HDM-4X2
HDMI Matrix Switcher

Installation Manual
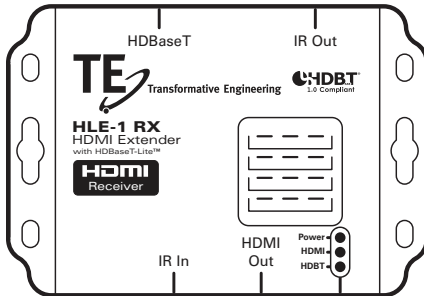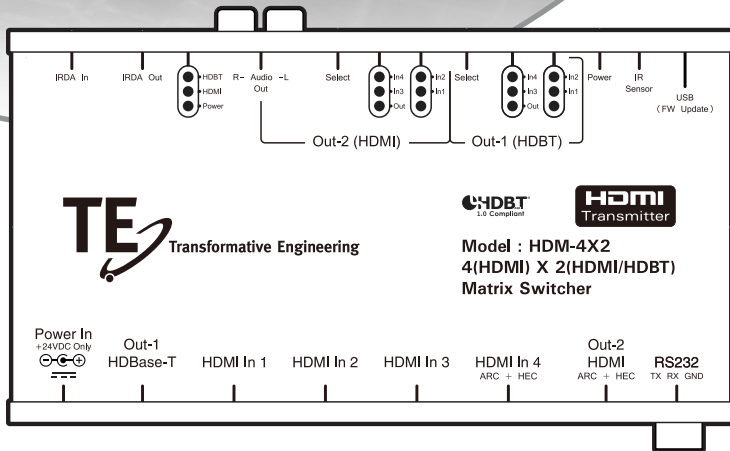

Model : HDM-4X2
4(HDMI) X 2(HDMI/HDBT)
Matrix Switcher

TE Transformative Engineering

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INTRODUCTION

Thank you for purchasing Transformative Engineering's HDM-4x2 HDMI Matrix Switcher. This product incorporates many advanced technologies to accomplish switching and distribution of (4) High Definition MultiMedia Interface (HDMI) sources to two independently selected displays. One output is carried over a length of Category 5e/6/7 wire, utilizing HDBase-T technology, licensed here. This unique conversion of HDMI signals provides for the most reliable, stable and predictable method to transfer all HDMI requirements. More information on this technology may be found at the HDBase-T website, www.hdbaset.org. We are proud to be an early Adopter Member of the Alliance.

Proper connection and attention to limitations of this (or any other) product will result in secure, reliable, and predictable results. The most important variable to success will depend on wire chosen as the interconnection between our Transmitter and Receiver. All Category wire is not created equal. It is vital that care is taken at all times to avoid kinks, crimps, nicks, and other abuse of the wire and jacket. Also, we highly recommend that all wire be sweep tested before and after installation to insure full bandwidth is not impaired. A sweep-test generator, such as the Fluke CableIQ Qualification Tester, or its equivalent, is suggested. Please be sure to specify Category 5e, or better, cable that meets a minimum of 400MHz bandwidth. Typical high-quality Category 6 cable performs from 550-850 MHz, and Category 7 cable should pass 1GHz or more.

This HDMI Switcher will meet our rated specifications using CAT 5e/6/7 UTP cable. It will also perform with STP (shielded twisted pair) cable as well. MOST FAILURES OR INCONSISTENT PERFORMANCE ARE THE RESULT OF INFERIOR WIRE OR IMPROPER TERMINATIONS. The first step in diagnosing problems with this product should center on the connection and choice of the wire used.

Please follow the instructions and diagrams shown in this Manual. Any questions should be directed to your Dealer, Distributor, or to our Technical Department. Our Contact information is:

Transformative Engineering, Inc.
194 Vanderbilt Ave.
Norwood, MA 02062-5000
Telephone: 781-769-6410
Fax: 781-255-0975

Email: info@transformativeengineering.com

Kit Contents

SAFETY INFORMATION

- Do not expose this device to water, moisture, or liquids. Possible electric shock may result as well as failure of the unit to operate.

- Do not modify or disassemble the enclosed Power Supply. Doing so will void the warranty and potentially expose the user to dangerous voltages resulting in electrical shock.

- Do not substitute or use any other Power Supply other than the enclosed unit, or a Transformative Engineering approved replacement part.

- Do not disassemble or modify either Transmitter or Receiver for any reason. There are no user serviceable parts inside. Doing so will void the manufacturer's warranty. Also, our case is n integral part of our design and is responsible for cooling and shielding. Any breach of this case will potentially cause malfunction and/or product failure.

KIT CONTENTS

- HDM-4x2 Switcher
- (1) 24V, 1A Power Supply with outlet adapter for your region
- (1) HLE-1 HDBase-T Receiver (for output #1)
- (1) Set of mounting ears for HLE-1
- (1) SMA- IR Adapter Cable for IR Pass-Thru
- (1) IR Remote for Switcher
- (1) Installation Manual

FEATURE SET

- (4) HDMI Inputs (Version 1.4a)

- (2) Independent Outputs - HDMI

- HDBase-T - 70 Meters, CAT6 @ 1080p typical

- HDBase-T Receiver Included -

- Output # 1 features IR Bi-Directional Pass-Thru with Power Option

- Audio Take-Off (Stereo) for Output #2

- ARC (Audio Return Channel) and HEC (Home Ethernet Connectivity) between Output #2 and Input #4

- Full remote control via IR (Remote Included) or RS232

- Powered by one 24V Power Supply (Provided)

- Diagnostic Indicator Lights for monitoring performance and operation

- Highest Quality Extruded Aluminum case for cooling, shielding, and safety.
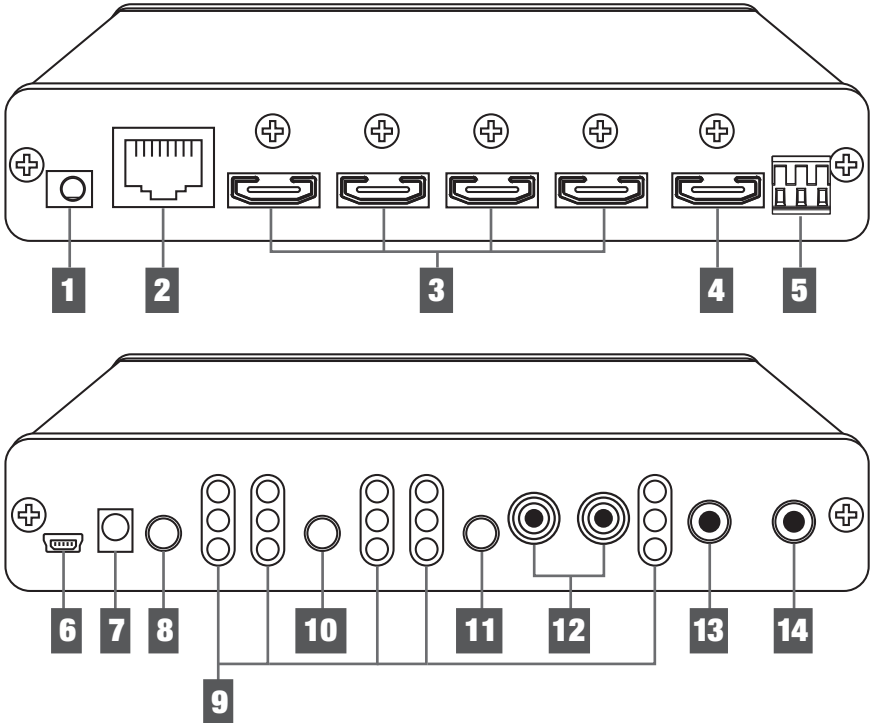
Specifications

SPECIFICATIONS

Input Signals	HDMI Version 1.0 thru 1.4a
	Ethernet (10/100T)
	IR Signal – Pass Thru (Industry Compatible)
	IR Powered Pickup – Ring (Ground), Tip (Signal),
	Sleeve (+12VDC) (see page 7)
	RS232 – 3-Pin (see Page 9)
Video Formats Supported:	480i/576i/480p/576p/720p/1080i/1080p
Audio Formats Supported:	All HDMI Supported Formats, including DTS-HD,
	Dolby-HD, DVD-A, Dolby TrueHD, 8-CH LPCM
Output Signal:	HDMI Version 1.0 thru 1.4a (Output #2)
	HDBase-T Version 1.0, Type 2
	IR Signal – Pass Thru (Xantech Compatible)
	(See page 7)
	Stereo Audio (For Output # 2)
Maximum Distance (with CAT6):	70 Meters (328 Feet), @ 1080p
Power Supply (supplied):	24 VDC, 1A, Each
Dimensions (Switcher)	7.0" W x 1.25" H x 4.0" D
(Receiver)	3.125"W x 1.0" H x 2.75"D
Weight:	1.50 Lbs (Switcher)
	0.75 lbs (Receiver)

Switcher Connections

SWITCHER CONNECTIONS

1 Power In	**8** Power Button
2 Out-1 HDBase-T	**9** Indicator Lights
3 HDMI In 1-4	**10** Select (Out-1)
4 Out-2 HDMI	**11** Select (Out-2)
5 RS232	**12** Audio Out
6 USB	**13** IRDA Out
7 IR Sensor	**14** IRDA In

HDBASE-T RECEIVER CONNECTIONS
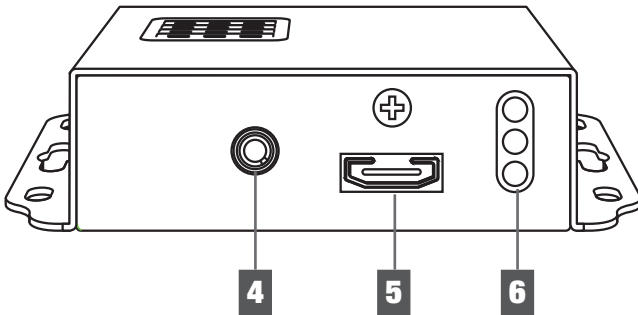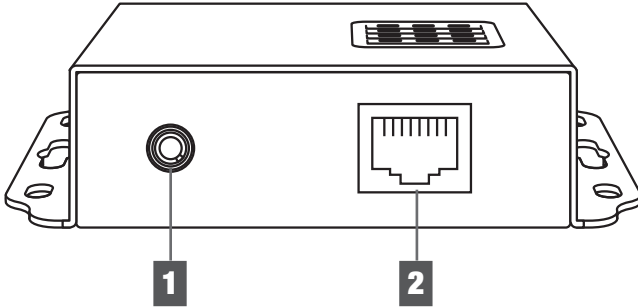
1	IR Out		5	HDMI Out
2	HDBaseT		6	Indicator Lights
4	IR In			

SWITCHER FUNCTIONS - See pg 7

1 **Power In –** This receptacle accepts the supplied 24V DC Power adapter. Do not substitute any other device or possible damage or operational defects may occur.

2 **Out-1 –** This RJ45 connection is designed ONLY for connection to the supplied "HLE-1" HDBase-T Receiver. Standard CAT5e or CAT6 wire is preferred and must utilize T-568 Type "B" terminations. The recommended maximum length of wire for 1080p resolutions is 70 Meters (CAT6).

3 **HDMI In 1-4 –** These four HDMI input jacks are standard HDMI v1.4a compatible and will pass all video and audio signals thru to the selected output. In addition, INPUT #4 will route Audio Return Channel (ARC) and Home Ethernet Control (HEC) Signals to your ARC and HEC-enabled AV Receiver via Output #2 (only).

4 **Out-2 –** Connect to your Display #2 for selection of Inputs 1-4. This is a standard HDMI v1.4a connector and will be limited to cable length similar to any other HDMI source.

5 **RS232 –** Control command connection for this switcher. Please refer to Appendix A for the command protocols. Three conductors are required.

6 **USB –** For Firmware updates (provided if necessary) by Transformative Engineering. DO NOT attempt to connect this port for any other reason. Loss of all operation may result.

7 **IR Sensor –** Receiver for remote control signals to control the Switcher. The remote controller is included in the accessory kit and is the controller recommended. Alternatively, RS232 commands or IR codes programmed into a Control System may be utilized. See Appendix A for the proper protocols.

8 **Power Button –** Turns this Switcher ON or OFF.

Switcher Functions

9 **Indicator Lights –** Shows when (1) Power is being applied to the HDBase-T Receiver, (2)'HDBT' when the HDBase-T Receiver is connected, and (3) 'HDMI'when the HDMI signal is obtained and should result in a stable picture. A Flashing 'HDMI" light indicates either non-compliant HDCP (no picture), or no HDCP is present (picture may be present). Whichever lights are present here should be mirrored at the HDBase-T Receiver.

10 **Select (Out-1) –** This manual button can select which input you desire routed to display #1. The two rows of indicator lights will show which input (1-4) you have chosen, along with a light indicating a HDMI "handshake" with the display, which should result in a picture.

11 **Select (Out-2) –** This manual button can select which input you desire routed to display #2. The two rows of indicator lights will show which input (1-4) you have chosen, along with a light indicating a HDMI "handshake" with the display, which should result in a picture

12 **Audio Out –** This is a stereo audio take-off from the audio supplied on OUTPUT #2. This is useful for adding the sound to an existing audio distribution system, or other purpose. It is a stereo mix-down of any surround mode audio present on the HDMI signal chosen.

13 **IRDA Out –** Infra-Red pathway designed to accept an IR emitter. The insertion of this IR signal is done at the HDBase-T Receiver located at the Display #1. See Section VII. NO DONGLE IS REQUIRED AT IRDA OUT.

14 **IRDA In –** Infra-Red pathway for sending IR commands to Display #1. This is sent over the UTP connection and decoded within the HDBase-T Receiver (See Section VII). IT IS IMPORTANT TO NOTE THAT THIS IS A POWERED CONNECTION, DESIGNED FOR A "XANTECH"-TYPE PICKUP. Utilization of this pathway as a "passive" IR inserter MUST include the mini-jack dongle included in the accessory kit. IR commands coming from a control system (Crestron, Control4, etc) must be routed thru the IR dongle which is then connected to this input. FAILURE TO DO SO WILL RESULT IN NON-OPERATION OF YOUR IR. Connection of a "Xantech" –type pickup may be directly connected here (NO DONGLE) which will power the pickup and insert the IR commands.

Receivers Functions

RECEIVER FUNCTIONS - See Page 8

1 IR Out – Connect a "Xantech"-compatible IR Emitter here to relay the IR commands injected at the "IRDA IN" port in Section VI, Item 6.

2 HDBase-T – RJ45 Connection for UTP (CAT5e or CAT6) wiring for OUTPUT #1. No power supply is required, as the Switcher provides power over the UTP wire. See Section VI, Item 2 for more information.

4 IR In – Infra-Red pathway for sending IR commands to the Switcher's IRDA OUT port. This is sent over the UTP connection and decoded within the Switcher. IT IS IMPORTANT TO NOTE THAT THIS IS A **POWERED CONNECTION**, DESIGNED FOR A "XANTECH"-TYPE PICKUP. Utilization of this pathway as a "passive" IR inserter MUST include the mini-jack dongle included in the accessory kit. IR commands coming from a control system (Crestron, Control4, etc) must be routed thru the IR dongle which is then connected to this input. FAILURE TO DO SO WILL RESULT IN NON-OPERATION OF YOUR IR. Connection of a "Xantech" –type pickup may be directly connected here (NO DONGLE) which will power the pickup and insert the IR commands.
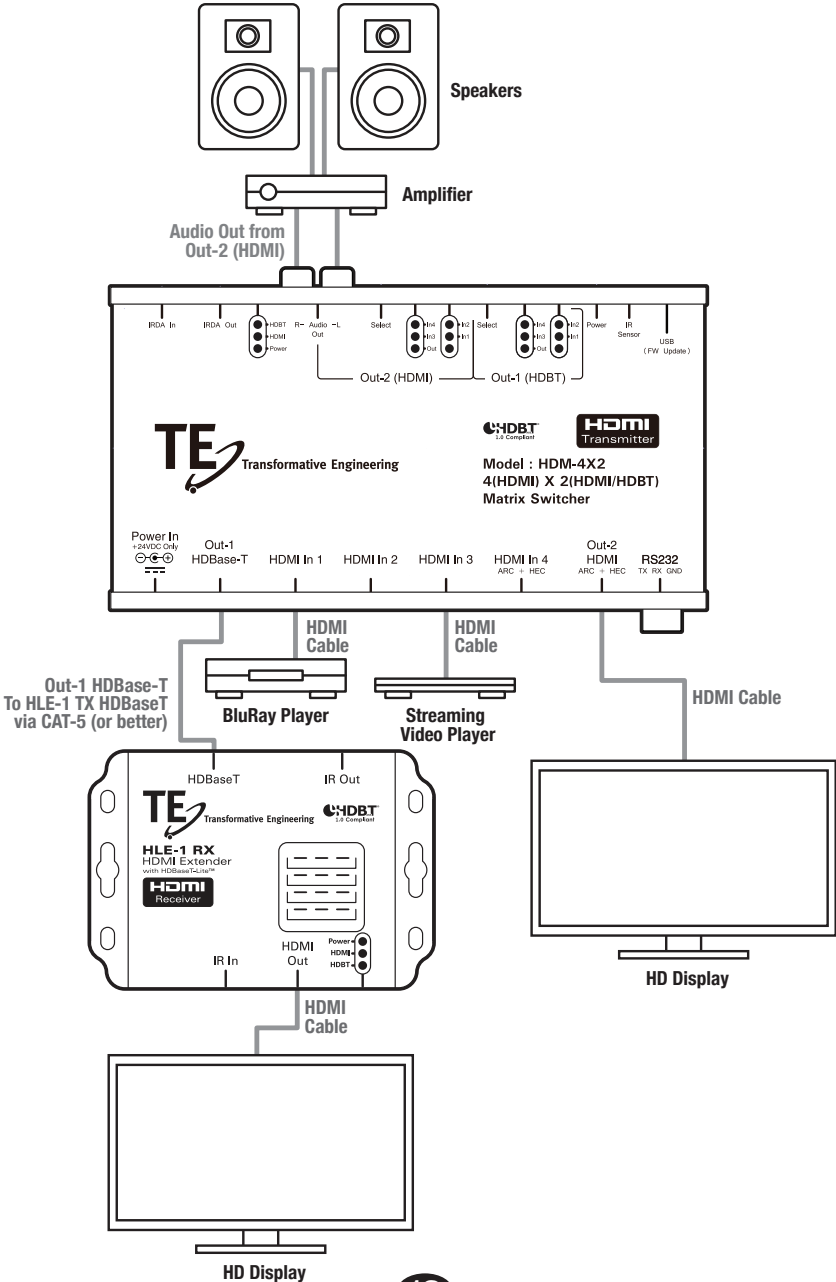
5 HDMI Out – Standard HDMI v1.4a connection. We recommend as short an HDMI cable as necessary. HDMI Cables in excess of 4 Meters are not recommended.

6 Indicator Lights – Indication for (1) Power acknowledged at the Receiver, (2) HDBase-T link established with the Switcher, and (3)) 'HDMI'when the HDMI signal is obtained and should result in a stable picture. A Flashing 'HDMI" light indicates either non-compliant HDCP (no picture), or no HDCP is present (picture may be present). Whichever lights are present here should be mirrored at the Switcher.

Wiring Diagram

Speakers

Amplifier

Audio Out from Out-2 (HDMI)

IRDA In   IRDA Out   HDBT R— Audio —L   Select   In4   In2 Select   In4   In2 Power   IR
                     HDMI   Out   In3   In1   In3   In1   Sensor   USB
                     Power   Out   Out   (FW Update)

Out-2 (HDMI)   Out-1 (HDBT)

TE Transformative Engineering   Model : HDM-4X2
                                           4(HDMI) X 2(HDMI/HDBT)
                                           Matrix Switcher

Power In   Out-1   Out-2
+24VDC Only HDBase-T HDMI In 1 HDMI In 2 HDMI In 3 HDMI In 4   HDMI   RS232
                                                        ARC + HEC ARC + HEC TX RX GND

HDMI Cable   HDMI Cable

Out-1 HDBase-T
To HLE-1 TX HDBaseT
via CAT-5 (or better)

BluRay Player   Streaming Video Player

HDMI Cable

HDBaseT   IR Out

TE Transformative Engineering

HLE-1 RX
HDMI Extender
with HDBaseT-Lite™

HDMI Receiver

Power
HDMI
HDBT

IR In   HDMI Out

HD Display

HDMI Cable

HD Display

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Troubleshooting & Warranty

TROUBLESHOOTING

As mentioned previously, most malfunctions can be addressed by careful examination of the Category cable terminations and suitability of the UTP cable itself. Once the "Link" lights are on, this system is operating normally. Lack of function should be traced to a failure in HDMI interconnection cables or device settings. If all this has been examined with no resolution of your problem, please contact our Technical Support Department at 781-769-6410 or via email at: info@transformativeengineering.com.

WARRANTY

Transformative Engineering, Inc. guarantees this product for Two Years from your original purchase. We guarantee performance and operation to published specifications including all parts and labor. We do not warranty against mis-use or abuse. To obtain warranty service, please contact our Technical Support Department at 781-769-6410 or via email at: info@transformativeengineering.com.

Appendix: IR Codes

IR CODES

Remote Code Mapping		HDM-4X2
Vendor Code	01FE	
Function	**Code**	**Description**
Power	0A	System Power ON/OFF
OUTPUT 1		
1	0C	Output 1 to Input 1
2	04	Output 1 to Input 2
3	08	Output 1 to Input 3
4	07	Output 1 to Input 4
OUTPUT 2		
1	1F	Output 2 to Input 1
2	1E	Output 2 to Input 2
3	05	Output 2 to Input 3
4	01	Output 2 to Input 4

RS232 Codes

Queries and Responses

[TX] - swc ?<CR><LF>
[RX] - (HDBT) Output 1 = 01<LF>
(HDMI) Output 2 = 04<LF>

Example Strings

[TX] - SWC 1 2<CR><LF>
swc 1 0<CR><LF>
swc 1 4<CR><LF>
swc 2 1<CR><LF>
swc 2 2<CR><LF>
swc 2 3<CR><LF>
swc ?<CR><LF>

[RX] - (HDBT) Output 1 = 04<LF>
(HDMI) Output 2 = 03<LF>

[TX] - swc 2 4<CR><LF>
swc ?<CR><LF>

[RX] - (HDBT) Output 1 = 04<LF>
(HDMI) Output 2 = 04<LF>

[TX] - \pwr 0<CR><LF>
pwr 0<CR><LF>
pwr 1<CR><LF>

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