

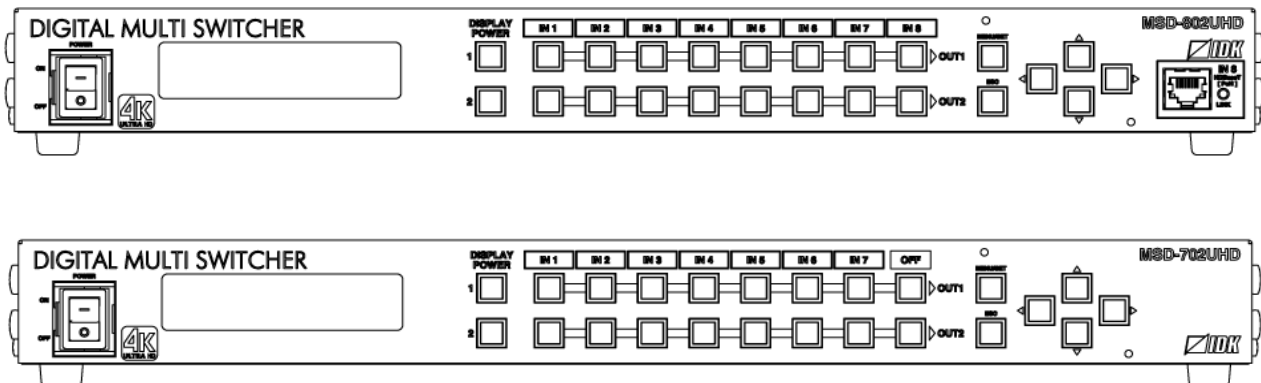
4K@60 and HDCP 2.2 supported Digital Multi Switcher

MSD-701UHD / 702UHD

MSD-801UHD / 802UHD

<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 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, communication commands, 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 cautions as detailed in this document.

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

 Instruction	<ul style="list-style-type: none"> ● Lifting must be done by two or more personnel. <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>
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■ For installing and connecting products:

 Prohibited	<ul style="list-style-type: none"> ● Do not place the product upon a surface that may give way or that may become unstable. <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"> ● Secure the product if installing in locations prone to vibration or movement. <p>Otherwise, it may move unexpectedly or it may fall and lead to injury.</p>
 Instruction	<ul style="list-style-type: none"> ● Installation work must be performed by professionals. <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"> ● Insert the power plug into an outlet that is unobstructed. <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"> ● Insert the power plug into an appropriate outlet completely. <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"> ● Unplug the product from the AC power source during installation or service. <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:

 Prohibited	<ul style="list-style-type: none"> ● Keep out any foreign objects. <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"> ● For power cable/ plug: <ul style="list-style-type: none"> ▪ Do not scratch, heat, or modify, including splicing or lengthening them. ▪ Do not pull, place heavy objects on them, or pinch them. ▪ Do not bend, twist, tie or clamp them together forcefully. <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>
 Do not disassemble	<ul style="list-style-type: none"> ● Do not repair, modify or disassemble. <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>
 Do not touch	<ul style="list-style-type: none"> ● Do not touch the product and connected cables during electrical storms. <p>Contact may cause electric shock</p>
 Instruction	<ul style="list-style-type: none"> ● Clean the power plug regularly. <p>If the plug is covered in dust, it may increase the risk of fire.</p>

Warning

■ If the following problem occurs:



Unplug

- **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 fropping.**

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>Prohibited</p>	<ul style="list-style-type: none"> ● Do not place the product in a location where it will be subjected to high temperatures. 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. ● Do not store or operate the product in dusty, oil smoke filled, or humid place. If the product is placed near humidifiers or in a dusty area, it may increase the risk of fire or electric shock. ● Do not block the vent holes. If ventilation slots are blocked, it may cause the product to overheat, affecting performance and reliability and may increase the risk of fire. ● Do not place or stack heavy items on the product. Failure to observe this precaution may result in damage to the product and other property and may lead to the risk of personal injury. ● Do not exceed ratings of outlet and wiring devices. Exceeding the rating of an outlet may increase the risk of fire and electric shock.
 <p>No wet hands</p>	<ul style="list-style-type: none"> ● Do not handle power plug with wet hands. Failure to observe this precaution may increase the risk of electrical shock.
 <p>Instruction</p>	<ul style="list-style-type: none"> ● Use and store the product within the specified temperature/humidity range. If the product is used outside the specified range for temperature and humidity continuously, it may increase the risk of fire or electric shock. ● Do not place the product at elevations of 2,000 meters (1.24 mi.) or higher above sea level. Failure to do so may shorten the life of the internal parts and result in malfunctions. ● When mounting the product into the rack, provide sufficient cooling space. 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. ● Never insert screws without the rubber feet into the threaded holes on the bottom of the product. 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.

■ For operating products:



 <p>Prohibited</p>	<ul style="list-style-type: none"> ● Use only the supplied power cable and AC adapter. ● Do not use the supplied power cable and AC adapter with other products. If non-compliant adapter or power cables are used, it may increase the risk of fire or electrical shock.
 <p>Unplug</p>	<ul style="list-style-type: none"> ● If the product won't be used for an extended period of time, unplug it. Failure to observe this precaution may increase the risk of fire. ● Unplug the product before cleaning. To prevent electric shock.

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1 About this Guide

This user's guide explains how to use the MSD-701UHD / 702UHD / 801UHD / 802UHD digital multi switcher (hereafter referred to as "MSD"), which have a scan converter. The MSD series is divided into four models as shown in the table below.

Since descriptions in this document are for MSD-802UHD, there may be slight differences between the model and other models.

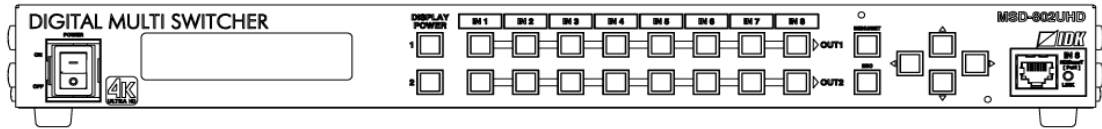
[Table 1.1] Main differences among MSD-701UHD / 702UHD / 801UHD / 802UHD

Model	Number of I/Os		Front panel HDBaseT input	Front panel OFF Keys
	Input	Output		
MSD-701UHD	7	1	No	Yes
MSD-702UHD		2		
MSD-801UHD	8	1	Yes	No
MSD-802UHD		2		

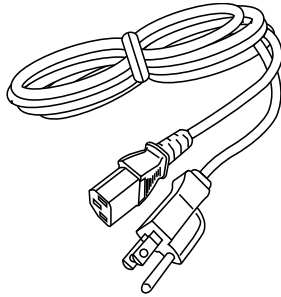
【See: 8.2.2 Turning off input signal】

2 Included Items

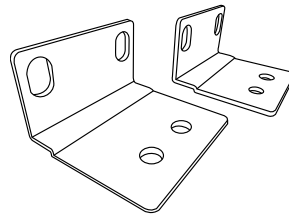
Ensure all items below are included in the package.
If any items are missing or damaged, please contact IDK.



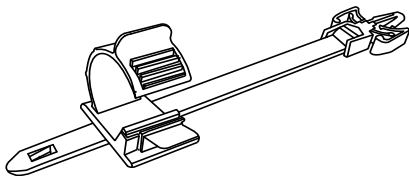
One (1) main unit (MSD-802UHD)



One (1) power cord (5.91 ft. (1.8 m))

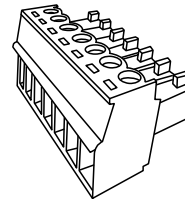


Two (2) rack mounting brackets

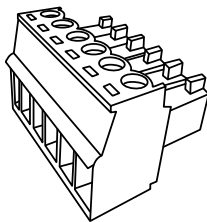


Cable clamps

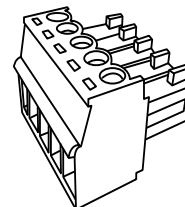
Six (6) for MSD-801UHD / MSD-701UHD
Seven (7) for MSD-802UHD / MSD-702UHD



One (1) 7-pin terminal blocks

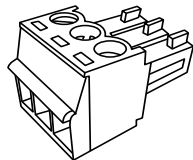


One (1) 6-pin terminal blocks



5-pin terminal blocks

Four (4) for MSD-801UHD / MSD-701UHD
Five (5) for MSD-802UHD / MSD-702UHD



One (1) 3-pin terminal blocks

[Fig. 2.1] Included items list

3 Product outline

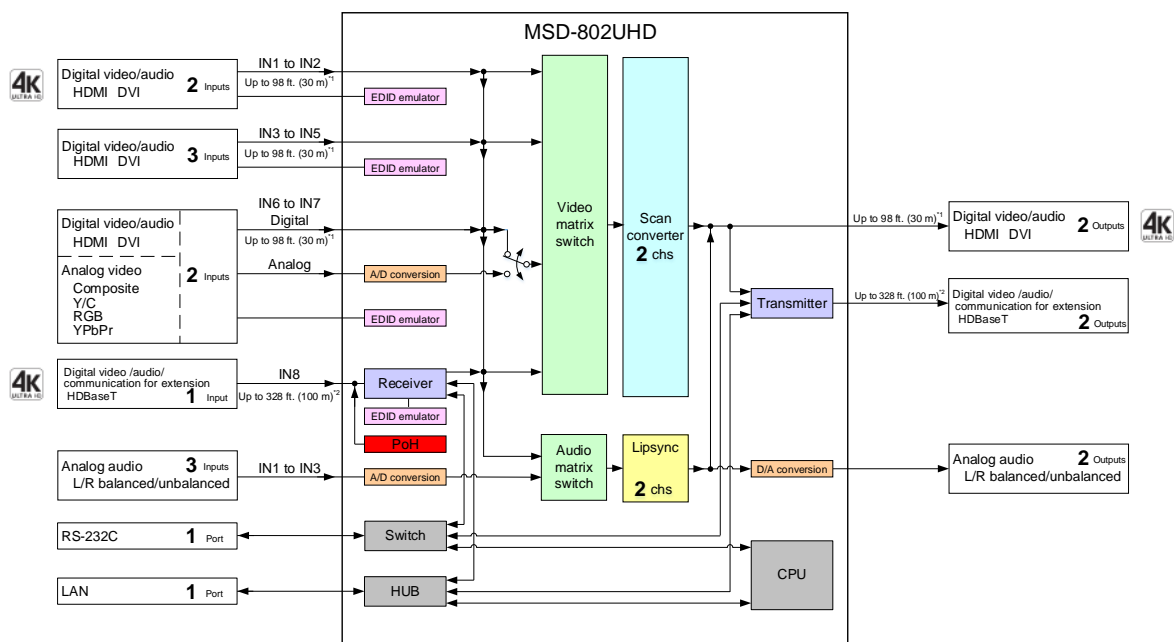
The MSD-701UHD / 702UHD / 801UHD / 802UHD are high-performance digital multi switchers with a built-in scan converter.

The following input signal formats are supported: HDMI, DVI, composite video, S video, analog RGB, and analog YPbPr signals. All input video signals are converted to HDMI signals and output at user definable resolution formats up to 4K@60.

MSD-801UHD and MSD-802UHD include front panel HDBaseT input in order to provide power to the transmitter that support PoH (Power over HDBaseT).

For audio input and output, digital audio and analog audio formats are supported, and they are cross-routable. Audio levels of each input and output can be set individually. The lip sync feature provides the user with a means to control time alignment between the video and audio.

The MSD is controlled remotely via RS-232C or LAN. Additionally, external devices connected to the MSD can be controlled through RS-232C, LAN, CEC, or contact closure by registering external control commands. The waiting function can delay the issuance of registered commands to external devices. As an example, a power down command can be delayed until after sufficient lamp cooling time for a projector has elapsed. Control commands for external devices can be executed from front panel keys or in response to commands via RS-232C or LAN. Commands can also be executed when input channel selection keys are operated or the MSD is powered ON.



¹ Maximum extension distance

Up to 98 ft. (30 m) : 1080p@60

Up to 39 ft. (12 m) : 4K@60 (when 18 Gbps high-speed cable is used) (IN1, IN2, OUT1 and OUT2 only)

² Maximum extension distance

Up to 328 ft. (100 m) : Input/4K@60 (4:2:0), Output/4K@30

Up to 492 ft. (150 m) : 1080p (24 bit) in Long reach mode with IDK's HDBaseT products supporting 328 ft. (100 m)

[Fig. 3.1] MSD-802UHD diagram

4 Features

■ Video

- Up to 4K@60 (4:4:4)
- HDCP 1.4 / 2.2
- Up to 492 ft. (150 m) over Cat6 cable (Long reach mode)^{*1}
- Motion adaptive I/P conversion
- Scan conversion (independent for each output)
- Aspect ratio control
- Seamless switching^{*2}
- A/D conversion
- Anti-snow (automatic recovery from HDCP error)

■ Audio

- A/D, D/A conversion
- Volume adjustment
- Lip sync

■ Control Input

- RS-232C
- LAN
- Command control

■ Control output

- Control command output (e.g. controlling projector)
- PLink
- Power control of sink device over CEC
- Contact closure

■ Others

- Power over HDBaseT (PoH) power feeding (HDBaseT input)^{*3}
- EDID emulation
- All functions and configuration settings accessible through browser
- Automatic input detection and switching
- Audio breakaway enables independent audio and video switching
- Cross point memory
- Preset memory
- Last memory
- Connection Reset
- Security lock

^{*1} For Long reach mode, up to 1080p (24 bit) resolutions are supported.

^{*2} Seamless switching with a black frame.

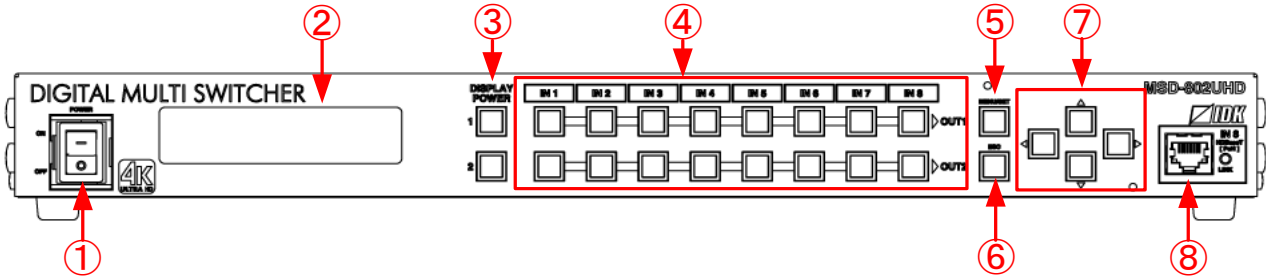
^{*3} Only for MSD-801UHD / 802UHD.

Tip:

For Long reach mode, use IDK's HDBaseT products supporting 328 ft. (100 m).

5 Panels

5.1 Front panel

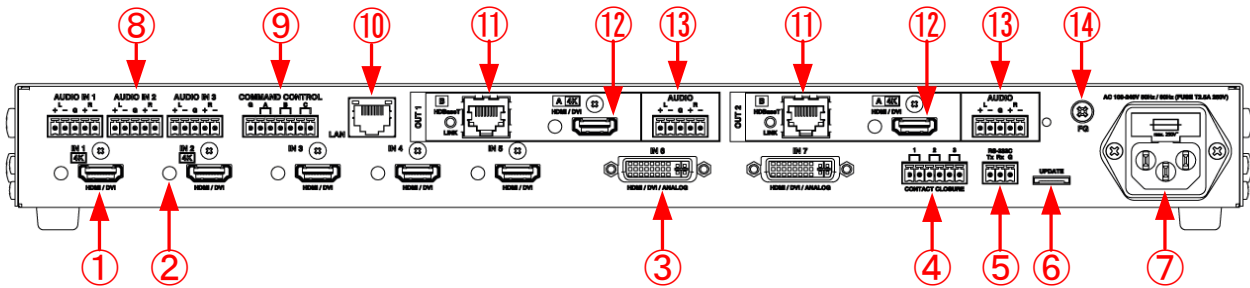


[Fig. 5.1] Front panel drawing (MSD-802UHD)

[Table 5.1] Front panel's name and description

#	Name	Description
①	POWER switch	Powers on / off the MSD.
②	VFD screen	Displays menus and settings.
③	DISPLAY POWER key	Turns on / off connected sink devices.
④	Input channel selection key	Selects input channels. 【See: 8.2 Switching input channel】
⑤	MENU/SET key	Selects menus and edits / controls / stores settings. 【See: 8.3 Menu operation】
⑥	ESC key	Ends the current menu setting
⑦	Arrow keys (▲, ▼, ◀, ▶)	Switches menu, moves cursor, and changes setting values
⑧	HDBaseT input connector	Input connector for HDBaseT signal Connects to a transmitter over a twisted pair cable. Provides power to HDBaseT transmitter that supports PoH. 【See: 6 System configuration example】 【See: 7.2.3 Twisted pair cable for extension】 【See: 9.6.6 HDBaseT input long reach mode】

5.2 Rear panel



[Fig. 5.2] Rear panel drawing (MSD-802UHD)

[Table 5.2] Rear panel's part name and description

#	Name	Description
①	HDMI input connector	Input connectors for HDMI and DVI signals to interface source devices, such as Blu-ray players.
②	HDMI cable fixing hole	Retains HDMI cables by inserting cable clamps. 【See: [Fig. 7.2] Attaching a cable clamp】
③	DVI input connector	Input connectors for DVI-I and DVI-D cables. HDMI signal can be interfaced using an HDMI-DVI conversion cable. Analog video also can be input using a DVI-analog conversion cable. <ul style="list-style-type: none"> • HDMI • Analog RGB (such as PC) • Analog YPbPr (SDTV / HDTV) • Composite video (NTSC / PAL) • S video (NTSC / PAL) 【See: 7.2.2 DVI-I input connector】
④	Contact closure	For external device control by dry contact closure Connector type: Terminal block (6-pin). 【See: 7.2.6 Contact closure】
⑤	RS-232C connector	For external control by communication commands Connector type: Terminal block (3-pin). 【See: 7.2.5 Connecting RS-232C cable】
⑥	Maintenance connector	Factory use only.
⑦	AC power inlet	For use with provided power cable
⑧	Audio input connector	Input connector for analog audio signals Connector type: Terminal block (5-pin) 【See: 7.2.4 Connecting audio cables】
⑨	COMMAND CONTROL connector	For external interface that execute commands from a switch box The connected switch box operates as control command execution keys (COMMAND A to COMMAND C). Connector type: Terminal block (7-pin) 【See: 7.2.7 Command control】

[Table 5.3] Rear panel's part name and description (Cont'd)

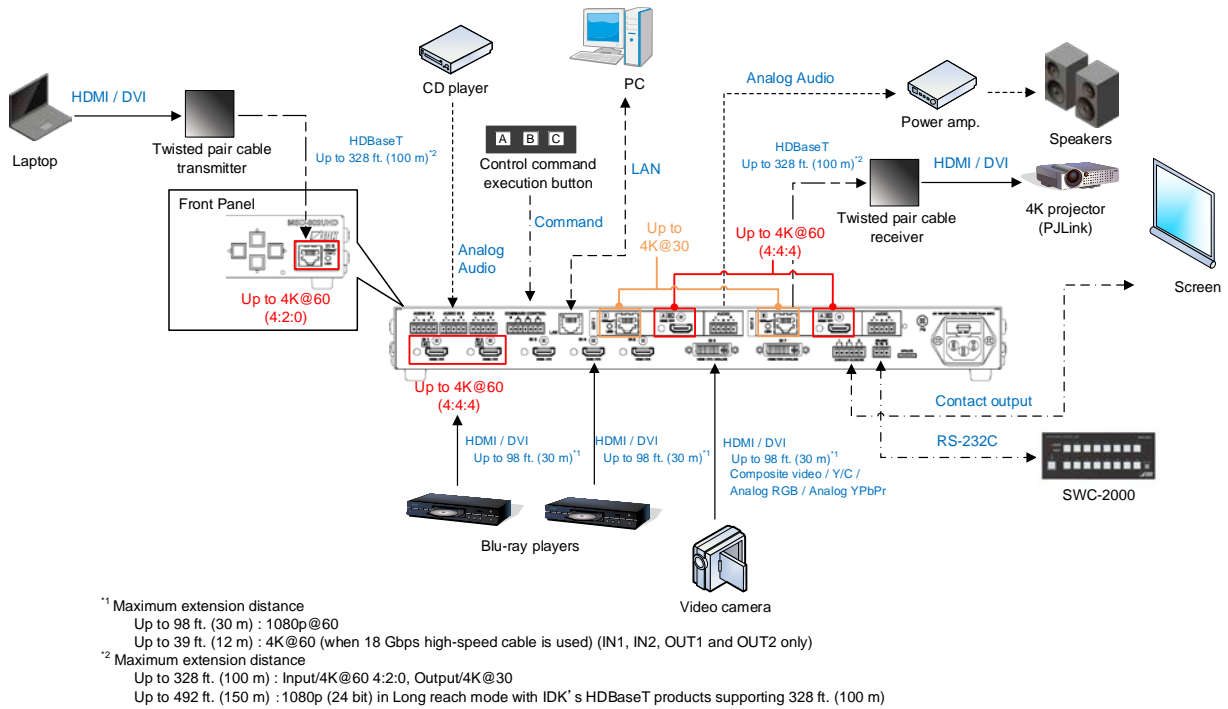
#	Name	Description
⑩	LAN connector	For external control by communication commands or web browsers
⑪	HDBaseT output connector	Output connector for HDBaseT signal Connects to a receiver over a twisted pair cable. 【See: 7.2.3 Twisted pair cable for extension】 【See: 9.8.16 HDBaseT output long reach mode】
⑫	HDMI output connector	Output connector for HDMI and DVI signal interfaces with sink devices such as LC monitors and projectors
⑬	Audio output connector	Analog audio output connectors interface to amplifiers, speakers, and mixers. Connector type: Terminal block (5-pin) 【See: 7.2.4 Connecting audio cables】
⑭	Frame ground	Use for bonding chassis to local ground. An M4 screw is used.

6 System configuration example

Configuration example: source and sink devices are connected to the MSD.

Use a transmitter that supports PoH PD (IEEE802.3af) and AWG 24 twisted pair cable or thicker cable in order to provide power from the HDBaseT input connector on the front panel to the twisted pair cable transmitter.

For long reach mode, please use the MSD with IDK's twisted pair cable transmitter or receiver.



[Fig. 6.1] Configuration example (MSD-802UHD)

7 Precautions

Before connecting to external devices, follow the precautions below.

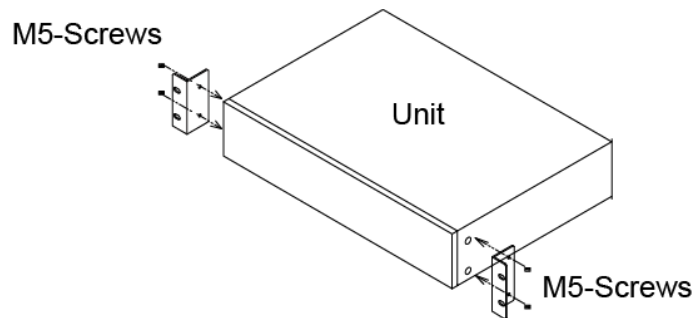
7.1 Installation

When installing the MSD, please observe the following precautions.

- 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 1.18 inches (30 mm).
- When the MSD needs to be mounted in an EIA rack, or an enclosed space, please ensure that sufficient ventilation or cooling is provided and that the ambient temperature will not exceed 104°F (40°C). If inadequately vented, the product's service life, operation and reliability may be affected.

■ Attaching rack mounting brackets

1. Remove four M5 screws from one side of the unit. Retain these screws for step 2.
2. Attach one bracket to the side of the unit using the screws removed in step 1.
3. Repeat steps 1 and 2 on the other side of the unit.



[Fig. 7.1] Attaching rack mounting brackets

Note:

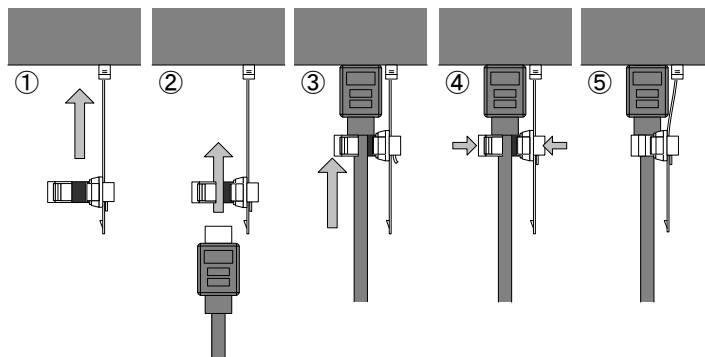
The standard screw tightening torque is 2.94 N·m (about 30 kgf·cm).

7.2 Cabling

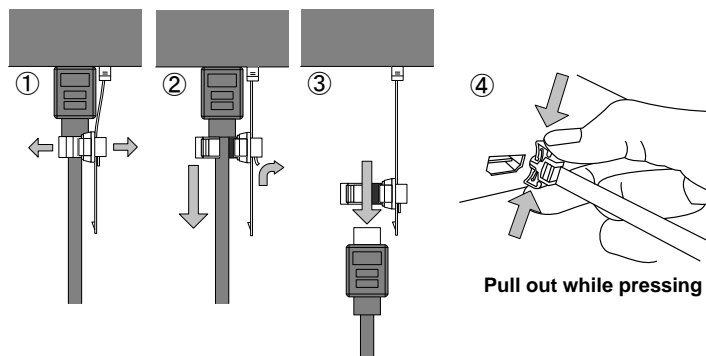
When connecting the MSD to external devices, please observe the following precautions.

- Read manuals for the external devices.
- Before you connecting cables to the MSD or an external device, dissipate static electricity by touching grounded metal such as 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.
- Secure HDMI cables using cable clamps to prevent connectors from being accidentally pulled out of ports.

Fixing HDMI cable using cable clamp



Removing HDMI cable and cable clamp



[Fig. 7.2] Attaching a cable clamp

7.2.1 Cables

IDK has a large selection of flexible HDMI cables, DVI cables, high-quality long cables, and conversion cables.

Use the correct cable depending on the system configuration.

For analog audio and RS-232C, select or fabricate cables to match the connectors as needed.

7.2.2 DVI-I input connector

29-pin DVI-I female connectors are used for DVI inputs.

The DVI-I input connectors can be used for HDMI/DVI digital signals and for analog signal.

■ DVI signal input

Use DVI-I or DVI-D cable.

Signal only supports single-link.

■ HDMI signal input

Use HDMI-DVI conversion cable.

■ Analog RGB signal input

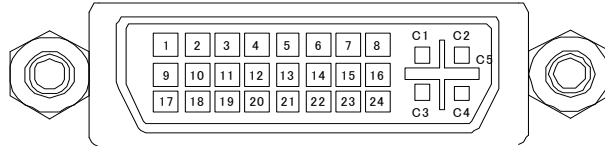
Use conversion cable which has DVI-I (male) and high-density D-sub 15 (female).

■ Other analog signal input

Analog YPbPr / composite video / Y/C signals can be input.

Use conversion cable for each signal.

Pin assignments for each signal are shown below.



[Fig. 7.3] 29-pin DVI-I female connector

[Table 7.1] Pin assignments

Pin #	Input signal name				
	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

7.2.3 Twisted pair cable for extension

To ensure the best performance of twisted pair cables, select a correct twisted pair cable and connect it correctly.

- Cat5e UTP/STP and Cat6 UTP/STP can be used, but we recommend CAT.5E HDC cable* for optimal performance.
- If using an STP cable, connect the FG connector to a ground source. Otherwise, the shielding feature does not work correctly. When using a UTP cable, we still recommend using the ground connector.
- The shielded STP cables are less affected by interference or external noise than UTP cables.
- Connectors for long-haul extension 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 extension distance of a twisted pair cables is the shorter distance of the maximum extension distances of transmitter/receiver/sink device connected to the MSD.
- Pin assignments: T568A or T568B straight
- Do not pull the cable hard. The allowable tension of the twisted pair cable is 110 N.
- Do not bend the connection cable at a sharp angle. Keep the bend radius four times of the cable diameter or larger.
- Do not tie the cable tightly; leave a space allowing the cable to move slightly.
- If you use multiple twisted pair cables, we recommended keeping a distance between the cables or not to place the cables closely in parallel.
- Keep the twisted pair cable as straight as you can. If you coil the cable, it is easily affected by noise.
- Do not place the cable in an electrically noisy environment, since high-speed signals are transmitted. Particularly when you use a high-output radio around the MSD, video or audio may be interrupted.
- If the total extension distance from the transmitter to receiver is 328 ft. (100 m) or less, up to two cable joints can be used. Products supporting Cat6A (10GBase-T) are recommended. However, the extension distance of high-resolution transmission, such as 4K, may be shortened about 10%.
- Use AWG 24 or ticker cable for PoH.
- The table below shows supported extension distance for each twisted pair cable category. Note that the distance may shorten depending on the actual environment.

[Table 7.2] Twisted pair cable and extension distance

Noise influence	Category		Extension distance	TMDS clock	Remarks
Easily affected	UTP	Cat5e	164 ft. (50 m)	\leq 225 MHz	For 164 ft. (50 m) or longer, Cat5e STP, Cat6 UTP / STP, CAT.5E HDC* are recommended.
		Cat6	328 ft. (100 m)		
				230 ft. (70 m)	
Less affected	STP	Cat5e*	328 ft. (100 m)	Long reach mode \leq 148 MHz (1080p 24 bit or less)	Cat5e STP, Cat6 STP, CAT.5E HDC cable
		Cat6	492 ft. (150 m)		

*The CAT.5E HDC cable is a double-shielded twisted pair cable that optimizes video signal transmission. It is certified to 500 MHz bandwidth at distance up to 330 feet (100 m) and verified to meet requirements specified by HDBaseT Alliance. The double-shielded structure protects video signal from outside interference.

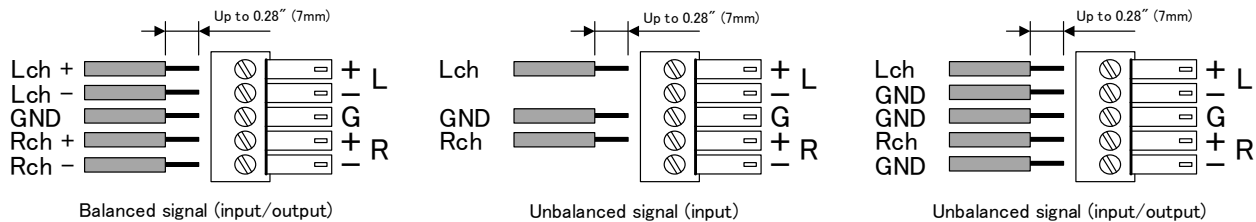
Note:

If there is a problem in the transmission path, video or audio may be interrupted. Check the precautions above. If the problem still cannot be solved, shortening the twisted pair cable may remedy the problem.

7.2.4 Connecting audio cables

Connect audio cables to the 5-pin terminal block. The MSD supports both balanced and unbalanced analog signals.

AWG28 to AWG16 conductor gauge is recommended. The recommended wire strip length is 0.28 in. (7 mm).



[Fig. 7.4] Connecting audio cable to 5-pin terminal block connector

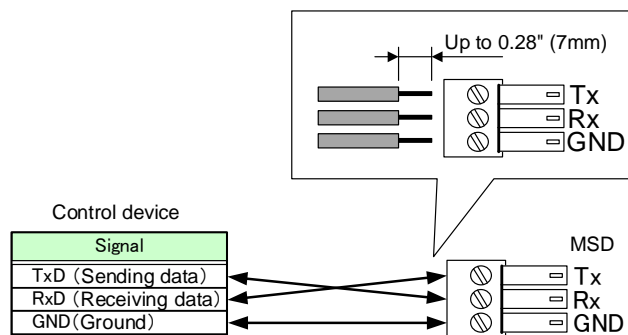
7.2.5 Connecting RS-232C cable

A 3-pin terminal block is used for the RS-232C connector.

Fix RS-232C cable to the attached 3-pin terminal block, and then connect it to the MSD.

AWG28 to AWG16 conductor gauge is recommended. The recommended wire strip length is 0.28 in. (7 mm).

Short RTS/CTS and DTR/DSR as needed.



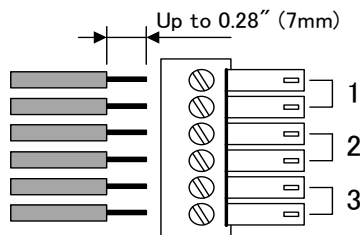
[Fig. 7.5] Connecting RS-232C cable to 3-pin terminal block connector

7.2.6 Contact closure

The MSD has a total of three (3) independently controlled contact closure channels for external control. Each connector supports three (3) channels. The maximum peak load for each contact is 24 VDC @ 500 mA.

Connect a cable to the 6-pin terminal block, and then insert into the appropriate connector on the MSD's rear panel.

AWG28 to AWG16 conductor gauge is recommended. The recommended wire strip length is 0.28 in. (7 mm).



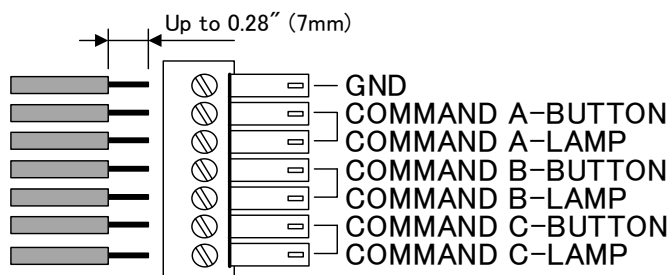
[Fig. 7.6] Connecting cable to 6-pin terminal block connector

7.2.7 Command control

Up to three command buttons (commands A to C) can be executed by connecting the provided 7-pin terminal block to the command control connector.

Connect these buttons for control commands A to C and LAMPs to the terminal block. When 0V (GND) is input to the BUTTON terminal, the command will be executed. The LAMP terminal is controlled with DC 5V/100mA. For LEDs, a current-limiting resistor has to be connected.

AWG28 to AWG16 conductor gauge is recommended. The recommended wire strip length is 0.28 in. (7 mm).



[Fig. 7.7] Connecting cable to 7-pin terminal block connector

8 Basic operation

8.1 Power up init period

After powering on the MSD, there is some seconds initialization delay before the WEB browser is fully operational and before the first communication command can be received and executed.

[Table 8.1] Required time

Operation	Required time
Receiving communication command	11 seconds
Receiving WEB browser operation	11 seconds
Receiving operation of front panel	12 or longer seconds

Note:

If "9.15.7 Startup bitmap output" is set to "ON", the required time for the front panel operation may be longer.

8.2 Switching input channel

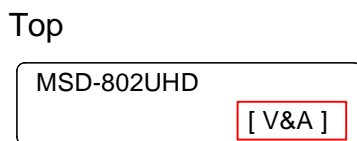
8.2.1 Selecting input channels

Video and audio signals can be switched simultaneously or independently.

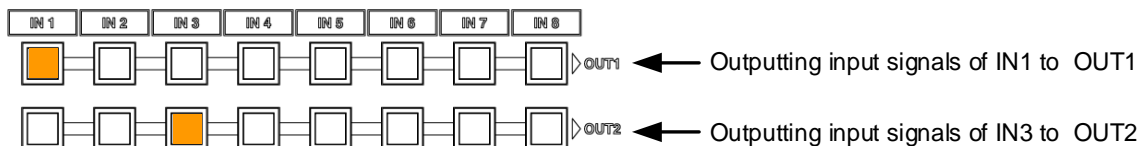
Select the desired mode and press the input channel selection key, and then select the output channel.

[Table 8.2] Switching mode

Switching mode	Description
V&A	Video&Audio simultaneously
VIDEO	Video
AUDIO	Audio



[Fig. 8.1] Switching mode

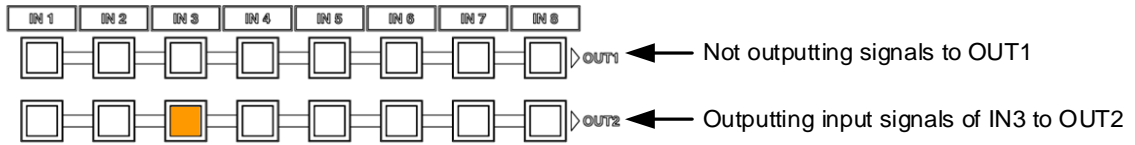


[Fig. 8.2] I/O cross point indication

8.2.2 Turning off input signal

■ MSD-802UHD / MSD-801UHD

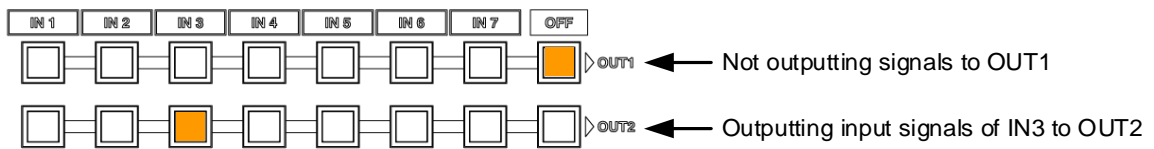
You can disable the input signal by pressing the input key that is currently selected. You can enable or disable the input signal by toggle operation.



[Fig. 8.3] Input selection: OFF (MSD-802UHD)

■ MSD-702UHD / MSD-701UHD

To stop outputting signals, press the “OFF” button of OUT1 or OUT2.



[Fig. 8.4] Input selection: OFF (MSD-702UHD)

8.3 Menu operation

You can use the VFD screen and front panel keys to view and control settings.

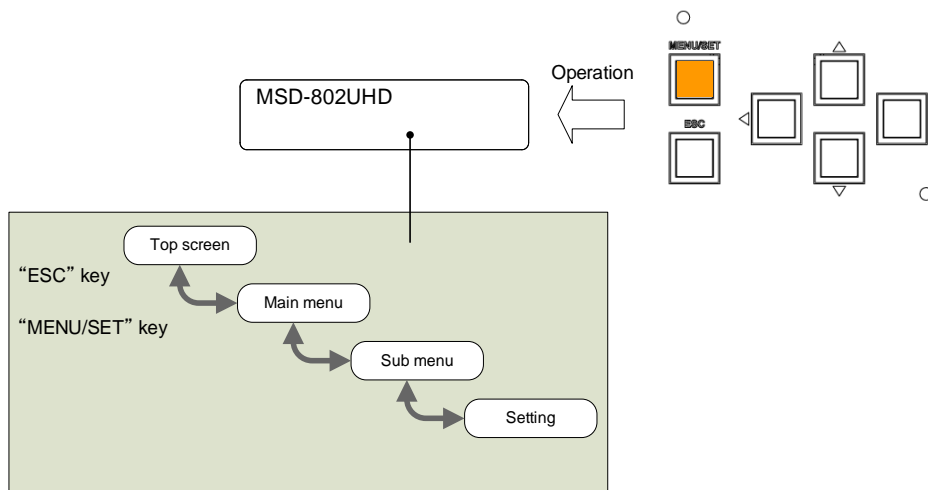
Press the “MENU/SET” key to apply settings and to change the menu level.

Press the “ESC” key to go back to the previous screen.

Use the “▲” and “▼” keys to select channels and use the “▲” and “▼” keys to select the menu item.

In the setting screen, use “▲”, “▼”, “▲” and “▼” keys to move the cursor and select the setting. The applied values are saved automatically after the session.

【See: 9.1 Menu list】



【Fig. 8.5】 Menu level

Tip:

The “MENU/SET” key LED is illuminated only for settable menu.

For some setting screens, the set value is applied from the “MENU/SET” key. When the “MENU/SET” key flashes, press the key to apply the setting value. After the setting has been applied, the key will illuminate without flashing.

We offer an optional cover for menu operation keys to prevent accidental key presses. Please contact us as needed.

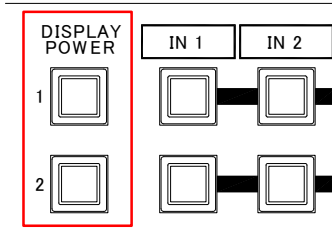
Note:

To avoid losing settings, do not interrupt power to the MSD while “NOW SAVING” is displayed; otherwise, the setting information may be lost.

8.4 Menu operation

You can register control commands to power the sink device on/off. By pressing the appropriate key, control commands are sent to the sink device.

【See: 9.13.3 Command link】



[Table 8.3] Sink device power supply key

Sink device power status	LED
Power ON	Lights (orange)
Power OFF	Turned off

[Fig. 8.6] Sink device power control key

Note:

If power a ON/OFF control command is sent to a sink device and reply command of normal termination is sent from the sink device, the “DISPLAY POWER” key turns orange (when powered ON) or the key light turns off (when powered OFF).

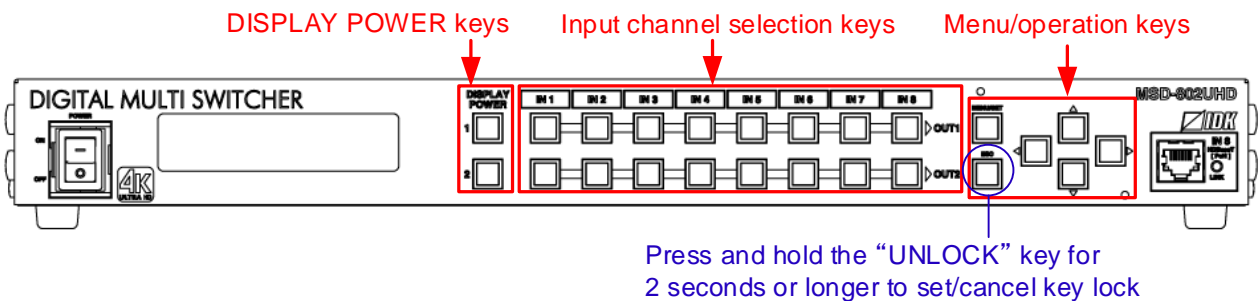
If the reply command from the sink device is not checked, the actual power status of the sink device and the LED may not match.

8.5 Locking and unlocking keys

Press and hold the “UNLOCK” key for 2 seconds or longer to set/cancel keylock function for keys below. You will hear a beep and then one of the following messages is displayed for 1 second.

【See: 9.17.1 Grouping key function lock】

- OPERATION LOCK ! (Locked)
- OP LOCK RELEASE ! (Unlocked)



[Fig. 8.7] Keys to be set/cancel operation lock (MSD-802HUD)

8.6 Initialization

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

Table 8.4 below, shows the Factory default values.

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. Some menus can be set for each input channel and output channel individually; see “[Table 8.14] Setting condition” for details.

[Table 8.4] Factory default

Menu	Factory default		See
SWITCHING MODE	For	---	P.47
	Default	V&A	
OUTPUT TIMING			
RESOLUTION	For	Each output channel	P.48
	Default	AUTO-A	
MONITOR ASPECT	For	Each output channel	P.50
	Default	RESOLUTION	
INPUT ASPECT	For	Each input channel, each input signal	P.50
	Default	AUTO-1	
ASPECT PROCESS	For	Each input channel, each input signal	P.51
	Default	L-BOX / S-PANEL	
INPUT OVER SCAN	For	Each input channel, each input signal	P.51
	Default	105 % [NTSC / PAL / SDTV input] 100 % [HDTV / PC input]	
INPUT POSITION	For	Each input channel, each input signal	P.51
	Default	H : 0 V : 0	
INPUT SIZE	For	Each input channel, each input signal	P.52
	Default	H : Horizontal output resolution V : Vertical output resolution	
INPUT MASKING	For	Each input channel, each input signal	P.53
	Default	L : 0 R : Horizontal input size T : 0 B : Vertical input size	
INPUT AUTO SIZING	For	Each input channel, each input signal	P.53
	Default	---	

[Table 8.5] Factory default (Cont'd)

Menu	Factory default		See:
OUTPUT TIMING			
OUTPUT POSITION	For	Each output channel	P.51
	Default	H : 0 V : 0	
OUTPUT SIZE	For	Each output channel	P.52
	Default	H : Horizontal input size V : Vertical input size	
OUTPUT MASKING	For	Each output channel	P.53
	Default	L : 0 R : Horizontal input size T : 0 B : Vertical input size	
OUTPUT AUTO SIZING	For	Each output channel	P.53
	Default	---	
BACKGROUND COLOR	For	Each output channel	P.54
	Default	R : 0 G : 0 B : 0	
TEST PATTERN	For	Each output channel	P.54
	Default	OFF	
IMAGE EFFECT			
INPUT SHARPNESS	For	Each input channel, each input signal	P.55
	Default	0	
INPUT BRIGHTNESS	For	Each input channel, each input signal	P.55
	Default	100 %	
INPUT CONTRAST	For	Each input channel, each input signal	P.55
	Default	R : 100 % G : 100 % B : 100 %	
INPUT HUE	For	Each input channel, each input signal	P.56
	Default	0 °	
INPUT SATURATION	For	Each input channel, each input signal	P.56
	Default	100 %	
INPUT SETUP LEVEL	For	Each input channel, each input signal	P.56
	Default	0.0 %	
IN DEFAULT COLOR	For	Each input channel, each input signal	P.57
	Default	---	
OUTPUT BRIGHTNESS	For	Each output channel	P.55
	Default	100 %	
OUTPUT CONTRAST	For	Each output channel	P.55
	Default	R : 100 % G : 100 % B : 100 %	
OUTPUT GAMMA	For	Each output channel	P.56
	Default	1.0	
OUT DEFAULT COLOR	For	Each output channel	P.57
	Default	---	

[Table 8.6] Factory default (Cont'd)

Menu	Factory default		See:
INPUT SETTING			
INPUT VIDEO DETECT	For	Each input channel, digital input only	P.58
	Default	10000 ms	
HDCP INPUT ENABLE	For	Each input channel, digital input only	P.59
	Default	HDCP 2.2 [IN1, IN2, IN8] HDCP 1.4 [IN3 to IN7]	
ANALOG INPUT TYPE	For	Each input channel, each input signal, analog input only	P.60
	Default	AUTO	
INPUT OFF CHECK	For	Each input channel	P.61
	Default	ON	
INPUT AD TYPE	For	Each input channel, DVI connector only	P.61
	Default	DIGITAL	
LONG REACH MODE	For	HDBaseT input channel	P.61
	Default	OFF	
INPUT TABLE FIXED	For	Each input channel	P.62
	Default	[Setting mode] SELECTED [Individual setting ("SELECTED" is selected for setting mode)] ASPECT : OFF, ANALOG TYPE : ON(FIXED) AUDIO LEVEL : ON(FIXED)	
INPUT TIMING			
AUTO SETUP	For	Each input channel, each input signal, analog input only ^{*1}	P.64
	Default	NORMAL MODE	
H TOTAL DOTS	For	Each input channel, each input signal, analog input only ^{*1}	P.66
	Default	Depends on input signal	
H START	For	Each input channel, each input signal	P.66
	Default	Depends on input signal	
H DISPLAY	For	Each input channel, each input signal	P.67
	Default	Depends on input signal	
V START	For	Each input channel, each input signal	P.66
	Default	Depends on input signal	
V DISPLAY	For	Each input channel, each input signal	P.67
	Default	Depends on input signal	
AUTO START POS	For	Each input channel, each input signal, analog input only ^{*1}	P.68
	Default	ON	
UNKNOWN TIMING	For	---	P.68
	Default	AUTO SETUP ON	

^{*1} Can be set and executed only if an analog RGB or YPbPr signal input is active.

[Table 8.7] Factory default (Cont'd)

Menu	Factory default		See:
INPUT TIMING			
LOAD	For	Each input channel, each input signal	P.69
	Default	---	
SAVE	For	each input signal, each input signal ^{*1}	P.69
	Default	---	
TRACKING	For	Each input channel, each input signal ^{*1}	P.69
	Default	0	
OUTPUT SETTING			
OUTPUT MODE	For	Each output channel	P.70
	Default	HDMI YCbCr 4:4:4 MODE	
SYNC OUTPUT	For	Each output channel	P.70
	Default	ON	
VIDEO OUTPUT	For	Each output channel	P.71
	Default	BLUE	
VIDEO SWITCHING	For	Each output channel	P.71
	Default	FREEZE→FADE OUT-IN	
SWITCHING SPEED	For	Each output channel	P.71
	Default	350 ms	
WIPE COLOR	For	Each output channel	P.71
	Default	R : 0, G : 0, B : 0	
OUTPUT CONNECTOR	For	Each output channel	P.72
	Default	ON	
HDCP OUTPUT MODE	For	Each output channel	P.72
	Default	HDCP 2.2	
HDCP ERROR RETRY	For	Each output channel	P.73
	Default	ETERNITY	
DEEP COLOR OUTPUT	For	Each output channel	P.73
	Default	24-BIT COLOR	
CEC CONNECTION	For	Each output channel	P.74
	Default	NOT CONNECTED	
HDCP AUTHORIZATION	For	Each output channel	P.74
	Default	---	
AUTO SWITCHING ON	For	Each output channel	P.75
	Default	OFF	
AUTO SWITCHING OFF	For	Each output channel	P.75
	Default	OFF	
AUTO SWITCHING MASK	For	Each output channel	P.77
	Default	0s000ms	
AUTO SWITCHING MODE	For	Each output channel	P.77
	Default	V&A	
LONG REACH MODE	For	Each output channel	P.77
	Default	OFF	

[Table 8.8] Factory default (Cont'd)

Menu	Factory default		See:
AUDIO			
OUTPUT LEVEL	For	Each output channel	P.79
	Default	0 dB	
OUTPUT MUTE	For	Each output channel	P.79
	Default	OFF	
AUDIO INPUT SELECT	For	Each input channel, digital input only	P.79
	Default	DIGITAL	
INPUT OFFSET	For	Each input channel, each input signal	P.79
	Default	0 dB	
OUTPUT LIP SYNC	For	Each output channel	P.80
	Default	0 FRAME	
INPUT LIP SYNC	For	Each input channel, each input signal	P.80
	Default	0 FRAME	
SAMPLING FREQUENCY	For	Each output channel	P.80
	Default	AUTO-A	
AUDIO OUTPUT	For	Each output channel	P.81
	Default	ANALOG&DIGITAL	
DIGITAL OUTPUT	For	Each output channel	P.81
	Default	ON	
MULTI AUDIO	For	Each output channel	P.81
	Default	DOWN MIX	
OUT AUDIO PRIORITY	For	Each output channel	P.82
	Default	MULTI	
TEST TONE	For	Each output channel	P.83
	Default	TEST TONE : OFF SPEAKER : ALL	

[Table 8.9] Factory default (Cont'd)

Menu	Factory default		See:
EDID			
EDID DATA	For	Each input channel, digital input only	P.84
	Default	INTERNAL EDID	
PC RESOLUTION	For	Each input channel	P.85
	Default	IN1 to IN2 : 2160p@60 (3840x2160) IN4 to IN7 : 1080p(1920x1080) IN8 : 2160p@30 (3840x2160)	
AV RESOLUTION	For	Each input channel, digital input only ^{*2}	P.87
	Default	AUTO	
DEEP COLOR INPUT	For	Each input channel, digital input only ^{*2}	P.88
	Default	24-BIT COLOR	
AUDIO FORMAT	For	Each input channel, digital input only ^{*2}	P.88
	Default	PCM : 48 kHz Dolby Digital : OFF AAC : OFF Dolby Digital+ : OFF DTS : OFF DTS-HD : OFF Dolby TrueHD : OFF	
SPEAKER	For	Each input channel, digital input only ^{*2}	P.89
	Default	MODE : AUTO NUMBER : 2 FL / FR : ON LFE : OFF FC : OFF RL / RR : OFF RC : OFF FLC / FRC : OFF RLC / RRC : OFF FLW / FRW : OFF FLH / RLH : OFF TC : OFF FCH : OFF FCH : OFF	
MONITOR EDID COPY	For	No.1 to No.8	P.90
	Default	---	

^{*2} Can be set only if "INTERNAL EDID" is selected for the EDID mode.

[Table 8.10] Factory default (Cont'd)

Menu	Factory default		See:
COM PORT			
PARAMETERS	For	EACH RS-232C CHANNEL	P.91
	Default	Baud rate : 9600 Data bit length : 8 Parity check : NONE Stop bit : 1	
FUNCTION	For	EACH RS-232C CHANNEL	P.92
	Default	RECEIVER (Receiver mode)	
OUT B SCI CONNECT	For	---	P.92
	Default	OFF	
LAN			
IP ADDRESS	For	---	P.95
	Default	192.168.1.199	
SUBNET MASK	For	---	P.95
	Default	255.255.255.0	
GATEWAY ADDRESS	For	---	P.95
	Default	192.168.1.200	
FUNCTION	For	Each connection	P.95
	Default	Operation mode : RECEIVER IP address : 192.168.1.198 PJLink : OFF PORT : 1100 PASS WORD : 20 in ASCII (Space)	
PORT NUMBER	For	Each connection	P.96
	Default	Connection1 to Connection3 : 1100 Connection4 to Connection6 : 23 Connection7 to Connection8 : 80	
MAC ADDRESS	For	---	P.96
	Default	---	
HDBASET LAN	For	HDBaseT input, HDBaseT output	P.96
	Default	ON	

[Table 8.11] Factory default (Cont'd)

Menu	Factory default		See:
PRESET COMMAND			
COMMAND EDIT	For	Each control command	P.99
	Default	"[Table 9.21] Setting items of control command"	
RECV COMMAND EDIT	For	Each reply command	P.104
	Default	"[Table 9.26] Setting items of return command"	
COMMAND LINK	For	Each control command execution condition	P.107
	Default	OFF	
COMMAND EXECUTION	For	---	P.108
	Default	---	
INVALID TIME	Set value	0s000ms to 999s999ms	P.108
	For	---	
	Default	0s000ms	
INITIALIZE	For	---	P.108
	Default	---	
COMMAND TALLY	For	Each control command execution key	P.109
	Default	REGISTERED	
FLASH TIME	For	Each control command execution key, each sink device power key	P.109
	Default	EXECUTION	
PRESET MEMORY			
LOAD CROSS POINT	For	---	P.110
	Default	---	
SAVE CROSS POINT	For	---	P.110
	Default	---	
EDIT CROSS POINT	For	Each cross point memory	P.111
	Default	Video input channel : --- Audio input channel : --- Memory name : 20 (space)	
LOAD ALL SETTING	For	---	P.111
	Default	---	
SAVE ALL SETTING	For	---	P.112
	Default	---	
COPY OUTPUT MEMORY	For	---	P.113
	Default	---	
STARTUP	For	---	P.114
	Default	LAST CHANNEL	

[Table 8.12] Factory default (Cont'd)

Menu	Factory default		See:
BITMAP			
BITMAP OUTPUT	For	Each output channel	P.117
	Default	OFF	
BACKGROUND COLOR	For	Each output channel, each bitmap	P.117
	Default	R : 255 G : 255 B : 255	
ASPECT	For	Each output channel, each bitmap	P.117
	Default	AUTO	
POSITION	For	Each output channel, each bitmap	P.118
	Default	CENTER	
CHANNEL ASSIGN	For	Each output channel	P.118
	Default	OFF	
POWER ON BITMAP	For	Each output channel	P.118
	Default	OFF	
DIVIDE MEMORY ^{*3}	For	---	P.119
	Default	MODE : RESIZE NUMBER : 1 DISPLAY : BLOCK SIZE : 127	
VIDEO CAPTURE	For	---	P.121
	Default	---	
COM PORT			
DISPLAY POWER	For	Each output channel	P.123
	Default	AUTO	
OPERATION LOCK	For	---	P.124
	Default	AUTO	

^{*3} The registered bitmaps are not initialized by the initialization.

[Table 8.13] Factory default (Cont'd)

Menu	Factory default		See:
OTHERS			
OP LOCK MODE	For	CHANNEL CHANNEL MODE MENU COMMAND DISPLAY POW	P.125
	Default	LOCK	
BUZZER	For	---	P.126
	Default	ON	
POWER SAVE	For	---	P.126
	Default	ON	
DISP POW BUTTON ON	For	---	P.126
	Default	0 ms	
HDC POWER OUTPUT	For	---	P.126
	Default	OFF	
TOP DISPLAY	For	---	P.127
	Default	NORMAL	
INPUT STATUS	For	---	P.128
	Default	---	
MONITOR STATUS	For	---	P.130
	Default	---	
EDID STATUS	For	---	P.132
	Default	---	
VERSION	For	---	P.133
	Default	---	

[Table 8.14] Setting condition

Setting range		Description
Each output channel	(Common to OUTA / OUTB ^{*4})	Can be set for each output channel Setting is common to OUTA and OUTB
	(Each OUTA / OUTB)	Can be set for each output channels Can be set for OUTA and OUTB separately
	(only OUTA)	Can be set for OUTA
	(only OUTB)	Can be set for OUTB
Each input signal		Can be set for each input signal
Each input channel		Can be set for each input channel
Each input channel digital input only		Can be set for each input channel only if input channel is digital signal
Each input channel analog input only		Can be set for each input channel only if input channel is analog signal
Each input channel DVI connector only		Can be set for each input channel of DVI input connector
EACH RS-232C CHANNEL		Can be set for RC-232C channel
HDBaseT input, HDBaseT output		Can be set for HDBaseT input or HDBaseT output.
Each connection		Can be set for LAN connection
Each bitmap		Can be set for each bitmap

^{*4} OUTA: HDMI output connector, OUTB: HDBaseT output connector

8.7 Web menu operation

The MSD connected through a LAN can be controlled from a WEB browser, such as Microsoft Internet Explorer. JavaScript is used for the WEB browser screen. To do this, make sure to enable JavaScript of the WEB browser by referring to the HELP of each WEB browser.

Tip:

Compatibility has been tested and verified using the following system configuration:

OS: Windows 7 Professional

WEB browser: Microsoft Internet Explorer 11

Google Chrome 56

Mozilla Firefox 51

8.7.1 Control from WEB browser

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 to display the WEB menu. Note that the default IP address for all MSD: 192.168.1.199

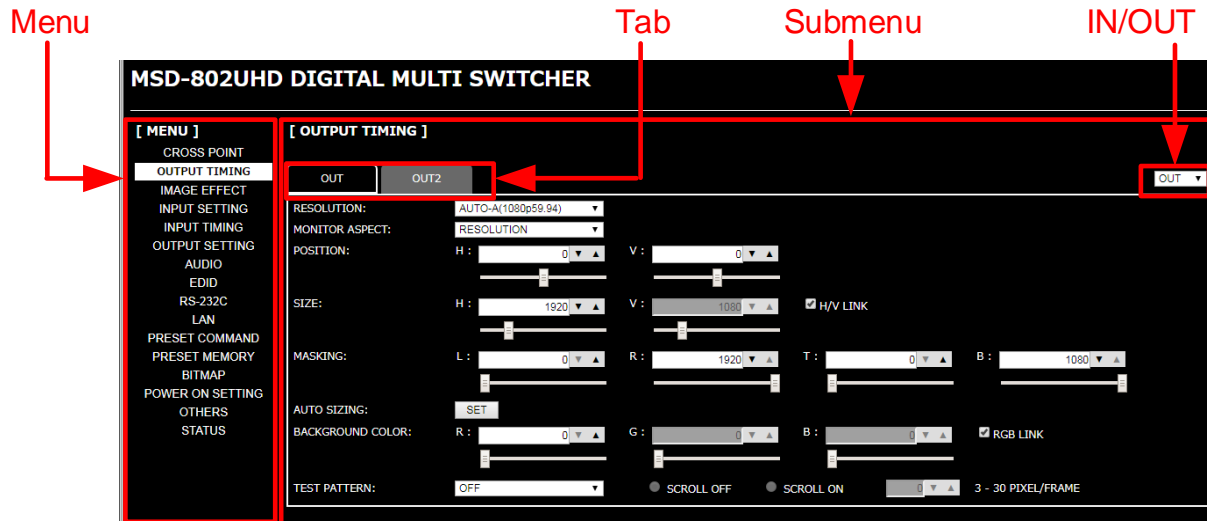
【See: 9.12.1 IP address/Subnet mask/Gateway address】

【See: 9.12.3 TCP port number】

[Table 8.15] Address input example

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

8.7.2 How to use WEB menu



[Fig. 8.6] WEB menu

- ① Select the target item from the menu.
Settings will be displayed in the sub menu.
- ② If there is a setting item that can be set for each channel, channel tab will be displayed.
- ③ Configure each setting from the submenu by following the table below.

[Table 8.16] Buttons for setting

Button name	Button	Description
Execution button	<input type="button" value="SET"/>	Executes the target operation.
Pull-down list	<input type="text" value="OUT1"/> ▼	Selects the desired value.
Spin button	<input type="text" value="10"/> ▼ ▲	Selects the desired value. You can type the desired value directly in the text area.
Slider bar	<input type="range"/>	You can move the slider to set the desired value.
Check box	<input checked="" type="checkbox"/> RGB LINK	Enables and disables by clicking or unclicking the box.
Radio button	<input type="radio"/> SCROLL OFF <input type="radio"/> SCROLL ON	Selects the desired value.

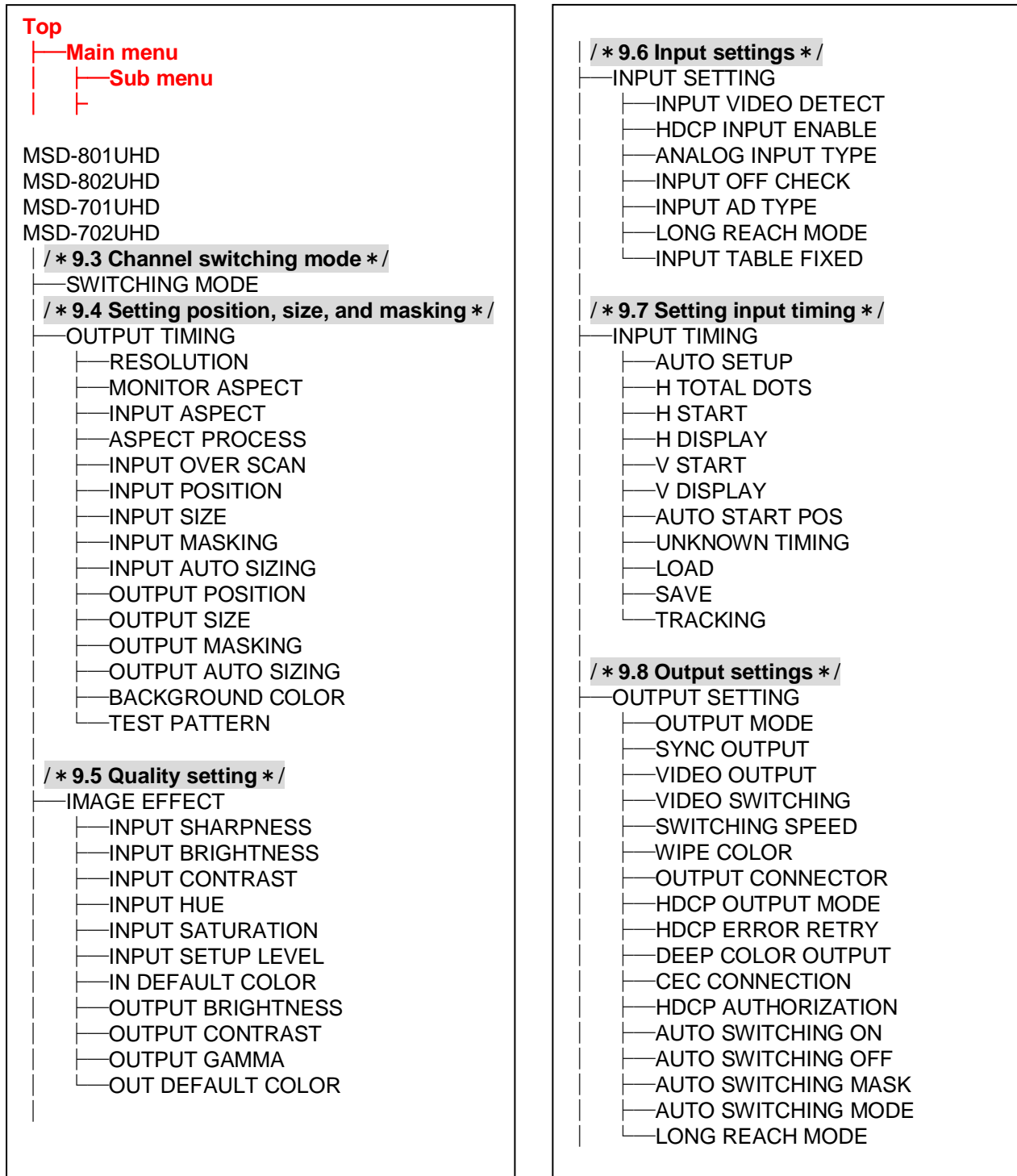
Tip:

You can change the channel name displayed in the tab from “NAME EDIT” in the “CROSS POINT”.

9 Menu

9.1 Menu list

Menu trees for the MSD



[Fig. 9.1] Menu list (1/2)

<p>/* 9.9 Audio setting */</p> <ul style="list-style-type: none"> └ AUDIO <ul style="list-style-type: none"> └ OUTPUT LEVEL └ OUTPUT MUTE └ AUDIO INPUT SELECT └ INPUT OFFSET └ OUTPUT LIP SYNC └ INPUT LIP SYNC └ SAMPLING FREQUENCY └ AUDIO OUTPUT └ DIGITAL OUTPUT └ MULTI AUDIO └ OUT AUDIO PRIORITY └ TEST TONE <p>/* 9.10 EDID (Extended Display Identification Data) */</p> <ul style="list-style-type: none"> └ EDID <ul style="list-style-type: none"> └ EDID DATA └ PC RESOLUTION └ AV RESOLUTION └ DEEP COLOR INPUT └ AUDIO FORMAT └ SPEAKER └ MONITOR EDID COPY <p>/* 9.11 RS-232C */</p> <ul style="list-style-type: none"> └ COM PORT <ul style="list-style-type: none"> └ PARAMETERS └ FUNCTION └ OUT B SCI CONNECT <p>/* 9.11.3 LAN */</p> <ul style="list-style-type: none"> └ LAN <ul style="list-style-type: none"> └ IP ADDRESS └ SUBNET MASK └ GATEWAY ADDRESS └ FUNCTION └ PORT NUMBER └ MAC ADDRESS └ HDBASET LAN <p>/* 9.13 Setting control command */</p> <ul style="list-style-type: none"> └ PRESET COMMAND <ul style="list-style-type: none"> └ COMMAND EDIT └ RECV COMMAND EDIT └ COMMAND LINK └ COMMAND EXECUTION └ INVALID TIME └ INITIALIZE └ COMMAND TALLY 	<p>/* 9.14 Preset memory */</p> <ul style="list-style-type: none"> └ PRESET MEMORY <ul style="list-style-type: none"> └ LOAD CROSS POINT └ SAVE CROSS POINT └ EDIT CROSS POINT └ LOAD ALL SETTING^{*1} └ SAVE ALL SETTING └ COPY OUTPUT MEMORY^{*2} └ STARTUP <p>/* 9.15 Bitmap setting */</p> <ul style="list-style-type: none"> └ BITMAP <ul style="list-style-type: none"> └ BITMAP OUTPUT └ BACKGROUND COLOR └ ASPECT └ POSITION └ CHANNEL ASSIGN └ POWER ON BITMAP └ DIVIDE MEMORY └ VIDEO CAPTURE <p>/* 9.16 Startup setting */</p> <ul style="list-style-type: none"> └ POWER ON SETTING <ul style="list-style-type: none"> └ DISPLAY POWER └ OPERATION LOCK <p>/* 9.17 Other settings */</p> <ul style="list-style-type: none"> └ OTHERS <ul style="list-style-type: none"> └ OP LOCK MODE └ BUZZER └ POWER SAVE └ DISP POW BUTTON ON └ HDC POWER OUTPUT └ TOP DISPLAY └ INPUT STATUS └ MONITOR STATUS └ EDID STATUS └ VERSION
--	---

[Fig. 9.2] Menu list (2/2)

*1 Displayed if preset memory is saved.

*2 Models having two or more outputs support this menu.

9.2 Input Signal Automatic Detection

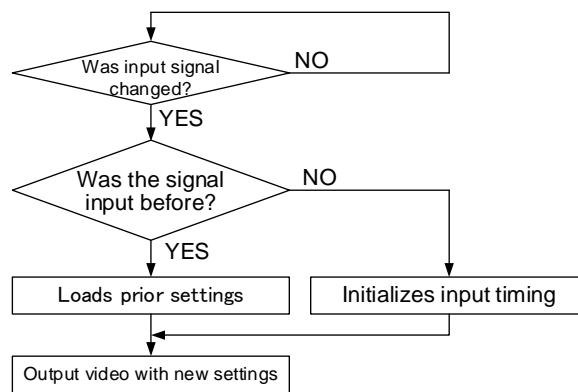
The MSD continuously monitors its input signals. If a particular signal has previously been connected to the MSD's input, the output signal will be presented in the same format as it was during the most recent session. If an input signal does not match any signal previously presented to the MSD, only the input timing settings are automatically negotiated. Other settings are not affected. The output image size and format settings can be adjusted if required.

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

【See: 9.5 Quality setting】

【See: 9.6.7 Fixing settings for each input signal】

【See: 9.7 Setting input timing】



【Fig. 9.3】 How signals are recognized

The MSD retains data for up to 50 input devices for each input connector. The data is used to determine if a signal has been presented to that connector previously by a particular device. The input signal have been input before or not. If input data storage exceeds 50 memory locations, the oldest data that have not been input recently will be deleted, instead.

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

The MSD retains data for up to 50 devices for each input connector.

↑
If input data storage exceeds 50 memory locations, the new memory entries will replace the earliest entries.

【Fig. 9.4】 Memory table per channel

The following attributes are saved for each input signal.

[Table 9.1] Attributes saved for each input signal

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

9.3 Channel switching mode

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

You can switch the channel switching mode.

9.4 Setting 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 enlarged display area by the sink device side or if it is desired to modify the displayed area for all inputs at once, set the desired attributes for the output ports.

9.4.1 Output resolution

Menu Top→OUTPUT TIMING→RESOLUTION

Setting for Each output channel (Common to OUTA / OUTB)

Setting values

•AUTO-A [Default]		•1080i@59.94	(1920x1080)	•WXGA++@60	(1600x900)
•AUTO-B		•1080i@50	(1920x1080)	•WXGA+@60	(1440x900)
•2160p@60(4096)	(4096x2160)	•720p@60	(1280x720)	•SXGA+@60	(1400x1050)
•2160p@50(4096)	(4096x2160)	•720p@59.94	(1280x720)	•WXGA@60	(1366x768)
•2160p@30(4096)	(4096x2160)	•720p@50	(1280x720)	•WXGA@60	(1360x768)
•2160p@25(4096)	(4096x2160)	•576p@50	(720x576)	•SXGA@60	(1280x1024)
•2160p@24(4096)	(4096x2160)	•576i@50	(720x576)	•Quad-VGA@60	(1280x960)
•2160p@60	(3840x2160)	•480p@59.94	(720x480)	•WXGA@60	(1280x800)
•2160p@50	(3840x2160)	•480i@59.94	(720x480)	•WXGA@60	(1280x768)
•2160p@30	(3840x2160)	•WQXGA@60	(2560x1600)	•XGA@60	(1024x768)
•2160p@25	(3840x2160)	•WQHD@60	(2560x1440)	•SVGA@60	(800x600)
•2160p@24	(3840x2160)	•QWXGA@60	(2048x1152)	•VGA@60	(640x480)
•1080p@60	(1920x1080)	•WUXGA@60	(1920x1200)		
•1080p@59.94	(1920x1080)	•VESAHD@60	(1920x1080)		
•1080p@50	(1920x1080)	•WSXGA+@60	(1680x1050)		
•1080i@60	(1920x1080)	•UXGA@60	(1600x1200)		

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

Numbers following “@” represent the vertical synchronous frequency.

480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 2160p are timing formats relating to the CEA-861E standard. Others are timing formats meeting either the VESA DMT standard or the VESA CVT standard. VESAHD@60, WUXGA@60, QWXGA@60, WQHD@60, and WQXGA@60 are output formats that incorporate Reduced Blanking.

The maximum format of OUTB (HDBaseT output connector) is 2160p@30. If 2160p@50 or 2160p@60 is selected, video signals cannot be output from OUTB.

If “AUTO-A” or “AUTO-B” is selected, the maximum output resolution format is set to 2160p@30 automatically. If you want to output video at 2160p@50 or 2160p@60 from OUTA (HDMI output connector), change the setting to 2160p@50 or 2160p@60. In this case, video cannot be output from OUTB (HDBaseT output connector).

■ "AUTO-A" and "AUTO-B":

"AUTO-A" (OUTA, HDMI output connector), "AUTO-B" (OUTB, HDBaseT output connector):
Automatically selects the optimal output resolution format depending on the EDID of the connected sink device. The optimal format is then provided to the connected sink device via the MSD's 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.

If the EDID of the connected sink device is higher than 2160p@30, an asterisk "*" is indicated to the right side of the format data.

[OUT1 RESOLUTION] ◀▶
AUTO (1080p59.94)

Outputting at optimal resolution

[OUT1 RESOLUTION] ◀▶
AUTO (1080p59.94)*

EDID cannot be loaded or optimal
resolution cannot be output

9.4.2 Aspect ratio for sink device

Menu	Top→OUTPUT TIMING→MONITOR ASPECT		
Setting for	Each output channel (Common to OUTA / OUTB)		
Setting value			

- | | | | |
|------------------------|---------|-------|-------|
| • RESOLUTION [Default] | • 16:10 | • 5:3 | • 4:3 |
| • 256:135 | • 16:9 | • 5:4 | |

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

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 an aspect ratio for the sink device of: "4:3," "5:4," "5:3," "16:9," "16:10," and "256:135" (4096x2160).

【See: 9.4.1 Output resolution】

9.4.3 Aspect ratio

Menu	Top→OUTPUT TIMING→INPUT ASPECT		
Setting for	Each input channel, each input signal		
Setting value			

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

You can set the aspect ratio for each video input.

If you select "AUTO-1" or "AUTO-2," the aspect ratio is restored automatically to the original ratio according to the settings of sink device aspect ratio and the MSD's aspect ratio control.

"AUTO-1" and "AUTO-2" work differently only when letter box signals are presented to the input. "AUTO-1" processes them as 16:9 or 14:9 video signals, while "AUTO-2" sets them as 4:3.

Normally, no problem occurs if you set the aspect ratio to "AUTO-1", but some DVD players and other devices display subtitles or setup menus in the un-displayed area. In such case, set the aspect to "AUTO-2" to display the entire area of the video signals.

【See: 9.4.2 Aspect ratio for sink device】

【See: 9.4.4 Aspect ratio control】

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

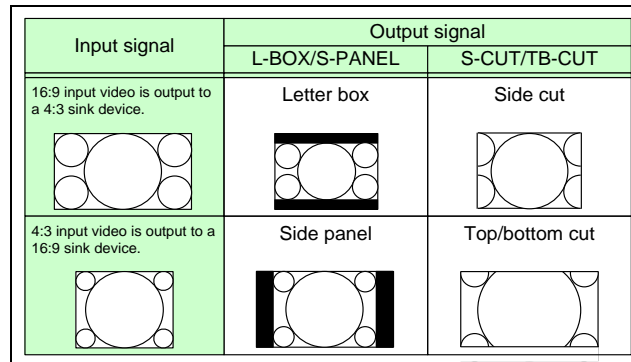
"FULL": video signals are displayed always in full screen mode regardless of input video signal and settings of "9.4.2 Aspect ratio for sink device" and "9.4.4 Aspect ratio control".

"THROUGH": video signals are displayed always in pixel 1:1 regardless of settings of "9.4.2 Aspect ratio for sink device" and "9.4.4 Aspect ratio control".

9.4.4 Aspect ratio control

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

Below is a visual description of restoring aspect ratio:



[Fig. 9.5] Restoring aspect ratio

9.4.5 Overscan

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

You can create an enlarged display of input video.

9.4.6 Display position

Menu	Top→OUTPUT TIMING→INPUT POSITION (input side) / OUTPUT POSITION (output side)
Setting for	Input side : Each input channel, each input signal Output side : Each output channel

Setting value

Input side:

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

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

Output side:

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

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

You can set the position where input video is displayed.

Note:

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

9.4.7 Display size

Menu	Top→OUTPUT TIMING→INPUT SIZE (input side) / OUTPUT SIZE (output side)
Setting for	Input side : Each input channel, each input signal Output side : Each output channel (Common to OUTA / OUTB)
Setting value	
Input side:	Horizontal size (Horizontal output resolution ÷ 4 to Horizontal output resolution x 4 [Default] Horizontal output resolution) Vertical size (Vertical output resolution ÷ 4 to Vertical output resolution x 4 [Default] Vertical output resolution)
Output side:	Horizontal size (Horizontal output resolution ÷ 4 to Horizontal output resolution x 4 [Default] Horizontal output resolution) Vertical size (Vertical output resolution ÷ 4 to Vertical output resolution x 4 [Default] Vertical output resolution)

You can set the display size of input video.

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

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

【See: 9.4.6 Display position】

Notes:

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

9.4.8 Masking

Menu	Top→OUTPUT TIMING→INPUT MASKING (Input side) / OUTPUT MASKING (Output side)	
Setting for	Input side	: Each input channel, each input signal
	Output side	: Each output channel (Common to OUTA / OUTB)
Setting value		
Input side:	Left side masking	(Horizontal input position to Right side masking [Default] 0)
	Right side masking	(Left side masking to Horizontal input position + Horizontal input size [Default] Horizontal input size)
	Top side masking	(Vertical input position to Bottom side masking [Default] 0)
	Bottom side masking	(Top side masking to Vertical input position + Vertical input size [Default] Vertical input size)
Output side:	Left side masking	(Horizontal output position (0 or more) to Right side masking [Default] 0)
	Right side masking	(Left side masking to Horizontal output position + Horizontal output size (Horizontal output resolution or less) [Default] Horizontal output resolution)
	Top side masking	(Vertical output position (0 or more) to Bottom side masking [Default] 0)
	Bottom side masking	(Top side masking to Vertical output position + Vertical output size (Vertical output resolution or less) [Default] Vertical output resolution)

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

9.4.9 Automatic sizing

Menu	Top→OUTPUT TIMING→INPUT AUTO SIZING (Input side) / OUTPUT AUTO SIZING (Output side)	
Setting for	Input side	: Each input channel, each input signal
	Output side	: Each output channel (Common to OUTA / OUTB)

This function adjusts output signal optimally, and as a result, the following settings will be initialized automatically.

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

[Table 9.2] Items to be initialized

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

9.4.10 Background color

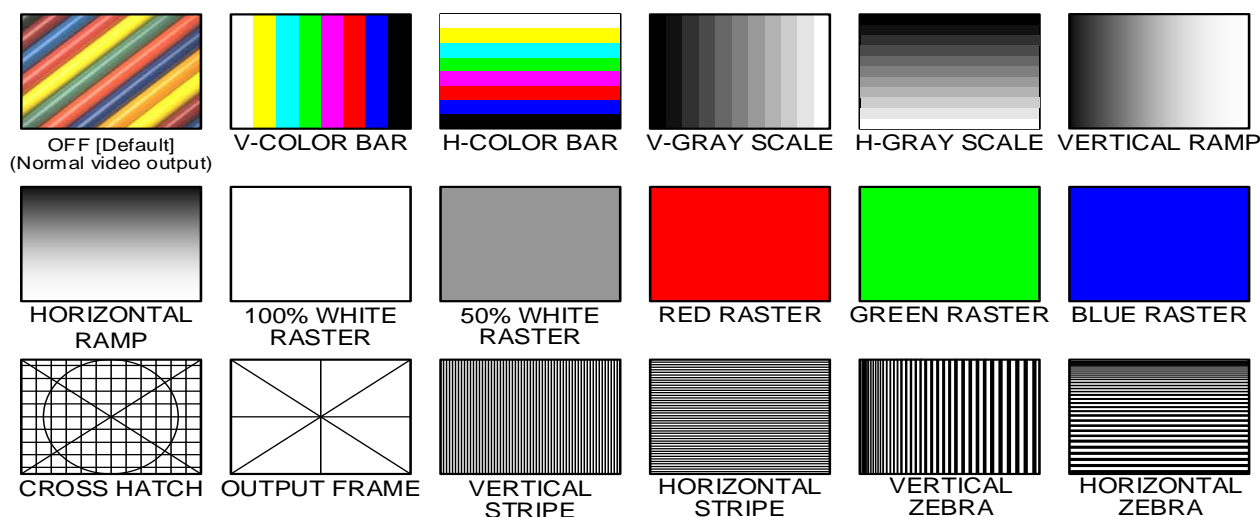
Menu	Top→OUTPUT TIMING→BACKGROUND COLOR
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	R / G / B: 0 to 255 [Default] R / G / B: 0 (black)

You can set the background color of output video.

If you set "LINK" to "ON", only the setting for "R" can be set, and "G" and "B" track the setting of "R".

9.4.11 Test pattern

Menu	Top→OUTPUT TIMING→TEST PATTERN
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	[Fig. 9.7] Test pattern



[Fig. 9.6] Test pattern

You can activate the MSD's internal test pattern generator and direct its signal to each output connector. While active, the test pattern will override any other signal that has been switched to that particular output connector.

All settings of "9.5 Quality setting" will be invalid while a test pattern is displayed.

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

Settings of "9.4.6 Display position" and "9.4.7 Display size" in the output side will be adjusted in order to display the test pattern on full screen.

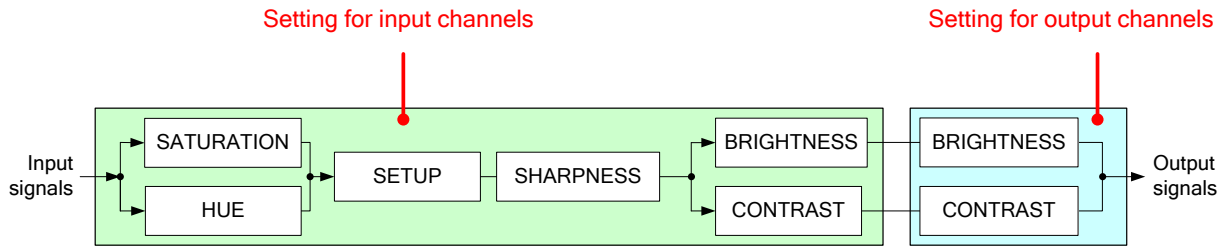
For test patterns other than "OUTPUT FRAME": video is output on full screen with the resolution set in "9.4.1 Output resolution" and the settings of "9.4.6 Display position", "9.4.7 Display size" and "9.4.8 Masking" will be invalid.

You can use the arrow keys (▶, ▲, ▼) to scroll through the available patterns "COLOR BAR", "GRAY SCALE", "RAMP", and "ZEBRA" by using. The scroll speed can be set by 3 pixels per frame up to 30 pixels per frame with ▲ and ▼ keys. You can check the residual image (resolution of moving picture) by displaying and scrolling the "ZEBRA" pattern.

9.5 Quality settings

Setting items for input channels are for correcting color bias.

Image quality to be output can be set for each input side (input channels) and output side (output channels) as follows.



[Fig. 9.7] Video correction

9.5.1 Sharpness

Menu Top→IMAGE EFFECT→INPUT SHARPNESS

Setting for Each input channel, each input signal

Setting value -5 to 15 [Default] 0

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

9.5.2 Brightness

Menu Top→IMAGE EFFECT→INPUT BRIGHTNESS (Input side) /
OUTPUT BRIGHTNESS (Output side)

Setting for Input side : Each input channel, each input signal
Output side : Each output channel (Common to OUTA / OUTB)

Setting value 80% to 120% [Default] 100%

You can set the brightness level for each input/output signal.

9.5.3 Contrast

Menu Top→IMAGE EFFECT→INPUT CONTRAST (Input side) /
OUTPUT CONTRAST (Output side)

Setting for Input side : Each input channel, each input signal
Output side : Each output channel (Common to OUTA / OUTB)

Setting value R / G / B : 0% to 200% [Default]: R / G / B: 100%

You can set the contrast of video image.

If you set "LINK" to "ON", only the setting for "R" can be set, and "G" and "B" track the setting of "R".

9.5.4 HUE

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

You can set the color HUE for each input signal.

9.5.5 Saturation

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

You can set the color saturation for each input signal.

9.5.6 Black level

Menu	Top→IMAGE EFFECT→INPUT SETUP LEVEL
Setting for	Each input channel, each input signal
Setting value	-10.0% to 10.0% (by 0.5%) [Default] 0.0%

You can adjust the black level for each input signal.

9.5.7 Gamma

Menu	Top→IMAGE EFFECT→OUTPUT GAMMA
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	0.1 to 3.0 (by 0.1) [Default] 1.0

You can adjust the gamma curve of each output signal.

9.5.8 Default color

Menu Top→IMAGE EFFECT→IN DEFAULT COLOR (Input side) /
OUT DEFAULT COLOR (Output side)

Setting for Input side : Each input channel, each input signal
Output side : Each output channel (Common to OUTA / OUTB)

You can initialize settings of the following items.

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

[Fig. 9.8] Items to be initialized

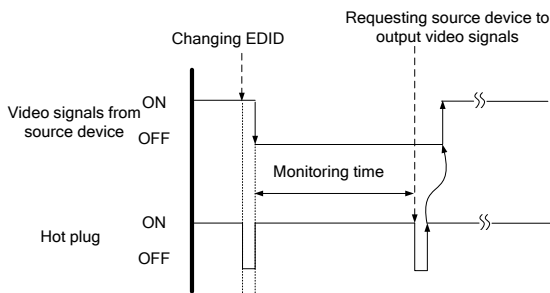
Items to be initialized	Input side	Output side
Brightness, contrast	Initialized	Initialized
Sharpness, hue, saturation, black level	Initialized	-
Gamma	-	Initialized

9.6 Input settings

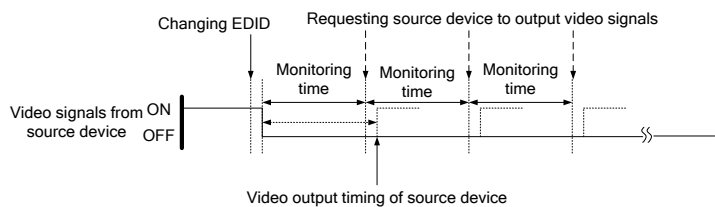
9.6.1 No-signal input monitoring

Menu	Top→INPUT SETTING→INPUT VIDEO DETECT
Setting for	Each input channel (only digital input signal)
Setting value	OFF, 2000ms to 15000ms (100 ms 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 which is from when a source device stops outputting signal to when the MSD requests the source device to output video signal.



[Fig. 9.9] Monitoring absence of input



[Fig. 9.10] Repeating reset

Note:

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

9.6.2 Input HDCP setting

Menu Top→INPUT SETTING→HDCP INPUT ENABLE

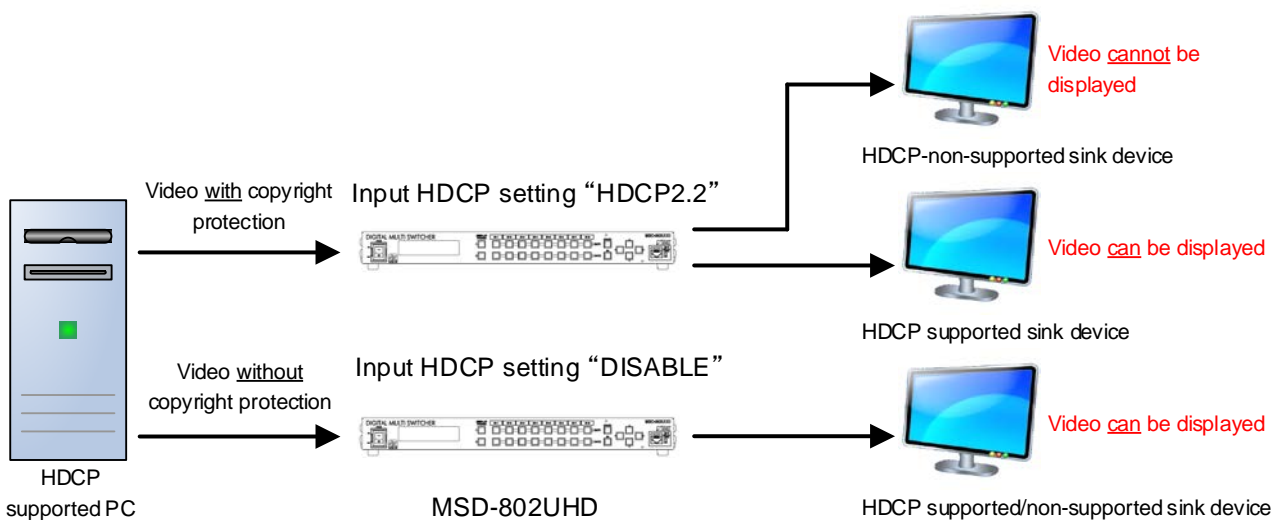
Setting for Each input channel (only digital input signal)

Setting value

- HDCP 2.2 : Supports HDCP 2.2 and HDCP 1.4 [Default]: [IN1, IN2, IN8]
- HDCP 1.4 : Supports HDCP 1.4 [Default]: [IN3 to IN7]
- DISABLE : Not support HDCP

Some source devices negotiates with the connected device to determine if it supports HDCP encryption. After this negotiation, the source device controls whether or not a signal may be sent to the device. 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, video may not be displayed. Under these circumstances and if the content is not protected, the problem can be solved by setting this menu to “DISABLE.”

【See: 9.6.5 Selecting signal of DVI input connector】



[Fig. 9.11] HDCP-supported and HDCP-non-supported display devices

Notes:

- HDCP2.2 (stream type 0) contents can be displayed on sink devices supporting HDCP1.4.
- HDCP2.2 (stream type 1) contents can be displayed on sink devices supporting HDCP2.2 but cannot be displayed on sink devices supporting HDCP1.4.

9.6.3 Analog input signal parameters

Menu	Top→INPUT SETTING→ANALOG INPUT TYPE	
Setting for	Each input channel, each input signal (only analog input)	
Setting value	<ul style="list-style-type: none"> ▪ AUTO : Automatic [Default] ▪ RGB : Analog RGB ▪ YPbPr : Analog YPbPr ▪ VIDEO AUTO : Video automatic ▪ VIDEO : Composite video ▪ Y/C : S video 	

You can set the signal type that is being presented to the DVI-I input connector.

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

This menu is available only if an analog signals are present on input ports 6 or 7.

【See: 9.6.5 Selecting signal of DVI input connector】

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".

9.6.4 Automatic detection of video input interruption

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

The MSD can stop outputting video immediately after input video signals are disconnected 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.

- **9.8.4 Window transaction effect**
- **9.8.5 Window transaction speed**
- **9.8.6 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 "**9.8.4 Window transaction effect**" to an option other than "CUT", noises or black bars may be output at the time of fading out or wiping out.

9.6.5 Selecting signal of DVI input connector

Menu	Top→INPUT SETTING→INPUT AD TYPE
Setting for	Each input channel (only DVI input connector)
Setting value	DIGITAL [Default], ANALOG

You can select either digital or analog formats.

9.6.6 HDBaseT input long reach mode

Menu	Top→INPUT SETTING→LONG REACH MODE
Setting for	HDBaseT input channel
Setting value	<ul style="list-style-type: none"> • OFF : Long reach mode disabled. Up to 328 ft. (100 m) [Default] • ON : Long reach mode enabled. Up to 492 ft. (150 m)

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

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

【See: 9.10 EDID (Extended Display Identification Data)】

9.6.7 Fixing settings for each input signal

Menu Top→INPUT SETTING→INPUT TABLE FIXED

Setting for Each input channel

Setting value

Setting mode:

- SELECTED : Sets for each item [Default]
- ALL FIXED : Does not load settings saved for each input signal but fixes the current settings

Individual setting (if “SELECTED” is selected for the setting mode):

- ASPECT : OFF [Default], ON(FIXED) 【See: 9.4.3 Aspect ratio】
- ANALOG TYPE : OFF, ON(FIXED) [Default] 【See: 9.6.3 Analog input signal parameters】
- AUDIO LEVEL : OFF, ON(FIXED) [Default] 【See: 9.9.4 Input level】

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 its previous use.

【See: 9.2 Input Signal Automatic Detection】

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

“ALL FIXED”: Does not load all settings saved for each input signal but outputs the video with the current setting.

“SELECTED”: Aspect ratio, analog input signal type and audio input level can be set individually. For setting items other than settings in [Table 9.1], settings saved for each input signal are used.

“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.

[Table 9.3] Individual settings for each digital or analog signal

Individual setting	Digital signal (IN1 to IN8*)	Analog signal (IN6 and IN7*)
ASPECT	Can be set	Can be set
ANALOG TYPE	Cannot be set	Can be set
AUDIO LEVEL	Can be set	Cannot be set

*IN6 and IN7: Digital and analog input signals can be accommodated.

For signal selection, see “9.6.5 Selecting signal of DVI input connector”.

9.7 Setting input timing

You can set the timing parameters for analog signal inputs.

The MSD loads the optimal table from its embedded 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 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 9.4] Settable items

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

Partly 1: can be set only if analog RGB / analog YPbPr 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.

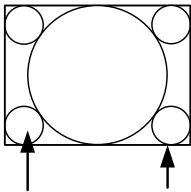
9.7.1 Automatic measurement

Menu	Top→INPUT TIMING→AUTO SETUP
Setting for	Each input channel, each input signal (only analog input signal)
Setting value	

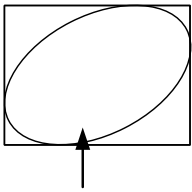
- NORMAL MODE [Default] • 4:3 • 5:3 • 16:10
- NEXT ASPECT • 5:4 • 16:9

Analog RGB/analog YPbPr input video is measured to set "9.7.2 The total number of horizontal dots", "9.7.3 Start position", "9.7.4 Active area", and "9.7.9 Tracking" automatically.

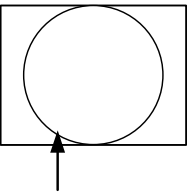
- Can be measured:
 - Input video contacts the circumscribed rectangle.
 - Brightness of input video is 25% or more.
- Cannot be measured:
 - Right and left sides of input video do not touch the circumscribed rectangle.
 - Brightness of input video is 24% or less.



Input video Valid display area



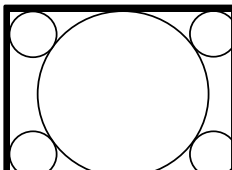
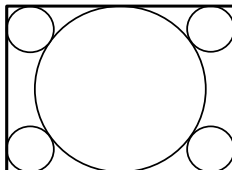
Input video

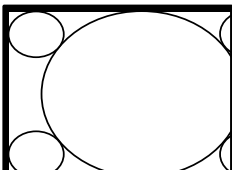
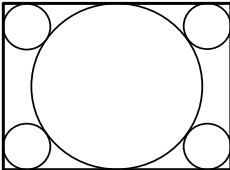


Input video

[Fig. 9.12] 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 starting position, the active area is also adjusted by executing automatic input measurement.

[Fig. 9.13] Automatic measurement by "NORMAL MODE"

If the total number of horizontal dots 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 the aspect ratio of the input signal is known, 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.

[IN7 AUTO SETUP]
1024x 768 60.00Hz

If there is no input signal on the input channel it shows "NOT AVAILABLE NOW" on the front VFD screen.

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

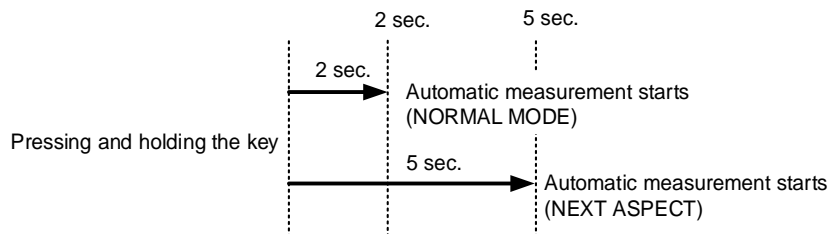
Note:

In case the aspect ratio does not match or video is displayed on the position far from the correct position, set the input timing in, "9.7.2 The total number of horizontal dots", "9.7.3 Start position", and "9.7.4 Active area".

■ **Operation from front keys**

You can execute the automatic measurement in "NORMAL MODE" by pressing an IN6 or IN7 key (analog input only) for 2 seconds or longer. If you want to execute the automatic measurement in "NEXT ASPECT", press the same key for 5 seconds or longer.

【See: 9.6.5 Selecting signal of DVI input connector】



[Fig. 9.14] Automatic measurement using front key

9.7.2 The total number of horizontal dots

Menu	Top→INPUT TIMING→H TOTAL DOTS
Setting for	Each input channel, each input signal (only analog input signal)
Setting value	400DOT to 4125DOT [Default] varies depending on the input signal

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

The settable values vary depending on the input signal. If interlace signal are input, the sampling clock (Horizontal synchronized frequency x the total number of horizontal dots) must be within 13 MHz to 81 MHz. If non-interlace signal are input, the sampling clock must be within 13 MHz to 162 MHz.

If other signals are input, the total number only can be displayed but not set.

If there is no input signal on the input channel it shows "NOT AVAILABLE NOW" on the front VFD screen.

9.7.3 Start position

Menu	Top→INPUT TIMING→H START (Horizontal) / V START (Vertical)
Setting for	Each input channel, each input signal
Setting value	[Table 9.5] Settings of start position

[Table 9.5] Settings of start position

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

[Default] varies depending on the input signal.

You can set the horizontal/vertical starting position.

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

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

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

If 4K video signals are input, only the display start position will be displayed; the value cannot be set.

If there is no input signal on the input channel it shows "NOT AVAILABLE NOW" on the front VFD screen.

9.7.4 Active area

Menu	Top→INPUT TIMING→H DISPLAY (Horizontal) / V DISPLAY (Vertical)
Setting for	Each input channel, each input signal
Setting value	[Table 9.6] Settings of active area

[Table 9.6] Settings of active area

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

[Default] varies depending on the input signal.

You can set the horizontal/vertical active area of input video.

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

If 4K video signals are input, only the active area will be displayed; the value cannot be set.

If there is no input signal on the input channel it shows “NOT AVAILABLE NOW” on the front VFD screen.

9.7.5 Automatic measurement of start position

Menu	Top→INPUT TIMING→AUTO START POS
Setting for	Each input channel, each input signal (only analog 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]

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

Notes:

- For motion images, some content may not be displayed on the full screen, and the display position may be moved every time the setting of the automatic measurement is applied. In such a case, set this menu to "OFF". As "OFF" and "ON" are saved for each input signal, it can be set according to the input signal. If you do not want to perform this function for all resolution, select "ALL OFF".
- Only the start position is set by automatic measurement of this menu. If **"9.7.2 The total number of horizontal dots"** and **"9.7.4 Active area"** do not match, the lower right may be cut off or blackout may be output. In this case, adjust the whole screen by following **"9.7.1 Automatic measurement"**. As the set value must not exceed the value set in **"9.7.3 Start position"**, some input videos are displayed with blackout at the left or top side.
- This menu is valid only if **"[Fig. 9.13] Conditions of automatic measurement"** is satisfactory.
- Even if you set this menu to "ON", the manual setting will be applied and the automatic measurement is not executed if you set any of the following menus: **"9.7.2 The total number of horizontal dots"**, **"9.7.3 Start position"**, and **"9.7.4 Active area"**. If you set **"9.7.9 Tracking"**, the manual setting is applied, and tracing is not set automatically when the automatic measurement is executed. When you execute **"9.7.1 Automatic measurement"**, settings of this menu will be valid again.

9.7.6 Automatic setting of input timing

Menu	Top→INPUT TIMING→UNKNOWN TIMING
Setting for	None
Setting value	AUTO SETUP ON [Default], AUTO SETUP OFF

The MSD loads the optimal table from the built-in tables and sets the input timing automatically. However, if unregistered signals are input, the input timing must be set. By setting this menu to "AUTO SETUP ON", **"9.7.1 Automatic measurement"** is executed and the input timing is set automatically if signal that cannot be detected by the MSD are input for the first time.

Note:

If automatic measurement finds inconsistency of aspect ratio, please perform **"9.7.1 Automatic measurement"** manually or set the input timing in **"9.7.2 The total number of horizontal dots"**, **"9.7.3 Start position"** and/or **"9.7.4 Active area"**.

9.7.7 Loading device data

Menu	Top→INPUT TIMING→LOAD
Setting for	Each input channel, each input signal

Device data whose input timing is registered can be loaded according to the input signal.

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

If there is no input signal on the input channel it shows “NOT AVAILABLE NOW” on the front VFD screen.

[Table 9.7] Items to be loaded

Input signal	Item
Analog	Registered device data will be loaded. Use this menu in the following cases: <ul style="list-style-type: none"> • Several device data with the same frequency of synchronous signal and different input timings is registered. • You want to set the input timing again.
Digital	The value that is automatically detected by the MSD will be set. Use this menu to restore the input timing to the original value.

9.7.8 Registering device data

Menu	Top→INPUT TIMING→SAVE
Setting for	Each input channel, each input signal (only analog input signal)
Setting value	No. 1 to No.99

You can save up to 99 analog RGB/analog YPbPr input timing settings.

The device data can be named up to 14 characters using ASCII code 20 to 7D. The device table name is optional. If a device table name is not registered and press MENU/SET key without device table name, the input resolution is registered as the device table name automatically. If a device table name is already registered and press MENU/SET key without device table name, the input timing is saved to the device table name without changing the device table name.

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

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

If there is no input signal on the input channel it shows “NOT AVAILABLE NOW” on the front VFD screen.

9.7.9 Tracking

Menu	Top→INPUT TIMING→TRACKING
Setting for	Each input channel, each input signal (only analog input signal)
Setting value	0 to 63 [Default]: 0

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

If there is no input signal on the input channel it shows “NOT AVAILABLE NOW” on the front VFD screen.

9.8 Output settings

9.8.1 Output mode

Menu Top→OUTPUT SETTING→OUTPUT MODE

Setting for Each output channel (Each OUTA / OUTB)

Setting value

- HDMI YCbCr 4:4:4 MODE [Default]
- HDMI YCbCr 4:2:2 MODE
- HDMI YCbCr 4:2:0 MODE *only OUTA
- HDMI RGB MODE
- DVI MODE

You can select an output signal mode and color space of the output video. The MSD outputs selected mode, however, if the connected sink device has optimal output mode and color space, the MSD outputs optimal output mode signal for the connected sink device.

“HDMI YCbCr 4:2:0 MODE”: YCbCr 4:2:0 has priority if the resolution is 4K@60 / 59.94 / 50 while YCbCr 4:4:4 has priority for other resolutions.

Higher priority	HDMI YCbCr 4:4:4 MODE
	HDMI YCbCr 4:2:2 MODE
	HDMI YCbCr 4:2:0 MODE
	HDMI RGB MODE
Lower priority	DVI MODE

Notes:

- If “DVI MODE” is selected and the output resolution is 2160p@30 or lower, the MSD outputs DVI signals. For other resolutions, it outputs signals at the appropriate mode of the connected sink device.
- Only TV resolutions (480i, 576i, 720p, 1080i, 1080p, and 2160p) can be output in “HDMI YCbCr 4:4:4 MODE” or “HDMI YCbCr 4:2:2 MODE”. PC resolutions are output in “HDMI RGB MODE” or “DVI MODE”.
- Since OUTB (HDBaseT output connector) does not support YCbCr 4:2:0, “HDMI YCbCr 4:2:0 MODE” cannot be selected.

9.8.2 Synchronous signal output with no input video

Menu Top→OUTPUT SETTING→SYNC OUTPUT

Setting for Each output channel (Common to OUTA / OUTB)

Setting value ON [Default], OFF

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

9.8.3 Output video with no input video

Menu	Top→OUTPUT SETTING→VIDEO OUTPUT
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	<ul style="list-style-type: none"> · BLUE [Default] · BACKGROUND COLOR · BLACK

You can set the color of the video to be output when no video signal is input from the selected input. The setting will be valid when “**9.8.2 Synchronous signal output with no input video**” is set to “ON”

9.8.4 Window transaction effect

Menu	Top→OUTPUT SETTING→VIDEO SWITCHING
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	<ul style="list-style-type: none"> · FREEZE→FADE OUT-IN [Default] · FADE OUT-IN · CUT · BOTTOM→TOP WIPE · TOP→BOTTOM WIPE · RIGHT→LEFT WIPE · LEFT→RIGHT WIPE

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

The setting will be valid also when “**9.6.4 Automatic detection of video input interruption**” is set to “ON”

9.8.5 Window transaction speed

Menu	Top→OUTPUT SETTING→SWITCHING SPEED
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	100ms to 2000ms (per 10ms) [Default]: 350 ms

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

The setting will be valid also when “**9.6.4 Automatic detection of video input interruption**” is set to “ON”.

9.8.6 Wipe color

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

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

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

9.8.7 Video output connector

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

The MSD distributes the same video to the HDMI output connector and HDBaseT output connector. You can set the each connector to output the video or not.

This feature can be used for previewing video. You can check the one of video in one output while the other output is set to "OFF".

9.8.8 HDCP

Menu	Top→OUTPUT SETTING→HDCP OUTPUT MODE
Setting for	Each output channel (OUTA / OUTB)
Setting value	<p>HDCP 2.2 : Encrypts HDCP via HDCP 2.2 [Default]</p> <p>HDCP 1.4 : Encrypts HDCP via HDCP 1.4</p> <p>HDCP INPUT ONLY : Encrypts HDPC only if input signal has HDCP</p> <p>DISABLE : Do not encrypt HDCP</p>

You can set the HDCP output for when a sink device supporting HDCP is connected.

Normally set this menu to "HDCP 2.2". The MSD encrypts optimal HDCP which HDCP 2.2 has priority.

If you select "HDCP 1.4", the MSD encrypts HDCP via HDCP 1.4 regardless which HDCP version the sink devices have.

If you select "HDCP INPUT ONLY", the MSD encrypts HDCP only if the input signal has HDCP. However, if input channel is changed to others and HDCP authentication status is changed, the MSD starts HDCP authentication again. This action may take time to output video and audio.

If you select "DISABLE", the MSD never encrypts HDCP. Only the input signal which does not have HDCP can be output.

If the sink device which does not support HDCP is connected, the MSD can output only the video and audio which do not have HDCP regardless this menu.

Notes:

- HDCP2.2 (stream type 0) contents can be displayed on sink devices supporting HDCP1.4.
- HDCP2.2 (stream type 1) contents can be displayed on sink devices supporting HDCP2.2 but cannot be displayed on sink devices supporting HDCP1.4.

9.8.9 The number of HDCP retries

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

You can set the number of HDCP retries.

If a sink device with HDCP is connected and you set “**9.8.7 HDCP**” to “HDCP 2.2”, “HDCP 1.4”, 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.)

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

9.8.10 Deep Color

Menu	Top→OUTPUT SETTING→DEEP COLOR OUTPUT
Setting for	Each output channel (OUTA / OUTB)
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. If a sink device that does not support Deep Color is connected, signals are output with “24-BIT COLOR” automatically. However, since the transmission clock of “30-BIT COLOR” is faster than that of “24-BIT COLOR”, noise may occur if a bad-quality cable or long cable is connected. In those cases, the noise may be removed by selecting “24-BIT COLOR”.

When the MSD outputs at WQHD (2560 x 1440) / WQXGA (2560x1600) / 4K (3840 x 2160) / 4K (4096 x 2160), the color depth is “24-BIT COLOR”.

9.8.11 CEC connection

Menu	Top→OUTPUT SETTING→CEC CONNECTION
Setting for	Each output channel (OUTA / OUTB)
Setting value	<ul style="list-style-type: none"> ▪ NOT CONNECTED [Default] ▪ SELECTED CHANNEL ▪ IN1 to IN8

You can set the CEC connection for when CEC-supported device is connected to HDMI input connector, HDBaseT input connector, HDMI output connector, or HDBaseT output connector.

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

Notes:

- Using CEC may cause negative effects. If you do not use CEC, set this menu to “NOT CONNECTED”. If the status of the sink devices connected to the HDMI output connector changes (such as being turned OFF→ON) or if the CEC connection changes, the EDID may also need to be changed (the MSD changes it automatically) in order to update the address of the connected device. When the EDID is changed, the source device stops outputting video temporarily.
- IN6 and IN7: CEC is not supported.
- CEC connection is a one-on-one basis; it cannot connect multiple inputs and outputs. If you set multiple outputs to connect to the same input, only a smaller output number is connected preferentially and other outputs are not connected.

9.8.12 HDCP re-authentication

Menu	Top→OUTPUT SETTING→HDCP AUTHORIZATION
Setting for	Each output channel (OUTA / OUTB)

If a sink device supporting HDCP is connected, HDCP is authorized automatically. You can re-authorize HDCP manually using this menu (Connection Reset is performed automatically, but it can be performed manually using this menu). Press the MENU/SET key to perform the re-authentication.

9.8.13 Priority of input channel automatic switching

Menu	Top→OUTPUT SETTING→AUTO SWITCHING ON / AUTO SWITCHING OFF
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	[Table 9.8] Setting of priority of input channel automatic switching

[Table 9.8] Setting of priority of input channel automatic switching

Item	Set value	Default
Output channel (OUT)	1 to 2	-*
Input channel (IN)	1 to 8	-*
Priority (PRI)	1 (high) to 8(low), OFF	OFF

*Setting each input channel priority to each output channel

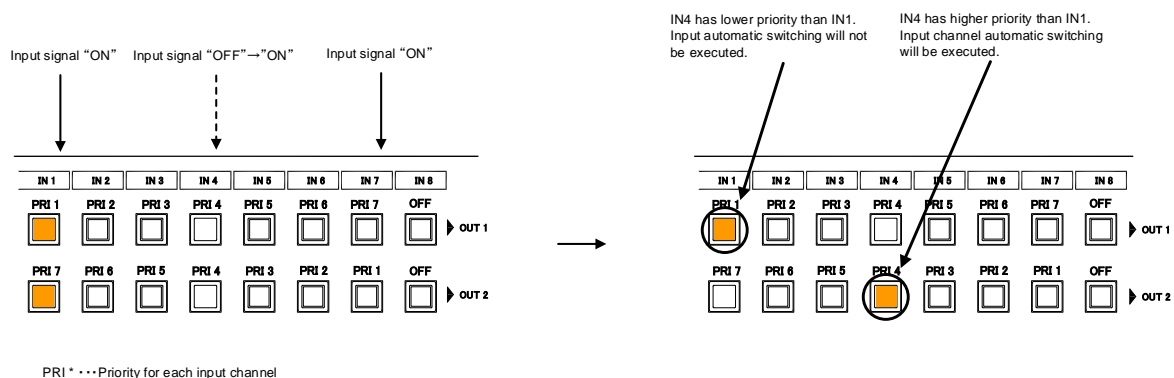
■ AUTO SWITCHING ON

AUTO SWITCHING ON menu switches input signal when the input signal changes from “OFF” to “ON”. The MSD switches input signal automatically as follows:

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

or

- When the input signal become from “OFF” to “ON” and the currently- selected channel that have higher priority than the input signal, but it does not have input signal.



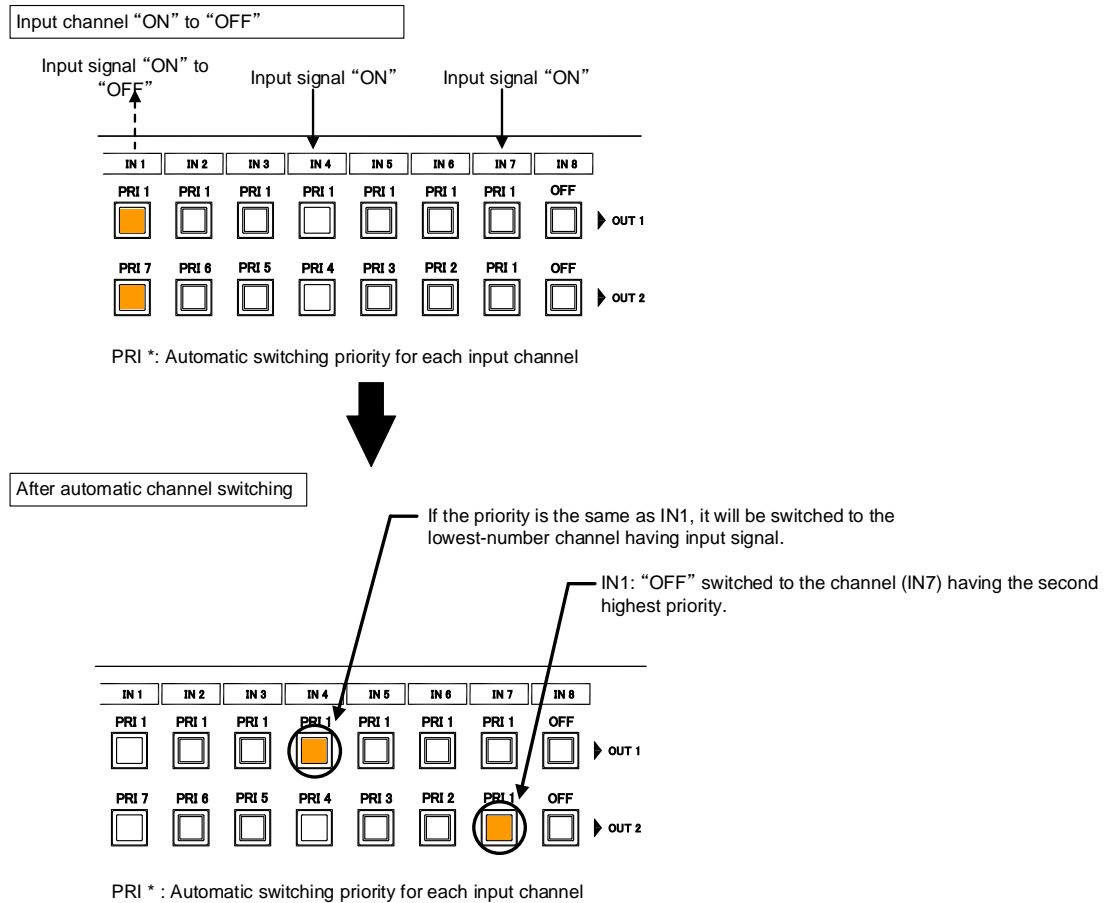
[Fig. 9.15] Input channel automatic switching “OFF” to “ON”

■ AUTO SWITCHING OFF

AUTO SWITCHING OFF menu switches input signal when the input signal changes from “ON” to “OFF”.

The MSD switches input signal automatically based on following conditions;

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



[Fig. 9.16] Input channel automatic switching “ON” to “OFF”

If the priority setting of the input channel is “OFF”, input channel automatic switching is not executed.

You can set channel switching mode for input channel automatic switching from “9.8.15 Channel switching mode of automatic switching”.

Make sure to press the “MENU/SET” key to apply the settings; otherwise, they are not changed.

9.8.14 Masking time after automatic switching of input channel

Menu	Top→OUTPUT SETTING→AUTO SWITCHING MASK
Setting for	Each output channel (Common to OUTA / OUTB)
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.

【See: 9.8.13 Priority of input channel automatic switching】

9.8.15 Channel switching mode of automatic switching

Menu	Top→OUTPUT SETTING→AUTO SWITCHING MODE
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	V&A (Video & Audio) [Default], VIDEO (Video), AUDIO (Audio)

You can set the channel switching mode when automatic switching is executed for when the input channel is switched automatically. This setting has priority regardless of setting of “8.2 Switching input channel”.

【See: 9.8.13 Priority of input channel automatic switching】

9.8.16 HDBaseT output long reach mode

Menu	Top→OUTPUT SETTING→LONG REACH MODE
Setting for	Each output channel (only OUTB)
Setting value	<ul style="list-style-type: none"> • 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 HDBaseT output long reach mode.

In 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.

【See: 9.4.1 Output resolution】

【See: 9.8.10 Deep Color】

9.9 Audio setting

HDMI digital audio supports the following formats. Set audio depending on device connected to the HDMI output connector.

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

【See: 9.10.5 Audio format】

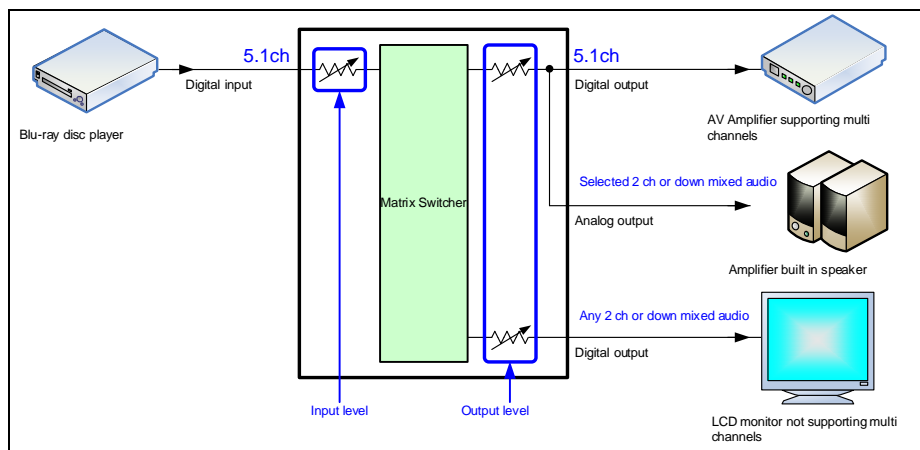
【See: 9.10.6 Speaker configuration】

[Table 9.9] Audio format

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

■ **If multi channel linear PCM signal input to digital audio:**

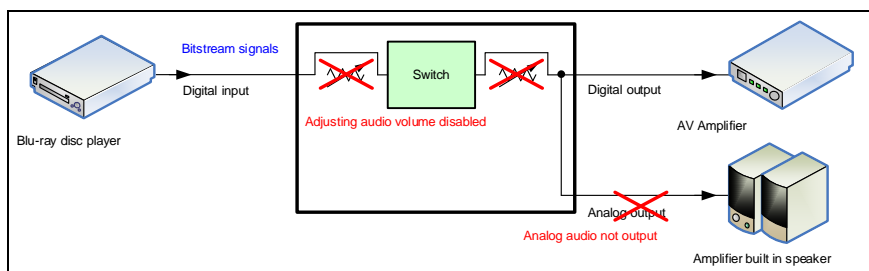
If Multi channel linear PCM signal are input to digital audio, two channels set in “9.9.9 Multi channel audio output” or down-mixed audio is output to analog audio and sink devices that do not support multi linear PCM.



[Fig. 9.17] Multi channel linear PCM input

■ **If bit stream signal input to digital audio:**

If bit stream signal (compressed audio) such as Dolby Digital is input to HDMI digital audio, these input audio signals are output to digital audio as they are. They are not output to analog audio, and audio volume cannot be adjusted.



[Fig. 9.18] Bit stream signal input

9.9.1 Output level

Menu	Top→AUDIO→OUTPUT LEVEL
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	-60dB to 10dB [Default] 0dB

You can set the audio output level.

If you change the output level while audio output mute is set to “ON”, mute is canceled.

If you set top display of front VFD screen to audio volume adjustment from “**9.17.6 Top page**”, you can change and set audio output level from top display.

9.9.2 Output mute

Menu	Top→AUDIO→OUTPUT MUTE
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	OFF [Default], ON

You can enable or disable the audio output mute.

If you set top display of front VFD screen to audio volume adjustment from “**9.17.6 Top page**”, you can change and set mute ON/OFF from top display.

9.9.3 Input selection

Menu	Top→AUDIO→AUDIO INPUT SELECT
Setting for	Each input channel
Setting value	DIGITAL [Default], ANALOG1, ANALOG2, ANALOG3

You can select digital or analog audio input to be output.

DIGITAL: Outputs HDMI audio. IN6 and IN7 do not output audio if “**9.6.5 Selecting signal of DVI input connector**” is set to “ANALOG”.

ANALOG1, ANALOG2, and ANALOG3: Output audio that is input to each connector.

9.9.4 Input level

Menu	Top→AUDIO→INPUT OFFSET
Setting for	Each input channel, each input signal
Setting value	-60dB to 0dB [Default] 0dB

You can set the audio input level.

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

9.9.5 Lip sync

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

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

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

If sampling frequency is 192 kHz and vertical synchronous frequency is 24 Hz / 25 Hz / 30 Hz, the total maximum value of lip sync input / output channel.

[Table 9.10] Lip sync maximum value

Sampling frequency	Vertical synchronous frequency	Lip sync maximum value
192 kHz	24 Hz	Up to 8 frames*
	25 Hz	Up to 8 frames*
	30 Hz	Up to 10 frames*
Other conditions		Up to 16 frames

*Up to 8 frames can be set for input / output channel lip sync, but lip sync is limited to the maximum value.

9.9.6 Sampling frequency

Menu	Top→AUDIO→SAMPLING FREQUENCY		
Setting for	Each output channel (Common to OUTA / OUTB)		
Setting value	<ul style="list-style-type: none"> • AUTO-A [Default] • 192kHz • 88.2kHz • 44.1kHz • AUTO-B • 96kHz • 48kHz • 32kHz 		

You can set the sampling frequency of digital audio output.

■“AUTO-A” or “AUTO-B”:

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

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.

[OUT1 FREQUENCY] [AUTO-A(48kHz) <=>]

Maximum sampling frequency

[OUT1 FREQUENCY] [AUTO-A(48kHz)* <=>]
--

Sampling frequency used last time

9.9.7 Audio output connector

Menu	Top→AUDIO→AUDIO OUTPUT
Setting for	Each output channel (OUTA / OUTB)
Setting value	[Table 9.11] Settings of audio output control

You can control the audio outputs of the audio output connector, HDMI output connector, and HDBaseT output connector.

[Table 9.11] Settings of audio output control

Setting value	Analog audio output connector	HDMI output connector	HDBaseT output connector
ANALOG&DIGITAL [Default]	Can be output	Partly*	Partly*
ANALOG	Can be output	Cannot be output	Cannot be output
DIGITAL	Cannot be output	Partly*	Partly*

*If "DVI MODE" is selected for "9.8.1 Output mode", audio is not output to the HDMI output connector regardless of the setting of this menu.

9.9.8 Digital audio output connector

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

You can control the audio outputs of the HDMI output connector and HDBaseT output connector. The MSD distributes the same audio to the HDMI output connector and HDBaseT output connector. You can enable /disable the audio output for each connector.

9.9.9 Multi channel audio output

Menu	Top→AUDIO→MULTI AUDIO
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	

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

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

You can select audio from "DOWN MIX" (multi-channel audio is down mixed), "STEREO" (stereo audio), or "MONO" (monaural audio).

9.9.10 Multi channel audio output priority

Menu	Top→AUDIO→OUT AUDIO PRIORITY
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	DOWN MIX, MULTI [Default]

If outputting multi channel linear PCM to a sink device, the MSD checks whether the sink device supports multi channel linear PCM. If the sink device supports multi channel linear PCM, the MSD outputs audio with the format. If the sink device does not support the format, the MSD outputs audio according to the setting of “9.9.9 Multi channel audio output”.

You can set the priority as shown below for if some sink devices that are connected to OUTA or OUTB support multi linear PCM while others do not.

[Table 9.12] Audio output

Setting value	Multi channel linear PCM audio		Output audio
	OUTA sink device	OUTB sink device	
DOWN MIX	Not supported	Not supported	DOWN MIX
	Supported	Not supported	DOWN MIX
	Not supported	Supported	DOWN MIX
MULTI [Default]	Not supported	Not supported	DOWN MIX
	Supported	Not supported	MULTI
	Not supported	Supported	MULTI

If no sink device is connected, it is treated as a sink device that does not support multi channel linear PCM.

9.9.11 Test tone

Menu	Top→AUDIO→TEST TONE
Setting for	Each output channel (Common to OUTA / OUTB)
Setting value	

Test tone:

OFF [Default], 1kHz, 400Hz

Speaker:

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

Since test tone can be output only to specific speakers, you can check the position of the speakers.
For "LOW FREQUENCY EFFECT", only test tone of 30 Hz is output.

【See: 9.10.6 Speaker configuration】

9.10 EDID (Extended Display Identification Data)

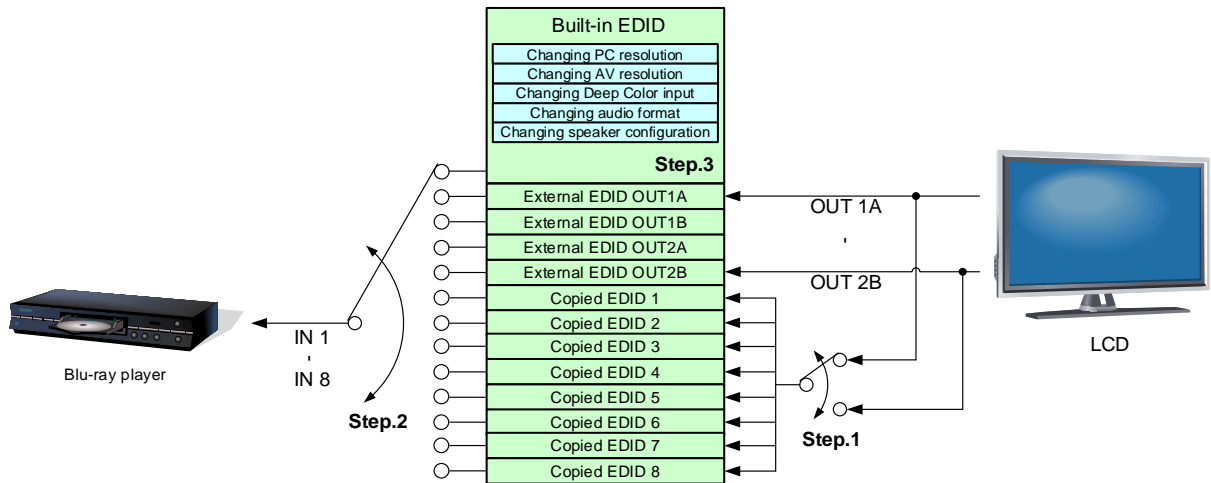
You can set or customize EDID to be sent to the source device. Change the setting as needed.

■ Setting EDID

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

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

Step 3 If you use built-in EDID, customize the data as usage.



[Fig. 9.19] Setting EDID (MSD-802UHD)

9.10.1 EDID

Menu	Top→EDID→EDID DATA
Setting for	Each input channel (only digital input)
Setting value	<ul style="list-style-type: none"> ▪ INTERNAL EDID [Default] ▪ OUT1A MONITOR ▪ OUT1B MONITOR ▪ OUT2A MONITOR ▪ OUT2B MONITOR ▪ COPY DATA1 to COPY DATA8

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

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

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

【See: 9.10.7 Copying EDID 】

9.10.2 Resolution for PCs

Menu Top→EDID→PC RESOLUTION

Setting for Each input channel

Setting value

- SVGA (800x600)
 - XGA (1024x768)
 - 720p (1280x720)
 - WXGA (1280x768)
 - WXGA (1280x800)
 - Quad-VGA (1280x960)
 - SXGA (1280x1024)
 - WXGA (1360x768)
 - WXGA (1366x768)
 - SXGA+ (1400x1050)
 - WXGA+ (1440x900)
 - WXGA++ (1600x900)
 - UXGA (1600x1200)
 - WSXGA+ (1680x1050)
 - 1080i (1920x1080)
 - 1080p (1920x1080)
 - WUXGA (1920x1200)
 - QWXGA (2048x1152)
 - WQHD (2560x1440)^{*1}
 - WQXGA (2560x1600)^{*1}
 - 2160p@30 (3840x2160)^{*1}
 - 2160p@60 (3840x2160)^{*2}
- [Default] IN1, IN2 : 2160p@60 (3840x2160)
 IN3 to IN7 : 1080p (1920x1080)
 IN8 : 2160p@30 (3840x2160)

^{*1} IN1, IN2, IN8

^{*2} IN1, IN2

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

This setting will also be applied for controlling output resolution when AV devices (such as Blu-ray players) are connected via HDMI. For digital input, this setting will be valid only if "INTERNAL EDID" is selected for "9.10.1 EDID".

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

Timing of 720p, 1080i, 1080p, and 2160p is the same as that of HD signal meeting the CEA-861D standard. For other resolutions, timings meet the VESA DMT or VESA CVT standards.

Set the maximum available resolution for EDID, but the lower resolutions are also supported. Select the resolution supported by the connected PC.

You can select 2160p (4096x2160) resolution from "9.10.3 Input resolution for AV devices".

If a source device that does not support 4K is connected to the input connector with 4K EDID settings, the source device may output DVI signal meaning audio is not output. In order to output HDMI signal from the source device, change the settings of this menu and "9.10.3 Input resolution for AV devices" to a value other than 4K.

[Table 9.13] Supported resolution

Input resolution settings	Supported resolution																							
	640x480	800x600	1024x768	1280x720	1280x768	1280x800	1280x960	1280x1024	1360x768	1366x768	1400x1050	1440x900	1600x900	1600x1200	1680x1050	1920x1080i	1920x1080p	1920x1200	2048x1152	2560 x 1440	2560 x 1600	2160p (30p)	2160p (60p)	
800x600	Y	Y	N	N	N	N	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	N	N	N	N
1280x720[D4]	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x768	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x800	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x960	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1280x1024	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1360x768	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1366x768	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
1400x1050	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
1440x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N
1600x900	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N
1600x1200	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N
1680x1050	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N
1920x1080i[D3]	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N
1920x1080p[D5]	Y	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N	N	N	N
1920x1200	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	N	N
2048x1152	Y	Y	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N
2560x1440	Y	Y	Y	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	N	N
2560x1600	Y	Y	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	N
2160p (30p)	Y	Y	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	N
2160p (60p)	Y	Y	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	Y	Y	Y

Y: Supported , N: Not supported

9.10.3 Input resolution for AV devices

Menu Top→EDID→AV RESOLUTION

Setting for Each input channel (only digital input)

Setting value

- AUTO [Default] • 1080i • 2160p@60 4:4:4^{*2}
- UNUSED • 1080p • 4096x2160@30^{*1}
- 480p • 2160p@30^{*1} • 4096x2160@60 4:2:0^{*1}
- 720p • 2160p@60 4:2:0^{*1} • 4096x2160@60 4:4:4^{*2}

^{*1} N1, IN2, IN8

^{*2} IN1, IN2

You can set the resolution requested to be output from AV devices (such as Blu-ray players).

This setting will be valid if “INTERNAL EDID” is selected for “**9.10.1 EDID**”.

Normally, set this menu to “AUTO” to set resolution for AV devices according to “**9.10.2 Resolution for PCs**” automatically.

“UNUSED” disables the EDID for AV devices. If you select “AUTO” and the resolution output from the PC is different from the resolution set in Properties, the problem may be solved by selecting “UNUSED”.

If there is a potential to connect both PCs and AV devices with different resolutions (for example, PC with WXGA (1366x768), Blu-ray disc player with 1080p), set the PC resolution in “**9.10.2 Resolution for PCs**” and select the AV resolution in this menu. However, some PCs and AV devices may select the higher resolution of the resolutions set in “**9.10.2 Resolution for PCs**” or this menu.

If a source device that does not support 4K is connected to the input connector with 4K EDID settings, the source device may output DVI signal meaning audio is not output. In order to output HDMI signal from the source device, change the settings of this menu and “**9.10.2 Resolution for PCs**” to a value other than 4K.

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

[Table 9.14] Input resolutions when “AUTO” is selected

PC Resolution	640x480	800x600	1024x768	1280x720	1280x768	1280x800	1280x960	1280x1024	1360x768	1366x768	1400x1050	1440x900	1600x900	1600x1200	1680x1050	1920x1080i	1920x1080p	1920x1200	2048x1152	2560 x 1440	2560 x 1600	2160@30	2160@60 4:4:4
AV Resolution	480p			720p												1080i	1080p				2160p@60 4:2:0	2160p@60 4:4:4	

Note:

If you select “UNUSED”, the settings of “**9.10.4 Deep Color**”, “**9.10.5 Audio format**”, “**9.10.6 Speaker configuration**” will be disabled and audio is not output because the source device outputs signal through DVI mode.

9.10.4 Deep Color

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

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

This menu is valid only if you select "INTERNAL EDID" for "9.10.1 EDID" and you select a resolution other than "UNUSED" for "9.10.3 Input resolution for AV devices".

If you select "30-BIT COLOR", compared to "24-BIT COLOR", "30-BIT COLOR" is transmitted using a higher clock frequency, which may cause noise if a cable with a bad quality or a long cable is connected. In such a case, the noise may be removed by setting the color to "24-BIT COLOR".

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

9.10.5 Audio format

Menu	Top→EDID→AUDIO FORMAT
Setting for	Each input channel (only digital input)
Setting value	[Table 9.15] Audio format

[Table 9.15] Audio format

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

Default values are shown in parentheses.

You can set the audio format and maximum sampling frequency to be output from a source device.

This menu will be valid only if you select "INTERNAL EDID" for "9.10.1 EDID" and you select a resolution other than "UNUSED" for "9.10.3 Input resolution for AV devices".

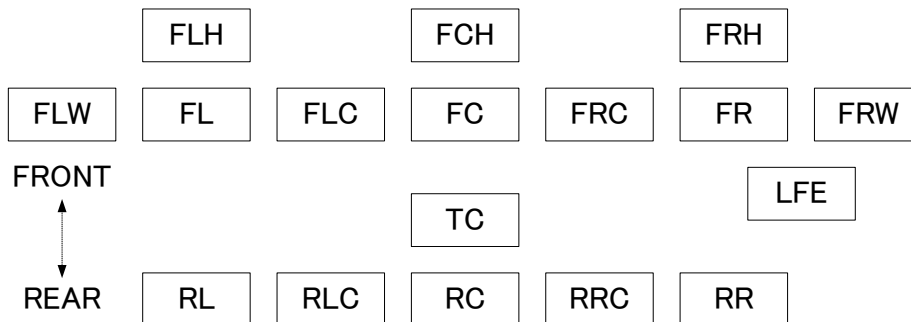
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

9.10.6 Speaker configuration

Menu	Top→EDID→SPEAKER
Setting for	Each input channel (only digital input)
Setting value	Setting mode : AUTO [Default], MANUAL Each speaker : ON, OFF The number of speakers: 1 to 8

[Table 9.16] Default speaker configuration

The number of speakers	FL/FR	LFE	FC	RL/RR	RC	FLC/FRC	RLC/RRC	FLW/FRW	FLH/FRH	TC	FCH
1	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2 [Default]	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
5	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
6	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
8	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF



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

[Fig. 9.20] Speaker configuration

You can set the speaker configuration of multi channel audio.

This menu is valid only if you select "INTERNAL EDID" for "9.10.1 EDID", you select a resolution other than "UNUSED" for "9.10.3 Input resolution for AV devices".

If you select "AUTO" for the setting mode and set the number of speakers, the speaker configuration will be set to the default setting that is shown in "[Table 9.16] 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.

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

9.10.7 Copying EDID

Menu	Top→EDID→MONITOR EDID COPY
Setting for	COPY EDID No.1 to No.8
Setting value	OUT1A, OUT1B, OUT2A, OUT2B

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

Up to eight EDID can be registered.

■ Copying EDID (Ex: MSD-802UHD)

Step.1: Select output channel (OUT1A to OUT2B) which is connected to sink device

Step.2: Select the number of COPY EDID (No.1 to No.8)

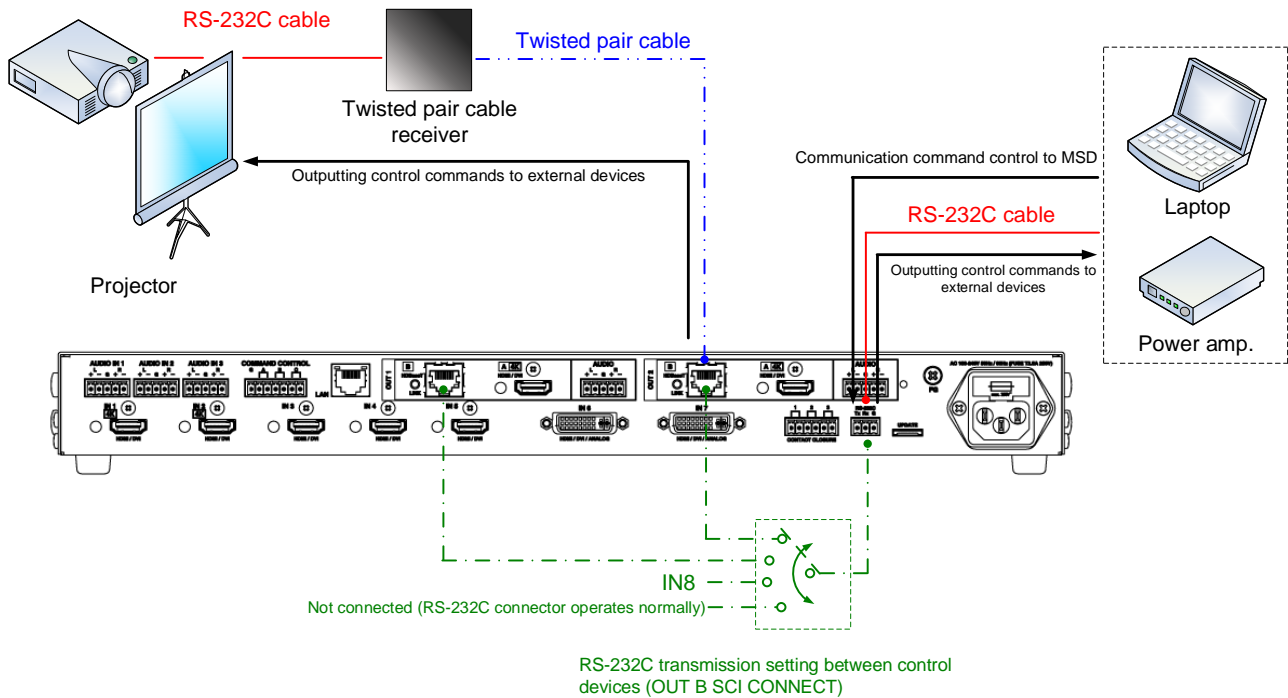
Step.3: Set the name of the EDID using ASCII code 20 to 7D (up to 10 characters)

Step.4: Press the "MENU/SET" key to register an EDID

9.11 RS-232C

The RS-232C connector of the MSD can output communication command control from PCs and can output control command to external devices from the MSD. The operation mode will be switched according to “9.11.2 RS-232C operation mode”.

【See: 9.13 Setting control command】



[Fig. 9.21] RS-232C communication

9.11.1 RS-232C communication setting

Menu Top→COM PORT→PARAMETERS

Setting for RS-232C connector, OUT1B connector, OUT2B connector, IN8 connector

Setting value [Table 9.17] RS-232C setting items

[Table 9.17] RS-232C setting items

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

You can set RS-232C communication.

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

9.11.2 RS-232C operation mode

Menu	Top→COM PORT→FUNCTION
Setting for	RS-232C connector, OUT1B connector, OUT2B connector, IN8 connector
Setting value	RECEIVER,TRANSMITTER
	[Default]
	RS-232C connector, IN8 connector: RECEIVER
	OUT1B connector, OUT2B connector: TRANSMITTER

You can set the operation mode to “RECEIVER” mode in which the MSD is controlled externally or “TRANSMITTER” mode in which the MSD controls peripheral devices.

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

9.11.3 RS-232C HDBaseT connection

Menu	Top→COM PORT→OUT B SCI CONNECT
Setting value	[Table 9.18] RS-232C operation

You can set the communication between MSD's RS-232C connector and an RS-232C connector of twisted pair cable transmitter or receiver that is connected to HDBaseT I/O connector.

[Table 9.18] RS-232C operation

Setting value	Operation
OFF [Default]	MSD's RS-232C connector operates in the mode that is set in “ 9.11.2 RS-232C operation mode ”.
OUT1B	Communication between MSD's RS-232C connector and an RS-232C connector of twisted pair cable transmitter or receiver that is connected to HDBaseT I/O connector. The MSD's RS-232C connector cannot be used for communication command control from PC to MSD or control command output from MSD to external devices.
OUT2B	
IN8	

【See: 9.11 RS-232C】

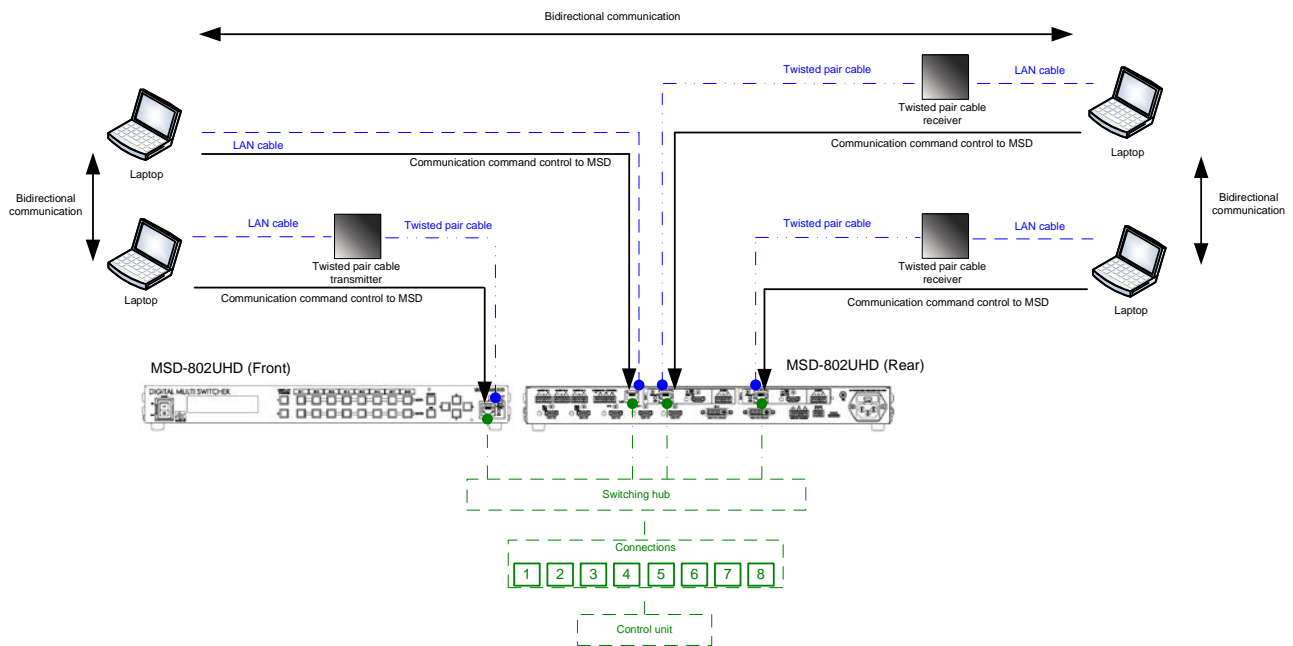
9.12 LAN

■ LAN communication

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

Communication command control 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 "9.12.2 LAN operation mode". The MSD has eight connections that can be set individually.

【See: 9.13 Setting control command】



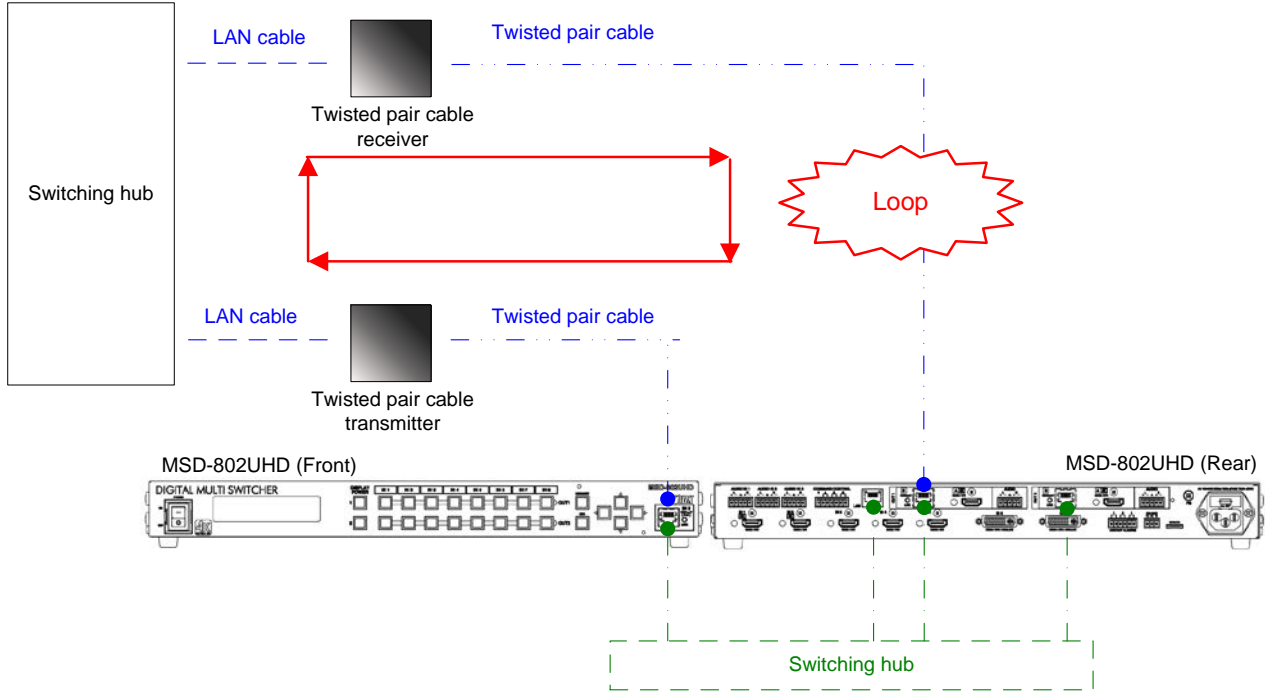
【Fig. 9.22】 LAN operation

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

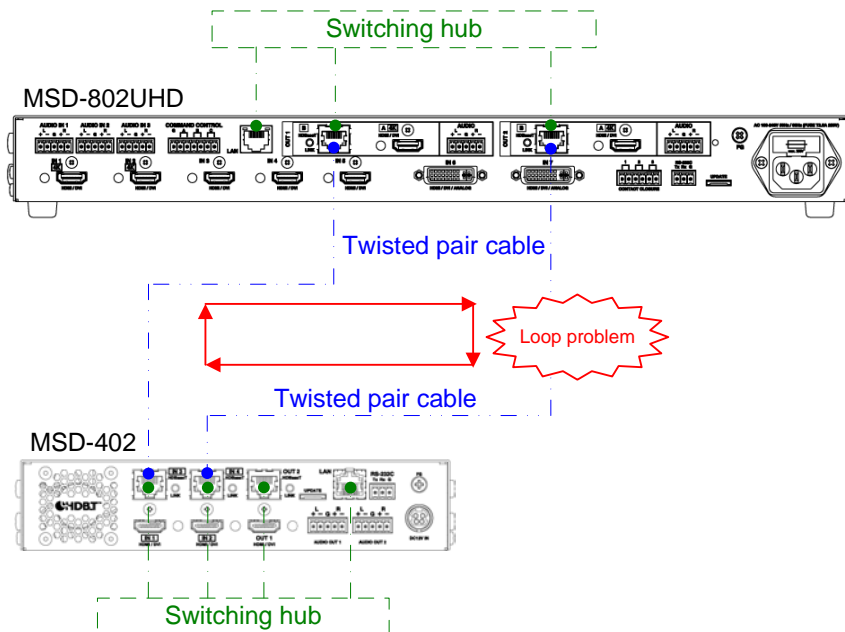
■ LAN loop problem

The MSD includes 3-port switching hub function. The network may be down due to loop problem. If the loop problem occurs, set “9.12.5 Setting HDBaseT LAN” to “OFF”.

Other manufacturer's device



[Fig. 9.23] Loop problem with other manufacturer's device



[Fig. 9.24] Loop problem with IDK's device

9.12.1 IP address/Subnet mask/Gateway address

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

You can set IP address, subnet mask, and gateway address.

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

9.12.2 LAN operation mode

Menu	Top→LAN→FUNCTION
Setting for	Each connection
Setting value	[Table 9.19] Setting items of LAN operation mode

[Table 9.19] Setting items of LAN operation mode

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

^{*1} If selecting “ON” for PJLink protocol, the target port number is fixed at “4352”.

^{*2} Up to 32 characters. If you do not want the password authentication, you do not need to set the item.

You can set the LAN operation mode consisting of “RECEIVER” mode that controls the MSD externally and “TRANSMITTER” mode that controls peripheral devices from the MSD.

If you select “TRANSMITTER” mode, you need to set the information of connecting device.

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

9.12.3 TCP port number

Menu	Top→LAN→PORT NUMBER
Setting for	Each connection
Setting value	[Table 9.20] Settings of TCP port number

[Table 9.20] Settings of TCP port number

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

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

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

This setting will valid if "RECEIVER" is selected for "**9.12.2 LAN operation mode**".

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

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

9.12.4 MAC address

Menu	Top→LAN→MAC ADDRESS
------	---------------------

You can display the MAC address.

9.12.5 Setting HDBaseT LAN

Menu	Top→LAN→HDBASET LAN
Setting for	HDBaseT input, HDBaseT output
Setting value	ON [Default], OFF

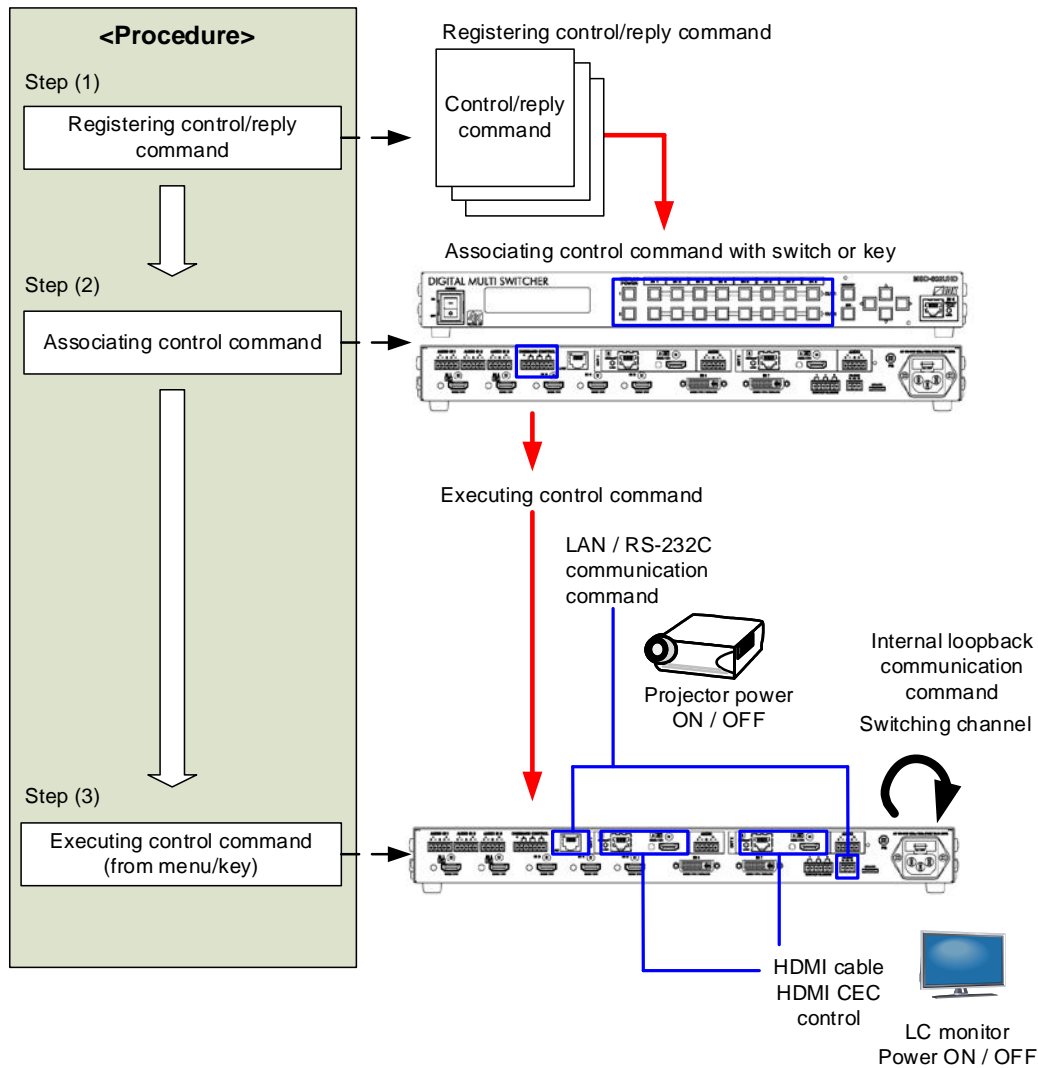
You can enable/ disable the LAN of HDBaseT output connector.

【See: 9.12 LAN】

9.13 Setting control command

You can control external devices (for example, turning ON/OFF projectors) via RS-232C, LAN, contact closure, or CEC. You can register up to 32 commands in the MSD. Registered control commands will be associated with control command execution keys (COMMAND A to COMMAND I) or execution conditions such as switching video or audio.

When execution conditions are met, those commands will be performed in the order. The loop back function allows you to control the MSD itself.



[Fig. 9.25] Executing control command

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

Control commands can be sent from MSD's RS-232C connector, LAN connector, or HDBaseT output connector.

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

【See: 9.11.2 RS-232C operation mode】

【See: 9.12.2 LAN operation mode】

■ **Screen display during control command execution**

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

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

Examples:

- (1) "SCREEN UP" is registered in 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. 9.26] Screen display

If you configure several control commands, or if you display data received from several com ports, the display time may be shortened by one to two seconds while control commands are being successively executed. If the received data does not fit in the full screen, the displayed data is scrolled.

9.13.1 Registering/editing control command

Menu Top→PRESET COMMAND→COMMAND EDIT

Setting for Each command

Setting value [Table 9.21] Setting items of control command

You can create and edit up to 32 control commands.

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

[Table 9.21] Setting items of control command

Item	Setting			Description	Range
	COM	CC	CEC		
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 of the control command. Use this item for devices such as projectors that requires time to cool down after powering off.	0ms to 999s999ms [Default] 0ms
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. <ul style="list-style-type: none"> • RS : RS-232C⁵ • OUT1B RS: RS-232C of OUT1B • OUT2B RS: RS-232C of OUT2B • LOOP BACK: Internal loop back • LAN1 to LAN8: LAN connection 1 to 8⁶ 	OFF [Default] ON
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 9.22] Setting items of control command (Cont'd)

Item	Setting			Description	Range
	COM	CC	CEC		
RECV DISPLAY	yes	no	no	Set whether received data is displayed or not.	OFF [Default] ASCII HEX
DELIMITER ^{*1}	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 [Default] 00 to FF (Hex)
RCV CHECK ^{*2}	yes	no	no	Set whether reply command that may be returned is checked or not.	CHECK NOT CHECK [Default]
TIME OUT ^{*3*4}	yes	no	no	Set the timeout time for reply command to a sent command.	0ms to 99s999ms [Default] 0ms
RETRY ^{*3*4}	yes	no	no	Set the number of retries to resend the same command again if no valid response is replied.	0 to 99 (times) [Default] 0
INTERVAL ^{*3*4}	yes	no	no	Set the retry interval to resend the command.	0ms to 99s999ms [Default] 0ms
ERROR ^{*3*4}	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 control [Default] OFF: contact open ON: contact close 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 ^{*7}	no	no	yes	Set the CEC control for the sink devices connected to OUT1A / OUT2A / OUT1B / OUT2B.	-: not control [Default] POWER OFF POWER ON
Process for CEC error	no	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 up to 14 characters. The registered note is displayed when the control command is executed.	20 to 7D in ASCII codes except for 2C (.) [Default] 20 (space)

- *1 If you set "RECV DISPLAY" to "OFF", you cannot set this item.
- *2 If you set "RECV DISPLAY" to "ASCII" or "HEX", you cannot set this item.
- *3 If you set only "LOOP BACK" of communication ports to "ON", you do not need to set this item.
- *4 If you set all "RCV CHECK" to "NOT CHECK", you do not need to set this item.
- *5 If you set "RS: RS-232C" to "ON", set "**9.11.2 RS-232C operation mode**" to "TRANSMITTER".
- *6 If you set any LAN connections for "LAN1" to "LAN8" to "ON", set "**9.12.2 LAN operation mode**" to "TRANSMITTER".
- *7 CEC: only power ON/OFF of the sink device can be controlled.

■ Setting loop back function

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

■ Setting PJLink

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

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

【See: 9.12.2 LAN operation mode】

[Table 9.23] PJLink command (class1) list

No.	Command											Description
1	%	1	P	O	W	R	(SP)	0	(CR)			Power off (Standby)
2	%	1	P	O	W	R	(SP)	1	(CR)			Power on (Lamp on)
3	%	1	P	O	W	R	(SP)	?	(CR)			Get power status
4	%	1	I	N	P	T	(SP)	1	*	(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 byte: the sent command data without change; the 7th bytes: "="; after the 8th byte: processing result

For example, if a command, "%1POWR 1CR", is processed normally, the reply command, "%1POWR=OK CR" will be replied.

PJLink specifications regulate that projectors are required to reply the reply commands within 2 seconds after receiving the PJLink command. However, some projectors have different specifications. Check the manual of your projector and apply the response time indicated in the manual if there is one listed.

[Table 9.24] Reply commands to PJLink command (class1) (ASCII codes)

No.	Command											Description	
1	%	1	x	x	x	x	=	O	K	(CR)		Terminated normally	
2	%	1	x	x	x	x	=	E	R	R	1	(CR)	Mistake in command itself (Undefined command)
3	%	1	x	x	x	x	=	E	R	R	2	(CR)	Invalid parameter
4	%	1	x	x	x	x	=	E	R	R	3	(CR)	Currently not acceptable
5	%	1	x	x	x	x	=	E	R	R	4	(CR)	Malfunction of projector

9.13.2 Registering / Editing reply command

Menu Top→PRESET COMMAND→RECV COMMAND EDIT

Setting for Each command

Setting value [Table 9.26] Setting items of return command

You can create and edit up to 32 reply commands.

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

[Table 9.26] Setting items of return command

Item	Description	Range
SIZE	Set the number of bytes from the first byte to be compared.	0 to 30 bytes [Default] 0 byte
PROCESS	Select "STOP" (to stop the next operation), "EXEC" (to execute it), or "RETRY" (to send the command again) for when received data and reply command data match.	STOP EXEC [Default] RETRY: Resend commands
PJLink	Select whether PJLink commands are set or not for when input reply command data is input.	OFF [Default] ON
COMMAND INPUT MODE	Select the input mode of reply command data. "ASCII": For data consisting of only 0A, 0D, 20 to 7D (text) "HEX": For data including other codes	ASCII [Default] HEX
DATA	Set the command to be compared with the received data from the first byte to the byte count set in "SIZE". If using alphabets (A to Z, a to z), make sure to distinguish capital and lower case letters. (Up to 30 bytes)	0A, 0D, and 20 to 7D of ASCII code or 00 to FF (Hex) [Default] 20 (Space) (Values described above all with hex)
MASK	Received data is compared with MASK DATA without "AND" of each bit and reply command data. (Use this item to determine the state using the received data bit. Settable if "COMMAND INPUT MODE" is set to "HEX"; if "ASCII" is selected, "FF" is set automatically.)	00 to FF (Hex) [Default] All: "FF"
MEMO	Register a note up to 14 characters. When reply command is received, the registered note is displayed.	20 to 7D of ASCII code except for 2C (,) [Default] All: Spaces

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

■ Setting loop back function

If the MSD sends a communication command back to the MSD itself using the loop back function, the MSD replies “OK” if processed normally while it replies “NG” if parameter or command is incorrect. (This differs from reply commands to communication commands received externally; not loop back.) Since “OK” and “NG” are registered to reply commands 31 and 32 by factory default, respectively, do not edit or delete those commands if you use the loop back function and check reply commands.

[Table 9.27] Default value of reply command

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

■ Setting PJLink:

See “Setting PJLink”.

■ **Mask data**

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. Only to determine the status using bits of the received data, change the setting.

[If ASCII codes (text) are replied from an external device]

Since the received data and “Reply command data” are compared without any changes, set “MASK” to “FF”. (If you set “COMMAND INPUT MODE” of reply command to “ASCII”, it is automatically set to “FF”.)

For example, if “0” of ASCII codes (“30” in hex) is replied:

	Binary		Binary	Hexadecimal
(Received data)	00110000	& (MASK)	11111111	=30
(Reply command data)	00110000			=30 matched

```
DATA1 : 30 00 00 00 00
MASK1 : FF FF FF FF FF
```

[If status is determined using bits of the received data]

Set only bits that determine the Mask data to “1” and set other bits to “0”.

For example, if determining status using the second bit from the left:

	Binary		Binary	Hexadecimal
(Received data)	11111111	& (MASK)	01000000	=40
(Reply command data)	01000000			=40 matched

	Binary		Binary	Hexadecimal
(Received data)	10111111	& (MASK)	01000000	=00
(Reply command data)	01000000			=40 not matched

```
DATA1 : 40 00 00 00 00
MASK1 : 40 FF FF FF FF
```

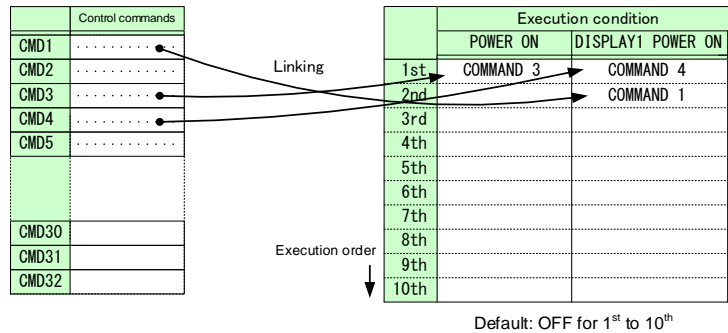
9.13.3 Command link

Menu Top→PRESET COMMAND→COMMAND LINK
Setting for [Table 9.28] Control command execution condition (Example: MSD-802UHD)
Setting value OFF [Default], COMMAND 1 to COMMAND 32

The MSD has 59 command execution conditions as shown below. If these execution conditions are met, control commands which are associated beforehand will be executed. One execution condition can be associated to up to 10 commands. If several commands are associated, commands are executed in order of registration. If the same command is associated several times, it is repeatedly executed.

Control command execution button can be toggled (COMMAND A to COMMAND I). 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.

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



[Fig. 9.27] Command link

[Table 9.28] Control command execution condition (Example: MSD-802UHD)

Execution condition	Function	Execution condition	Function
POWER ON	Controlling power switch	-	-
DISPLAY1 POWER ON	Controlling sink device power of OUT1	DISPLAY2 POWER ON	Controlling sink device power of OUT2
DISPLAY1 POWER OFF		DISPLAY2 POWER OFF	
VIDEO:OUT1-IN1 to VIDEO:OUT1-IN8, VIDEO:OUT1-OFF	Selecting video input channel of OUT1	VIDEO:OUT2-IN1 to VIDEO:OUT2-IN8, VIDEO:OUT2-OFF	Selecting video input channel of OUT2
AUDIO:OUT1-IN1 to AUDIO:OUT1-IN8, AUDIO:OUT1-OFF	Selecting audio input channel of OUT1	AUDIO:OUT2-IN1 to AUDIO:OUT2-IN8, AUDIO:OUT2-OFF	Selecting audio input channel of OUT2
COMMAND A to COMMAND I, PLANE-A	Command control	COMMAND A to COMMAND I, PLANE-B	Command control

9.13.4 Command execution

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

You can execute the registered control commands.

Only registered control command numbers are displayed as settable values. To execute the control command, press the "MENU/SET" key.

【See: 9.13.1 Registering/editing control command】

9.13.5 Invalid duration at control command execution

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

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

The longer time either of control command execution time or the time set in this menu will be applied as the invalid operation time. Only operations from ports that execute control commands will be invalid; operations from other ports can be performed. For example, if you execute a control command from the front panel, you cannot perform all operations from the front panel until the control command execution time or time set in this menu passes. However, even during invalid operation time, DISPLAY POWER and CHANNEL SELECT commands for different outputs can be executed consecutively.

9.13.6 Initializing registered commands and link

Menu Top→PRESET COMMAND→INITIALIZE
Setting value
 CMD 1 to CMD 32: Control command
 RCV 1 to RCV 32 : Reply command
 POWER ON : Control command association

You can initialize the following commands and associations:

- Control commands registered in "9.13.1 Registering/editing control command"
- Reply commands registered in "9.13.2 Registering / Editing reply command"
- Control command link "9.13.3 Command link"

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

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

9.13.7 Command execution key: Illuminating condition

Menu	Top→PRESET COMMAND→COMMAND TALLY
Setting for	Each control command execution key
Setting value	REGISTERED : Lights if a control command is registered [Default] ^{*1} EXECUTION : Lights while a control command is executed ^{*1 *2}

If you set "LINK" to "ON", you can change all lighting conditions at once.

^{*1} There are two planes (PLANE A and B) for each execution condition of COMMANDs 1 to 32. If you register control commands for both planes, the control commands are executed alternatively every time you press the command key as follows.

[Table 9.29] 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 executed	Illuminates if PLANE A will be executed at the next press; turned off if PLANE B will be executed at the next press.

^{*2} If execution duration is 500 ms or shorter, it illuminates for 500 ms. It can be set blinking in "9.13.7 Command execution key: Illuminating condition".

9.13.8 Blinking at command execution key

Menu	Top→PRESET COMMAND→FLASH TIME
Setting for	Each control command execution key, each display power key
Setting value	EXECUTION : Blinks while a control command is being executed [Default] OFF : Not blink 1sec. to 1000sec. : Blinks for the specified time (1 to 1000 sec.)

You can set the blinking duration of command execution keys and power switch of sink devices during command execution.

9.14 Preset memory

9.14.1 Recalling cross point

Menu Top→PRESET MEMORY→LOAD CROSS POINT

Setting value No.1 to No.9

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

【See: 9.14.2 Saving cross point】

9.14.2 Saving cross point

Menu Top→PRESET MEMORY→SAVE CROSS POINT

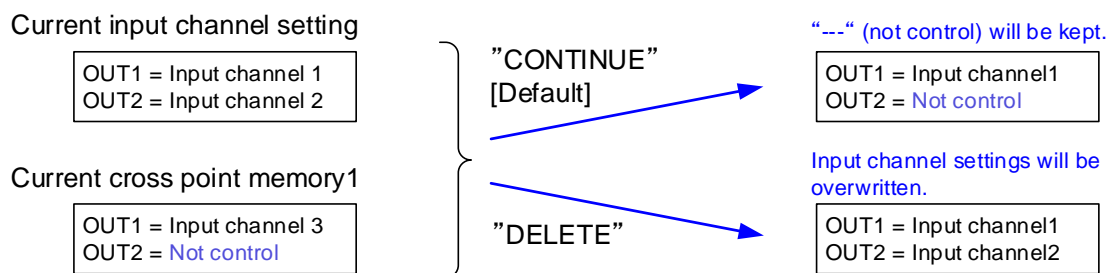
Setting value No.1 to No.9

You can save the I/O channel settings of video and audio into the cross point memory. Up to 9 cross point memories can be saved with their name (up to 10 characters). If you set "---" (not control) for "9.14.3 Editing cross point", a writing method (CONTINUE or DELETE) can be selected. The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

■ For writing

"CONTINUE": "---" (not control) will be kept in the cross point memory.

"DELETE": the current input channel settings will be overwritten.



[Fig. 9.28] Saving cross point

9.14.3 Editing cross point

Menu	Top→PRESET MEMORY→EDIT CROSS POINT
Setting for	Each cross point memory
Setting value	[Table 9.30] Editing cross point item

[Table 9.30] Editing cross point item

Setting item	Setting value	Default
Output channel (OUT)	1 to 2	-*
Video input channel (V)	--- (Not control), 1 to 8, OFF	---
Audio input channel (A)	--- (Not control), 1 to 8, OFF	---
Memory name (NAME)	20 to 7D of ASCII code	20 (space)

*Setting input channels of video and audio for each output channel

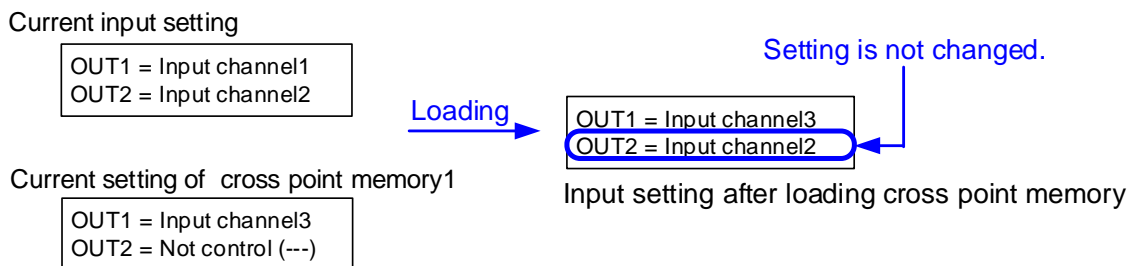
You can edit the cross point memory setting.

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

■ Not controlling channel

If you select "---" when setting input channel of V or A, channels are not controlled.

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



[Fig. 9.29] Loading edited cross point memory

9.14.4 Recalling all settings

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

You can recall all settings saved in the preset memory.

Once you perform this operation, all settings related to video and audio I/O except for some environmental settings will be updated. Operate this menu with great attention.

This menu is not displayed if setting is not saved in memory. Since no setting is saved in any memories by factory default, this menu is not displayed.

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

9.14.5 Saving all settings

Menu Top→PRESET MEMORY→SAVE ALL SETTING

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.

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

[Table 9.31] Settings can be saved in preset memory

Menu	Description
Switching input channel	Selecting input channels
Setting position, size, and masking	Output resolution, Aspect ratio for sink device, Aspect ratio, Aspect ratio control, Overscan, Display position, Display size, Masking, Background color, Test pattern
Quality setting	Sharpness, Brightness, Contrast, HUE, Saturation, Black level, Gamma
Input settings	No-signal input monitoring, Input HDCP setting, Analog input signal parameters, Automatic detection of video input interruption, Selecting signal of DVI input connector, HDBaseT input long reach mode
Setting input timing	The total number of horizontal dots, Start position, Active area, Automatic measurement of start position, Automatic setting of input timing, Tracking
Output settings	Output mode, Synchronous signal output with no input video, Output video with no input video, Window transaction effect, Window transaction speed, Wipe color, Video output connector, HDCP, Deep Color, CEC connection, Priority of input channel automatic switching, Masking time after automatic switching of input channel, Channel switching mode of automatic switching, HDBaseT output long reach mode
Audio setting	Output level, Output mute, Input selection, Input level, Lip sync, Sampling frequency, Audio output connector, Digital audio output connector, Multi channel audio output, Multi channel audio output priority, Test tone
EDID (Extended Display Identification Data)	EDID, Resolution for PCs, Input resolution for AV devices, Deep Color, Audio format, Speaker configuration

9.14.6 Copying output setting

Menu Top→PRESET MEMORY→COPY OUTPUT MEMORY

Setting value OUT1 → OUT2,OUT2 → OUT1

You can copy the setting data of the selected output channel to other output channels. The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

[Table 9.32] Settings to be copied

Menu	Description
Switching input channel	Selecting input channels
Setting position, size, and masking	Output resolution, Aspect ratio for sink device, Aspect ratio, Aspect ratio control, Overscan, Display position, Display size, Masking, Background color, Test pattern
Quality setting	Brightness, Contrast, Gamma
Output settings	Output mode, Synchronous signal output with no input video, Output video with no input video, Window transaction effect, Video output connector, HDCP, The number of HDCP retries, Deep Color, CEC connection, Priority of input channel automatic switching, Masking time after automatic switching of input channel, Channel switching mode of automatic switching, HDBaseT output long reach mode
Audio setting	Output level, Output mute, Lip sync, Sampling frequency, Audio output connector, Digital audio output connector, Multi channel audio output, Multi channel audio output priority, Test tone
Bitmap setting	Outputting bitmap image, Background color, Aspect ratio, Display position, Assigning input channel, Startup bitmap output

Note:

Please note that only one CEC connection is available, multiple input and outputs cannot be connected. For example, CEC connection is copied from this menu, the lowest output (OUT1) is connected preferentially and the sink device connected to OUT2 cannot output video with CEC.

9.14.7 Startup setting

Menu Top→PRESET MEMORY→STARTUP

Setting value [Table 9.33] Startup setting

You can set the memory loading at startup.

[Table 9.33] Startup setting

Item	Setting value	Startup operation
Last channel	LAST CHANNEL [Default]	Starts with the setting last time the MSD powered off.
Preset memory	PRESET MEMORY 1 to PRESET MEMORY 8*	Starts with the settings saved in the preset memory. For settings that are not saved in the preset memory, it starts up with the settings of the last MSD power off.
Cross point memory	CROSS POINT 1 to CROSS POINT 9	Starts with the channel settings saved in the selected cross point memory. For settings other than channel settings, starts up with the settings of the last MSD power off.
Channel OFF	CHANNEL OFF	Channel setting will be OFF. For settings other than channel setting, starts up with the settings of the last MSD power off.

*Only registered preset memory numbers are displayed.

9.15 Bitmap setting

9.15.1 Sending bitmap file

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

Bitmaps can be enlarged but cannot be reduced. The larger the resolution is, the longer the output time will be, and it may take a maximum of approximately six seconds to output a bitmap. Register a bitmap having smaller resolution than that of the sink device.

■ Conditions of bitmap file

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

[Table 9.34] Conditions of bitmap file

Item	Condition
File header	"BITMAPFILEHEADER"
Information header	"BITMAPCOREHEADER"(for OS/2) / "BITMAPINFOHEADER"(for Windows)
The number of colors	2 colors (monochrome, 1 bit), 16 colors (4 bits), 256 colors (8 bits), 16.77 million colors (TRUE COLOR, 24 bits)
Resolution	The maximum resolution: [Horizontal resolution x Vertical resolution x The number of bytes per pixel] = 8,388,608 bytes or less. If you register several bitmaps, the total bytes of all bitmaps should be 8,388,608 bytes or less. (Aspect ratio does not matter as long as it is within the maximum resolution). Bytes per pixel: 1 byte per pixel for 2 colors (monochrome, 1 bit), 16 colors (4 bits), and 256 colors (8 bits); 3 bytes per pixel for 16.77 million colors (TRUE COLOR, 24 bits).
Compression format	No compression (BI_RGB), 8 bit-run-length compression (BI_RLE8), 4 bit-run-length compression (BI_RLE4)

■ Transferring bitmap file

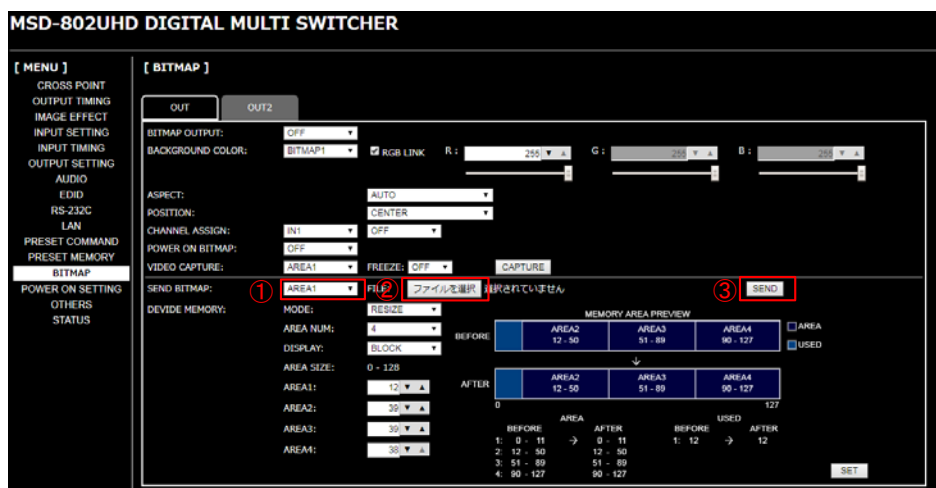
Use the WEB menu to transfer bitmap files.

Step (1) If the memory area is divided, select the registered area of the bitmap file.

Step (2) Select the target bitmap file using the “FILE” button.

Step (3) Click the “SEND” button to display the dialog box and click the “OK” button to transfer the bitmap file.

【See: 8.7 Web menu operation】



- ① Select the registered area. (for memory area division)
- ② Select the bitmap file.
- ③ Click the “SEND” button to send the bitmap file.

[Fig. 9.30] Transferring bitmap

Once bitmap file is transferred correctly, the message is displayed. Click the “OK” button of the dialog box to register bitmap file.

Do not operate the WEB menu or turn off the MSD until the registration completes.

[Table 9.35] Bitmap transfer error message

Error 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 rebooting the MSD and sending the bitmap file again.

9.15.2 Outputting bitmap image

Menu	Top→BITMAP→BITMAP OUTPUT
Setting for	Each output channel (Common to OUTA and OUTB)
Setting value	OFF [Default], ON (BITMAP1 ON to BITMAP4 ON)

You can enable/disable the bitmap image output.

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

9.15.3 Background color

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

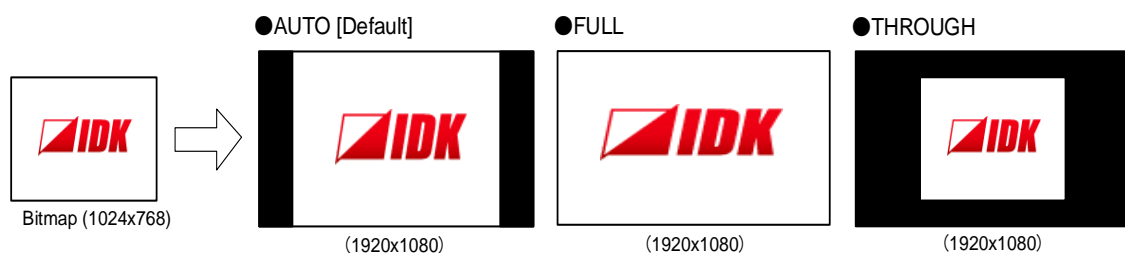
You can set the background color of the bitmap.

If you set "LINK" to "ON", you can set only Red (R). Settings of Green (G) and Blue (B) are also changed according to the setting of the Red (R).

If more than one bitmap is registered to the MSD, you can confirm the bitmap number at left of the second line on the VFD screen.

9.15.4 Aspect ratio

Menu	Top→BITMAP→ASPECT
Setting for	Each output channel, each bitmap
Setting value	[Fig. 9.30] Setting aspect ratio



[Fig. 9.31] Setting aspect ratio

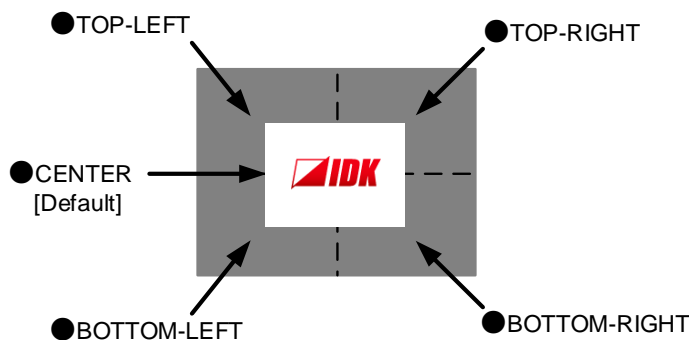
You can set the aspect ratio of bitmap.

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.

9.15.5 Display position

Menu	Top→BITMAP→POSITION
Setting for	Each output channel, each bitmap
Setting value	[Fig. 9.31] Position

You can set the display position of the bitmap.



[Fig. 9.32] Position

9.15.6 Assigning input channel

Menu	Top→BITMAP→CHANNEL ASSIGN
Setting for	Each input channel, each output channel (Common to OUTA and OUTB)
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 “**9.15.2 Outputting bitmap image**” to “OFF”.

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

If you switch a normal image to a bitmap image, it takes longer time to output the image, and you cannot perform other operations while the bitmap is being written and displayed.

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

9.15.7 Startup bitmap output

Menu	Top→BITMAP→POWER ON BITMAP
Setting for	Each output channel (Common to OUTA and OUTB)
Setting value	OFF [Default], ON (BITMAP1 ON to BITMAP4 ON)

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

9.15.8 Dividing memory area

Menu Top→BITMAP→DIVIDE MEMORY
 Setting value [Table 9.36] Dividing memory area

You can register up to four bitmaps within the available memory area by dividing the memory. You can select one of three dividing modes or specify the size you want to divide manually.

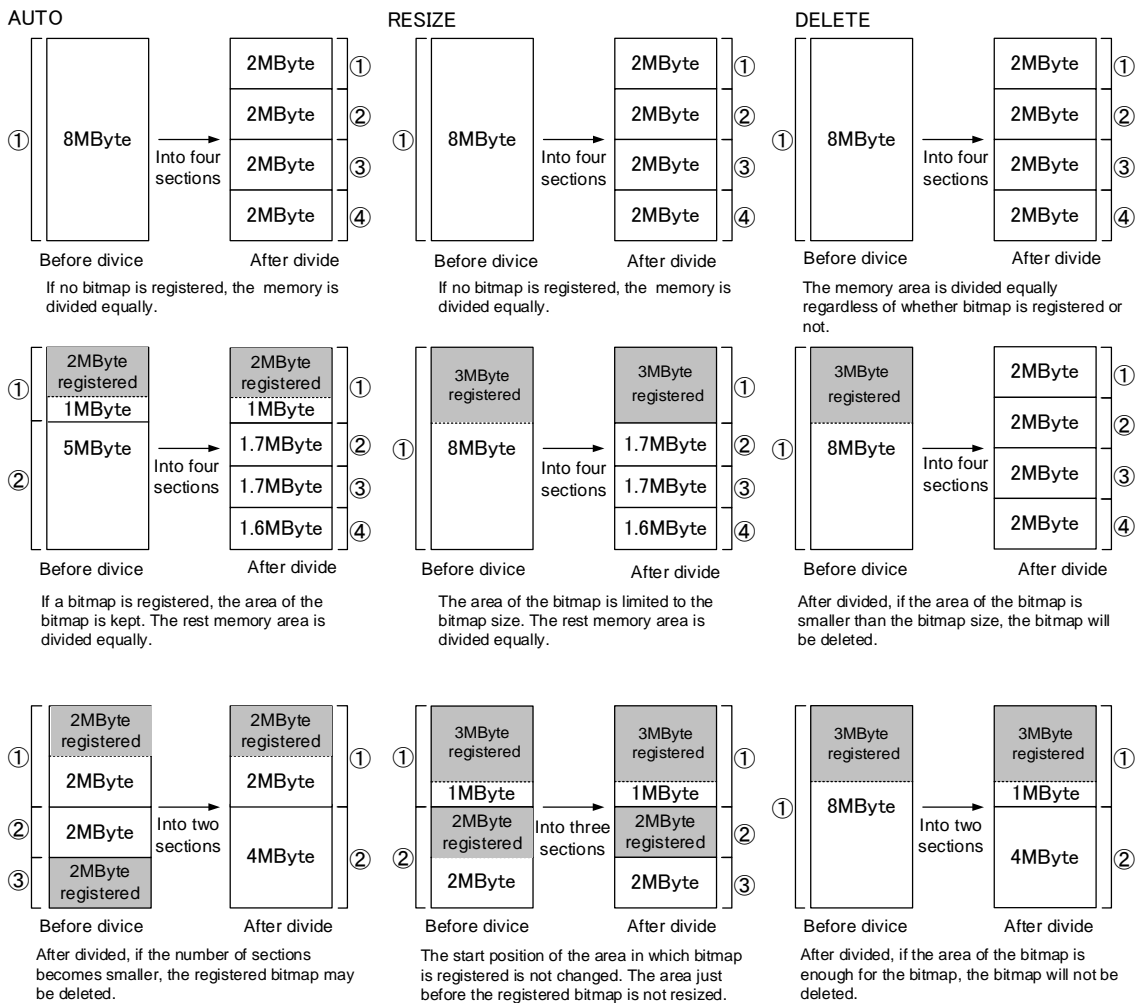
Memory areas are controlled by blocks. 1 block = 64K bytes; 128 blocks = 8M bytes in total

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

[Table 9.36] Dividing memory area

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

■ Dividing mode



[Fig. 9.33] Dividing mode

■ **Displaying method**

“BLOCK”

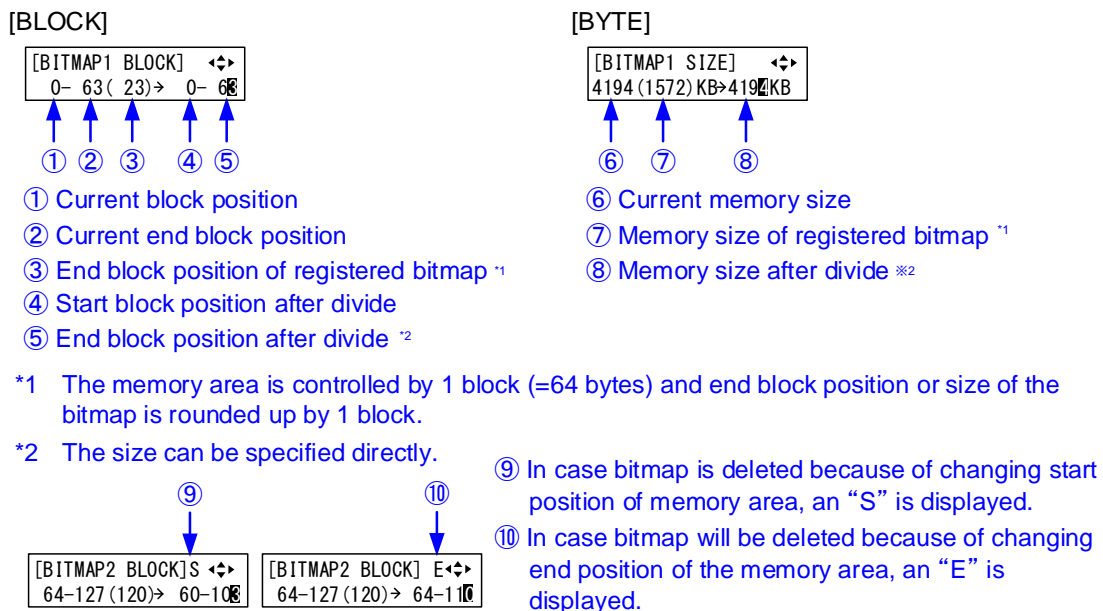
If you select “BLOCK” for “DISPLAY”, the current start and end block positions are displayed on the left of the VFD screen. If a bitmap is registered, the final block position is displayed in parentheses. The start and end block positions after divide are displayed on the right. If you want to specify the after-divide size directly, change the end block position.

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

“BYTE”

The currently-reserved memory size is displayed on the left. If a bitmap is registered, the number of bytes is displayed in parentheses. The memory size after divide is displayed on the right so that you can specify directly the after-division memory size.

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



[Fig. 9.34] “BLOCK” and “BYTE”

9.15.9 Input image capture

Menu Top→BITMAP→VIDEO CAPTURE

Setting value [Table 9.37] Input image capture setting

[Table 9.37] Input image capture setting

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

* Settable 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 x Vertical resolution x 3 (the number of bytes per pixel; "3" fixed)] 8,388,608 bytes or less. In order 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 in the same size or enlarged size but not in the reduced size. Larger resolutions require a longer loading time; it may take approximately six seconds at a maximum. Register images having a lower resolution than that of the sink device.

If an input image is larger than the output resolution, capture it with a reduced image size. If an input image is the same size or smaller, capture it without changing its size. You can register any images having a lower resolution by setting "**9.4.1 Output resolution**" to smaller resolution and capturing the video.

To freeze the input video temporarily, press the "MENU/SET" key. To register the frozen image, select "YES" and then press the "MENU/SET" key again. To release freeze, press the "ESC" key. It can be released automatically when an input channel is switched or input signal changes.

If resolution of input video is too large against the reserved memory area and it causes a significant memory shortage, a message "MEMORY SIZE OVER" will be displayed after you press the "MENU/SET" key. In such a case, registration cannot be executed.

■ From browser

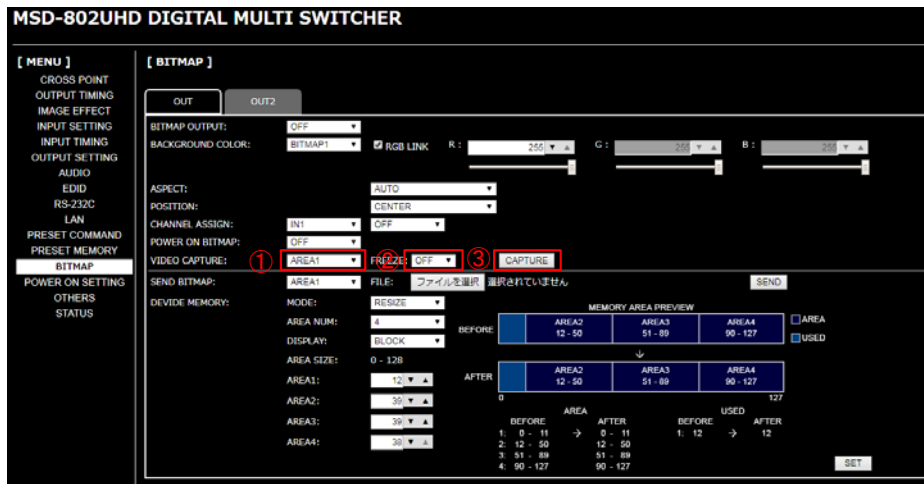
You can capture and save an input video through a WEB browser as well.

Step1) If the memory area is divided, select the registered area of the captured image.

Step2) Set “FREEZE” to “ON”. You can skip this step. This freeze is only temporary. If input channel is switched or input signal changes, the freeze is released and the input video will be output.

Step3) Click the “CAPTURE” button to display the dialog box. Click the “OK” button of the dialog box to capture the video. If you skip the Step2, the video freezes automatically just after clicking the “OK” button.

【See: 8.7 Web menu operation】



- ① Select the registered area of the captured video (for memory area division).
- ② Select the freeze of input video. (You can skip this step)
- ③ Start the capture by clicking the “CAPTURE” button.

[Fig. 9.35] WEB menu

When capture completes correctly, the message is displayed. Click the “OK” button of the dialog box to complete

Do not operate the WEB menu or turn off the MSD until the registration completes.

If capture does not start correctly or failed, an error message below will be displayed.

[Table 9.38] Capture error message

Error message	Description
Video Capture is not available because there is no input signal.	Since input video is not displayed, the video cannot be captured.
Memory Size Error is happened.	Since this input video data is larger than reserved memory area, it cannot be saved.

9.16 Startup setting

9.16.1 DISPLAY POWER keys

Menu	TOP→POWER ON SETTING→DISPLAY POWER
Setting for	Each output channel (Common to OUTA and OUTB)
Setting value	OFF [Default], ON

You can set the DISPLAY POWER key state for when MSD is powered on.

“OFF” : The power switch of the sink device does not operate.

“ON” : If any command is registered, the command will be executed.

【See: 9.13.3 Command link】

[Table 9.39] Startup sink device power status

Setting value	The DISPLAY POWER key state before it is tuned “OFF”.	The DISPLAY POWER key state after it is tuned “ON”.
OFF	OFF	OFF
	ON	
ON	OFF	ON
	ON	

9.16.2 Key function lock

Menu Top→POWER ON SETTING→OPERATION LOCK

Setting value AUTO [Default], UNLOCK, LOCK

You can set the key function lock for when the MSD is powered on.

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

“UNLOCK” : Key function is unlocked.

“LOCK” : Key function is locked.

【See: 9.17.1 Grouping key function lock】

[Table 9.40] Startup key function lock

	Condition	Status
Setting value	The lock state before the MSD is powered off or standby.	The lock state after the MSD is powered on.
AUTO	UNLOCK	UNLOCK
	LOCK	LOCK
UNLOCK	UNLOCK	UNLOCK
	LOCK	
LOCK	UNLOCK	LOCK
	LOCK	

9.17 Other settings

9.17.1 Grouping key function lock

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

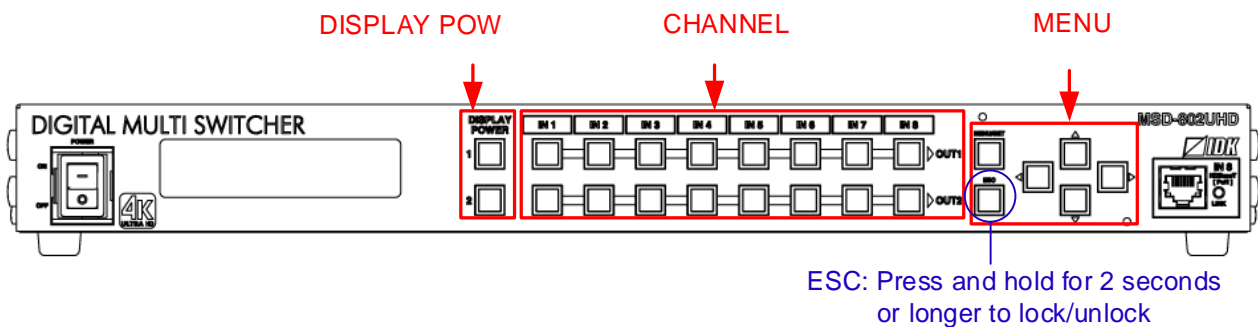
You can group front keys for key function lock.

【See: 8.5 Locking and unlocking key】

【See: 8.2 Switching input channel】

[Table 9.41] Grouping front keys

Setting value	Target keys
CHANNEL	Input channel selection keys
CHANNEL MODE	Locks channel switching mode selection <ul style="list-style-type: none"> • SWITCHING MODE menu • TOP menu
MENU	Menu operation keys
COMMAND	Locks control command execution <ul style="list-style-type: none"> • Command keys that connect to command control connectors
DISPLAY POW	Power key of sink device (DISPLAY POWER)



[Fig. 9.36] Grouping front keys (MSD-802UHD)

9.17.2 Buzzer

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

You can enable / disable the buzzer function (sounding every time you press a front panel key).

9.17.3 Power saving

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

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

9.17.4 DISPLAY POWER key pressing time

Menu Top→OTHERS→DISP POW BUTTON ON
Setting value 0ms to 5000ms (by 10ms) [Default] 0ms

You can set the pressing time of the target DISPLAY POWER key to prevent the sink device from being powered off when the key is pressed accidentally.

9.17.5 HDBaseT input power supply

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

You can set the power supply function from the HDBaseT input connector.

"ON": Power will be supplied to an HDBaseT transmitter supporting PoH (IEEE802.3af).

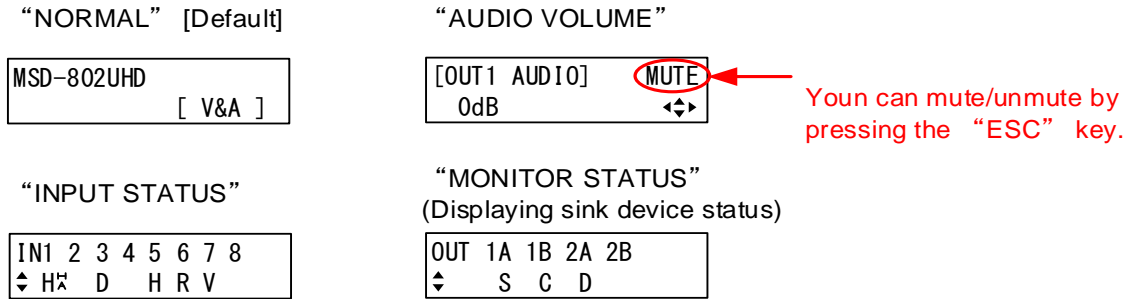
The setting of this menu is not updated until the MENU/SET key is pressed. Make sure to press the MENU/SET key to update the setting.

Note:

If you connect a device that does not support PoH (IEEE802.3af) while HDC POWER OUTPUT is enabled, the MSD and the connected device may be damaged.

9.17.6 Top page

Menu TOP→OTHERS→TOP DISPLAY
 Setting value [Fig. 9.36] Top page of VFD screen



[Fig. 9.37] Top page of VFD screen

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 “▼” keys.

【See: 9.17.7Input signal status】

【See: 9.17.8Sink device status】

The “ALERT” page will appear when the one or more of the following problems occurs.

```

***** ALERT *****
Fan Temp CmdLED

Fan      : Fan problem
Temp     : Temperature problem
CmdLED   : Output problem in command control connector
  
```

[Fig. 9.38] Alert page

9.17.7 Input signal status

Menu Top→OTHERS→INPUT STATUS

Values to be displayed [Table 9.42] Input signal status

You can view the input signal status that is input from HDMI and DVI input connectors.

[Table 9.42] Input signal status

	All input channels	Video status of each input channel	Audio status of each input channel
Screen	IN1 2 3 4 5 6 7 8 9 ↕ H [⌘] D H R V	[IN1 FORMAT] Type0 2160p 59.94Hz H [⌘]	[IN1 AUDIO] M↕ LINEAR PCM 48kHz
Upper row	Input channel	Input channel, Stream type	Input channel, multi-channel audio information
Lower row	Input signal type, other information	Video signal format, input signal type, other information	Audio signal type

■ Input signal type

[Table 9.43] Input signal type

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

■ Other information

Only for digital input

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

Lower: "A": audio is embedded.

■ Stream type

Type0: HDCP 2.2 stream type0

Type1: HDCP 2.2 stream type1

Nothing is displayed: If "H" of other information is displayed, the signal is HDCP 1.4.

If "H" of other information is not displayed, the signal is not protected by HDCP.

■ Input video signal format

[Table 9.44] Input video signal format

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

■ Multi channel audio information

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

■ Input audio signal type

[Table 9.45] Input audio signal type

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

9.17.8 Sink device status

Menu Top→OTHERS→MONITOR STATUS

Values to be displayed [Table 9.46] Sink device status

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

[Table 9.46] Sink device status

	All video output connector	Each video output connector
Display	OUT 1A 1B 2A 2B ↕ S N E	[OUT1A MONITOR] H24↕ HDCP 2.2 SUPPORT AAA
Upper	Video output channel	Output channel, output signal, color depth
Lower	HDCP status	HDCP status, error code

■ HDCP authorization status

[Table 9.47] HDCP authorization status

Character	HDCP status	Description
S	HDCP 2.2 SUPPORT	HDCP 2.2-compliant sink device is connected.
S	HDCP 1.4 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	MONITOR DISCONNECT	Monitor was disconnected (displayed only for 1 second).
	UNCONNECTED	No sink device is connected.

■ Output signal and color depth

H24 : HDMI, 24-BIT COLOR

H30 : HDMI, 30-BIT COLOR

D : DVI

■ Error code

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

[Table 9.48] Error code

Code	Video output	Audio output
	If any number or character is not displayed, video or audio is output correctly.	
1	—	“9.9.2 Output mute” is set to “ON”.
2	Displayed only for digital input. DDC power supply is not input. (If no source device is connected, this error code is displayed).	
3	No video signal is input.	No video signal is input.
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	—	“9.9.7 Audio output connector” is not enabled.
9	—	“9.8.1 Output mode” is set to “DVI MODE” or a sink device that does not support audio is connected. ^{*2}
A	Input channel is set to “OFF”.	
B	—	“9.9.8 Digital audio output connector” is not enabled. ^{*2}
C	No sink device is connected.	
D	HDCP is being authorized.	
E	HDCP authorization failed.	

^{*1} Input status of analog audio signal cannot be detected. Even if this status is not displayed, audio may sometimes not be output when analog input is selected.

^{*2} This status is only for HDMI output connectors or HDBaseT output connector.

9.17.9 Viewing sink device EDID

Menu Top→OTHERS→EDID STATUS

Values to be displayed [Table 9.49] Sink device EDID

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

- HDMI supported sink device : No.1 to No.6
- Non-HDMI-supported sink device : No.1 and No.2

If no sink device is connected, the VFD screen shows “UNCONNECTED”. If the MSD cannot read EDID from connected sink devices, the VFD screen shows “EDID READ ERROR”.

[Table 9.49] Sink device EDID

No.	1	2	3
Display	[OUT1A]xxxx 1920x1080 148.50MHz↕	[OUT1A]HDMI RGB/422/444/420 ↕ [OUT1A] DVI ↕	[OUT1A] 24BIT COLOR ↕
Upper	Monitor name	HDMI or nothing is displayed	—
Lower	Resolution, dot clock	Sampling structure 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	6
Display	[OUT1A] 32/44.1/48/96kHz ↕	[OUT1A] 16/20/24BIT 8CHANNEL COMPRESSED	[OUT1A] HDR:-- / SCDC:ON ↕
Upper	—	Audio bit length	—
Lower	Audio sampling frequency	Number of audio channels, compressed audio supported/not supported ("COMPRESSED")	HDR and SCDC supported/not supported

9.17.10 Viewing version information

Menu Top→OTHERS→VERSION

Values to be displayed Model name and firmware version

You can view the model name and firmware version.

10 Product specification

■ MSD-701UHD

Item		Description	
Input	Video	HDMI / DVI 2 inputs HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25 MHz to 300 MHz, TMDS data rate: 0.75 Gbps to 18 Gbps EDID emulation Connector: Female HDMI Type A (19-pin)	
		HDMI / DVI 5 inputs *DVI connectors: Switch-selectable between digital and analog HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 TMDS clocks: 25 MHz to 225 MHz, TMDS data rate: 0.75 Gbps to 6.75 Gbps EDID emulation Connector: 3 female HDMI Type A (19-pin), 2 female DVI-I (29-pin)	
		Universal Analog 2 inputs *Switch-selectable between digital and analog Composite video / Y/C / Analog RGB / Analog YPbPr (auto-recognition) Composite video (VBS Signal): 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: Female DVI-I (29-pin)	
		Format	HDMI / DVI 2 inputs VGA to WQXGA (Dot clock: 25 MHz to 300 MHz) 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (up to 4K@60 (4:4:4)) (*2)
			HDMI / DVI 5 inputs VGA to QWXGA (Dot clock: 25 MHz to 165 MHz) * For WUXGA / QWXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p
			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 analog audio 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), 2 female DVI-I (29-pin)	
		Analog 3 inputs *Switch-selectable between digital audio Stereo L/R balanced / unbalanced Input impedance: 48k Ω Balanced / 24 kΩ Unbalanced Reference level: -10 dBu, Max. input level: +10 dBu Connector: 5-pin terminal block	

Item		Description
Output	Video	HDMI / DVI 1 output Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25.175 MHz to 297 MHz, TMDS data rate: 0.755 Gbps to 17.82 Gbps Connector: Female HDMI Type A (19-pin)
		HDBaseT 1 output Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDBaseT (*1) HDCP 1.4 / 2.2 (*3) Connector: RJ-45 (*4) Cable: CAT.5E HDC, Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Format VGA / SVGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA / SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ / WXGA++ / UXGA / WSXGA+ / VESAHD / WUXGA / QWXGA / WQHD / WQXGA * For VESAHD / WUXGA / QWXGA / WQHD / WQXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (3840 x 2160) (*6) / 4K (4096 x 2160) (*6)
	Audio	Digital 1 output Audio can be distributed to an HDMI output 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: Female HDMI Type A (19-pin), RJ-45
		Analog 1 output Stereo L/R balanced / unbalanced Output impedance: 100 Ω balanced / 50 Ω unbalanced Reference level: -10 dBu, Max. output level: +10 dBu Connector: 5-pin terminal block
Maximum extension distance	Digital Input	HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*7)
	Digital output	HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*7) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*8)
Functions	Analog video processing unit	3D Y/C separation
	Scan Converter	Motion adaptive I/P conversion, Aspect Ratio Control, Picture adjustment (brightness, contrast, display position, display size, etc.), Seamless Switching (*9)
	Others	All function setting through browser, Automatic input detection and switching, Volume adjustment (volumes of input and output ports can be set separately), Lip Sync (Max. 16 frames), Audio breakaway enables independent audio and video switching, Cross-point memory (9 settings), Preset memory (8 settings), Last memory, Anti-Snow (*10), Connection Reset (*11), External control commands (32 commands), Security lock
External control	RS-232C	1 port / 3-pin terminal block
	LAN	1 port / RJ-45 10Base-T / 100Base-TX (Auto Negotiation), Auto MDI / MDI-X
	Contact closure	3 ports / 6-pin terminal block Non-voltage contact input up to DC 24 V 500 mA
	Command control	3 ports / 7-pin terminal block Controlling keys and LED
	External control	RS-232C, LAN, contact closure, PJLink (class1), CEC (power control of sink device) (*12)
General	Power	100 - 240 VAC ± 10%, 50 Hz / 60 Hz ± 3 Hz
	Power consumption	About 47 Watts
	Dimensions	16.9 (W) × 1.7 (H) × 13.8 (D)" (430 (W) × 44 (H) × 350 (D) mm) (EIA 1U high, full rack wide) (Excluding connectors and the like)
	Weight	10.6 lbs. (4.8 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 and HEC are not supported.
WQHD, WQXGA, and 4K format: 24 bit / pixel (8 bit / component) is supported.

*2 4K format: Only CEA-861 timing is supported.

*3 HDBaseT input/output: DVI signals protected by HDCP are not supported. To transmit those signals, use an IDK's twisted pair cable extender supporting DVI signals.

*4 RJ-45 (HDBaseT connector) is only for extending digital video and audio signals over a Cat5e / Cat6 twisted pair cable. Use it with IDK's twisted pair cable receiver. Do not use for LAN devices.

*5 T568A or T568B straight. The CAT.5E HDC cable is developed by IDK and recommended by HDBaseT alliance.

*6 4K format: Only CEA-861 timing is supported.

*7 The maximum cable distance varies depending on the connected devices and was measured under following conditions:

- 1080p@60: when IDK's AWG 24 cable was used and signals of 1080p@60 24 bit / pixel (8 bit / component) was input or output.
- 4K@60: when IDK's 18 Gbps supported cable was used and signals of 4K@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.

*8 The maximum extension 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. Operations may not be stable with some LCD devices; please check the operation beforehand or contact us.

The maximum extension distance is the shorter distance of connected HDBaseT product or sink device's maximum extension distance.

Up to 492 ft. (150 m): 1080p (24 bit) in Long reach mode. For Long reach mode, use IDK's twisted pair cable products that supports 328 ft. (100 m) or longer.

*9 Seamless switching with a black frame.

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

*11 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.

*12 The sink device must support CEC. Some sink devices cannot be controlled from the MSD through CEC.

■ **MSD-702UHD**

Item		Description
Input	Video	HDMI / DVI 2 inputs HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25 MHz to 300 MHz, TMDS data rate: 0.75 Gbps to 18 Gbps EDID emulation Connector: Female HDMI Type A (19-pin)
		HDMI / DVI 5 inputs *DVI connectors: Switch-selectable between digital and analog HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 TMDS clocks: 25 MHz to 225 MHz, TMDS data rate: 0.75 Gbps to 6.75 Gbps EDID emulation Connector: 3 female HDMI Type A (19-pin), 2 female DVI-I (29-pin)
	Universal Analog 2 inputs *Switch-selectable between digital and analog Composite video / Y/C / Analog RGB / Analog YPbPr (auto-recognition) Composite video (VBS Signal): 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: Female DVI-I (29-pin)	
	Format	HDMI / DVI 2 inputs VGA to WQXGA (Dot clock: 25 MHz to 300 MHz) 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (up to 4K@60 (4:4:4)) (*2)
		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 analog audio 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), 2 female DVI-I (29-pin)
		Analog 3 inputs *Switch-selectable between digital audio Stereo L/R balanced / unbalanced Input impedance: 48k Ω Balanced / 24 kΩ Unbalanced Reference level: -10 dBu, Max. input level: +10 dBu Connector: 5-pin terminal block

Item		Description
Output	Video	HDMI / DVI 2 outputs Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25.175 MHz to 297 MHz, TMDS data rate: 0.755 Gbps to 17.82 Gbps Connector: Female HDMI Type A (19-pin)
		HDBaseT 2 outputs Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDBaseT (*1) HDCP 1.4 / 2.2 (*3) Connector: RJ-45 (*4) Cable: CAT.5E HDC, Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Format VGA / SVGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA / SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ / WXGA++ / UXGA / WSXGA+ / VESAHD / WUXGA / QWXGA / WQHD / WQXGA * For VESAHD / WUXGA / QWXGA / WQHD / WQXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (3840 x 2160) (*6) / 4K (4096 x 2160) (*6)
	Audio	Digital 2 outputs Audio can be distributed to an HDMI output 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), 2 RJ-45
		Analog 2 outputs Stereo L/R balanced / unbalanced Output impedance: 100 Ω balanced / 50 Ω unbalanced Reference level: -10 dBu, Max. output level: +10 dBu Connector: 5-pin terminal block
Maximum extension distance	Digital Input	HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*7)
	Digital output	HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*7) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*8)
Functions	Analog video processing unit	3D Y/C separation
	Scan Converter	Motion adaptive I/P conversion, Aspect Ratio Control, Picture adjustment (brightness, contrast, display position, display size, etc.), Seamless Switching (*9)
	Others	All function setting through browser, Automatic input detection and switching, Volume adjustment (volumes of input and output ports can be set separately), Lip Sync (Max. 16 frames), Audio breakaway enables independent audio and video switching, Cross-point memory (9 settings), Preset memory (8 settings), Last memory, Anti-Snow (*10), Connection Reset (*11), External control commands (32 commands), Security lock
External control	RS-232C	1 port / 3-pin terminal block
	LAN	1 port / RJ-45 10Base-T / 100Base-TX (Auto Negotiation), Auto MDI / MDI-X
	Contact closure	3 ports / 6-pin terminal block Non-voltage contact input up to DC 24 V 500 mA
	Command control	3 ports / 7-pin terminal block Controlling keys and LED
	External control	RS-232C, LAN, contact closure, PJLink (class1), CEC (power control of sink device) (*12)
General	Power	100 - 240 VAC ± 10%, 50 Hz / 60 Hz ± 3 Hz
	Power consumption	About 66 Watts
	Dimensions	16.9 (W) × 1.7 (H) × 13.8 (D)" (430 (W) × 44 (H) × 350 (D) mm) (EIA 1U high, full rack wide) (Excluding connectors and the like)
	Weight	10.8 lbs. (4.9 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 and HEC are not supported.

WQHD, WQXGA, and 4K format: 24 bit / pixel (8 bit / component) is supported.

*2 4K format: Only CEA-861 timing is supported.

*3 HDBaseT input/output: DVI signals protected by HDCP are not supported. To transmit those signals, use an IDK's twisted pair cable extender supporting DVI signals.

*4 RJ-45 (HDBaseT connector) is only for extending digital video and audio signals over a Cat5e / Cat6 twisted pair cable. Use it with IDK's twisted pair cable receiver. Do not use for LAN devices.

*5 T568A or T568B straight. The CAT.5E HDC cable is developed by IDK and recommended by HDBaseT alliance.

*6 4K format of HDBaseT output: Up to 4K@30 is supported.

*7 The maximum cable distance varies depending on the connected devices and was measured under following conditions:

• 1080p@60: when IDK's AWG 24 cable was used and signals of 1080p@60 24 bit / pixel (8 bit / component) was input or output.

• 4K@60: when IDK's 18 Gbps supported cable was used and signals of 4K@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.

*8 The maximum extension 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. Operations may not be stable with some LCD devices; please check the operation beforehand or contact us.

The maximum extension distance is the shorter distance of connected HDBaseT product or sink device's maximum extension distance.

Up to 492 ft. (150 m): 1080p (24 bit) in Long reach mode. For Long reach mode, use IDK's twisted pair cable products that supports 328 ft. (100 m) or longer.

*9 Seamless switching with a black frame.

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

*11 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.

*12 The sink device must support CEC. Some sink devices cannot be controlled from the MSD through CEC.

■ MSD-801UHD

Item		Description
Input	Video	HDMI / DVI 2 inputs HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25 MHz to 300 MHz, TMDS data rate: 0.75 Gbps to 18 Gbps EDID emulation Connector: Female HDMI Type A (19-pin)
		HDMI / DVI 5 inputs *DVI connectors: Switch-selectable between digital and analog HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 TMDS clocks: 25 MHz to 225 MHz, TMDS data rate: 0.75 Gbps to 6.75 Gbps EDID emulation Connector: 3 female HDMI Type A (19-pin), 2 female DVI-I (29-pin)
		HDBaseT 1 input HDBaseT (*1) HDCP 1.4 / 2.2 (*2) EDID emulation, PoH power supply (IEEE 802.3af) (*3) Connector: RJ-45 (*4) Cable: CAT.5E HDC, Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Universal Analog 2 inputs *Switch-selectable between digital and analog Composite video / Y/C / Analog RGB / Analog YPbPr (auto-recognition) Composite video (VBS Signal): 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: Female DVI-I (29-pin)
		Format
	HDMI / DVI 5 inputs VGA to QWXGA (Dot clock: 25 MHz to 165 MHz) * For WUXGA / QWXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p	
	HDBaseT VGA to WQXGA (Dot clock: 25 MHz to 300 MHz) 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (up to 4K@60 (4:2:0)) (*6)	
	Audio	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
		Digital 8 inputs *Switch-selectable between analog audio 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), 2 female DVI-I (29-pin), 1 RJ-45
	Analog 3 inputs *Switch-selectable between digital audio Stereo L/R balanced / unbalanced Input impedance: 48k Ω Balanced / 24 kΩ Unbalanced Reference level: -10 dBu, Max. input level: +10 dBu Connector: 5-pin terminal block	

Item		Description
Output	Video	HDMI / DVI 1 output Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25.175 MHz to 297 MHz, TMDS data rate: 0.755 Gbps to 17.82 Gbps Connector: Female HDMI Type A (19-pin)
		HDBaseT 1 output Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDBaseT (*1) HDCP 1.4 / 2.2 (*2) Connector: RJ-45 (*4) Cable: CAT.5E HDC , Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Format VGA / SVGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA / SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ / WXGA++ / UXGA / WSXGA+ / VESAHD / WUXGA / QWXGA / WQHD / WQXGA * For VESAHD / WUXGA / QWXGA / WQHD / WQXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (3840 x 2160) (*7) / 4K (4096 x 2160) (*7)
	Audio	Digital 1 output Audio can be distributed to an HDMI output 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), 2 RJ-45
		Analog 1 output Stereo L/R balanced / unbalanced Output impedance: 100 Ω balanced / 50 Ω unbalanced Reference level: -10 dBu, Max. output level: +10 dBu Connector: 5-pin terminal block
Maximum extension distance	Digital Input HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*8) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*9)	
	Digital output HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*8) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*9)	
Functions	Analog video processing unit 3D Y/C separation	
	Scan Converter Motion adaptive I/P conversion, Aspect Ratio Control, Picture adjustment (brightness, contrast, display position, display size, etc.), Seamless Switching (*10)	
	Others All function setting through browser, Automatic input detection and switching, Volume adjustment (volumes of input and output ports can be set separately), Lip Sync (Max. 16 frames), Audio breakaway enables independent audio and video switching, Cross-point memory (9 settings), Preset memory (8 settings), Last memory, Anti-Snow (*11), Connection Reset (*12), External control commands (32 commands), Security lock	
External control	RS-232C 1 port / 3-pin terminal block	
	LAN 1 port / RJ-45 10Base-T / 100Base-TX (Auto Negotiation), Auto MDI / MDI-X	
	Contact closure 3 ports / 6-pin terminal block Non-voltage contact input up to DC 24 V 500 mA	
	Command control 3 ports / 7-pin terminal block Controlling keys and LED	
	External control RS-232C, LAN, contact closure, PLink (class1), CEC (power control of sink device) (*13)	
General	Power 100 - 240 VAC ± 10%, 50 Hz / 60 Hz ± 3 Hz	
	Power consumption About 77 Watts	
	Dimensions 16.9 (W) x 1.7 (H) x 13.8 (D)" (430 (W) x 44 (H) x 350 (D) mm) (EIA 1U high, full rack wide) (Excluding connectors and the like)	
	Weight 11 lbs. (5.0 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 and HEC are not supported.
WQHD, WQXGA, and 4K format: 24 bit / pixel (8 bit / component) is supported.

*2 HDBaseT input/output: DVI signals protected by HDCP are not supported. To transmit those signals, use an IDK's twisted pair cable extender supporting DVI signals.

*3 For PoH power feeding, please use an HDBaseT transmitter supporting IEEE 802.3af and AWG 24 twisted pair cable or thicker cable.

*4 RJ-45 (HDBaseT connector) is only for extending digital video and audio signals over a Cat5e / Cat6 twisted pair cable. Use it with IDK's twisted pair cable transmitter or receiver. Do not use for LAN devices.

*5 T568A or T568B straight. The CAT.5E HDC cable is developed by IDK and recommended by HDBaseT alliance.

*6 4K format: Only CEA-861 timing is supported.

*7 4K format of HDBaseT output: Up to 4K@30 is supported.

*8 The maximum cable distance varies depending on the connected devices and was measured under following conditions:
 • 1080p@60: when IDK's AWG 24 cable was used and signals of 1080p@60 24 bit / pixel (8 bit / component) was input or output.
 • 4K@60: when IDK's 18 Gbps supported cable was used and signals of 4K@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.

*9 The maximum extension 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. Operations may not be stable with some LCD devices; please check the operation beforehand or contact us.
 The maximum extension distance is the shorter distance of connected HDBaseT product or sink device's maximum extension distance.
 Up to 492 ft. (150 m): 1080p (24 bit) in Long reach mode. For Long reach mode, use IDK's twisted pair cable products that supports 328 ft. (100 m) or longer.

*10 Seamless switching with a black frame.

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

*12 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.

*13 The sink device must support CEC. Some sink devices cannot be controlled from the MSD through CEC.

■ MSD-802UHD

Item		Description
Input	Video	HDMI / DVI 2 inputs HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25 MHz to 300 MHz, TMDS data rate: 0.75 Gbps to 18 Gbps EDID emulation Connector: Female HDMI Type A (19-pin)
		HDMI / DVI 5 inputs *DVI connectors: Switch-selectable between digital and analog HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 TMDS clocks: 25 MHz to 225 MHz, TMDS data rate: 0.75 Gbps to 6.75 Gbps EDID emulation Connector: 3 female HDMI Type A (19-pin), 2 female DVI-I (29-pin)
		HDBaseT 1 input HDBaseT (*1) HDCP 1.4 / 2.2 (*2) EDID emulation, PoH power supply (IEEE 802.3af) (*3) Connector: RJ-45 (*4) Cable: CAT.5E HDC , Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Universal Analog 2 inputs *Switch-selectable between digital and analog Composite video / Y/C / Analog RGB / Analog YPbPr (auto-recognition) Composite video (VBS Signal): 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: Female DVI-I (29-pin)
	Format	HDMI / DVI 2 inputs VGA to WQXGA (Dot clock: 25 MHz to 300 MHz) 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (up to 4K@60 (4:4:4)) (*6)
		HDMI / DVI 5 inputs VGA to QWXGA (Dot clock: 25 MHz to 165 MHz) * For WUXGA / QWXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p
		HDBaseT VGA to WQXGA (Dot clock: 25 MHz to 300 MHz) 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (up to 4K@60 (4:2:0)) (*6)
	Audio	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
		Digital 8 inputs *Switch-selectable between analog audio 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), 2 female DVI-I (29-pin), 1 RJ-45
	Analog 3 inputs *Switch-selectable between digital audio Stereo L/R balanced / unbalanced Input impedance: 48k Ω Balanced / 24 kΩ Unbalanced Reference level: -10 dBu, Max. input level: +10 dBu Connector: 5-pin terminal block	

Item		Description
Output	Video	HDMI / DVI 2 outputs Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDMI Deep Color (*1) / DVI 1.0 TMDS single link, HDCP 1.4 / 2.2 TMDS clocks: 25.175 MHz to 297 MHz, TMDS data rate: 0.755 Gbps to 17.82 Gbps Connector: Female HDMI Type A (19-pin)
		HDBaseT 2 outputs Output video can be distributed to an HDMI / DVI and HDBaseT simultaneously. HDBaseT (*1) HDCP 1.4 / 2.2 (*2) Connector: RJ-45 (*4) Cable: CAT.5E HDC, Cat5e UTP / STP, Cat6 UTP / STP (*5)
		Format VGA / SVGA / XGA / WXGA (1280x768) / WXGA (1280x800) / Quad-VGA / SXGA / WXGA (1360x768) / WXGA (1366x768) / SXGA+ / WXGA+ / WXGA++ / UXGA / WSXGA+ / VESAHD / WUXGA / QWXGA / WQHD / WQXGA * For VESAHD / WUXGA / QWXGA / WQHD / WQXGA, only Reduced Blanking is supported. 480i / 480p / 576i / 576p / 720p / 1080i / 1080p / 4K (3840 x 2160) (*7) / 4K (4096 x 2160) (*7)
	Audio	Digital 2 outputs Audio can be distributed to an HDMI output 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), 2 RJ-45
		Analog 2 outputs Stereo L/R balanced / unbalanced Output impedance: 100 Ω balanced / 50 Ω unbalanced Reference level: -10 dBu, Max. output level: +10 dBu Connector: 5-pin terminal block
Maximum extension distance	Digital Input HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*8) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*9)	
	Digital output HDMI / DVI: up to 98 ft. (30m) (1080p@60), up to 39 ft. (12 m) (4K@60) (*8) HDBaseT: up to 328 ft. (100 m), up to 492 ft. (150 m) (Long Reach Mode) (*9)	
Functions	Analog video processing unit 3D Y/C separation	
	Scan Converter Motion adaptive I/P conversion, Aspect Ratio Control, Picture adjustment (brightness, contrast, display position, display size, etc.), Seamless Switching (*10)	
	Others All function setting through browser, Automatic input detection and switching, Volume adjustment (volumes of input and output ports can be set separately), Lip Sync (Max. 16 frames), Audio breakaway enables independent audio and video switching, Cross-point memory (9 settings), Preset memory (8 settings), Last memory, Anti-Snow (*11), Connection Reset (*12), External control commands (32 commands), Security lock	
External control	RS-232C 1 port / 3-pin terminal block	
	LAN 1 port / RJ-45 10Base-T / 100Base-TX (Auto Negotiation), Auto MDI / MDI-X	
	Contact closure 3 ports / 6-pin terminal block Non-voltage contact input up to DC 24 V 500 mA	
	Command control 3 ports / 7-pin terminal block Controlling keys and LED	
	External control RS-232C, LAN, contact closure, PLink (class1), CEC (power control of sink device) (*13)	
General	Power 100 - 240 VAC ± 10%, 50 Hz / 60 Hz ± 3 Hz	
	Power consumption About 96 Watts	
	Dimensions 16.9 (W) x 1.7 (H) x 13.8 (D)" (430 (W) x 44 (H) x 350 (D) mm) (EIA 1U high, full rack wide) (Excluding connectors and the like)	
	Weight 11.2 lbs. (5.1 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 and HEC are not supported.
WQHD, WQXGA, and 4K format: 24 bit / pixel (8 bit / component) is supported.
- *2 HDBaseT input/output: DVI signals protected by HDCP are not supported. To transmit those signals, use an IDK's twisted pair cable extender supporting DVI signals.
- *3 For PoH power feeding, please use an HDBaseT transmitter supporting IEEE 802.3af and AWG 24 twisted pair cable or thicker cable.
- *4 RJ-45 (HDBaseT connector) is only for extending digital video and audio signals over a Cat5e / Cat6 twisted pair cable. Use it with IDK's twisted pair cable transmitter or receiver. Do not use for LAN devices.
- *5 T568A or T568B straight. The CAT.5E HDC cable is developed by IDK and recommended by HDBaseT alliance.
- *6 4K format: Only CEA-861 timing is supported.
- *7 4K format of HDBaseT output: Up to 4K@30 is supported.
- *8 The maximum cable distance varies depending on the connected devices and was measured under following conditions:
- 1080p@60: when IDK's AWG 24 cable was used and signals of 1080p@60 24 bit / pixel (8 bit / component) was input or output.
- 4K@60: when IDK's 18 Gbps supported cable was used and signals of 4K@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.
- *9 The maximum extension 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. Operations may not be stable with some LCD devices; please check the operation beforehand or contact us.
The maximum extension distance is the shorter distance of connected HDBaseT product or sink device's maximum extension distance.
Up to 492 ft. (150 m): 1080p (24 bit) in Long reach mode. For Long reach mode, use IDK's twisted pair cable products that supports 328 ft. (100 m) or longer.
- *10 Seamless switching with a black frame.
- *11 The anti-snow feature automatically fixes snow noise that is a specific symptom of HDCP-compliant signals and mainly occurs at start-up. This feature does not work when snow noise has already occurred during startup or when it occurs due to a bad condition of the transmission line.
- *12 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.
- *13 The sink device must support CEC. Some sink devices cannot be controlled from the MSD through CEC.

11 Troubleshooting

This chapter recommends what to do if you have problems operating the MSD.

In case the MSD does not work correctly, please check the following items first.

- Are the MSD and all devices plugged in and powered on normally?
- Are cables connected correctly?
- Are there no loose connections?
- Are correct cables supported by devices being used?
- Are specifications of connected devices matched to each other?
- Are settings of the sink device correct?
- Are there any nearby objects that may cause noise?

If the problem still cannot be solved, perform the following actions. Refer to manuals of connected devices as well, since they may possibly be the cause of the problem.

Problem	Cause/Check item/Solution	Page
●Video output		
Video is not output.	<p>Check the error code in “9.17.8 Sink device status”. (Since the MSD has multiple output connectors, check the error code of the output connector that does not output video.)</p> <ul style="list-style-type: none"> · Error code 2: Check if the source device is connected and turned on. · Error code 3: Signal is not input. Check [1] to [6] on the next page. · Error code 4: A problem may occur in the source device or HDCP authentication. Check [2], [5] and [6]. · Error code 5: If a sink device that is not HDCP compliant is connected: <ul style="list-style-type: none"> - only video without content protection (such as analog input and test pattern) can be output - black is output when signal with content protection is input. - the MSD does not display video, because it supports HDCP. In that case, you can disable HDCP input from the source device in “9.6.2 Input HDCP setting” in order to display the video. <p>Some source devices check whether the sink device is HDCP compliant or not and they output video depending on the result.</p> <ul style="list-style-type: none"> · Error code 6 and 7: A problem occurs in the source device. · Error code A: Set “8.2 Switching input channel” to a value other than “OFF”. · If no error code is displayed: Set “9.4.11 Test pattern” to a pattern other than “OFF”. <ul style="list-style-type: none"> - If any test pattern is not output, check [5] to [7]. - If a test pattern is output, the source device may not output video. 	—

Problem	Cause/Check item/Solution	Page
Digital input video is not output.	[1] The set time for monitoring no-signal input may be too short.	58
Analog input video is not output.	[3] Change the input signal type.	60
Video is not output	[4] If the source device has multiple output connectors, check the video output settings of the source device.	—
Video is disappeared, interrupted, or has noise.	[5] If using a long cable for input or output, replace it with a 5 m/16.4 ft. or shorter cable. Since the MSD has the equalizing function, long cables can be connected, but the MSD may not provide its full performance depending on the cable quality and the connected device. If the problem is solved by replacing the cable, signal may have been degraded due to the long haul transmission. We have high-quality cables, cable boosters and extenders. Please contact us as needed.	—
	[6] When high-speed signal (high resolution: such as UXGA, WUXGA, QWXGA, WQHD, WQXGA, 1080p, 4K; DEEP COLOR signal) is input or output, video may not be displayed or noise may appear depending on the cable quality and the connected device. If the problem occurs only when a specific input is selected, the problem was caused by the input side. If it occurs for all inputs or only when a test pattern is displayed, the problem was caused by the output side. Change the resolution to a lower level and/or disable Deep color. You can check the resolution and color depth of the input signal in “9.17.7 Input signal status” and you can also limit resolution and color depth of input signal according to the EDID setting. You can specify the output resolution and check the color depth of the output signal in “9.17.8 Sink device status” and you can also limit the output signal color depth.	85,87,88 48 73
Input video and test pattern are not output.	[7] If you set the output resolution other than “AUTO-A” and “AUTO-B”, check if the selected resolution is supported by the sink device. If you select 480i, 576i, or 1080i, video may not be output to sink devices that do not support interlaced signal. For TV output resolutions (480i to 4K (4096 x 2160)), check the vertical synchronous frequency. PC output resolutions (VGA to WQXGA) may not be output to LCD TVs.	48
Video is interrupted.	If you set “9.6.4 Automatic.... ” to “ON”, false detection may occur. Change the setting to “OFF”.	61
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 cable with a shorter one.	—

Problem	Cause/Check item/Solution	Page
Video from analog input is displayed in black-and-white or green.	Change the input signal type.	60
VHS reproduction or fast-forward is interrupted when analog composite video or analog S-Video is input.	Automatic detection of input signal failed. Set the input signal type manually to "VIDEO AUTO", "VIDEO", or "Y/C".	60
The left, right, top and bottom sides are cut off.	If the problem occurs only when "CROSS HATCH" (a test pattern) is output, the sink device enlarges and displays the video. Adjust the sink device. If the sink device does not have the adjusting function, set the video size and position of the output. If the problem occurs even if "CROSS HATCH" is output to all outputs, check [8] to [13].	54 51, 52
Part of video is cut off or black is displayed at edge(s).	[8] Check the overscan setting.	51
	[9] Settings of the display position or size are not changed? Note: Display position and size can be set for each input or output.	51, 52 47
	[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)	50 51
	[11] If vertical and horizontal frequencies are displayed in " 9.17.7 Input signal status ", signal that is not registered in the built-in data of the MSD is input. If " 9.7.6 Automatic setting of input timing " is set to "AUTO SETUP ON", input timing is measured when new signal is input. However, if correct video is not input, the measurement may fail. In this case, measure the input timing manually and register the device data.	64, 69
	[12] For analog input, set the automatic measurement of input timing in "9.7.1 Automatic measurement". If the result of the automatic measurement shows that video is cut off or black is displayed at edges, set the total number of the horizontal dots, scanning start position, and the active area. For digital input, 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 dots cannot be set).	66, 67
Black is displayed at top, bottom, right and left on PC video or	[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 " 9.17.7 Input signal status "). If not, set the EDID	

only part of the PC video is displayed, and the rest is displayed by scrolling with the mouse.	and PC resolutions. If the copy of the built-in LCD screen is output in the laptop, the output to an output monitor is limited to the resolution of the LCD screen. As a result, black may be displayed at edges. The problem can be solved by enlarging the display or displaying only to the external monitor.	84, 85
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Problem	Cause/Check item/Solution	Page
Video is reduced vertically or horizontally.	Does the selected aspect ratio of the output resolution match that of the connected sink device? If not, set the aspect ratio of the sink device.	50
	Check the set aspect ratio of the input signal.	50
	Check the monitor setting of the source device (such as 4:3, 16:9, letter box and the like).	—
	For analog input, signal that cannot be recognized by the MSD and wrong aspect ratio may be applied. Perform the automatic measurement in the "NEXT ASPECT" mode.	64
Video flickers	If interlace signal is input to a sink device that does not support interlace signal, the video may flicker. Check the output resolution of the sink device.	48
PC's dual monitor cannot be set or the setting is canceled.	If the monitoring function for no-signal input works, the dual monitor function may not work correctly. In this case, disable the monitoring function.	58
It takes a long time to output video after video input is switched.	If you set the HDCP output to "HDCP INPUT ONLY", some sink devices may fail HDCP authentication. In this case, it may temporarily not output video and audio when a channel signal without HDCP support is input and then is switched to a channel signal with HDCP support is input. In this case, set the HDCP output setting to "HDCP 2.2" or "HDCP 1.4".	72
Video from a PC of analog input is displayed with bright- and- dark vertical stripes	Set the total number of horizontal dots. If you change the total number of horizontal dots, you may sometimes have to set the start position of scanning and the active area.	66
Light shadows appear on a few video lines from an analog input PC.	Adjust the tracking.	69
Fluctuation appears on the analog input video.	Adjust the tracking.	69
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.	64
Display position of analog input video changes on its own.	If the function that automatically adjusts the display position (upper left of the screen) works while the automatic measurement is executed, the video may move on its own. In this case, disable the adjusting position function.	68

<p>Part of the bitmap is cut off, or bitmap is not displayed on the full screen.</p>	<p>If the bitmap resolution does not match the output resolution, the bitmap may be partially cut off or may not be displayed on the full screen, depending on settings of the aspect ratio and display position. In this case, set the aspect ratio and display position as needed.</p>	<p>117</p>
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Problem	Cause/Check item/Solution	Page
●Audio output		
Audio is not output.	<p>If audio is not output, first check the error code in “9.17.8 Sink device status”. (The MSD has multiple output connectors. Find the error code of the output connector that does not output audio.)</p> <ul style="list-style-type: none"> ▪ Error code 1: Set “9.9.2 Output mute” to “OFF”. ▪ Error code 2: Ensure that the source device is connected and powered on. ▪ Error code 3: Signal is not input. Check [14], [15], [17] and [18]. ▪ Error code 4: There may be problems in the source device side or HDCP authentication. Check [14]. ▪ Error code 5: If the display device or AV amplifier does not support HDCP, only audio without content protection (such as analog input) is output; audio is not output when signal with content protection is input. Some HDMI/DVI devices check if the connected device is HDCP compliant and determines whether to output HDCP 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 from the input device in “9.6.2 Input HDCP setting”. ▪ Error code 6: There are problems in the source device. ▪ Error code 7: LCD monitors may not output compressed audio, such as Dolby Digital, DTS, and so on. If playing contents with compressed audio (such as Blu-ray disc), check the audio output setting. Audio signal that is output from the source device can be controlled by setting EDID. ▪ Error code 8: Enable the target audio output connector by setting “9.9.7 Audio output connector”. ▪ Error code 9: Set “9.8.1 Output mode” to a mode other than “DVI MODE”. If the sink device does not support HDMI signal, the MSD outputs DVI signal automatically. Check which signal type is supported by the sink device. ▪ Error code A: Set “8.2 Switching input channel” to “OFF”. ▪ If any error code is not displayed: Check [14] to [18]. The source device may not be outputting audio. 	88

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 “ 9.17.7 Input signal status ”. DVI signal may be output depending on EDID settings. If a source device that does not support 4K is connected to the input connector to which 4K EDID is set, DVI signal may be output. Change the setting of “ 9.10.2 Resolution for PCs ” and “ 9.10.3 Input resolution for AV devices ”.	87 85 87
	[16] Is the input audio format supported by the connected sink device or AV amplifier input? LCD monitors, especially, may not output 88.2 kHz or higher sampling frequency of linear PCM and compressed audio (such as Dolby Digital, DTS, and so on). Audio signal output from the source device can be controlled by setting EDID.	128 88
Audio of input connectors is not output.	[17] Is “ 9.9.3 Input selection ” set to “AUTO”? If not, change the setting to “AUTO” in order to switch the audio automatically.	79
Audio is not output.	[18] If the source device has multiple output connectors, check the audio output settings of the selected output device.	—
Audio is output from digital output connectors but not from analog output connectors.	If compressed audio (such as Dolby Digital, DTS, and so on) is input, analog audio is not output. You can check the input audio type in “ 9.17.7 Input signal status ”.	75 88
Audio is output from analog output connectors but not from digital output connectors.	If the output resolution is set to a value other than “AUTO-A” and “AUTO-B”, make sure that the sink device or AV amplifier supports the selected output resolution. If a PC output resolution (VGA to 4K) is selected, some sink devices and AV amplifiers cannot output audio.	48
	If the sampling frequency is set to a value other than “AUTO” and “AUTO-B”, make sure that the sampling frequency is supported by the sink device or AV amplifier. Some LCD monitors may not output audio whose sampling frequency is high (88.2 kHz or higher).	80
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.	88
	In order to output compressed audio of multi-channel, set the number of speakers.	89
	Check the audio output settings of the source device.	—
Multi-channel audio is not output.	In order to output multi-channel audio, set the number of speakers.	89
Audio of only a specific scene is not output from digital input	Is “DOWN MIX” is set for multi-channel audio output? For multi-channel audio, since channels changes depending on scenes, audio may not output if audio is not included in the set channel.	81

Problem	Cause/Check item/Solution	Page
●Key operation		
Keys do not operate.	Ensure that keys are not locked.	30
	Since no control command is registered by Factory default, "DISPLAY POWER" keys do not work. Register and associate control commands in order to enable these keys.	99, 107
	When a control command is executed using a front panel key, all keys are disabled until the command is executed or "INVALID TIME" passes.	108
	Check the set time of "POWER SWITCH ON" that prevent accidental operation.	126
	Immediately after start-up, all keys are disabled until the connection of the sink device is confirmed.	27
Settings are not saved or reflected to the actual operation.	Settings of some menus may not be saved if the "MENU/SET" key is not pressed after setting.	27
●Communication command control		
Communication command control from the PC to the MSD cannot be performed.	Are the following items set correctly? For RS-232C: baud rate and data length For LAN: IP address and subnet mask	91 95, 96
	Is COM PORT's FUNCTION set to "RECIEVER" mode? If it is set to "TRANSMITTER" mode, the communication command of the MSD cannot be controlled externally.	92, 95
"@ERR,6" is returned.	If control commands are executed by communication commands, the communication command controls are disabled until control commands executed or "INVALID TIME" passes.	108
	Immediately after start-up, the communication command control function is disabled until the connection of the sink device is confirmed.	27
●Sending control command function		
Control command is not sent.	Ensure that the registered control command and the number of bytes are correct. Devices requiring delimiters may not execute commands if the delimiters are not sent. If the set number of bytes is not correct, the control command is not sent completely or unnecessary data is sent after the control command.	99
	Is the registered control command linked to the desired control command execution condition?	107
	Is COM PORT's FUNCTION set to "RECIEVER" mode? In order to send the control command, set the communication port to "TRANSMITTER" mode. If using LAN, set the IP address and other settings of the connected device.	92, 95

Problem	Cause/Check item/Solution	Page
"RETRY OVER ERROR" is displayed and control command is not sent completely.	Is the registered reply command correct?	104
	Ensure that the setting of "TIME OUT" for checking control commands is not too short.	99
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 turns on the sink device from external devices of the sink device.	
●Others		
Input signal temporarily disappear when input channel is switched.	When the CEC connection changes, EDID may change. In this case, input signal is interrupted. Check the CEC connection settings.	74
Devices cannot be controlled through CEC.	Are HDMI cables supporting CEC being used?	74
	To use CEC, enable HDMI link control of the connected devices (such as LCD TVs, Blu-ray recorder, and so on).	

If additional assistance is required, please perform the following tests and then contact us.

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| <ol style="list-style-type: none"> 1. The problem occurs at all connectors? 2. Connect the devices using genuine cables without connecting the MSD. <p>The problem still cannot be solved? Please contact us for assistance.</p> |
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