CMSI-4H4CV/CMSI-8H8CV
HDBaseT™ 4×4/8×8 HDMI Matrix over CAT5e/6/7

Operation Manual
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SAFETY PRECAUTIONS
Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

• Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.

• To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

• Never spill liquid of any kind on or into this product.

• Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.

• Do not attach the power supply cabling to building surfaces.

• Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.

• Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.

• To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.

REVISION HISTORY

<table>
<thead>
<tr>
<th>VERSION NO.</th>
<th>DATE DD/MM/YY</th>
<th>SUMMARY OF CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VR0</td>
<td>13/11/12</td>
<td>Preliminary Release</td>
</tr>
</tbody>
</table>
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1. INTRODUCTION
The HDBaseT™ 4 by 4 or 8 by 8 HDMI Matrix over CAT5e/6/7 supports the transmission of video (resolutions up to 1080p Full HD and 1920x1200@60Hz), multi-channel digital audio and control via IR, RS-232, Telnet or Web GUI from four or eight high definition sources to four or eight outputs over a single CAT5e/6/7 cable (up to 100m) for each output. It supports high resolution digital audio formats such as LPCM 7.1CH, Dolby TrueHD, Dolby Digital Plus and DTS-HD Master Audio as well as 3D content that can be displayed when connecting a 3DTV and 3D source. Power over Ethernet (PoE) support means that compatible receivers do not need their own power supplies, allowing for greater flexibility in installations.

2. APPLICATIONS
• HDMI Matrix System
• Video/TV wall display and control
• Security surveillance and control
• Commercial advertising, display and control
• University lecture hall, display and control
• Retail sales and demonstration

3. PACKAGE CONTENTS
• HDBaseT™ 4×4/8×8 HDMI Matrix over CAT5e/6/7
• 2×IR Extender
• 2×IR Blaster
• 2×24V/6.25 A DC Power Adaptor (1 for PoE)
• 1×IR Remote Control
• Operation Manual
4. SYSTEM REQUIREMENTS

• HDMI equipped source devices, connect with HDMI cables or DVI equipped source, connect with DVI to HDMI cables
• HDMI equipped displays (TVs or monitors) or HDMI equipped AV receivers, connect with HDMI cables
• Industry standard CAT5e/6/7 cables
• HDBaseT™ Receivers (i.e. CH-506RX, CH-507RX or CH-1109RX)

5. FEATURES

• HDMI, HDCP1.1 and DVI compliant
• Supports HDMI 3D features
• Supports resolutions VGA~WUXGA and 480i~1080p dependent upon the output display’s EDID settings
• Supports 3D signal display dependent upon the output display EDID settings
• Supports PoE (Power over Ethernet) on compatible receivers only
• Supports HDMI input up to 15 meters at 8-bit resolution or 10 meters at 12-bit resolution
• Supports bi-directional IR from input and output locations
• Supports RS-232, remote control, on-panel control and IP Control (Telnet & Web GUI)
• 2U size design
• Supports external and internal EDID settings
• Supports LPCM 7.1CH, Dolby TrueHD, Dolby Digital Plus and DTS-HD Master Audio transmission

Note:
1. The PoE function is designed for powering compatible receiver units only—non-PoE receivers will need their own power supply. Receivers of another brand may not be compatible.
2. Do not connect the LAN/CONTROL port to CAT outputs of this device.
6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel

1. LCM: Displays the setting information of each input and output setting.

2. POWER: Press this button to power the device on/off. The LED will illuminate green when the power is on, red when it is in 'Standby' mode.

3. LOCK: Press this button to lock all the buttons on the panel; press again to unlock. The LED will illuminate green when locked.

4. IR: IR Receiver window (accepts the remote control signal of this device only) with IR frequency of 38kHz.

5. MENU: Press this button to access the LCM menu system, from here EDID settings can be managed and IP system settings are displayed.

6. 1~8/A~H and OUT/IN: Press the OUT or IN button to select the output or input mode and then press the required number button to make the selection accordingly.

For example, if outputs A~D need to be set to input 1 and outputs E~H need to be set to input 2, then the following sequence of button presses need to be performed:

Press: OUT→A→B→C→D→IN→1→MENU,
and then press: OUT→E→F→G→H→IN→2→MENU.

Note: If the MENU button is not pressed the selection will not be changed.
6.2 Rear Panel

1. **CONTROL**: This port is the link for Telnet or Web GUI controls, connect to an active Ethernet link with an RJ45 terminated cable (for further details, please refer to section 6.8 & 6.9).

   *Warning: Please do not connect this port directly to the PC/Laptop as the Telnet function will not work.*

2. **RS-232**: Connect to a PC or control system with D-Sub 9-pin cable for the transmission of RS-232 commands.

3. **ALL IR OUT**: Connect to the IR blaster for IR signal transmission to the source side. Place the IR blaster in direct line-of-sight of the equipment to be controlled for it will blaster out all signal received from the IR IN at the receiver sides.

4. **ALL IR IN**: Connect to the IR extender for IR signal reception. Ensure that remote being used is within the direct line-of-sight of the IR extender for it will send out the signal to all receiver's IR OUT.

5. **SERVICE**: Manufacturer use only.

6. **IR OUT A~H**: Connect to the IR blaster for IR signal transmission. Place the IR blaster in direct line-of-sight of the equipment to be controlled for it will blaster out the IR signal received from the receiver side chosen by input selection.

7. **IR IN 1~8**: Connect to the IR extenders for IR signal reception. Ensure that the remote being used is within the direct line-of-sight of the IR extender for it will send out the IR signal to the selected receiver's IR OUT.

8. **CAT5e/6/7 OUT A~H**: Connect from these CAT outputs to the CAT input port of the receiver units with a single CAT5e/6/7 cable for HDMI Audio/Video and IR/RS-232 control signal transmission.

9. **HDMI IN 1~8**: Connect to the HDMI input source devices such as a DVD player or a Set-top Box with HDMI cable or DVI to HDMI cable.

10. **DC 24V**: Plug the 24 V DC power supply into the unit and connect the adaptor to an AC outlet.
**PoE 24V:** Plug the 24 V PoE power supply into the unit and connect the adaptor to an AC outlet. This unit will mainly power PoE (Power over Ethernet) capable receiver units.

*Warning: Please do not connect the CAT5e/6/7 cable into the receiver’s LAN port.*

### 6.3 Side Panel

**Fan Ventilator:** These are air ventilation areas, DO NOT block these areas or cover it with any object. Please allow adequate space around the unit for air circulation.

### 6.4 Remote Control

1. **POWER:** Press this button to switch on the device or set it to standby mode.
2. **IN:** Input ports selection 1~8.
3. **OUT:** Output ports selection A~H.

*Note: This remote control can also be used from the receiver side to control the matrix's setting.*
6.5 IR Cable Pin Assignment

**IR Blaster**
- Pin 1: Power 5 V
- Pin 2: IR Blaster Signal
- Pin 3: NC

**IR Extender**
- Pin 1: IR Signal
- Pin 2: Power 5 V
- Pin 3: Grounding
6.6 RS-232 Pin Assignment

<table>
<thead>
<tr>
<th>PIN</th>
<th>Assignment</th>
<th>PIN</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
<td>1</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>Tx</td>
<td>2</td>
<td>Rx</td>
</tr>
<tr>
<td>3</td>
<td>Rx</td>
<td>3</td>
<td>Tx</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td>6</td>
<td>NC</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
<td>9</td>
<td>NC</td>
</tr>
</tbody>
</table>

Baud Rate: 19200 bps
Data Bit: 8-bit
Parity: None
Stop Bit: 1-bit
Flow Control: None
# 6.7 RS-232 and Telnet Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1~A8</td>
<td>Switch Output A to 1~8</td>
</tr>
<tr>
<td>B1~B8</td>
<td>Switch Output B to 1~8</td>
</tr>
<tr>
<td>C1~C8</td>
<td>Switch Output C to 1~8</td>
</tr>
<tr>
<td>D1~D8</td>
<td>Switch Output D to 1~8</td>
</tr>
<tr>
<td>E1~E8</td>
<td>Switch Output E to 1~8</td>
</tr>
<tr>
<td>F1~F8</td>
<td>Switch Output F to 1~8</td>
</tr>
<tr>
<td>G1~G8</td>
<td>Switch Output G to 1~8</td>
</tr>
<tr>
<td>H1~H8</td>
<td>Switch Output H to 1~8</td>
</tr>
<tr>
<td>ABCE...1~ABCD...8</td>
<td>Switch Output ABCD... to 1~8 at the same time</td>
</tr>
<tr>
<td>SETIP &lt;IP&gt;&lt;SubNet&gt;&lt;GW&gt;</td>
<td>Setting IP, SubNet, GateWay&lt;Static IP&gt;</td>
</tr>
<tr>
<td>RSTIP</td>
<td>IP configuration was reset to factory defaults&lt;DHCP&gt;</td>
</tr>
<tr>
<td>IPCONFIG</td>
<td>Display the current IP config</td>
</tr>
<tr>
<td>P0</td>
<td>Power Off</td>
</tr>
<tr>
<td>P1</td>
<td>Power On</td>
</tr>
<tr>
<td>I1~I8</td>
<td>Switch all the output to 1~8</td>
</tr>
<tr>
<td>ST</td>
<td>Display the current matrix state and firmware version</td>
</tr>
<tr>
<td>RS</td>
<td>System Reset to H8</td>
</tr>
<tr>
<td>EM</td>
<td>Setting EDID MODE. 1-STD 2-TV.</td>
</tr>
<tr>
<td>?</td>
<td>Display all available commands</td>
</tr>
<tr>
<td>QUIT</td>
<td>Exit (Telnet only)</td>
</tr>
</tbody>
</table>

**Note:**
1. Any commands will not be executed unless followed by a carriage return. Commands are case-insensitive.
2. When telnet is idle for 10min it will be off-line automatically.
3. EDID TV will always follow output port 1’s EDID regardless on the output change.
4. EDID setting switching will execute immediately.
6.8 Telnet Control

Before attempting to use the telnet control, please ensure that both the Matrix (via the 'LAN /CONTROL' port) and the PC/Laptop are connected to the active networks.

To access the telnet control in Windows 7, click on the 'Start' menu and type "cmd" in the Search field then press enter.

Under Windows XP go to the 'Start' menu and click on "Run", type "cmd" with then press enter.

Under Mac OS X, go to Go→Applications→Utilities→Terminal

See below for reference.
Once in the command line interface (CLI) type “telnet”, then the IP address of the unit and “23”, then hit enter.

Note: The IP address of the Matrix can be displayed on the device's LCM monitor by pressing the Menu button twice.

![Command prompt showing telnet at IP address 192.168.5.00 23]

This will bring us into the device which we wish to control. Type “HELP” to list the available commands.

![Command prompt showing list of commands]

Type “IPCONFIG” To show all IP configurations. To reset the IP, type “RSTIP” and to use a set static IP, type ”SETIP” (For a full list of commands, see Section 6.7).

Note: Any commands will not be executed unless followed by a carriage return. Commands are case-insensitive. If the IP is changed then the IP Address required for Telnet access will also change accordingly.
6.9 Web GUI Control

On a PC/Laptop that is connected to the same active network as the Matrix, open a web browser and type device’s IP address on the web address entry bar. The browser will display the device’s status, control and User setting pages.

Click on the 'Control' tab to control power, input/output ports, EDID and reset mode.
Clicking on the 'User Setting' tab allows you to reset the IP configuration. The system will ask for a reboot of the device every time any of the settings are changed. The IP address needed to access the Web GUI control will also need to be changed accordingly on the web address entry bar.
7. CONNECTION DIAGRAM

- **ZONE A**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)
- **ZONE B**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)
- **ZONE C**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)
- **ZONE D**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)
- **ZONE E**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)
- **ZONE F**: IR BLASTER, RX (Power, Extender Blaster, IR 1, IR 2, RS232 Out, CAT5e/6 In, Link), RX (IR Out, IR In)

- **Wireless Router**: IR In (ALL)
- **Smartphone or Tablet**: IR Out (ALL)
- **RS-232 Equipped PC or Notebook**: IR Out (ALL)

- **IR Receiver**: 1.5m, 60°
- **IR Blaster**: 7m, 3m, 4m, 7m, 3m
8. SPECIFICATIONS

**Video Bandwidth** 225 MHz/6.75 Gbps

**Input Ports**
- **4H4CV**: 4×HDMI, 5×IR Extender, 1×RS-232, 1×RJ-45 (Control), 1×Mini USB Type B (For firmware updated only)
- **8H8CV**: 8×HDMI, 9×IR Extender, 1×RS-232, 1×RJ-45 (Control), 1×Mini USB Type B (For firmware updated only)

**Output Ports**
- **4H4CV**: 4×CAT5e/6/7, 5×IR Blaster
- **8H8CV**: 8×CAT5e/6/7, 9×IR Blaster

**IR Frequency** 30~50kHz

**Audio Sampling Rate** Up to 192kHz

**ESD Protection**
- Human-body Model:
  - ± 8kV (Air-gap discharge)
  - ± 4kV (Contact discharge)

**Power Supply** 24 V/6.25 A DC (US/EU standards, CE/FCC/UL certified)

**Dimensions** 438 mm (W)×255 mm (D)×93 mm (H)

**Weight**
- 4238 g (4H4CV), 4458 g (8H8CV)

**Chassis Material** Metal

**Silkscreen Color** Black

**Operating Temperature** 0 ºC~40 ºC/32 ºF~104 ºF

**Storage Temperature** −20 ºC~60 ºC/−4 ºF~140 ºF

**Relative Humidity** 20~90 % RH (non-condensing)

**Power Consumption**
- **4H4CV**: 64 W Tx (Main), 56 W Rx (PoE)
- **8H8CV**: 42 W Tx (Main), 27 W Rx (PoE)
CAT5e/6/7 Cable Specification

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Range</th>
<th>Pixel clock rate</th>
<th>Video Data Rate</th>
<th>Supported Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT5e/6/7</td>
<td>100 m</td>
<td>&lt;=225 MHz</td>
<td>&lt;=5.3 Gbps (HD Video)</td>
<td>Up to 1080p, 60 Hz, 36 bits, 3D (data rates lower than 5.3 Gbps or below 225 MHz TMDS clock).</td>
</tr>
<tr>
<td></td>
<td>70 m</td>
<td>&gt;225 MHz</td>
<td>&gt; 5.3 Gbps (Ultra HD Video)</td>
<td>4K2K, 30Hz video formats</td>
</tr>
</tbody>
</table>

9. ACRONYMS

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>COMPLETE TERM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLI</td>
<td>Command Line Interface</td>
</tr>
<tr>
<td>DTS</td>
<td>Digital Theater System</td>
</tr>
<tr>
<td>DVI</td>
<td>Digital Visual Interface</td>
</tr>
<tr>
<td>EDID</td>
<td>Extended Display Identification Data</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>HDCP</td>
<td>High-bandwidth Digital Content Protection</td>
</tr>
<tr>
<td>HDMI</td>
<td>High-Definition Multimedia Interface</td>
</tr>
<tr>
<td>HDTV</td>
<td>High-Definition Television</td>
</tr>
<tr>
<td>LCM</td>
<td>Liquid Crystal Module</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
<tr>
<td>VGA</td>
<td>Video Graphics Array</td>
</tr>
<tr>
<td>WUXGA</td>
<td>Widescreen Ultra Extended Graphics Array</td>
</tr>
</tbody>
</table>