HSM-44-UHD

4K 4X4 HDMI Matrix Switch

Supports 4K UHD resolution

HDCP 2.2 and 1.4 compliant with EDID Management

RS-232, IP, IR and Front panel Control with Status LCD Display

Analog and Digital Extracted Audio Outputs

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TRADEMARKS USED IN THIS MANUAL

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FCC RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been designed to comply with the limits for a Class B computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are intended to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.0 Introduction

1.1 General

As a member of Genesis Digital Matrix™ series of switchers, the HSM-44-UHD matrix provides exceptional quality, intuitive operation and powerful control methods that are hallmarks of Hall Technologies video matrix switches.

The 4K matrix is a 4x4 cross-point switch in a compact 1-RU enclosure.

The HSM-44-UHD supports HDMI resolutions up to 4K @ 60 Hz 4:4:4. It also supports HDCP 2.2 and 1.4, 3D, deep-color and PCM, Dolby, DTS, and HD audio standards. The matrix intelligently calculates EDID for each input based on the EDID of the connected sinks.

Users can save and recall multiple matrix routing configuration PRESETs. HDMI outputs can also be blanked. The matrix includes a two-line character LCD on its front panel to display the current video routing and to facilitate creating or recalling presets.

The HSM-44-UHD matrix is ideal for conference rooms, multimedia presentations, digital signage, houses of worship, and many other settings.

1.2 Features

- Supports HDCP 2.2 and 4K UHD
- Simultaneous HDMI on each output
- Intuitive front panel control with two-line LCD
- Analog and Digital Extracted Audio Outputs
- Save and Recall Presets of commonly used routing patterns
- HDMI video output can be blanked or un-blanked
- Controlled via: Front Panel, RS-232, IP (Telnet), and IR
- Internal Universal Power Supply with standard IEC C14 connector
- 1-RU rack mountable metal enclosure

2.0 Package Contents

(1) Model HSM-44-UHD
(1) External Universal Power Supply
(1) IR Remote
(2) Rack mounting brackets with (6) screws
(1) IR Detector (for use with IR Remote)
(1) 3 Pin screw-terminal (for use with RS-232 connector)
(1) User's Manual Card

3.0 Operation

3.1 General Operation

3.1.1 Front Panel Functions

The front panel can be used for the following purposes:

- View current input/output routings (ties) on LCD
- Make new ties either starting from input or output
- Lock or unlock the front panel

All the front panel buttons have built-in LEDs to help with their operation.

The LOCK 🔒 button is used to enable or disable the keys on the front panel and IR remote control.

Locking the front panel is intended to prevent inadvertent actions for example, if the buttons are pressed unintentionally. Note that when the front panel is locked, the IR remote function is also locked, the other means to control the matrix (RS-232, Telnet or WebGUI) are still functional.

Lock the front panel by pressing the LOCK button for 3 Seconds. The display will show 'Panel Locked!' and the LOCK button LED will turn on.

Unlock the front panel by pressing the LOCK button for 3 Seconds. The display will show 'Panel Unlocked!' and the LOCK button LED will turn off.

Attempting to control the matrix with the buttons or IR remote control while the unit is 'Locked', results in the LCD displaying 'Panel Locked!'.

Note that the IR Remote Control POWER control will still function even if the system is Locked.

3.1.2 Front Panel Operation.
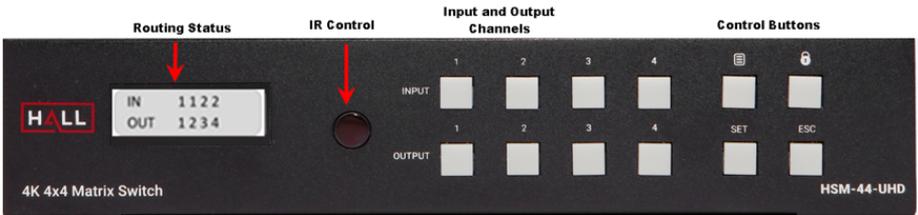
The front panel pushbuttons have built-in LEDs which represent the buttons state. Button LEDs can be off, blinking or on (solid).

Front panel button LED states

3.1.3 Reading the LCD routing configuration.

Routing information is displayed on the LCD. The 'IN' row on the LCD changes to represent the current routing status.   The 'OUT' values are fixed or show an output as blank by displaying an 'x' in that position.
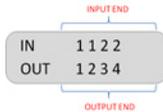
In the above example, the routing configuration can be understood from the output end as follows:

- Output 1 is tied to Input 1.
- Output 2 is tied to Input 1.
- Output 3 is tied to Input 2.
- Output 4 is tied to Input 2.

3.1.4 Turning the unit on and off.

The system can be turned on and off via the IR Remote Control, RS-232 or Telnet.

3.1.5 Making AV Routing or "Ties" from the Front Panel.

Users can initiate "ties" either from the HDMI OUTPUT or INPUT point of view. For most users it is more logical to initiate ties starting with the OUTPUT.

Think of it as: "I want OUTPUT 1 to get its video from INPUT 2".

3.1.6 Making a tie starting from the OUTPUT.

To tie an output to an input, use the following steps:

1. Press the desired output button. The button for the currently tied INPUT will light up.
2. Press the input button you want to tie to. This selected input button will start blinking. The blinking button designates it as a "desired" choice; the actual tie is not made until the SET button is pressed.
3. Press the SET button. If you do not press the SET button with ~5 seconds, the process will time out and the button LEDs go out.

Example: Route output 3 to input 3 (when currently tied to Input #2)
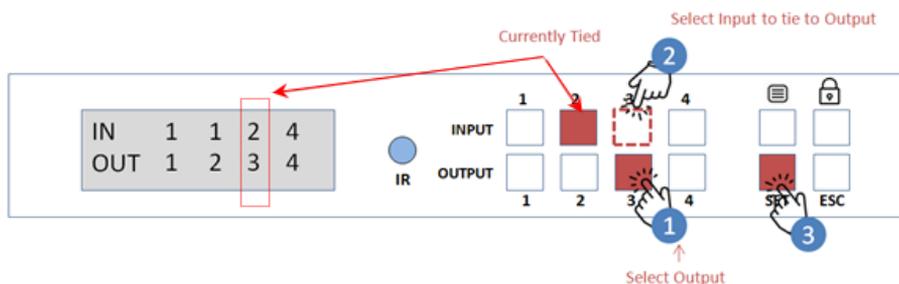
3.1.7 Making a tie starting from input

Routing from the input end is like the above, but an input can be routed to multiple outputs all at one time.

1. Press one of the input buttons. That button LED will light up solid along with ALL the outputs currently routed from that input.
2. Select all the outputs you wish to route to. There can be multiple desired outputs, and all will be blinking until the SET button is pressed. To remove an output, press the blinking output again.
3. Press SET to apply the changes.

Example: Route Input 1 to Output 1, 2 and 3
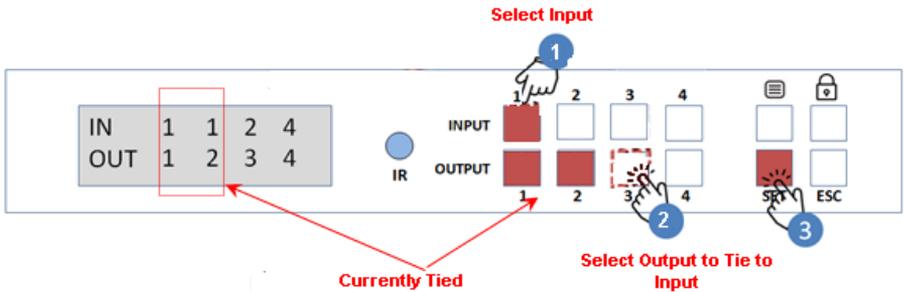
3.1.8 Blanking Outputs.

Any HDMI output can be 'blanked' using either the WebGUI, RS-232 or Telnet commands.

3.2 Presets (Memorized Routing Patterns)

3.2.2 Recalling Presets.

Preset routing configurations can be selected by using the IR Remote control, RS-232 or WebGUI.

3.2.3 Editing Presets.

Preset routing configurations can be created by using RS-232 or the WebGUI.

3.3 IR Remote Control.

The IR Remote included allows for changing current selected video ties and selecting previously configured presets.

Press any INPUT # button on the desired OUTPUT row to route the video from that INPUT to the selected OUTPUT.

Press any of the buttons on the PRESET row to select that recall that previous configuration.

IR Remote Button Codes		
Button ID	**Device Code**	**Button Code**
POWER	0x0000	0x14
OUTPUT 1 - INPUT 1	0x0000	0x09
OUTPUT 1 - INPUT 2	0x0000	0x1D
OUTPUT 1 - INPUT 3	0x0000	0x1F
OUTPUT 1 - INPUT 4	0x0000	0x0D
OUTPUT 2 - INPUT 1	0x0000	0x17
OUTPUT 2 - INPUT 2	0x0000	0x12
OUTPUT 2 - INPUT 3	0x0000	0x59
OUTPUT 2 - INPUT 4	0x0000	0x08
OUTPUT 3 - INPUT 1	0x0000	0x5E
OUTPUT 3 - INPUT 2	0x0000	0x06
OUTPUT 3 - INPUT 3	0x0000	0x05
OUTPUT 3 - INPUT 4	0x0000	0x03
OUTPUT 4 - INPUT 1	0x0000	0x18
OUTPUT 4 - INPUT 2	0x0000	0x44
OUTPUT 4 - INPUT 3	0x0000	0x0F
OUTPUT 4 - INPUT 4	0x0000	0x51
PRESET 1	0x0000	0x53
PRESET 2	0x0000	0x52
PRESET 3	0x0000	0x01
PRESET 4	0x0000	0x45

3.4 Rear Panel
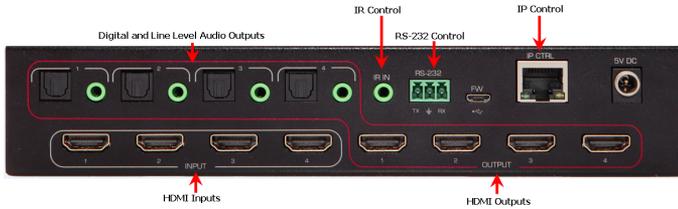
Rear Panel

HDMI Inputs: Connect to HDMI sources.

HDMI Outputs: Connect to HDMI displays.

Digital/Line Audio Outputs: Connect to external sound system

Control Inputs:

The IP CTRL port connects to a user's network LAN. It is used to control the matrix using Telnet or to access the internal WebGUI.

The RS-232 terminal block connects to external serial control systems (115.2k baud).

The IR IN port connects to the supplied IR Detector cable if the matrix switcher does not have a direct line of sight of the IR remote.

4.0 EDID management

The HSM-44-UHD gives users the flexibility to configure the EDID for each input. The source for the EDID data associated with each input can be from one of 5 standard built-in choices or copied from any of the TVs connected to a particular output.

By default, the EDID for all inputs are set to 4Kx2K@30 video with 2-channel audio.

4.1 EDID Configuration

Via RS-232, Telnet or WebGUI, the user can specify an EDID table and load it into any selected input port on the matrix. HSM-44-UHD comes with 5 common EDIDs saved in its internal memory, or you can copy the EDID of any of the devices connected to outputs.

Note to change an Input to 'Copy from Output x', you must have a SINK device connected at the time of configuration. The SINK can be changed later, but it must be connected during configuration for the change to become valid.

Index	EDID Description
1	1080p Video, 2 Ch Audio
2	1080p Video, 5.1 Ch Audio
3	4kx2k@30Hz Video, 2 Ch Audio
4	4kx2k@60Hz Video, [4:4:4] 2.0 Ch Audio
5	4kx2k@60Hz Video, [4:4:4] 5.1 Ch Audio
6	Copy from Output 1
7	Copy from Output 2
8	Copy from Output 3
9	Copy from Output 4

6.0 Network Settings

As shipped from the factory (or after a factory default), the HSM-44-UHD IP address is set for static IP address of 192.168.1.50.

To change the IP address or to switch to DHCP, you must use either RS-232 or Telnet. For example, to change the IP address via RS-232:

- Connect a PC with Terminal-Emulator software to the RS-232 port.
- The DHCPn command can be used to change the DHCP setting.

7.0 Serial & Telnet Commands

Telnet port is **6324**, RS-232 port settings are:

Baud rate: 115200, Parity: None, Stop: 1-bit

- Commands are in ASCII format.
- Commands are case in-sensitive.
- Use a single <CR> character to terminate each command.
- Responses from the matrix are terminated with <CR><LF>.
- Other than Power command (PW1), the matrix must be powered on.
- Unknown commands respond with "INVALID COMMAND"<CR><LF>.
- After plugging power to the matrix, you must wait ~45 seconds for it to fully boot up before sending any commands.
- Command characters should be sent continuously without pauses. If you pause for more than 5 seconds, the command will automatically terminate.
- When the front panel buttons are used, some serial responses will be sent out the RS-232 port.

Command	Description	Response
DN	Query Device Name	**HSM-44-UHD**
DN[16 Characters]	Set Device Name	**Device name set**
CVn,m n= Output [1-4] m= Input [1-4] or m=x to blank the specified Output	Connect output *n* to input *m*	**CVn,m**
CV*,m m= Input [1-4] m=x to blank all the Outputs	Connect **all** outputs to input *m*	**CV1,m** **CV2,m** **CV3,m** **CV4,m**
CVn n= Output [1-4]	Query output routing	**CVn,m** n= Output [1-4] m= Input [1-4] m=x means blanked
CV	Query all the outputs	**CV1,m** **CV2,m** **CV3,m** **CV4,m** m= Input [1-4]

Command	Description	Response
HSM	Reboot the system	**FW Version:?.??** **CV1,?** **CV2,?** **CV3,?** **CV4,?** **LK?** **IP ???.???.???.???** **MAC ??-??-??-??-??-??** **DHCP?** **? represents the value of the setting being displayed**
LKn n = 0 Lock OFF n = 1 Lock ON	Lock Front Panel	**LKn** n = 0 Lock OFF n = 1 Lock ON
LK	Lock Status Query	**LKn** n = 0 Lock OFF n = 1 Lock ON
ESn,m n = Input # [1-4] m = EDID Index 0 1080p/60Hz, 2.0 ch 1 1080p/60Hz, 5.1 ch 2 4Kx2K/30Hz, 2.0 ch 3 4Kx2K /30Hz, 5.1 ch 4 4Kx2K /60Hz, [4:4:4] 2.0 ch 5 4Kx2K /60Hz, [4:4:4] 5.1 ch 6 Copy from Output 1 7 Copy from Output 2 8 Copy from Output 3 9 Copy from Output 4	Set EDID for a particular input to *n (default is 2)*	**ESn,m** m = Input # [1-4] n = EDID Index [1-9]
MAC	MAC Address Query	**MAC xx.xx.xx.xx.xx.xx.xx**
IP	IP Address Query	**IP xxx.xxx.xxx.xxx**
IP xxx.xxx.xxx.xxx	Assign Static IP Address (DHCP must be off)	**IP xxx.xxx.xxx.xxx**
SN	Subnet Mask Query	**SN xxx.xxx.xxx.xxx**
SN xxx.xxx.xxx.xxx	Assign Static Subnet Address (DHCP must be off)	**SN xxx.xxx.xxx.xxx**
GW	GATEWAY Address Query	**GW xxx.xxx.xxx.xxx**

Command	Description	Response
GW xxx.xxx.xxx.xxx	Assign Static Gateway Address (DHCP must be off)	**GW xxx.xxx.xxx.xxx**
DHCPn n = 0 (DHCP off) n = 1 (DHCP on)	Enable DHCP	**DHCP0** **or** **DHCP1**
DHCP	DHCP Status Query	**DHCPn** n = 0 (DHCP off) n = 1 (DHCP on)
FW	Firmware Version Query	**FW Version:x.xx**
RB	Reboot the system	**As shown in the "HSM" Response**
FD	Restore factory defaults Note: Resets all parameters including network settings	**As shown in the "HSM" Response**
PSx x=Preset # [1 to 4]	Saves the current configuration to the preset specified	**PSx** **X = Preset # [1-4]**
PSx=1,m/2,m/3,m/4,m x = Preset # m=Input #[1-4] or m=x (to blank the output)	Define and save a Preset	**PSx=1,m/2,m/3,m/4,m** **x = Preset #** **m = Input # [1-4]**
PRx x=Preset # [1 to 4]	Preset Recall	**CV1,?** **CV2,?** **CV3,?** **CV4,?**

8.0 Troubleshooting

There are no field serviceable parts or circuits in the device. If you think the device is malfunctioning (or have no connectivity), please try to use the following methods for troubleshooting:

- Try Rebooting the device by cycling the input power.
- Restore factory defaults (FD command) using the RS-232, Telnet or WebGUI interface.

8.1 Contacting Hall Technologies

If you determine that your Matrix Switch is malfunctioning, do not attempt to repair the unit.

Instead contact Hall Technologies Technical Support at 800-959-6439 or via email at support@halltechav.com.

To return the unit to Hall Technologies you must first get a Return Authorization (RMA) number.

Package the unit carefully, if returning.
We recommend using the original container the product came in.

9.0 Specifications

Video Input Ports	(4) HDMI 2.0
Video Output Ports	(4) HDMI 2.0
HDCP	HDCP 2.2 and HDCP 1.4
HDMI Bandwidth	18 Gbps
HD Resolutions	Up to 4K60 (4:4:4)
PC Resolutions	VGA through WQXGA
Audio Output Ports	(4) TOSLINK (S/PDIF digital supports all formats listed below) (4) 3.5 mm (Analog Stereo, L/R, supports only 2-channel formats) PCM 2.0, PCM 5.1, PCM 7.1, Dolby 5.1, DTS 5.1, DD+, D-TrueHD, DTS-HD 16/20/24 bits per sample and up to 96 KHz Sampling Rate
Control	Front Panel / Telnet / RS-232 / IR / WebGUI
Baud Rate	115200 bps
Power Supply	110-240 vAC External (US/EU standards/ CE/FCC/UL certified) 5V 4A
Power consumption	12.5 W (Max) / 4.0 W
Housing	Metal Enclosure
Color	Black
ESD Protection	Human body model - ±12 kV [air-gap discharge] & ±8 kV
Operating Temperature	32 to 122 °F (0 to 50 ℃) 10-90%, non-condensing
Storage Temperature	-40 to +158 °F (-40 to +70 °C)
Dimensions	Device (including protrusions): 8.50" (216 mm) W x 5.00" (127 mm) D x 1.75" (45 mm) H Shipping: 11.1" (280 mm) W x 9.25" (235 mm) D x 3.23" (82 mm) H
Weight	Device: 2.05 lbs. (0.93 kg) Shipping: 4.25 lbs. (1.92 kg)
EMI/EMC	CE, FCC Class B
MTBF	90,000 hours
Warranty	3 Years