left, right, top and bottom sides are cut off.	If the problem occurs only when "CROSS HATCH" (internal test pattern) is output, the sink device is enlarging the video. Adjust the sink device.	69
	If the sink device does not provide image configuration adjustments, set the video size and position parameters for the MSD's output port. If the problem occurs even if "CROSS HATCH" is output to all outputs, check [8] to [13].	64
Part of video is cut off or black is displayed at edge(s).	[8] Check the overscan setting.	79
	[9] Settings of the image position or size are not changed? <b>Note:</b> Image position and size can be set for each input or output.	80, 80, 65, 66
	[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 is cut off. b) Black is displayed at edge(s).	78 79
	[11] If "9.22.3 Input signal status" is set to "AUTO SETUP ON", input timing is measured when new signal is input. However, if a non-standard video format is applied to the input, the measurement may fail to provide optimal results. In this case and if the video is cut off, but the vertical and horizontal frequencies are correctly presented on the MSD's front panel display <b>"9.8.8 Automatic setting of input timing"</b> , the signal's characteristics don't match the built in format parameters. It will be necessary to make manual adjustments. Once the manual adjustments are configured, their values will automatically be stored for that non-standard source on that input port.	92 98
	[12] For analog input, set the automatic measurement of input timing in <b>"9.8.1 Automatic measurement"</b> . If the result of the automatic measurement shows that video is cut off or black is displayed at edges, set the total number of horizontal pixels, scanning start position, and the active area. For digital input, the start position and active area do not have to be set. Only when video edges are cut off 1 to 2 dots, set these items. (For digital input, the total number of horizontal pixels cannot be set).	94 to 95

Problem	Cause/Check item/Solution	Page
Black is displayed at top, bottom, right and left on PC video or only part of the PC video is displayed, and the rest can be revealed by scrolling with the mouse.	[13] Does the PC resolution (you can check it in "Properties" of the PC) match the resolution that is output from the PC (you can check it in "9.22.3 Input signal status". If not, set the EDID and PC resolutions. For laptops, if the "copydesktop" is enabled, the output to an external monitor is limited to the resolution of the laptop's native LCD screen. As a result, black may be displayed at edges. The problem can be solved by enlarging the display, extending the desktop or displaying only to the external monitor.	118, 118
Video is reduced vertically or horizontally.	Does the selected aspect ratio of the output resolution match that of the connected sink device? If not, adjust the aspect ratio of the sink device.	65
	Check the set aspect ratio of the input signal.	78
	Check the monitor setting of the source device (such as 4:3, 16:9, letter box and the like).	—
	For analog inputs, signals that cannot be recognized by the MSD may possibly be output with the wrong aspect ratio. Perform the automatic measurement in the "NEXT ASPECT" mode.	92
Video flickers	If an interlace signal is input to a sink device that does not support interlace inputs, the video may flicker. Check the format settings for the MSD's output port driving the sink device.	64
PC's dual monitor cannot be set or the setting is canceled.	If the monitoring function for no-signal input is enabled, the dual monitor function of your PC may not work correctly. In this case, disable the monitoring function.	84
It takes a long time to output video after video input is switched.	If you set the HDCP output to "HDCP INPUT ONLY", some sink devices may fail HDCP authentication. In this case, the sink may temporarily stop presenting video and audio when switching between input signals with and without HDCP support. In this case, set the HDCP output setting to "ALWAYS".	72
Analog video input from a PC displays with light-and-dark vertical stripes.	Set the total number of horizontal pixels. If you change the total number of horizontal pixels, you may sometimes have to set the start position of scanning and the active area.	94
Analog video input from a PC displays with light shadows on a few video lines.	Adjust the input tracking setting.	98
Fluctuation appears on the analog input video.	Adjust the input tracking setting.	98
Automatic measurement of input timing fails.	In order to execute the automatic measurement of the input timing, 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.	92
Image position of analog input video changes unexpectedly.	If the function that automatically adjusts the image position (upper left of the screen) works while the automatic measurement is executed, the video may move on its own. In this case, disable the automatic measurement of start position function.	96

Problem	Cause/Check item/Solution	Page
Part of the bitmap is cut off, or bitmap is not displayed on the full screen.	Set the total number of horizontal dots.	151
	If you change the total number of horizontal dots, you may sometimes need to set the start position of scanning and the active area manually.	151
<b>• Audio output</b>		
Audio is not being output.	<p>If audio is not being output, first check the error code in <b>"9.22.1 Sink device status"</b>. (The MSD has multiple output connectors. Find the error code of the output connector that is not outputting audio.)</p> <ul style="list-style-type: none"> <li>▪ Error code 1: Set <b>"9.11.4 Mute"</b> to "OFF".</li> <li>▪ Error code 2: Ensure that the source device is connected and powered on.</li> <li>▪ Error code 3: Signal is not input. Check [14], [15], [17] and [18].</li> <li>▪ Error code 4: There may be problems in the source device side or HDCP authentication. Check [14].</li> <li>▪ Error code 5: If the display device or AV amplifier does not support HDCP, only signals without content protection (such as analog sources) will be output; audio is not output when signal with content protection is applied to input. Some HDMI/DVI source devices check if the connected device is HDCP compliant and determines whether to output an HDCP encrypted signal or not. Since 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 for the port supporting the source device. <b>"9.7.4 HDCP input"</b>.</li> <li>▪ Error code 6: There are problems in the source device.</li> <li>▪ Error code 7: LCD monitors may not output compressed audio, such as Dolby Digital, DTS, and so on. If playing content with compressed audio (such as Blu-ray disc), check the audio output setting. The audio signal parameters terminating from the source device can be controlled by changing the EDID settings for input port(s).</li> <li>▪ Error code 8: Set <b>"9.11.1 Audio output"</b> to "ON".</li> <li>▪ Error code 9: Set <b>"9.5.7 Output format"</b> to a mode other than "DVI MODE". If the sink device does not support HDMI signals, the MSD outputs DVI automatically. Check which signal type is supported by the sink device.</li> <li>▪ Error code A: Set <b>"8.3.2 Selecting input channels"</b> to "OFF".</li> <li>▪ If any error code is not displayed: Check [14] to [18]. The source device may not be outputting audio.</li> </ul>	—

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 “ <b>9.22.3 Input signal status</b> ”. DVI signal may be output automatically depending on EDID settings.	—
	[16] Is the input audio format supported by the connected sink device or AV amplifier input? Typically, LCD monitors may not output 88.2 kHz or higher sampling frequency of LPCM and compressed audio (such as Dolby Digital, DTS, and other format). The source device’s audio signal characteristics can be managed by the MSD’s EDID configuration settings.	121 117
Audio from input connector is not being output.	[17] Is the selection of digital audio input and analog audio input correct?	111
Audio is not output.	[18] If the source device has multiple output connectors, check the audio output settings for the specific port of that device.	—
Audio is output from digital output connectors but not from analog output connectors.	If compressed audio (such as Dolby Digital, DTS, and other formats) is applied to the input, analog audio is not provided at output. You can check the input audio type in “ <b>9.22.3 Input signal status</b> ”.	111
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”, make sure that the sink device or AV amplifier supports the selected output resolution. If a PC output resolution (VGA to QWXGA) is selected, some sink devices and AV amplifiers cannot output audio.	64
	If the sampling frequency is set to a value other than “AUTO”, make sure that the sampling frequency is supported by the sink device or AV amplifier. Some LCD monitors may not output audio if the sampling frequency is high (typically 88.2 kHz or higher).	108
Compressed audio (such as Dolby Digital, DTS) is not output from the source device.	Compressed audio input is set to OFF (EDID settings) by factory default. If using compressed audio, change the EDID setting.	121 to 123
	In order to output multi-channel compressed audio, configure the MSD’s EDID profile to define the correct number of speakers.	124
	Check the audio output settings of the source device.	—
Multi-channel audio is not output.	In order to output multi-channel audio, configure the MSD’s EDID profile to define the correct number of speakers.	124
Audio only from specific scenes is not output from digital input	Is “DOWNMIX” is set for multi-channel audio output? For multi-channel audio content, channel assignments are dynamic and can change between scenes. Audio may not be output if audio is not included in the selected channel.	109

Problem	Cause/Check item/Solution	Page
Speaker output is intermittent.	Does the "MIC/LINE" or "SOURCE" LED light red? Speaker output stops abnormally. Decrease the speaker output level.	106
Speaker output distorted	Does the "SOURCE" LED light amber? Decrease the speaker output level.	106
The MSD reboots if increasing volume.	Overcurrent protection works. Decrease the speaker output level.	106
Mic input distorted	Does the "MIC/LINE" LED light amber? The set reference level may be low to mic input level. Change the audio input reference level.	112
<b>● Button operation</b>		
Buttons do not operate.	Ensure that buttons are not locked.	46
	Since no control command is registered by factory default, "DISPLAY POWER" button does not work. Register and associate control commands in order to enable this buttons.	132, 140
	When a control command is executed using a front panel button, all buttons are disabled until the command is executed or INVALID TIME passes.	142
	Check the setting of "DISPLAY POWER" button press dwelling time. This feature prevents accidental operation.	160
	Immediately after start-up, all buttons are disabled until the connection of the sink device is confirmed.	36
Setting changes are not saved or observed to be active in actual operation.	Settings within certain configuration menus may not be saved unless the "MENU/ENTER" button is pressed after making the setting selection.	37
<b>● Communication command control</b>		
Control commands cannot be issued from PC to the MSD.	Are the following items set correctly? For RS-232C : Baud rate and data word length For LAN : IP address and subnet mask	126 127
	Is COM PORT's FUNCTION set to "RECIEVER" mode? If this feature is set to "TRANSMITTER" mode, the MSD cannot be controlled externally.	126 129
"@ERR,6" is returned.	When remote commands are issued, additional commands will not be processed until the current commands are executed or until the INVALID TIME period elapses.	—
	When remote commands are issued, additional commands will not be processed until the current commands are executed or until the INVALID TIME period elapses.	—

Problem	Cause/Check item/Solution	Page
<b>• Sending control command function</b>		
Control command is not sent.	Ensure that the registered control command data and the number of bytes are both correct. Devices requiring delimiters may not execute commands correctly if the delimiters are not sent. If the set number of bytes is not correct, the control command may not be sent completely or unnecessary data may follow the control command.	132
	Is the registered control command correctly linked to the desired control command execution condition?	140
	Is COM PORT's FUNCTION set to "RECIEVER" mode? In order to send control commands, the communication port must be configured for "TRANSMITTER" mode. If using LAN, set the IP address and other com port settings of the connected device.	126 129
"RETRY OVER ERROR" is displayed and control command is not sent completely.	Is the registered reply command correct?	137
	Ensure that the setting of "TIME OUT" for checking control commands is not too short.	132
Control through CEC cannot be performed.	Does the cable support CEC? In order to use CEC, use an HDMI cable that supports 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.	—
<b>• Others</b>		
Input signal temporarily disappear when input channel is switched.	When the CEC connection changes, EDID may also change. In this case, the input signal may be interrupted. Check the CEC connection settings.	77
Devices cannot be controlled through CEC.	Are HDMI cables that support CEC being used?	77
	To use CEC, enable the HDMI link control of the connected devices (such as LCD TVs, Blu-ray recorder, and other formats).	77

If additional assistance is required, please perform the following tests and then contact us.

No.	Checking items	Result
1	The problem occurs at all connectors?	Yes or No
2	Connect the devices using genuine cables without connecting the MSD. The problem still cannot be solved? Please contact us for assistance.	Yes or No

## User Guide of MSD-701AMP

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