



1T-CT-653 Transmitter



1T-CT-654A Receiver

## Instruction Manual

1T-CT-653/1T-CT-654A  
HDMI Over Single Cat.6  
With LAN/IR/RS-232



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## **1.0 INTRODUCTION**

Thanks for purchasing this HDMI over single Cat.6 product from tvONE. The product group consists of a 1T-CT-653 Transmitter coupled with a 1T-CT-654A Receiver which employs HDMI v1.4 capability and HDBaseT 5Play™ technology to allow transmission of uncompressed, 1080p high definition television signals over a single Cat.5e or Cat.6 cable (this is the type cable typically employed for Ethernet computer networks). HDMI v1.4 signals - including 3D and 4K x 2K formats - are supported and the system will also allow DVI signal transmission with appropriate DVI to HDMI Cable adapters. In addition, embedded 7.1CH LPCM, Dolby TrueHD and DTS-HD Master Audio capability is standard. The 1T-CT-653/1T-CT-654A system can achieve signal distribution distances of up to 100 meters (325 feet) for uncompressed 1080p signals without signal degradation. Control signals can be transmitted (Ethernet, Infrared or RS-232) and PoH (Power Over HDBaseT) technology is employed to allow powering of the Receiver from the Transmitter, negating the need for a separate power supply for that unit.

Our professional video conversion products have been serving the industry for over twenty years. tvONE offers a full line of high quality Seamless Switchers, Video Scalers, Up/Down/Cross Converters, Analog-Digital Converters (SD/HD-SDI, HDMI, DVI), Format Converters, Standards Converters, TBC/Frame Synchronizers, Matrix Routing Switchers, Signal Distribution Amplifiers and Cat.5 Transmission Systems.

### **1.1 Liability Statement**

Every effort has been made to ensure that this product is free of errors. tvONE cannot be held liable for the use of this hardware or any direct or indirect consequential damages arising from its use. It is the responsibility of the user of the hardware to check that it is suitable for his/her requirements and that it is installed correctly. All rights reserved. No parts of this manual may be reproduced or transmitted by any form or means electronic or mechanical, including photocopying, recording or by any information storage or retrieval system without the written consent of the publisher.

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## 1.2 Features

The 1T-CT-653/1T-CT-654A HDMI over single Cat.6 system has many features that enable it to perform in a superior manner. Among these features you will find:

- HDMI with 3D, 4k(24Hz/30Hz) support
- Compliant with HDMI v1.4a, HDCP 1.1 and DVI 1.0 specifications
- Uncompressed signal distribution to 100 meters (325 feet)
- Uses HDBaseT performance enhancing technology \*
- Full HD resolution support (1080p@60Hz/36bit), UHD support (4k@30Hz)
- HD 3D formats & PC resolutions up to WUXGA
- Supports Embedded HDMI Lossless Digital Audio
- Supports CEC bypass
- Uses a single Cat.5e/Cat.6/Cat.6a/Cat.7 Ethernet cable via RJ45 connectors
- Output resolution follows input
- Bi-directional Infrared remote control extension support
- Bi-directional RS-232 remote control
- Bi-directional Ethernet support
- Receiver supports both PoH (Power over HDBaseT) and local power.

\*  technology provides a methodology to distribute uncompressed video plus embedded audio (at a bit rate of up to 10.2 Gbps), 100Mbps Ethernet, RS-232, IR and up to 100 Watts of power over distances of up to 100 meters (325 ft.) via a single cable. Video signals above 1920x1200@60Hz require the use of Cat.6a or Cat.7 cable in order to reach 100 meter transmission distances. Individual transmitter/receiver pairs can be cascaded to extend the total transmission distance.

*NOTE: Not all HDBaseT products will support all of the features listed. The PoH function is designed for powering compatible receiver units only! Receivers of another brand may not be compatible and are not supported. Non-PoH tvONE receivers (1T-CT-652, 1T-CT-642, etc.) will need their own power supply.*

## 2.0 PACKAGE CONTENTS

Before attempting to use this unit, please check the packaging and make certain the following items are contained in the shipping carton:

- 1x Transmitter (1T-CT-653) or Receiver (1T-CT-654A) unit
- 1x Power Adapter
- 1x IR Emitter Device (with 1T-CT-653) or
- 1x IR Receiver Device (with 1T-CT-654A)
- 1x Operations Manual

*Note: Please retain the original packing material should the need ever arise to return the unit. If you find any items are missing, contact your reseller or tvONE immediately. Have the Model Number, Serial Number and Invoice available for reference when you call.*

### 3.0 SPECIFICATIONS:

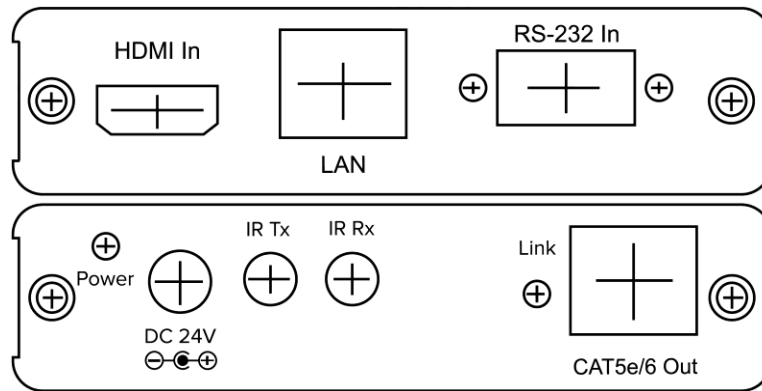
|                                                    |                                                                                                         |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Video Inputs/Outputs</b>                        |                                                                                                         |
| 1T-CT-653 Tx - HDMI Input                          | 1x via HDMI Connector                                                                                   |
| 1T-CT-654A Rx - HDMI Output                        | 1x via HDMI Connector                                                                                   |
| <b>Cat.5e/Cat.6 Cable Inputs/Outputs</b>           |                                                                                                         |
| 1T-CT-653 Tx - Cat.5e/Cat.6 Output                 | 1x via RJ45 Connector                                                                                   |
| 1T-CT-654A Rx - Cat.5e/Cat.6 Input                 | 1x via RJ45 Connector                                                                                   |
| <b>Additional Inputs/Outputs</b>                   |                                                                                                         |
| Connectors (each unit)                             | 1x RJ45 (Ethernet), 2x 3.5mm mini-jack (Infrared),<br>1x DB-9 (RS-232)                                  |
| <b>Supported Signals &amp; Protocols</b>           |                                                                                                         |
| Industry Standards                                 | HDMI v1.4a (3D, 4k), HDCP 1.1, DVI 1.0, Infrared,<br>RS-232, Ethernet                                   |
| <b>Video Performance</b>                           |                                                                                                         |
| Maximum Resolution                                 | HD up to 1080p@60Hz/36bit,<br>UHD up to 4k@30Hz, PC up to WUXGA                                         |
| <b>Audio Support</b>                               |                                                                                                         |
| Formats Supported                                  | 7.1 CH LPCM, Dolby TrueHD, DTS-HD Master Audio                                                          |
| <b>HDBaseT Support</b>                             |                                                                                                         |
| Maximum Bandwidth                                  | Uncompressed Video/Audio to 10.2Gbps                                                                    |
| <b>Maximum Range</b>                               |                                                                                                         |
| up to 1920x1200@60Hz (rates below 5.3 Gbps)        | 100m (325 ft.) using high quality Cat.5e/6 (23AWG)                                                      |
| up to 3840x2160@30Hz (rates above 5.3 Gbps)        | 70m (230 ft.) using high quality Cat.5e/6 (23AWG)<br>100m (325 ft.) using high quality Cat.6a/7 (23AWG) |
| <b>Cable Requirements (T/R)</b>                    |                                                                                                         |
| Ethernet Cable (UTP or STP)                        | Highest Quality Cat.5e, Cat.6, Cat.6a, Cat.7 cable                                                      |
| <b>Warranty</b>                                    |                                                                                                         |
| Limited Warranty                                   | 3 Years Parts and Labor                                                                                 |
| <b>Mechanical</b>                                  |                                                                                                         |
| 1T-CT-653 Size (H-W-D)<br>1T-CT-653 Weight (Net)   | 25 x 102 x 113mm (0.98 x 4.0 x 4.45")<br>252g (0.55 lbs.)                                               |
| 1T-CT-654A Size (H-W-D)<br>1T-CT-654A Weight (Net) | 25 x 102 x 113mm (0.98 x 4.0 x 4.45")<br>256g (0.56 lbs.)                                               |
| <b>Environmental</b>                               |                                                                                                         |
| Operating Temperature<br>Operating Humidity        | 0° to +40°C (+32° to +104°F)<br>20% to 90%, Non-condensing                                              |
| Storage Temperature<br>Storage Humidity            | -20° to +60°C (-4° to +140°F)<br>20% to 90%, Non-condensing                                             |
| <b>Power Requirement</b>                           |                                                                                                         |
| External Power Supply (1T-CT-653)                  | 1x 24VDC@1.25A, screw lock connector                                                                    |
| Optional External Power Supply (1T-CT-654A)        | 1x 5VDC@2.6A, screw lock connector                                                                      |
| <b>Regulatory Approvals</b>                        |                                                                                                         |
| Transmitter/Receiver Units                         | FCC, CE, RoHS                                                                                           |
| Power Supply                                       | UL, CUL, CE, PSE, GS, RoHS                                                                              |
| <b>Accessories Included</b>                        |                                                                                                         |
| 1x AC Power Adapter                                | US, UK and Euro Type                                                                                    |
| 1x IR Emitter or Receiver                          |                                                                                                         |
| 1x Operations Manual                               |                                                                                                         |

## 4.0 CONNECTING THE HARDWARE

Referring to the drawings below, connect the proper cables and then connect the AC power adaptor.

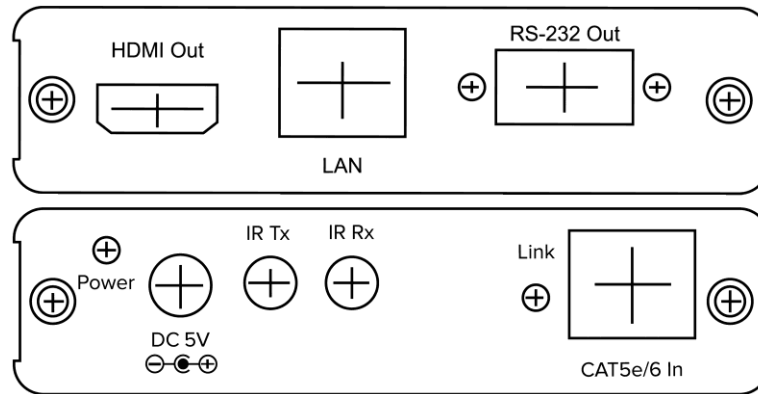
*NOTE: The resolution capability of the remotely located display devices must be capable of displaying the output of the source device. Before using the extender system, verify that the display device on the receiving end can support the output resolution and signal format by connecting it directly to the source device.*

### 4.1 1T-CT-653 Transmitter



1. Connect the HDMI source device's output to the HDMI IN port of the 1T-CT-653 Transmitter, using an appropriate HDMI cable, (1 Meter (~3') in length for 12 bit signals, 10 meters (~33') for 8 bit signals).
2. **(OPTIONAL)** If there is an IR controllable device on the 1T-CT-653 side that you wish to control remotely from the 1T-CT-654A side, connect the IR Emitter device to the IR Tx connector on the 1T-CT-653. If there is an IR controllable device on the 1T-CT-654A side that you wish to control remotely from the 1T-CT-653 side, connect the IR Receiver device to the IR Rx connector on the 1T-CT-653.
3. Connect the Cat.5e or Cat.6 cable to the transmitter via the CAT5e/6 Out port. Ensure that the RJ45 connector is securely locked into the transmitter's port.
4. If using the RS-232 control feature, connect the RS-232 device to the 1T-CT-653 via the DB-9 port.
5. If you wish to transmit Ethernet signals between the 1T-CT-653 and 1T-CT-654A, connect an Ethernet cable/device via the RJ45 LAN port.
6. Connect the 24v AC power adapter's DC power connector to the 1T-CT-653 Transmitter.

## 4.2 1T-CT-654A Receiver



1. At the remote location, connect the Cat.5e/Cat.6 cable to the Receiver's CAT5e/6 In port. Ensure that the RJ45 connector is securely locked into the receiver's port.
2. **(OPTIONAL)** If there is an IR controllable device on the 1T-CT-654A side that you wish to control remotely from the 1T-CT-653 side, connect the IR Emitter device to the IR Tx connector on the 1T-CT-654A. If there is an IR controllable device on the 1T-CT-653 side that you wish to control remotely from the 1T-CT-654A side, connect the IR Receiver device to the IR Rx connector on the 1T-CT-654A.
3. Connect the HDMI port of the Receiver to the HDMI input of the remote display or other device, using an appropriate cable, (1 Meter (~3') in length for 12 bit signals, 10 meters (~33') for 8 bit signals).
4. If using the RS-232 control feature, connect the RS-232 device to the 1T-CT-654A via the DB-9 port.
5. If you wish to transmit Ethernet signals between the 1T-CT-653 and 1T-CT-654A, connect an Ethernet cable/device via the RJ45 LAN port.
6. **(OPTIONAL)** If you wish to power the 1T-CT-654A locally then connect the 5v AC power adapter's DC power connector to the 1T-CT-653 Transmitter. **NOTE: If you wish to use the 1T-CT-653 Transmitter's PoH functionality to power the device you should skip this step.**
7. Turn on the remote display and source device. Observe the Link LEDs on the Transmitter and the Receiver. Both should be lighted.

### 4.3 RS-232 Cable Guide

To assist the user in fabricating the RS-232 cables used with external devices, the following chart is provided showing the pin-outs used for the RS-232 DB-9 connector.

| DB-9 Connector Pin Number | Connectivity |
|---------------------------|--------------|
| 1                         | N/C          |
| 2                         | TxD/RxD      |
| 3                         | RxD/TxD      |
| 4                         | N/C          |
| 5                         | Ground       |
| 6                         | N/C          |
| 7                         | N/C          |
| 8                         | N/C          |
| 9                         | N/C          |

### 5.0 OPERATING THE UNIT

Once the connections have been made and power applied as explained above, there are no operational adjustments required. It is recommended however that the power on sequence be as follows: HDMI destination device, HDMI Over Cat.6 Transmitter/Receiver and HDMI source – in that order.

### 6.0 TROUBLESHOOTING

Other than faulty cables, a non-functional power supply source for the receiver or transmitter, or attempting to use the product over too great a distance, there are seldom problems with these products.

*Note: It is strongly recommended that you use premium cables in order to achieve maximum distance cable runs and the best performance possible.*

If there is no image present at the remote location, connect the display device directly to the source to make certain that the problem is not in the display or signal source. If an image is present under those circumstances, make certain the transmitter(s) and receiver(s) are receiving power. Next make certain your Cat.5e/Cat.6 cable is defect free and securely attached at both ends. Also make certain that the HDMI connectors are securely attached at both ends.

After trying the above suggestions should the problem still persist, contact your dealer for additional suggestions before contacting tvONE. Should the dealer's technical personnel be unable to assist you, contact tvONE via our support website:

**<http://tvone.crmdesk.com>**. Create a technical support request on the site and our support team will respond within a short period of time.

## **7.0 LIMITED WARRANTY**

tvONE warrants the original purchaser that the equipment it manufactures or sells will be free from defects in materials and workmanship for a fixed term from the date of purchase. The warranty term for specific product lines is defined below.

1. tvONE branded products based on tvONE's CORIO technology are warranted for a period of five years from the date of purchase. This includes products with the model number prefix of C2, 1T-C2, CX, A2 or S2.
2. tvONE products, other than those based on tvONE's CORIO technology mentioned above, are warranted for a period of three years from the date of purchase. This includes products with the model number prefix of 1T, with the exception of 1T-C2.
3. LCD Monitors are warranted for a period of three years from the date of purchase, with the exception of the LCD panels integrated into the monitors that are supplied by third parties. LCD panels are limited to the term and conditions of the warranty offered by the respective LCD panel manufacturer. Such specific LCD panel warranties are available upon request to tvONE.

Should a product, in tvONE's opinion, prove defective within this warranty period, tvONE, at its option, will repair or replace this product without charge. Any defective parts replaced become the property of tvONE. This warranty does not apply to those products which have been damaged due to accident, unauthorized alterations, improper repair, modifications, inadequate maintenance and care, or use in any manner for which the product was not originally intended.

If repairs are necessary under this warranty policy, the original purchaser must obtain a Return Authorization Number from tvONE and return the product to a location designated by tvONE, freight prepaid. After repairs are complete, the product will be returned, freight prepaid.

**LIMITATIONS** - All products sold are "as is" and the above Limited Warranty is in lieu of all other warranties for this product, expressed or implied, and is strictly limited to the stated number of years from the date of purchase. tvONE assumes no liability to distributors, resellers or end-users or any third parties for any loss of use, revenue or profit.

tvONE makes no other representation of warranty as to fitness for the purpose or merchantability or otherwise in respect of any of the products sold. The liability of tvONE with respect to any defective products will be limited to the repair or replacement of such products. In no event shall tvONE be responsible or liable for any damage arising from the use of such defective products whether such damages be direct, indirect, consequential or otherwise, and whether such damages are incurred by the reseller, end-user or any third party.

## 8.0 REGULATORY COMPLIANCE

The 1T-CT-653 and 1T-CT-654A HDMI over single Cat.6 cable products have been tested for compliance with the appropriate FCC and CE rules and regulations. The power adaptor/supply has been tested for compliance with appropriate UL, CUL, CE, PSE, GS Rules, regulations and/or guidelines. This product and power adapter are RoHS compliant.

## 9.0 CONTACT INFORMATION

Should you have questions or require assistance with this product in areas not covered by this manual, please contact tvONE at the appropriate location shown below.

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End of Manual