DIGITAL
MEDIA PRODUCT

HDMI Expander-Cat5

HDMI-E102T
HDMI-E102TR
HDMI-E104C
HDMI-E108C

User Manual

One-Port HDMI Transmitter : HDMI-E102T
One-Port HDMI Transceiver : HDMI-E102TR
4-Port HDMI Transceiver with One Local Input
8-Port HDMI Transceiver with One Local Input

TABLE OF CONTENTS

Package Contents

A. HDMI-E102T : One Port HDMI Expander Transmitter
   1. HDMI-E102T x 1
   2. HDMI Cable x 1
   3. Power Adaptor DC5V x 1
   4. User Manual

B. HDMI-E102TR : One Port HDMI Expander Transceiver
   1. HDMI-E102TR x 1
   2. Power Adaptor DC5V x 1
   3. User Manual

C. HDMI-E104C: 4-Port HDMI Transceiver
   1. HDMI-E104C x 1
   2. HDMI Cable x 1
   3. HDMI-HR Receiver x 1
   4. Power Adaptor DC5V, 3A x 1

D. HDMI-E108C: 8-Port HDMI Transceiver
   1. HDMI-E108C x 1
   2. HDMI Cable x 1
   3. HDMI-HR Receiver x1
   4. Power Adaptor DC5V, 3A x 1

Introduction

The Cat5 HDMI Expander system consists of Transmitter, Transceiver and Receiver. The system can extend HDMI signals over Cat5/5e/6 FTP cable. By cascading Transceivers, it is possible to extend the HDMI signals with almost unlimited capacity. The Cat5 HDMI Expander system is a great solution for digital signage, public information display, and large scale demonstration, where crystal-clear, high-resolution digital video needs to be shown.

By taking the advantage of cost efficient Cat5/5e/6 FTP cable, the Cat5 HDMI Expander can simplify installation. With its unlimited cascading capacity, you can extend digital video displays almost anywhere. The Transmitter and Transceiver units are fitted with magnetic pads, enabling them to be quickly attached to metal surfaces. A screw fixing plate is also included for permanent installations.

HDMI-E102TR
One-Port HDMI Transceiver

HDMI-HR
HDMI-RJ45 Receiver

HDMI Cable (for Player)

HDMI –E104C
4-Port HDMI Transceiver

HDMI –E108C
8-Port HDMI Transceiver

Key Features

1. Unlimited cascading of HDMI over Cat5/5e/6 FTP cable

2. The system consists of Transmitter, Transceiver and Receiver. Transmitter has a HDMI local connection and extends the HDMI signal over Cat5/5e/6 FTP cable.

3. Transceiver has a HDMI input port (RJ-45 or HDMI type), 4/8 HDMI RJ-45 output ports and cascading function to extend the HDMI signal over Cat5/5e/6 FTP cable.

4. Video Amplifier Bandwidth: 1.65GHz

5. Maximum distance between Transmitter and Transceiver is determined by display resolution and FTP cable type and quality. Typical distances are: < 80m. for 480p, < 70m. for 720p/1080i, < 30m. for 1080p. (Distances are based on FTP cable skew < 15ns/100m).

6. Maximum distance between Transceiver and HDMI-HR Receiver determined by display resolution and FTP cable type and quality. Typical distances are: < 30m. for 480p/720p/1080i, < 15m. for 1080p. (Distances are based on FTP cable skew < 15ns/100m).

7. HDMI Input/Output Connector: HDMI digital signal

8. EQ control to adjust the video quality

9. LED status to indicate HDMI activity

10. Magnetic pad and attachable metal plate on each device for easy installation
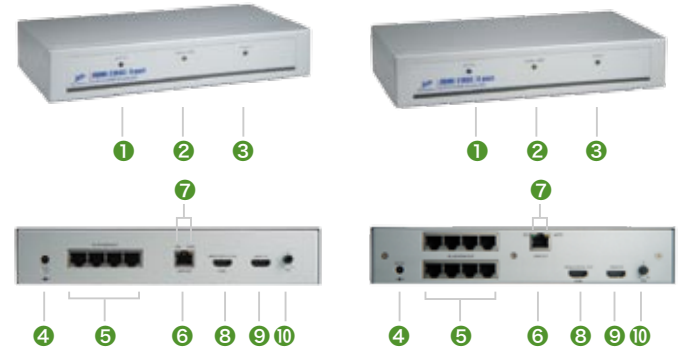
⊕ Panel Description

1. HDMI-E102T Transmitter and HDMI-E102TR Transceiver
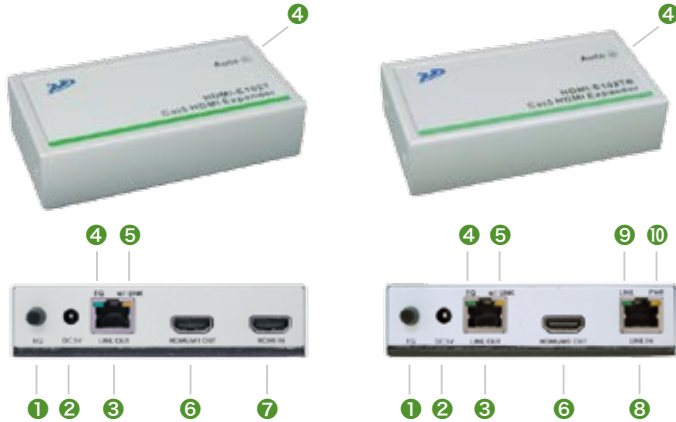
1 Video EQ Control
2 Power Jack
3 RJ-45 HDMI Output
4 EQ Indicator
  LED ON : Auto EQ
  LED Off : Manual

5 Link Indicator of Local Monitor (MI)
6 HDMI Output for Local Monitor (MI)
7 HDMI Input (Use HDMI connector)
8 RJ-45 HDMI Input
9 Link Indicator
10 Power Indicator

2. HDMI-E104C and HDMI-E108C Transceiver

1 EDID Activity
2 Link of Local Monitor
3 Power Indicator
4 Power Jack
5 RJ-45 HDMI Output
6 RJ-45 System Link Out

7 EQ Indicator
  LED ON : Auto EQ
  LED Off : Manual
8 HDMI Output
9 HDMI Input
10 Video EQ Control

3. HDMI Cable and Cat5 HDMI-RJ45 Receiver

HDMI Output

To HDMI Player   To HDMI Input of Transmitter   RJ-45 HDMI Iutput

HDMI Cable (for Player)

HDMI-HR
HDMI-RJ45 Receiver

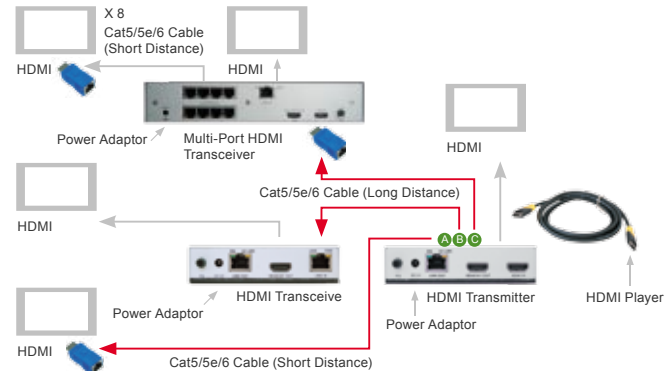## ⊙ Installation and Operation

1. Install HDMI-E102T Transmitter:

(1) First Time Set-up: Please turn off the HDMI output device and monitors.

(2) Device Connection: Connect local HDMI monitor (M1) to the "HDMI/ M1 OUT" of the transmitter and take the HDMI cable, plug one end to "HDMI IN" port of transmitter and the other end of the cable to the HDMI output port of HDMI output device.

(3) Connect the power adaptor to the "DC5V" and plug into the power outlet.

HDMI

HDMI Transmitter

Power Adaptor

HDMI Player
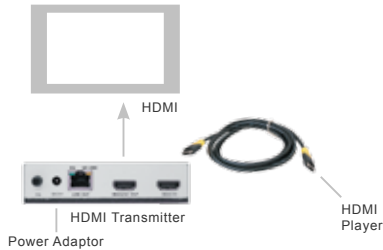
Connection of HDMI Transmitter

(4) System Turned On: Turn on your HDMI output device and monitor to confirm the function of display. The "M1 LINK" LED of the transmitter should turn on orange to reflect the connection of a local HDMI monitor.

(5) Other Monitors: Please make sure the other HDMI monitors used in Transceiver can also display the video resolution broadcasted.

(6) EQ Adjustment: In most of the cases, you can adjust the EQ control to Auto mode by rotate the EQ to the left side and the "EQ" and " Auto" LEDs will turn on blue. If you see some dynamic dots or unclear image on the HDMI monitor, it reflects the HDMI signal received by Transmitter need to be adjusted. Then you can adjust the EQ control for better image display, it will turn the EQ into manual mode, the "EQ" and "Auto" LED will turn off to indicate the manual EQ mode.

(7) LINK OUT: HDMI signal can be extended/cascaded over "LINK OUT" port by Cat5/5e/6 FTP cable, please refer to "Selection and Preparation of Cat5/5e/6 cable." The signal can be received by following three ways (A), (B) and (C):

A. HDMI-HR: The HDMI distance can be extended is: < 30m. for 480p/720p/1080i, or < 15m. for 1080p. (Distance is based on FTP cable skew < 15ns/100m).

B. "LINK IN" of HDMI-E102TR: Typical cascaded distance is: < 80m. for 480p, < 70m. for 720p/1080i, or < 30m. for 1080p. (Distance is based on FTP cable skew < 15ns/100m). The installation of HDMI-E102TR is described in next section.

C. "HDMI IN" of HDMI-E104C/HDMI-E108C: To connect to the HDMI connector, a HDMI-HR Receiver is required. Typical cascaded distance is: < 80m. for 480p, < 70m. for 720p/1080i, or < 30m. for 1080p. (Distance is based on FTP cable skew < 15ns/100m).

X 8
Cat5/5e/6 Cable
(Short Distance)

HDMI

HDMI

Power Adaptor

Multi-Port HDMI Transceiver

HDMI

Cat5/5e/6 Cable (Long Distance)

HDMI

Ⓐ Ⓑ Ⓒ

HDMI Transceive

HDMI Transmitter

HDMI Player

Power Adaptor

Power Adaptor

HDMI

Cat5/5e/6 Cable (Short Distance)

Three Ways of Extending HDMI Signal from HDMI Transmitter

2. Installation of HDMI-E102TR Transceiver:

(1) Monitor Connection: Connect HDMI monitor's HDMI cable to Transceiver and turn on the monitor.

(2) Device Connection: Plug power adaptor to HDMI-E102TR, the "PWR" LED and "M1 LINK" will turn ON, the other "LINK" LED should turn off, since there is no input of video signal from "LINK IN" port.
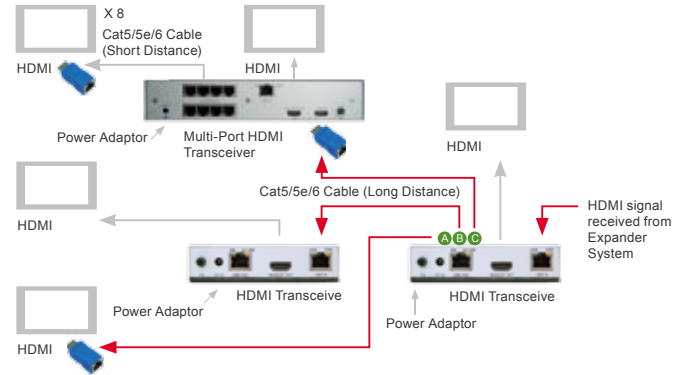
HDMI

Power Adaptor — HDMI Transceiver
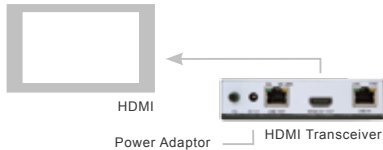
Connection of HDMI Transceiver

(3) HDMI Cascading: The RJ-45 "LINK IN" port is designed to receive the HDMI signal from Transmitter over Cat5/5e/6 FTP cable, follow previous section to install Transmitter and extend the HDMI signal here.

HDMI   HDMI

Cat5/5e/6

HDMI Transceiver   HDMI Transmitter   HDMI Player

Power Adaptor   Power Adaptor
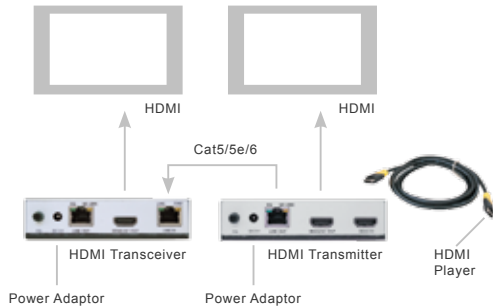
(4) EQ Adjustment : In most of the cases, you can adjust the EQ control to Auto mode by rotate the EQ to the left side and the "EQ" and " Auto" LEDs will turn on blue. After connecting the expander system, if you see some dynamic dots or unclear image on the HDMI monitor, it reflects the HDMI signal received by Transmitter need to be adjusted. Then you can adjust the EQ control for better image display, it will turn the EQ into manual mode, the "EQ" and "Auto" LED will turn off to indicate the manual EQ mode.

(5) LINK OUT : The function of "LINK OUT" port on Transceiver will act the same as Transmitter's. It can extend/cascade HDMI signal to (A) HDMI-HR Receiver, (B) another one-port HDMI Transceiver or (C) 4/8-port HDMI Transceiver as following illustration.

X 8
Cat5/5e/6 Cable
(Short Distance)

HDMI   HDMI

Power Adaptor   Multi-Port HDMI
Transceiver

HDMI

Cat5/5e/6 Cable (Long Distance)

HDMI

Ⓐ Ⓑ Ⓒ

HDMI signal received from Expander System

HDMI Transceive   HDMI Transceive

Power Adaptor   Power Adaptor

HDMI

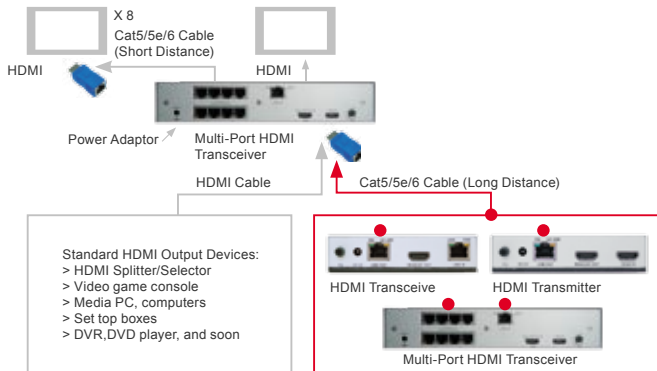Three Ways of Extending HDMI Signal from HDMI Transmitter

3. Installation of HDMI-E104C / HDMI-E108C Multi-port Transceiver:

(1) These two models have the same function and are only different in the amount of RJ-45 HDMI output.

(2) Monitor Connection: Connect HDMI monitor's HDMI cable to Multi-port Transceiver's "HDMI/LOCAL OUT" port and turn on the monitor.

(3) Device Connection: Plug power adaptor to Multi-port Transceiver, the front panel's "POWER" LED and "LOCAL LINK" will turn ON, the "ACTIVE" LED will turn ON till Transceiver has received active HDMI signal.
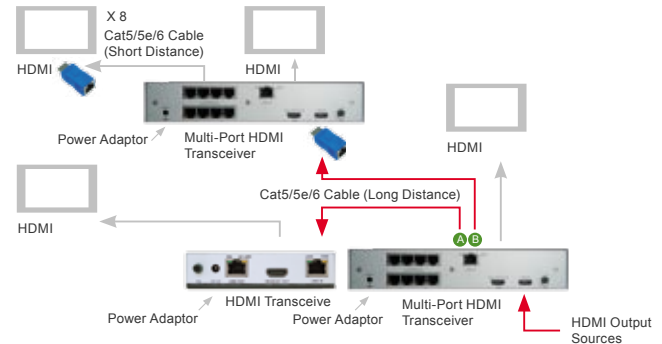

HDMI

Power Adaptor — Multi-port HDMI Transceiver
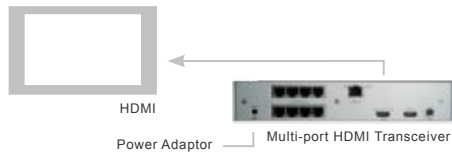
Connection of Multi-port HDMI Transceiver

(4) HDMI Sources: The "HDMI IN" can receive HDMI signal from (A) standard HDMI output device or (B) HDMI-E102T / HDMI-E102TR / HDMI-E104C / HDMI-108C by using a HDMI-RJ45 Receiver.

X 8
Cat5/5e/6 Cable
(Short Distance)

HDMI   HDMI

Power Adaptor   Multi-Port HDMI
                 Transceiver

HDMI Cable   Cat5/5e/6 Cable (Long Distance)

Standard HDMI Output Devices:
> HDMI Splitter/Selector
> Video game console
> Media PC, computers
> Set top boxes
> DVR,DVD player, and soon

HDMI Transceive   HDMI Transmitter

Multi-Port HDMI Transceiver

Connecting of HDMI Sources

(5) EQ Adjustment: In most of the cases, you can adjust the EQ control to Auto mode by rotate the EQ to the left side and the "EQ" and " Auto" LEDs will turn on blue. After connecting the expander system, if you see some dynamic dots or unclear image on the HDMI monitor, it reflects the HDMI signal received by Transmitter need to be adjusted. Then you can adjust the EQ control for better image display, it will turn the EQ into manual mode, the "EQ" and "Auto" LED will turn off to indicate the manual EQ mode.

(6) LINK OUT: The function of "LINK OUT" port on Multi-port Transceiver is used to cascade HDMI signal to (A) one-port HDMI Transceiver or (B) another 4/8-port HDMI Transceiver as following illustration.

X 8
Cat5/5e/6 Cable
(Short Distance)

HDMI   HDMI

Power Adaptor   Multi-Port HDMI
                 Transceiver

HDMI   HDMI

                 Cat5/5e/6 Cable (Long Distance)

HDMI   Ⓐ Ⓑ

HDMI Transceive   Multi-Port HDMI
                        Transceiver
Power Adaptor   Power Adaptor   HDMI Output
                                              Sources

Two Ways of Cascading HDMI Signal by Multi-port HDMI Transmitter

(7) Connecting Monitors: 4/8 HDMI monitors can be connected to the "RJ-45 HDMI OUT" ports by adapting a HDMI-HR Receiver.

X 8
HDMI   HDMI
Cat5/5e/6 Cable
(Short Distance)

Power Adaptor ——⌐ Multi-port HDMI Transceiver

Connecting 8 HDMI Monitors
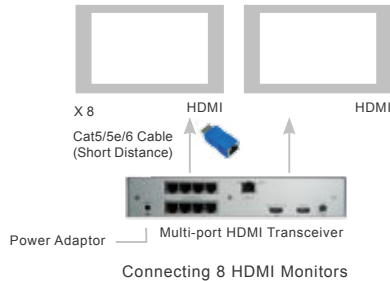
(8) Additional System Expansion: The "RJ-45 HDMI OUT" port can also be used as link out port for more system expansions.

4. Selection and Preparation of Cat5/5e/6 FTP cable:

(1) Selection: Most makes and versions of current Cat5/5e/6 cables will work with the DVI-E102T Transmitter and DVI-E102TR Transceivers. However since the quality and characteristics of Cat5/5e/6 cable varies it has been found that some perform better than others, even if they cost lower. The major factor influencing the transmitting distance is the skew property of the cables. Skew represents the difference in propagation delay between the fastest and slowest set of wire pairs. A lower skew will mean a longer video transmitting distance.

(2) Skew Property: A Cat5/5e/6 cable with a skew lower than 15ns/100m should enable a cascading length of <80m. at 480p resolution, <70m. at 720p/1080i resolution and <30m. at 1080p resolution. Some cable types may not have a known skew so it is best to test for maximum practical distances before starting the installation.

(3) For some installations where the potential for interference exists the FTP type of Cat5/5e/6 cable is recommended.

(4) The RJ-45 terminations to the Cat5/5e/6 cable must be made to the EIA 568B specifications.

PAIR 3

PAIR 2   PAIR 1   PAIR 4

1   2   3   4   5   6   7   8

JACK POSITION
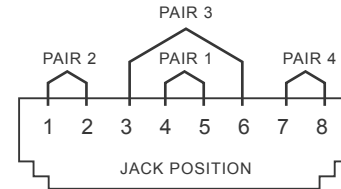
The EIA/TIA defination of 568B in the pin assignment is
(1) orange white, (2) orange, (3) green white, (4) blue,
(5) blue white, (6) green, (7) brown white, and (8) brown

(5) Connecting the Cat5/5e/6 FTP cable: Plug one end of the cable to the Transmitter's "LINK IN/OUT" port and the other end to the Transceiver's RJ-45 "LINK IN/OUT" port. The monitor connected to the Transceiver should now display and the "LINK" or "ACTIVE" LED should turn green to indicate the HDMI signal activation. Adjust the "EQ" control for best quality HDMI display.

5. Installing More Transceivers and Displays:

(1) Using additional Transceivers and Cat5/5e/6 FTP cable it is possible to extend the system almost indefinitely to remote HDMI displays. For a large group of cascaded Transceivers, please ensure common grounding is maintained to minimize ground-loops and interference.

(2) A HDMI splitter or distribution amplifier may be used at each HDMI output to drive additional local HDMI displays.
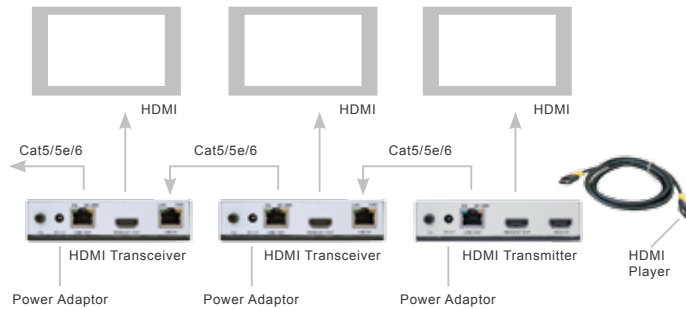
Connection Diagram of HDMI Expander

⊙ Specification

Model	Cat5 HDMI Transmitter HDMI-E102T	Cat5 HDMI Transceiver		
		HDMI-E102TR	HDMI-E104C	HDMI-E108C
Input	HDMI Female x 1	RJ-45 x 1	HDMI Female x 1	HDMI Female x 1
Output	HDMI Female x 1 RJ-45 x 1	HDMI Female x 1 RJ-45 LINK Out x 1	HDMI Female x 1 RJ-45 HDMI Out x 4 RJ-45 LINK Out x 1	HDMI Female x 1 RJ-45 HDMI Out x 8 RJ-45 LINK Out x 1
Max Distance and Resolution	480p with each cascading length < 80m, 720p/1080i with each cascading length < 70m 1080p with each cascading length < 30m			
Video Control	EQ x 1			
Signal Type	HDMI			
Power Consumption	DC5V , 750mA	DC5V , 750mA	DC5V 1.8A	DC5V, 2.5A
Housing	Metal			
Dimension (LxWxH) mm	Compact Size, 62 x 113 x 29		1U Height, 240x180x44	

⊙ Remarks

1. Please read this operation manual carefully before installing the system.
2. Please use high quality Cat5/5e/6 cable for optimum results.
3. To prevent potential power damage do not use 2-wire extension cord. Ensure AC outlets at PCs and displays are on the same phase and have correct and common grounding.
4. Limited Warranty:
   (1) In no events shall the vendor's liability for direct or indirect, special, incidental or consequential damages, loss of profit, loss of business, or financial loss which hay be caused by the use of the product exceeds the price paid for the product.
   (2) The vendor makes no warranty or representation, expressed or implied with respect to the contents or use of this documentation, and especially disclaims its quality, performance, merchantability, or fitness for any particular purpose.
   (3) The vendor also reserves the right to revise or update the product or documentation without obligation to notify any user of such revisions or updates. For further information, please contact your direct vendor.

GREEN-BOX TECHNOLOGY CO., LTD.

2 F., NO.62 Lane 188 RuiGuang Rd. Neihu Dist.
Taipei, 11491 TAIWAN
TEL:886-02-26590065 FAX:886-02-26599362

www.green-box.com.tw