User manual

HDMI 4x4 Matrix with single CAT5e/6 Extender Outputs

MATRIX 4 x 4
WITH SINGLE CAT5E/6 EXTENDER OUTPUT, BI-DIRECTION IR & POWER OVER UTP.

FULL HD
POWER
ON/OFF
IR
A
B
C
D
UTP OUTPUT STATUS
A
B
C
D
HDMI OUTPUT STATUS
1
2
3
4
INPUT STATUS
1
2
3
4
INPUT STATUS
1
2
3
4
INPUT
STATUS
1
2
3
4
OUTPUT A
OUTPUT B
OUTPUT C
OUTPUT D
About

■ Product model and standard
HDMI 4x4 single CAT5e/6 extender output HD video matrix, which can accept 4 HD HDMI signal inputs, as well 4 HD HDMI and 4 CAT5e/6 RJ45 outputs can select any one of 4 video inputs. This 4x4 matrix can support maximum 1080p 3D or 1080p 60fs resolution, and also include a 4x4 bi-direction IR matrix companion with video matrix extender output. The 4x4 HDMI matrix is fully compatible with HDMI 1.3c (HDMI 1.4 3D) and HDCP 1.3

■ Main features
- Support HDMI 1.3 spec and HDMI 1.4 3D
- HDMI HDCP1.3 compatible
- True 4 by 4 HDMI matrix, 4 outputs could select the same or different HDMI sources simultaneously
- Each group of matrix output includes one HDMI and one RJ-45 extender ports; both can output HD video simultaneously
- CAT5e/6 extender outputs support power over UTP, receiver side don’t need external DC adapter
- Support resolutions 1080p/1080i/720p/576p/576i/480p/480i
- Support audio formats PCM, Dolby®-AC3, DTS®7.1, DSD
- Support HPD
- Companied 4x4 bi-direction IR matrix embedded with local IR control
- Auto restore last power-off matrix status and auto skip for unconnected inputs when power-on initialization
- EDID dynamic mixing management with maximum compatibility
- CAT5e/6 extender ports support EDID call back
- Multi-mode control by LAN, RS232, local IR remote, CAT5e/6 extender side IR receiver or panel buttons
- ESD protection level HBM ±4 kV (Contact Discharge) for any input and output ports
- Industrial metal case, easy to install
About

■ Parameters:

<table>
<thead>
<tr>
<th>Interface</th>
<th>4 HDMI input ports(female type A); 4 HDMI outputs (female type A); 4 CAT5e/6 extender outputs (RJ45); 4 IR outputs (3.5mm); 4 IR inputs (3.5mm); RS232 series port(DB9); LAN port (RJ45); 12V DC in (Ø3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>&lt;24W when the function of power over UTP of 4 extender outputs are on.</td>
</tr>
<tr>
<td>Dimension</td>
<td>(L x W x H): 338.8•150.4•45.2mm (no including 3mm height rubber pad)</td>
</tr>
<tr>
<td>Net weight</td>
<td>2.28kg per unit</td>
</tr>
<tr>
<td>Input/Output Video formats</td>
<td>HDMI V1.3, 1080p/1080i/720p/576p/576i/480p/480i</td>
</tr>
<tr>
<td>HD interface standard</td>
<td>HDMI 1.3 standard (HDMI 1.4 3D function), HDCP 1.3, EDID</td>
</tr>
<tr>
<td>Input Video Signal Amplitude</td>
<td>0.5-1.0 volts p-p</td>
</tr>
<tr>
<td>Input DDC Signal</td>
<td>5 volts p-p (TTL)</td>
</tr>
<tr>
<td>HDMI Input/output audio formats</td>
<td>PCM, Dolby®-AC3, DTS®7.1, DSD, Maximum 8 channels</td>
</tr>
<tr>
<td>HDMI input/output cable distance</td>
<td>≥15m (26 AWG, and can be extended with amplifier in most cases)</td>
</tr>
<tr>
<td>Extender output resolution and distance</td>
<td>1080P 170ft (50meters)-CAT5e/ 230ft (70meters)-CAT6 720P/1080i 230ft (70meters)-CAT5e/ 300ft (90meters)-CAT6</td>
</tr>
<tr>
<td>Indicators</td>
<td>Power-Green, Extender output connected status-Yellow, Matrix Status-Yellow</td>
</tr>
<tr>
<td>IR frequency</td>
<td>Wide frequency 20-60kHz</td>
</tr>
<tr>
<td>ESD level</td>
<td>HBM ±4 kV(contact discharge)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0<del>40°C (operation), -20</del>60°C(stock)</td>
</tr>
<tr>
<td>Compliance</td>
<td>FCC CE</td>
</tr>
</tbody>
</table>

■ Product introduction

Input ports and output ports.
About

1) Local IR receiver window
2) UTP extender receiver link status
3) HDMI output link status
4) Selected source indicators for HDMI output A, B, C and D
5) Output selection buttons for HDMI output A, B, C and D
6) Power status indicator
7) Power switch
8) 12V DC input
9) Local 100M LAN Ethernet port
10) Local RS232 series port
11) 4 HDMI output ports
12) 4 UTP video output ports
13) CONFIG DIP switch
14) 4 IR extension transmitter outputs
15) 4 IR extension receiver inputs
16) 4 HDMI input ports

■ Packing list

• 1 unit HDMI 4x4 matrix
• 1 12V 3A Power adapter
• 1 IR remote controller
• 4 IR extension transmitter cable(1 meters)
• 4 IR extension receiver cable(1 meters)
• 1 user manual
• 477*245*95mm carton packing
• 4 HDMI RX extenders
Installation details and cautions
• Before installation
  a) Prepare place for installing system.
  b) The matrix should be far away from electro magnetic disturbance sources. Such as AC motors, electro soldering, fluorescents, microwave ovens, etc. These disturbance sources might affect video quality.
  c) Ensure the length of cable is suitable, no external tensions.
  d) Ensure reliable AC plug base.

• Typical installation instruction
Connecting HDMI video sources to 4x4 matrix HDMI input ports 1 to 4, and connect HDMI display terminals to HDMI output ports A to D, or extend HDMI outputs by UTP CAT5e/6 cable from 4 UTP output ports A to D for UTP extender application, accordingly a remote UTP receiver extender will be installed at HDMI video display terminals side. Moreover, Customers can connect IR transmitter cables to IR outputs 1 to 4; as well connect IR receiver cables to IR inputs A to D, all these local IR inputs and outputs could exchange IR control signal with IR outputs or inputs of remote UTP extender receivers with same switch control status of 4x4 video matrix.
Operation instruction

■ Getting started
After finishing all steps above, system is workable, follow below steps.
   a) Ensure the video source and the display terminals are power on.
   b) Ensure all input, output HDMI and IR cables are connected.
   c) Insert DC IN power adapter into AC plug base, and press power switch to ‘ON’, then ‘Power’ indicator will light.
   d) It takes about 4~5 seconds to finish EDID, HDCP and other initialization-automatically.
   e) One of 4 HDMI ‘Input Status’ indicator labled as A, B, C and D will light; it means one of input HDMI videos is chosen for HDMI output A,B,C and D and video signal is OK.
   f) At this time, display terminals will show the same format for HDMI outputs A,B,C and D video that video sources send out.
   g) LED A/B/C/D of "UTP output status" will be ON or OFF depend on whether UTP port is connected to HDMI extender or

■ HDMI 4x4 Matrix
The product has 4 HDMI inputs, and 4 HDMI/UTP outputs, and all HDMI ports support HDMI 1.3 standard. 4 HDMI/UTP outputs can select any one of 4 HDMI different inputs, or same HDMI inputs. The user can control 4x4 matrix by front panel buttons, IR remote, RS232 or local 100M LAN Ethernet port.

■ Front Panel Control
“OUTPUT A-D” buttons can select one of 4 HDMI inputs to HDMI/UTP outputs A to D.
Operation instruction

■ Local IR Remote Control

Local IR remote control window can control the HDMI route of the matrix; there are 4 group key pads for 4 output ports. For each output port selects sources, there are 4 number keys and two arrow keys. Press number keys to select specific input port, and left arrow button can select the input port backward and right arrow can select input port forward. Except of front panel local IR receiver window, the user can also use this local IR remote controller at remote UTP extender side with 4 IR receiver extension cables. In addition, Remote controller can control matrix via any one IR receiver in matrix's IR IN socket.

■ 4x4 IR matrix to control HDMI source devices

4x4 Remote IR matrix

"Remote IR matrix" means IR transmission path is between Remote UTP extender unit and Local IR which is located in matrix's IR IN/OUT socket; This function is enable/disable via the setting of pin 4 in CONFIG switch; The matrix can not only switch the HDMI source signal to HDMI display terminals which is in remoted rooms, but also can pass the IR signal through the 4x4 IR matrix. IR matrix share the same control and transmission route with HDMI matrix and support the bi-direction, that means the user can place IR extension receiver A (IR input port of UTP output A receiver) near remoted HDMI output display terminal A and IR extension receiver B (IR input port of UTP output B extender receiver) near remoted HDMI output sink B, as so on IR receiver C and IR receiver D; as well fix 4 IR extension transmitter 1,2,3,4 (IR output 1,2,3,4 ports) aimed to IR window of 4 HDMI input sources.
**Operation instruction**

1, 2, 3, 4, so the user can easily to control selected input HDMI sourced in remoted HDMI display terminals side, when input HDMI source is changed, IR route will also be changed to point to new selected HDMI source, and no need to change IR extension transmitter position. Contrarily the user can also place IR receivers connected to matrix IR input ports A, B, C and D on HDMI sources side, and place IR transmitters connected to the extender IR output ports on remote HDMI sink side, that also can realize same IR matrix function. Please refer to application diagram to learn the IR matrix configuration. Place IR receivers connected to matrix IR input ports A, B, C and D on HDMI sources side, and place IR transmitters connected to the extender IR output ports on remote HDMI sink side, that also can realize same IR matrix function. Please refer to application diagram to learn the IR matrix configuration.

IR matrix features are realized by software, so it can be customized according to customer real requirements, like default remote to local bidirection IR matrix mode, local single direction IR matrix mode, or remote to local hybrid single direction IR matrix mode.

**4x4 Local IR matrix**

"Local IR matrix" means IR transmission path is between local IR IN and OUT which is located in matrix’s IR IN/OUT socket.
Operation instruction

This is real IR matrix implementation diagram. There are 4 HDMI source 1, 2, 3 and 4, 4 HDMI sinks A, B, C and D. When the user need implement local IR matrix, they need place IR receiver 1 near to HDMI sink A and connect IR receiver 1 extender cable to matrix IR INPUT 1 port, then IR receiver 2 near to HDMI sink B and connect IR receiver 2 extender cable to matrix IR INPUT 2 port, then IR receiver 3 near to HDMI sink C and connect to matrix IR INPUT 3 port, IR receiver 4 near to HDMI sink D and connect to matrix IR INPUT 4 port. Similarly place IR emitter A point to HDMI source 1 and connect to matrix IR OUTPUT A port, IR emitter B point to HDMI source 2 and connect matrix IR OUTPUT B port, IR emitter C point to HDMI source 3 and connect to matrix IR OUTPUT C port, and IR emitter D point to HDMI source 3 and connect to matrix IR OUTPUT D port. So when HDMI matrix switch any HDMI output sink to any HDMI input source, IR matrix will accordingly switch IR receiver signal near to this HDMI sink to IR emitter near to HDMI source output, and don’t need change IR receiver or emitter initial installment.

■ CONFIG Switch

Please see below table to set the matrix with different configuration mode by front panel CONFIG switch.

<table>
<thead>
<tr>
<th>SWITCH NUMBER</th>
<th>ON</th>
<th>OFF( Default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Choose the higher definition display terminal’s EDID forward to source</td>
<td>Choose the lower definition display terminal’s EDID forward to source</td>
</tr>
<tr>
<td>2</td>
<td>Power over UTP function is ON</td>
<td>Power over UTP function is OFF</td>
</tr>
<tr>
<td>3</td>
<td>EDID dynamic selection will be done only with two sinks connected to same source</td>
<td>EDID dynamic selection will be done only</td>
</tr>
<tr>
<td>4</td>
<td>Local IR matrix is ON; Remote IR matrix is OFF</td>
<td>Local IR matrix is OFF; Remote IR matrix is ON</td>
</tr>
<tr>
<td>5</td>
<td>Reserved</td>
<td>Reserved</td>
</tr>
</tbody>
</table>
Operation instruction

■ EDID dynamic selection function

The 4x4 matrix has internal EDID function, support HDMI display terminal EDID dynamic selection when each 2 HDMI display terminals choose the same HDMI source. There are two different EDID dynamic selection modes, one is to choose the lower definition EDID as current EDID, and the other is to choose the higher definition EDID as current EDID. The user can set “CONFIG” switch 1 to select EDID mode, when “CONFIG” switch 1 is set as “off” (default mode), the matrix will choose the lower definition HDMI display terminal EDID, when “CONFIG” switch 1 is set as “on”, the matrix will choose the higher definition HDMI display terminal EDID. For example, One TV is 1080P, the other is 1080i. The “CONFIG” switch 1 is set as “OFF”, the selected EDID will be 1080i, When 2 HDMI display terminal choose different HDMI sources, the matrix just forward connected HDMI display terminal EDID to selected source, and don’t change anything. This function is to keep maximum compatibility and flexibility.
■ EDID dynamic selection occasion

There are two different conditions when the 4x4 matrix should do EDID dynamic selection, and the first is that the matrix selects the EDID of one of 2 sinks dynamically after the system power on finished; and another is the system just does dynamic EDID selection when the two sinks select the same source, that means the matrix just send independent EDID of selected sink to source if two sinks select different source. The user can set “CONFIG” switch 3 to select EDID dynamic selection occasions, when “CONFIG” switch 3 set ‘off’ (Default), the system will do EDID dynamic selection after power-on, when “CONFIG” switch 3 set ‘on’, the system will do EDID dynamic selection under two sinks connected to one same source condition.

■ EDID call back function

All UTP extender output ports support EDID call back function. UTP extender receivers will read EDID from display terminals, and then pass this EDID information to 4x4 matrix through UTP cable. The matrix will collect all connected display terminals EDID information and then do EDID dynamic selection. This function is automatic, no need to setup by customers. The intension function is to keep maximum compatibility.
Operation instruction

■ Power over UTP cable
The 4x4 matrix has 4 UTP output ports and support power over UTP cable, which can make sure UTP extender receivers get the power from the UTP output ports without DC adapters. Please note that UTP extender receivers must also support power over UTP and get the matched UTP extender receiver model for this function. This power over UTP function should be turned on when set “CONFIG” switch 2 to ON, and default status is “OFF”.

Warning
Please use the recommended UTP extender receiver model for UTP extender application, otherwise it will bring the potential risk for damaging the UTP extender receivers and the matrix.

■ Rs232 control port
The 4x4 matrix provide a RS232 series port for system configuration, firmware update, matrix control, please refer to assorted GUI help to know how to control the matrix.

■ LAN port
The 4x4 matrix also provide a LAN port for TCP/IP visits from Ethernet PC or mobile device. The matrix reside a web server so that the PC or mobile phone can visit the matrix internal web page by general web browser. The web server has realized different matrix control page, like matrix switch, EDID read, DIP switch config etc., please see assorted GUI help to know how to configure LAN port IP address and visit web server.
Operation instruction

■ CAT5e/6 cable information
The 4x4 matrix UTP output request normal CAT5e or CAT6 Ethernet cables, which must meet standard-TIA/EIA-568B, refer to below pin definition.

■ Storage conditions
Products storage temperature should be -20°C~60°C. For long time storage requirement, please use original carbon boxes, and avoid from high humid, acid base or dusty place.

■ Maintenance

Warning
To ensure your safety, place choose original adapters. And provide stable AC input according to this manual.
Troubleshooting

■ Normal problems

a) No outputs on display
Check power first, then check ‘STATUS’ indicators. If ‘STATUS’ indicators are not light, then check if HDMI input cables are plugged in and HDMI video sources please, and check UTP link status that make sure the other side UTP extender receiver is connected. Another consideration is about EDID configuration, if you want to get maximum compatibility, you should set “CONFIG” switch 1 to “OFF”, that means the HDMI source will get EDID from the lower definition HDMI display terminal, so that all connected HDMI display terminals can display the video.

b) IR no response
Check if IR in or IR out cables are plugged well, and IR in ports should connect IR extension receiver cables, IR out ports should connect IR transmitter cables. IR out 1 should point to HDMI input 1 source, IR out 2 to HDMI input 2, and so on. IR input A should match with HDMI output A, and IR input B should match with HDMI output B, and so on.
**Input Selection and Mapping**

1) I/O:
   Select the input
   Click “Send” to change the I/O setting

2) Save Mapping:
   Select Mapping(1-8)

3) Preset mapping:
   Select Mapping(1-8)
   Click “Send” button to recall previous mapping which are saved
1) Rename I/O:
   Rename output name
   Rename input name

2) Rename Mapping:
   Rename Mapping name
### EDID BUTTON

1) Learn EDID from Default
   - Select Default EDID (1-9 Default EDID)
   - Select Input
   - Click “Learn” button to learn default EDID

2) Learn EDID From Display
   - Select output
   - Select input
   - Click “Learn” button to learn display EDID

3) Load EDID File To Input
   - Select Input
   - Click “Load” button to load EDID file (Please refer to EDID file in “EDID” folder as below)
**EDID BUTTON**

- **View EDID**
  Click “View / Create” button, display “EDID Analysis” popup menu

  ![EDID Analysis Menu](image)

  Select Input or HDMI output, then read EDID and analysis
  You can also load EDID file for analysis

- **Create EDID**
  a) Click “View / Create” button, display “EDID Analysis” popup menu
  b) Click “Create EDID”, you can choose EDID content as you want,
  c) Click “Apply” button, The content of 256 bytes will update as your chose parameters
  d) Click “Copy” button, The 256 bytes EDID will copy to Clipboard, you can paste the 256 bytes in notepad
  e) Click “Save As” button, you can save the 256 bytes to an EDID file in your folder
1) Save Setting

   Save the IP address which is manually entered

2) Read Setting:

   Read the IP address from the device
Appendix-A  GUI User Guide

■ SYSTEM BUTTON

You can update firmware as below

1) Choose the corresponding serial port, then click “open” button to open serial port:

![Serial Port Interface]

2) Click “System” label, enter Firmware update interface, Click “LoadFile” button in “Host MCU FW Update” Combo box

![Firmware Update Interface]
3) Find the file path at popup dialog menu, Choose the bin file, “HOST_MCU_FW.bin”, Click “Open” Button

4) Then popup a new dialog, Display corresponding hexadecimal content of bin file, You can close this window
5) Click “start” button in “Host MCU FW Update” Combo box, The status bar at GUI left bottom corner will show information “Start to connect … Pls restart the machine.”, what you do is to power down matrix, then power on, wait for the firmware automatic update.

6) When matrix is power on, Update is working; Progress bar will show the update progress; Status bar will show “Update successfully” once update is completed.
7) Similarly, you can update the firmware “ETH_MCU_FW.bin” in “ETH MCU FW update” Combo box as above step 1~6.
■ COM PORT SELECTION

Click button to select COM Port, click to connect to responding serial port.

8) CONNECT/DISCONNECT

Click button to change connection status, it will toggle between connect and disconnect status.

9) ETHERNET

Once click button to switch to Ethernet function, it will auto search IP address, then display the address as below.

Click The “Routing,Setting,EDID,Network,System” menu will be available for user, user can control matrix via ethernet.

Click button, it will research matrix IP address again.

10) HELP BUTTON

Click button, Open the user manual document.