HDMI 8x8 Matrix Switcher
User Guide

Model CM-MT8810-HD

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Introduction

The HDMI 8x8 Matrix Switcher is a matrix switcher with eight female HDMI inputs and eight female HDMI outputs. It enables cross-point switching from any input to any output, or all outputs, and supports 3D, 4K x 2K, and 1080P. It can be used in both residential and commercial applications to allow sharing of HD source content to multiple displays.

Features

- HDMI 1.4a, supports 3D.
- HDTV compatible with high definition transmission resolution up to 1920 x 1200 at 60 Hz, and supports 1080P.
- HDCP compliant and DVI compatible, supporting DVI1.0.
- RS232 controllable EDID management.
- Matrix switch is controllable via RS232, IR (remote included), or the front panel.
- RS232 serial control port for serial commands and third-party control.
- RS232 controllable front panel security lock to avoid unauthorized or accidental use when the matrix is installed in an unsecure environment.
- Built-in gain compensation technique and synchronous signal correction technology. Switching speed is less than 200 ns (maximum).
- LEDs indicate the real-time running state of the matrix switch.
- Internal power supply (100 to 240 VAC, 50/60 Hz).

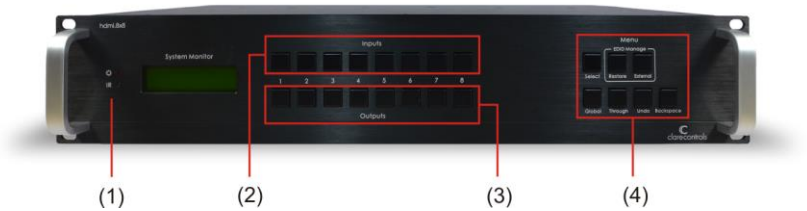
Package contents

- 1 x CM-MT8810-HD 8x8 HDMI matrix switcher with integrated rack mounting
- 1 x power cord
- 1 x IR remote
- 4 x plastic feet for shelf mounting
- 1 x RS232 cable (male to female) for connection to a control system
- 1 x user manual

Operation of the control panel and the IR remote

Operation of the panel

Figure 1: Front panel



(1)	Power indicator	Power indicator light and IR receive window.
(2)	Input channel	Input buttons range from 1 to 8.
(3)	Output channel	Output buttons range from 1 to 8.
(4)	Function buttons	Controls device functions

Buttons	Function description
INPUTS	Allows direct selection of the input channel from 1 to 8.
OUTPUTS	Allows direct selection of the output channel from 1 to 8.
SELECT	Used to transfer video and audio signal (HDMI) from an input to an output. **Example** To transfer both the video and audio signals from input channel 3 to output channel 4, press the buttons as follows: Input "3" + "SELECT" + Output "4".
INITIAL	Used to restore EDID management to factory default.
EXTERNAL	Used to manually control EDID management. **Example**: To learn the EDID data of the display on output channel 2 to input channel 3, press the buttons as follows: Input “3” + “EXTERNAL” + Output "2".
GLOBAL	Used to transfer video and audio signal (HDMI) of all input channels to all output channels. **Example**: To transfer HDMI signal from input channel 7 to all output channels, press the buttons as follows: Input “7” + “GLOBAL”.
UNDO	Used to undo the last issued command.

THROUGH	Used to transfer HDMI signal directly to the corresponding output. **Example 1**: To transfer HDMI signal from input channel 3 to output channel 3, press the buttons as follows: Input “3” + “THROUGH”. **Example 2**: To transfer all HDMI input signals to the corresponding output respectively (i.e. In 1 to Out 1, In 2 to Out 2, etc.), press the buttons as follows: “GLOBAL” + “THROUGH”.

Using the IR remote

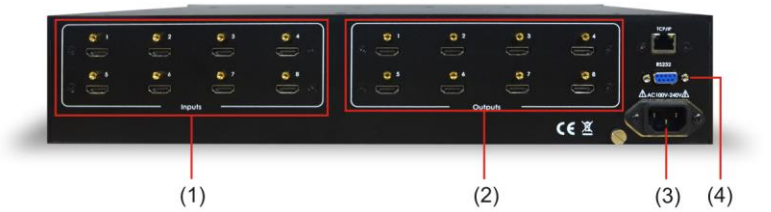
You can control the switcher remotely using the infrared IR remote. The function buttons on the IR remote are the same as the ones on the front control panel. The IR remote shares the same control operation and command format as the control panel.

Figure 2: Panel of the IR remote

External connection

Introduction to the input and output connectors

Figure 3: Panel of the IR remote



(1)	HDMI inputs	HDMI-I connector
(2)	HDMI outputs	HDMI-I connector
(3)	100 to 240 VAC	Alternating current for power supply
(4)	RS232	Serial port, 9-pin, female connector

How to connect with the input and output terminals

The HDMI matrix switcher accepts all standard HDMI video sources (Blu-ray DVD, cable TV STB, media player, PC, etc.). It sends the signal from any source device to any of the four HDMI outputs individually, or simultaneously to more than one output. Outputs can be connected via HDMI to a variety of destinations (flat panel TV, projector, AV receiver, etc.) or can be connected to an HDMI extender set
(CM-BT10-TXRX70), if the device destination does not exceed 230 ft. (70 m).

Figure 4: HDMI connector

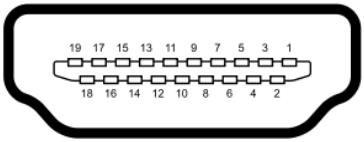


Table 1: HDMI pin functions

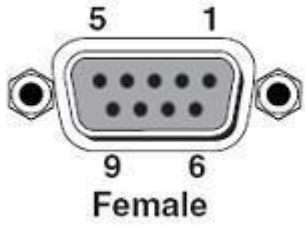
Number	Signal name	Number	Signal name
1	TMDS Data 2+		
2	TMDS Data 2 Shield	19	Hot Plug Detect
3	TMDS Data 2-	18	+5V Power
4	TMDS Data 1+	17	Ground
5	TMDS Data 1 Shield	16	DDC Data
6	TMDS Data 1-	15	DDC Clock
7	TMDS Data 0+	14	No Connect
8	TMDS Data 0 Shield	13	CEC
9	TMDS Data 0-	12	TMDS Clock-
10	TMDS Clock+	11	TMDS Clock Shield

Connecting the RS232 communication port

You can use the front-mounted buttons to control the CM-MT8810-HD matrix switch. However, you can also perform control functions via a control system (Clare Controls, Crestron, or other system) using its RS232 communication port. The RS232 communication port is a female 9-pin D connector (DB9). As shown in the table below, only pins 2, 3, and 5 are used. The standard functions of Tx, Rx, and Gnd apply.

Table 2: RS232 connection definitions

No.	Pin	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused



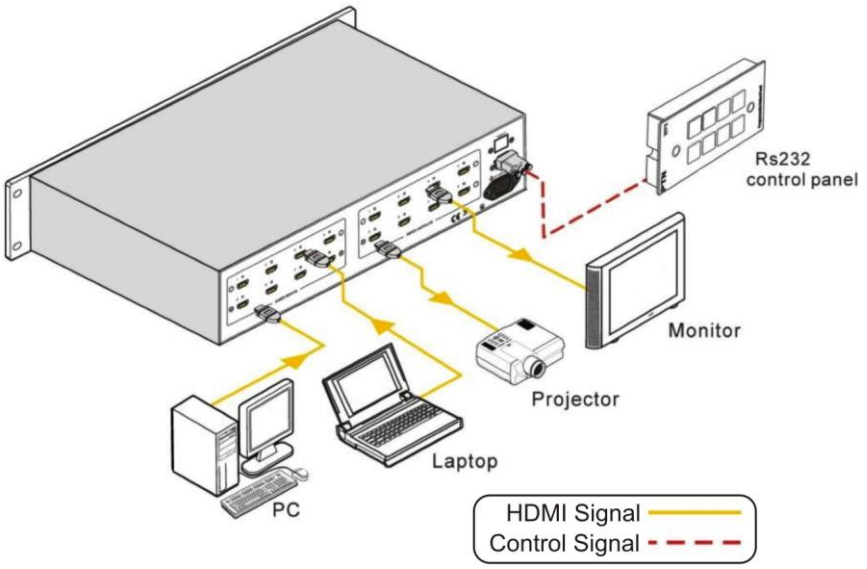
Connecting with the computer

The CM-MT8810-HD can be controlled via a computer COM port. However, a more likely scenario is to use a third-party control system such, as Clare Controls, Crestron, or other system. The RS232 protocols required for these systems are listed in the section “Communication protocol and command codes” on page 8. Use a straight-thru RS232 cable (non-null modem) to connect to these systems, unless otherwise stated by the control system’s manufacturer.

System diagram

The CM-MT8810-HD allows up to eight HDMI sources (Blu-ray DVD, STB, Media Player, PC, etc.) to be routed to any or all of the eight HDMI destinations (HDTV, projector, AV receiver, etc.). The diagram below shows an example of possible connections.

Figure 5: HDMI 8x8 matrix switcher system connection



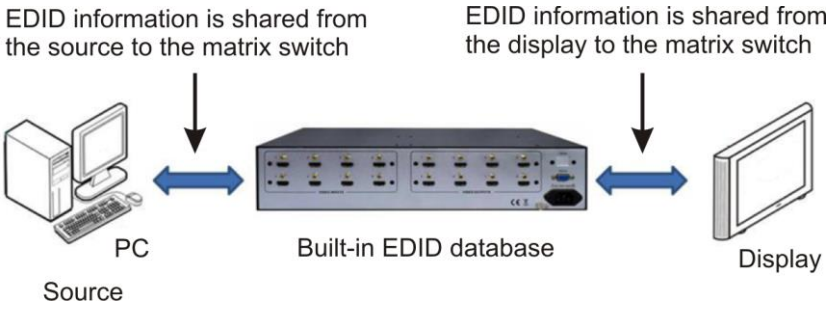
EDID management

EDID automatic shake hand

The matrix switcher has built in EDID data management, which can communicate with the sources and displays automatically. When the sources

and displays are connected to the matrix switcher, they share the EDID/DDC information with the matrix switcher. The communication solution is as follows:

Figure 6: EDID communication



The EDID database includes the most common display data (but not all), due to capability and firmware limitations. You can manually refresh the EDID data to update the EDID database.

EDID management of the matrix switch

The RS232 commands for EDID management of the HDMI 8x8 matrix switch include: ”EDIDMInit.” and ”EDIDM[X]B[Y].” (Note the period at the end of the command.)

- When the "EDIDMInit." command is sent, all connected displays display blank for two to three seconds, and then recover. The EDID management resets to the factory default. The HDMI 8x8 matrix switcher sends the RS232 feedback command “EDIDMInit.”
- You can also restore the matrix EDID to factory default by pressing INITIAL on the front panel.
- When the “EDIDM[X]B[Y].” command is sent to the HDMI matrix switcher, the matrix learns the EDID of output [X] to input [Y]. The switch sends the feedback "EDIDM:[X]To[Y].

Note: If the output[X] does not connect to an active display, the EDID management takes no action.

Communication protocol and command codes

Communication protocol: RS232 communication protocol

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Table 3: RS232 command types and codes

Command Type	Command Code	Function
System Command	/*Type;	Returns the switch model information.
	/%Lock;	Locks the front panel buttons on the matrix switch.
	/%Unlock;	Unlocks the front panel buttons on the matrix switch.
	/^Version;	Returns the firmware version installed.
	/:MessageOff;	Turns off the feedback command from the COM port. It displays “switcher OK”.
	/:MessageOn;	Turns on the feedback command from the com port.
	EDIDMInit.	Restores to the factory default EDID data.
	EDIDM[X]B[Y].	Manual EDID switching. Copies the EDID data of output[X] to the input[Y].
Operation Command	[x1]All.	Transfers signals from the input channel [x1] to all output channels
	All#.	Transfers all input signals to the corresponding output channels respectively.
	All$.	Switches off all the output channels.
	[x1]#.	Transfers signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switches off the output channel [x1].
	[x1] B[x2].	Transfers the signal from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfers the signal from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status.	Returns which input channels are sent to which output channels one by one.

Save[Y].	Saves the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
Recall[Y].	Recalls the preset command [Y].
Clear[Y].	Clears the preset command [Y].

Notes

- [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
- In above commands, “[” and “]” are symbols for easy reading and do not need to be typed in actual operation.
- Please remember to end the commands with the ending symbols “.” and “;”. Type the command carefully. Commands case-sensitive.

Example 1

Transfer signals from an input channel to all output channels: [x1]All.

e.g., “3All.” transfers HDMI from the input channel No.3 to all output channels.

Example 2

Transfer all input signals to the corresponding output channels respectively: All#.

e.g., "All#." results in input 1 to output 1, input 2 to output 2, input 3 to output 3, and input 4 to output 4.

Example 3

Switch off all the output channels: All$.

e.g., "All$" results in no signal on any of the output channels.

Example 4

Check the version of the firmware: /^Version;

e.g., "/^Version;" returns the firmware version of the CM-MT8810-HD

Example 5

Switch off the detail feedback command from the COM port: /:MessageOff;

e.g., "/:MessageOff;" results in “switch OK” as the feedback for all commands.

Example 6

Switch on the detail feedback command from the COM port: /:MessageOn;

e.g., "/:MessageOn;" results in detailed feedback for all commands.

Example 7

Transfer signals from an input channel to the corresponding output channel: [x]#.

e.g., “4#.” transfers HDMI from input 4 to output 4.

Example 8

Switch off an output channel: [x]$.

e.g., “5$.” switches off output 5.

Example 9

Switch HDMI from an input to an output: [x1] B[x2].

e.g., “2B2,3,5.” transfers HDMI from input 2 to outputs 2,3, and 5.

Example 10

Inquire which input channel is assigned to the output channel [x]: Status[x].

e.g., “Status3.” returns the input channel currently assigned to output 3.

Example 11

Inquire which inputs are assigned to which outputs one by one: Status.

e.g., “Status.” returns which input is assigned to each output one by one.

Example 12

Save the present input/output assignment to the preset command [Y]: Save[Y].

e.g., “Save7.” to save the present assigned input/outputs to the preset command 7.

Example 13

Recall the preset command [Y]: Recall[Y].

e.g., “Recall5.” recalls the preset command 5.

Example 14

Clear the preset command [Y]: Clear[Y].

e.g., “Clear5.” clears the preset command 5.

TCP/IP control

You can configure your switcher remotely using its web interface.

Connection modes

The default IP settings are as follows:

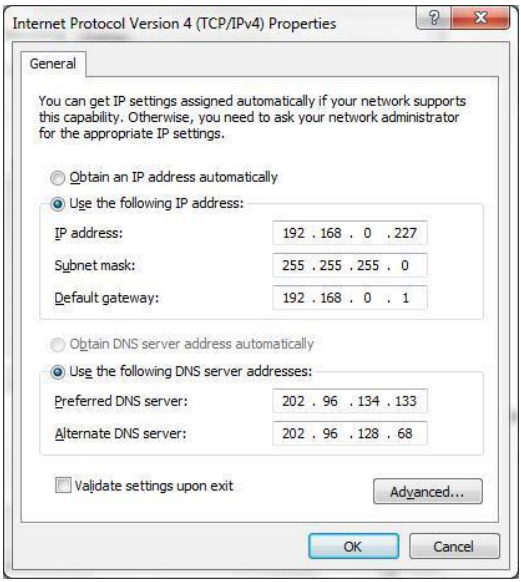
- TCP/IP: 192.168.0.178
- Gateway: 192.168.0.1
- IP control port: 4001

You can change the IP and gateway settings as needed. Do not change the serial port number.

Connecting directly to a PC

Connect a computer to the TCP/IP port of the switcher, and set its IP address and gateway to the same IP section as the default IP of the switcher (192.168.0.178).

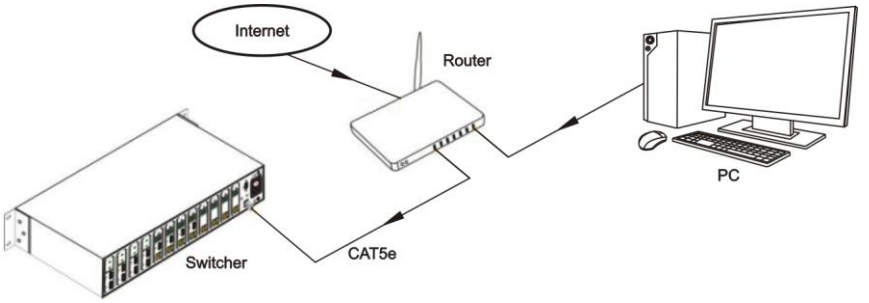
Figure 7: Setting the PC's IP address the same as the switcher



Connecting by PCs in a LAN

You can connect the switcher to PCs so that it can be controlled in a LAN. Ensure the switcher's IP section is the same as the router.

Figure 8: Connecting to a LAN



To connect to a LAN:

1. Connect the TCP/IP port of the switcher to an Ethernet port on your router using a Cat5e cable.
2. Set the PC's IP address and gateway to the same IP section as the switcher. Note the PC's original IP address and gateway.
3. Set the switcher's IP address and gateway to the same IP section as the router.
4. Set the PC's IP address and gateway as the original one.
5. Connect the PC(s) to the router. In the same LAN, each PC is able to control the switcher asynchronously.

To connect the switcher to the PC:

1. Connect the TCP/IP port of the switcher to Ethernet port on the PC with a twisted pair.
2. Set the PC's IP and gateway to the same IP subnet as the default IP of the switcher (192.168.0.178).
3. Launch your web browser, and then enter **192.168.0.178**.

   This is the default IP address for all Clare Controls HDMI switchers.
4. When the Web Interface Login page displays, enter the password "secure7", and then click **Login**.

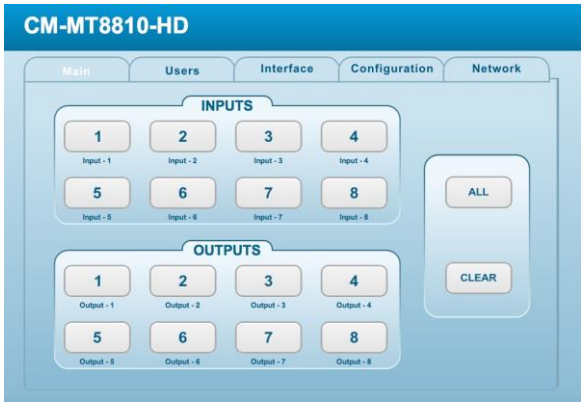
Configuring the switcher using the web interface

You can configure the switcher's inputs and outputs, user, interface, configuration, and network settings using the switcher's web interface. The interface displays automatically when you log into the device.

To configure using the web interface:

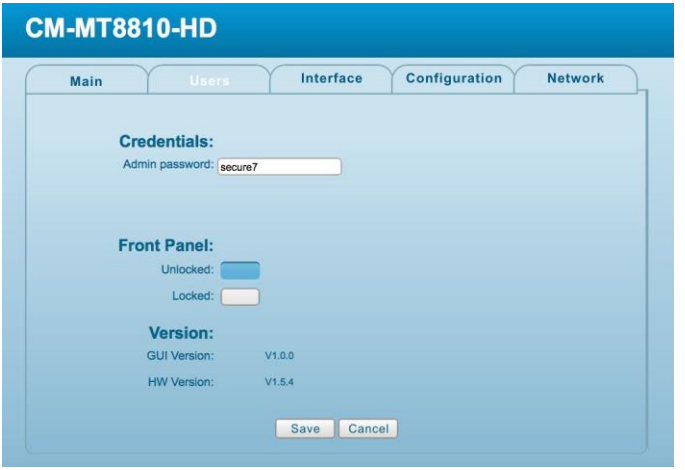
1. Click the Main tab, and then click an input button and its corresponding output button.

   For example, click input 1 to set the cable box to output 1 (Living Room).

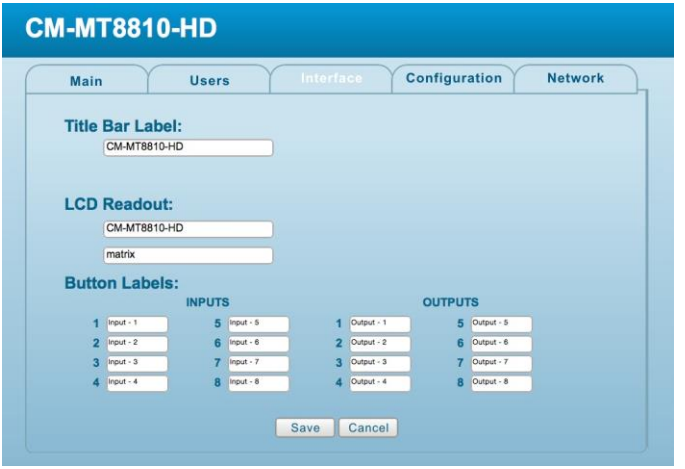


   Note: Click **All** to select all outputs, or click **Clear** to clear all selections.

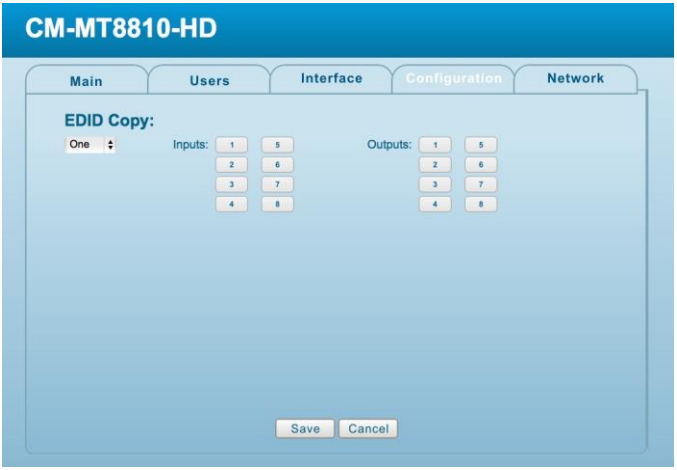
2. Click the Users tab to set your Admin password and to lock the front panel.



3. Click the Interface tab to define a title bar label that displays on the switcher's front panel. You can also label the inputs and outputs.

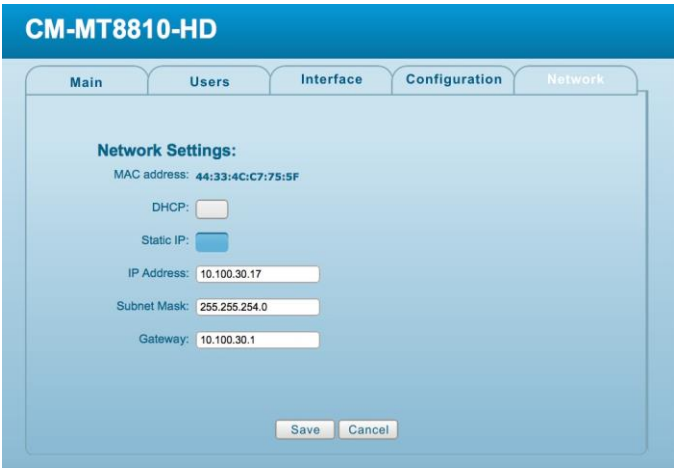


4. Click the Configuration tab to turn on or off your HDCP compliance inputs and to configure EDID.



5. Select the Network tab to set the following parameters.

- DHCP
- Static IP
- IP address
- Subnet mask
- Gateway



6. Click **Save**.
7. Reboot the switcher.

Once rebooted, you will be able to connect the switcher over IP.

Specifications

Video Input		Video Output	
Input type	HDMI	Output type	HDMI
Input connector	Female HDMI	Output connector	Female HDMI
Input level	T.M.D.S. 2.9 V to 3.3 V	Output level	T.M.D.S. 2.9 V to 3.3 V
Input impedance	75 Ω	Output impedance	75 Ω
Video general			
Gain	0 dB	Bandwidth	6.75 Gbit/s
Video signal	HDMI (or T.M.D.S)	Maximum pixel clock	165 MHz
Resolution range	Up to 1920 x 1200 or 1080P at 60 Hz	Switching speed	200 ns (max.)
CEC	Supports CEC wired infrared data pass-through using HDMI 1.4a standard.		
EDID and DDC management	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using HDMI/DVI standards, EDID and DDC signals are actively buffered.		
HDCP management	Compatible with HDCP using HDMI 1.4a standards. The built-in HDCP management technology can analyze the HDCP key and perform handshake functionality internally.		
Audio general			
Digital audio	Supports HDMI audio.		
Control parts			
Serial control port	RS232, 9-pin female D connector	Pin configurations	2 = Tx, 3 = Rx, 5 = Gnd
IR remote	Default IR remote	Front panel control	Buttons
General			
Power supply	100 to 240 VAC, 50/60 Hz	Power consumption	40 W
Temperature	-4 to +158ºF (-20 to +70ºC)	Humidity	10 to 90%
Case dimension (W × H × D)	19.0 × 3.4 × 12.6 (48.3 × 8.7 × 32 cm) (2U high, full rack wide)	Product weight	9.5 lb. (4.3 Kg)

Troubleshooting and maintenance

- No image on display.
  - Ensure that the display device has been set to the correct input.
  - Ensure that the HDMI cables used for both the source and the display are properly connected and are working. Test the HDMI cables directly from a source to display and ensure their operation.
  - Ensure proper grounding of all devices.
- Color loss or poor picture quality.
  - Ensure that the HDMI cables used for both the source and the display are properly connected and are of good quality. Test the HDMI cables directly from a source to display and ensure their operation.
  - Ensure proper grounding of all devices.
- Unable to control the matrix via RS232.
  - Ensure that a null modem cable has not been used.
  - Ensure that the control system has assigned the commands to the correct COM port.
  - Verify that the commands and protocols used are correct. All commands are case sensitive and require precise entry.
- No output image when switching.
  - Ensure that switching is being made to the correct output channel.
  - Ensure that the source is on and sending signal. Verify by switching the source to an alternate display or by routing the source directly to a display.
  - Ensure that the display is on the correct input and can receive signal. Verify by switching to an alternate source or connecting a source directly.
  - If you are unable to view video via the switch and all cables, sources, and displays are working when bypassing the switch, please contact customer support for further assistance.
- If the POWER indicator does not work, or does not respond to any operation, ensure the power cord is connected properly. Check to be sure that a circuit breaker has not tripped and that power is available. If power is available and the switch will not power on, please contact customer service for assistance.

- If the matrix switch fails to respond to commands on the front panel, ensure that panel has not been locked via RS232. If the switch fails to respond to commands from RS232, IR, or front panel, please contact customer service.

Safety operation

To guarantee the reliable operation of the equipment and safety of the staff, please follow the procedures listed below.

- The system must be grounded properly. Do not use two blades plugs. Ensure the alternating power supply ranges from 100 to 240 V and from 50 to 60 Hz.
- Do not locate the device in a place that is abnormally hot or cold or does not have proper temperature control and ventilation.
- The device generates heat when running. Its environment should be well ventilated to prevent damage caused by overheating.
- Disconnect power in humid weather, or when left unused for long periods.
- Before making or removing any connections to the device, ensure that the power supply has been disconnected.
- Do not attempt to open the equipment enclosure. Do not attempt any repairs. There are no user-serviceable parts inside. Any attempt to open the equipment will result in a complete void of any warranty and may result in serious injury or death.
- Do not splash any chemical substances or liquids on or around the equipment.

After-sales service

- If there appears to be problems when running the device, refer to the “Troubleshooting and maintenance” section in this manual. Return shipping costs are not covered by this warranty.
- You can contact Customer Support at claresupport@clarecontrols.com. Please be ready to provide the following information.
    - Product model number, version and serial number.
    - Detailed description of the trouble issues.
    - Description of all connections and third-party equipment being used.
- We offer this product with a three-year warranty, which starts from the first day you purchase this product.
- If, during the warranty period, the unit cannot be repaired, a suitable replacement will be issued. Replacement units will be comparable to the original. However, due to potential design changes over time, replacement units may not be identical to the unit replaced.
- Items not covered by this warranty.
    - Damage caused due to incorrect usage and/or connections.
    - Damage caused due to installation by person(s) not adequately trained in the installation of this equipment.
    - Any attempt to open this unit and access internal components shall immediately void this warranty.
    - Damage caused by any physical force (dropping the unit or dropping an object upon the unit, etc.).
    - Damage caused by voltage/cycle fluctuations outside acceptable range.
    - Damage caused by over-current, voltage spikes or lightning damage due to inadequate surge protection.
- A valid invoice of purchase via an authorized dealer shall be required for any warranty coverage.