



## Instruction Manual

# 1T-SX-654

4x1 HDMI 2.0, 4K HDR Switcher



# Table of Contents

|      |                                  |    |
|------|----------------------------------|----|
| 1.0  | Safety precautions               | 4  |
| 2.0  | Introduction                     | 5  |
| 3.0  | Features                         | 5  |
| 4.0  | Operation Controls and Functions | 6  |
|      | Front Panels                     | 6  |
|      | Rear Panels                      | 7  |
| 5.0  | Source Button Control            | 7  |
|      | Manual Switching                 | 7  |
|      | Automatic Switching              | 7  |
|      | IR Remote Functionality          | 8  |
| 6.0  | RS-232 Control                   | 9  |
|      | RS-232 Commands                  | 9  |
|      | Signal Switching                 | 9  |
|      | Source Device Control            | 9  |
|      | Display Device Control           | 10 |
|      | Audio Selection                  | 10 |
|      | System Control                   | 10 |
| 7.0  | EDID Management                  | 11 |
|      | Predefined EDID Setting          | 11 |
|      | User Defined EDID Setting        | 12 |
| 8.0  | ARC Mode                         | 13 |
| 9.0  | Firmware Upgrade                 | 13 |
| 10.0 | Specifications                   | 14 |
| 11.0 | Ordering Information             | 15 |
| 12.0 | Panel Drawing                    | 15 |
| 13.0 | Limited Warranty                 | 16 |
| 14.0 | Regulatory Compliance            | 18 |
| 15.0 | Liability Statement              | 18 |
| 16.0 | Contact Us                       | 19 |

## 1.0 SAFETY PRECAUTIONS

Read all instructions before attempting to unpack, install or operate this equipment, and before connecting the power supply.



- Unpack the equipment carefully and save the original box and packing material for possible future shipment
- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
- Refer all servicing to qualified service personnel.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Do not put any heavy items on the extension cable in case of extrusion.
- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
- Install the device in a place with fine ventilation to avoid damage caused by overheat.
- Keep the module away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Unplug the power cord when left unused for a long period of time.
- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

## 2.0 INTRODUCTION

The 1T-SX-654 is an ultra-thin auto switcher with four HDMI video inputs and one HDMI output with resolution support up to 4Kx2K@60Hz 4:4:4 HDR. Control options include auto-switch mode, which automatically switches to an HDMI input as soon as a new source is connected, or control via the front panel source button, RS-232 or IR (remote control included).

Audio functionality includes multi-channel support, de-embedded digital stereo audio to provide an analog output, or an audio return channel (ARC) for transmitting audio back to the HDMI input from the connected display.

## 3.0 FEATURES

- Switch any of the four HDMI inputs to a single HDMI output
- Supports video resolution up to 4Kx2K@60Hz 4:4:4 HDR
- 18Gbps high bandwidth
- HDMI 2.0 and HDCP 2.2 compliant
- Audio return channel (ARC) support
- Ultra-thin (12mm) design for easy install
- Controllable via RS-232 and IR
- Locking DC Power connector
- Supports CEC
- Advanced EDID management

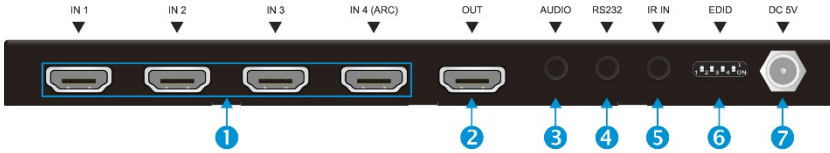
## 4.0 OPERATION CONTROLS AND FUNCTIONS

### FRONT PANELS



| Number | Name               | Description   |
|--------|--------------------|---|
| 1      | Auto/Source Button | <ul style="list-style-type: none"> <li>Press to switch to next input source.</li> <li>Press and hold at least three seconds to switch between manual mode and auto mode.</li> </ul> |
| 2      | Power LED          | The LED illuminates red when power is applied.  |
| 3      | Audio Mode LED     | <ul style="list-style-type: none"> <li>Illuminates green when de-embedding audio.</li> <li>Illuminates yellow when in ARC mode.</li> </ul>  |
| 4      | Switching Mode LED | <ul style="list-style-type: none"> <li>Illuminates green in manual switch mode.</li> <li>Illuminates yellow in auto-switch mode.</li> </ul>   |
| 5      | Input 1 - 4 LED    | The LED illuminates green when there is HDMI input on the corresponding channel.  |
| 6      | FIRMWARE           | Micro-USB port for firmware upgrade.  |

## REAR PANELS



| Number | Name   | Description   |
|--------|--------|---|
| 1      | 1 - 4  | Four type-A female HDMI input ports to connect HDMI sources. The Input 4 port supports ARC. |
| 2      | OUT    | Type-A female HDMI output port to connect HDMI display.                                     |
| 3      | AUDIO  | 3.5mm mini jack for analog audio output.  |
| 4      | RS-232 | 3.5mm mini jack to connect to a control device.   |
| 5      | IR IN  | 3.5mm mini jack to connect the included IR remote.  |
| 6      | EDID   | Four pin DIP switch for EDID setting.   |
| 7      | DC 5V  | Screw in locking connector to connect a 5V DC AC power adapter.                             |

## 5.0 SOURCE BUTTON CONTROL

### Manual Switching

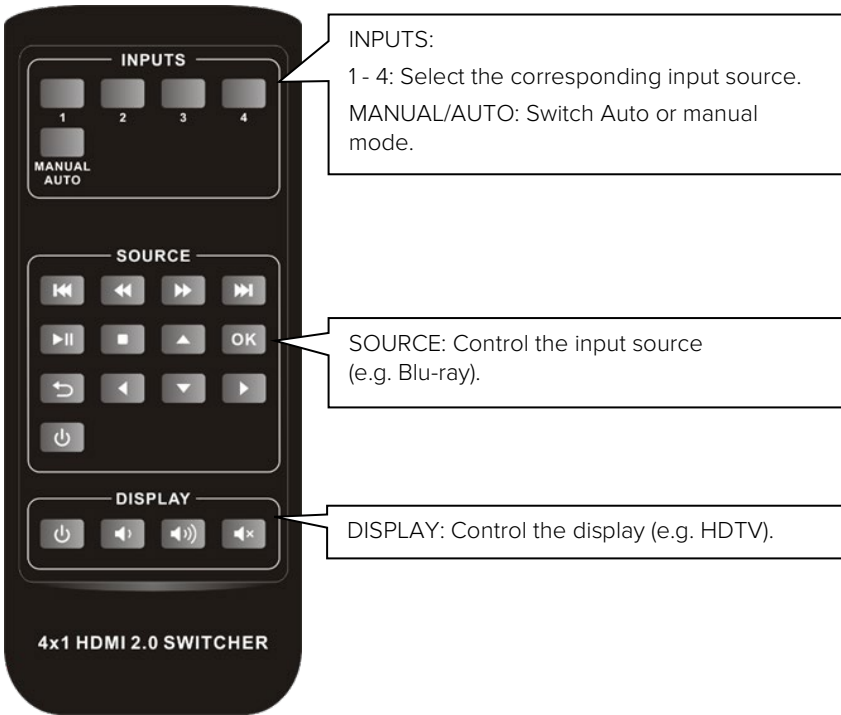
When the switcher is in manual switching mode, the Switching Mode LED will be green. To switch to the next input press the Auto/Source button to switch to the next input.

### Automatic Switching

To enable automatic switching, press and hold the Auto/Source button for three seconds. The Switching Mode LED will turn to yellow. In auto-switch mode, the switcher follows the rules in the certain circumstances:

- **New Input:** Upon detecting a new input, the switcher will automatically select the new source.
- **Reboot:** Once power is restored to the switcher, if the last selected source is still available, the switcher will still output this signal, otherwise, the switcher will switch to the first available active input starting at HDMI Input 1.
- **Source Removed:** When an active source is removed, the switcher will switch to the first available active input starting at HDMI Input 1.

## IR Remote Functionality



### Note:

- HDMI input 4 port does not support CEC. Any source device connected to this input can not be controlled by IR remote.
- The source and display devices are required to support CEC when the IR remote is used to control them.



## 6.0 RS-232 CONTROL

Connect the switcher to the control device (e.g. PC) with an RS-232 cable and set the parameters in the right manner:

Baud rate: 9600;

Data bit: 8;

Stop bit: 1;

Parity bit: none

### RS-232 Commands

**Note:** All commands must be ended with "<CR><LF>".

#### Signal Switching

| Function                      | Command  | Feedback Example |
|-------------------------------|----------|------------------|
| Switch to HDMI input 1.       | >>HDMI1  | <<HDMI1          |
| Switch to HDMI input 2.       | >>HDMI2  | <<HDMI2          |
| Switch to HDMI input 3.       | >>HDMI3  | <<HDMI3          |
| Switch to HDMI input 4.       | >>HDMI4  | <<HDMI4          |
| Enable auto-switching mode.   | >>AUTO   | <<AUTO Switch    |
| Enable manual switching mode. | >>MANUAL | <<MANUAL Switch  |

#### Source Device Control

**Note:**

- The input source device is required to support CEC.
- HDMI input 4 does not support CEC, the source device connected to this port can not be controlled by IR remote.

| Function  | Command           | Feedback Example  |
|---|-------------------|-------------------|
| Turn on the input source device, e.g. Blu-ray.  | >>SRCon           | <<SRCon           |
| Turn off the input source device, e.g. Blu-ray. | >>SRCOff          | <<SRCOff          |
| Play  | >>SRCPlay         | <<SRCPlay         |
| Pause   | >>SRCPause        | <<SRCPause        |
| Stop  | >>SRCStop         | <<SRCStop         |
| Fast Forward x1                                 | >>SRCForward      | >>SRCForward      |
| Fast Rewind x1                                  | >>SRCBackward     | <<SRCBackward     |
| Next Section                                    | >>SRCSkipForward  | >>SRCSkipForward  |
| Previous Section                                | >>SRCSkipBackward | <<SRCSkipBackward |
| Open the menu setting                           | >>SRCMenu         | >>SRCMenu         |
| Go back   | >>SRCBack         | >>SRCBack         |
| Confirm (OK)                                    | >>SRCOK           | >>SRCOK           |

|                 |            |            |
|-----------------|------------|------------|
| Exit            | >>SRCExit  | >>SRCExit  |
| Up direction    | >>SRCUp    | >>SRCUp    |
| Down direction  | >>SRCDown  | >>SRCDown  |
| Left direction  | >>SRCLeft  | >>SRCLeft  |
| Right direction | >>SRCRight | <<SRCRight |

### Display Device Control

**Note:** The display device is required to support CEC.

| Function                                | Command    | Feedback Example |
|---|------------|------------------|
| Turn on the display device, e.g. HDTV.  | >>TVOn     | >>TVOn           |
| Turn off the display device, e.g. HDTV. | >>TVOff    | >>TVOff          |
| Volume up.                              | >>TVVOL+   | >>TVVOL+         |
| Volume down.                            | >>TVVOL-   | >>TVVOL-         |
| Mute.                                   | >>TVMUTE   | >>TVMUTE         |
| Unmute                                  | <<TVUNMUTE | <<TVUNMUTE       |

### Audio Selection

| Function                             | Command       | Feedback Example |
|--------------------------------------|---------------|------------------|
| Select ARC audio channel.            | >>AUDExternal | <<AUDExternal    |
| Select the HDMI audio input channel. | >>AUDInternal | >>AUDInternal    |

### System Control

| Function                | Command   | Feedback Example  |
|-------------------------|-----------|---|
| System reset.           | >>RESET   | >>RESET   |
| Get system information. | >>SYSInfo | <<AUDExternal<br><< WUH4ARC-H2<br><< V1.0.0<br><< -----<br><<HDMI1<br><<Auto Switch<br><<AUDExternal<br><<EDID0 |

## 7.0 EDID MANAGEMENT

### Predefined EDID Setting

The rear panel boasts a four pin DIP switch to set the predefined EDID. The ten types of embedded EDID and their corresponding switch status are shown in the below list:

|  | ID | Switch Status | Video                                  | Audio           |
|--|----|---------------|--|-----------------|
|  | 0  | 0000          | Pass though                            | Pass though     |
|  | 1  | 0001          | 1920x1080p@60Hz<br>4:4:4 RGB 8bit      | Stereo          |
|  | 2  | 0010          | 1920x1080p@60Hz<br>4:4:4 RGB 8bit      | High Definition |
|  | 3  | 0011          | 1920x1080p@60Hz<br>4:4:4 RGB 12bit     | Stereo          |
|  | 4  | 0100          | 1920x1080p@60Hz<br>4:4:4 RGB 12bit     | High Definition |
|  | 5  | 0101          | 3840x2160p@60Hz<br>4:2:0 RGB 8bit      | Stereo          |
|  | 6  | 0110          | 3840x2160p@60Hz<br>4:2:0 RGB 8bit      | High Definition |
|  | 7  | 0111          | 3840x2160p@60Hz<br>4:4:4 RGB 10bit HDR | Stereo          |
|  | 8  | 1000          | 3840x2160p@60Hz<br>4:4:4 RGB 10bit HDR | High Definition |
|  | 9  | 1001          | 1280x800@60Hz                          | Stereo          |
|  | 10 | 1010          | 1920x1200@60Hz                         | Stereo          |



When in the lower position, the switch represents "ON", while putting the switch in the up position, it represents "OFF".

## User Defined EDID Setting

Except directly invoking the embedded EDID, the specific EDID can be customized.

Five EDID's can be customized following the below operations.

- 1) Rename the user defined EDID according the following format.

**EC\_xx\_xxxx\_xxx.bin**

- EC: Represents EDID.
- xx: Represents EDID ID. It is 11~15.
- xxxx: Represents the video parameter.
- xxx: Represents the audio format.

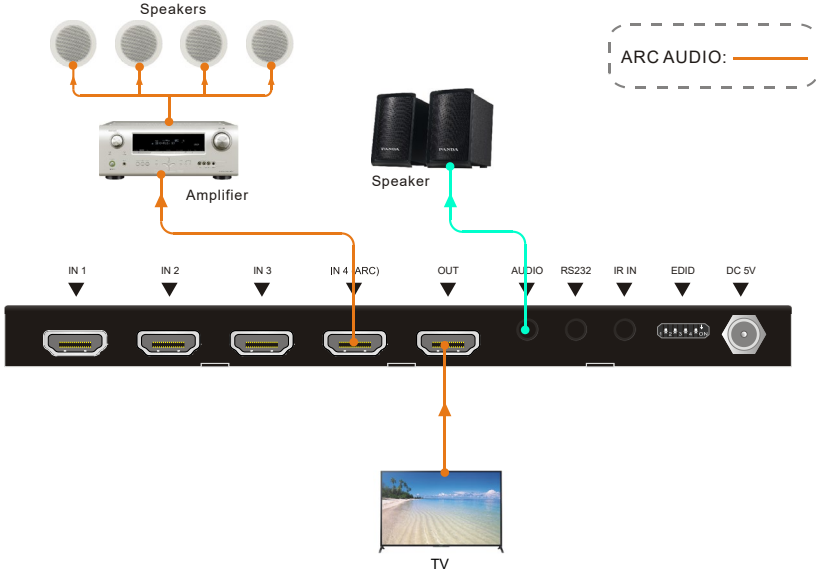
Example: EC\_11\_720P\_LPCM.bin

- 2) Power on the switcher, and then connect the switcher to the PC with an USB cable. The PC will automatically detect a U-disk named "BOOTDISK".
- 3) Double-click the U-disk, a file named of "READY.TXT" will be shown.
- 4) Copy the user defined EDID (such as **EC\_11\_720P\_LPCM.bin**) to the "BOOTDISK" U-disk.
- 5) Re-open the U-disk to check the filename "READY.TXT" whether automatically becomes "SUCCESS.TXT", if yes, the user defined EDID has been imported into the switcher and saved as its corresponding EDID ID successfully updated.
- 6) Repeat the above third to fifth step to copy other user defined EDIDs to the "BOOTDISK" U-disk.
- 7) Remove the USB cable and reconnect to the power supply.
- 8) The new EDID also can be invoked via the four pin DIP switch directly. The EDID ID and its corresponding switch status are shown in the below list.

| ID | Switch Status |
|----|---------------|
| 11 | 1011          |
| 12 | 1100          |
| 13 | 1101          |
| 14 | 1110          |
| 15 | 1111          |

## 8.0 ARC MODE

The Audio Return Channel (ARC) allows audio from a display to pass “upstream” through an HDMI cable to an audio processing device, such as an AV amplifier. active HDMI source device if it can process the signal.



Only the HDMI input four port features ARC, when the display and AV amplifier support ARC, the audio connection diagram is shown below:

## 9.0 FIRMWARE UPGRADE

Please follow the steps as below to upgrade firmware by the Micro-USB port on the rear panel:

1. Prepare the latest upgrade file (.bin) and rename it as “USERAPP.bin”
2. Connect the switcher to the PC with an USB cable, and then power on the switcher. The PC will automatically detect a U-disk named of “BOOTDISK”.
3. Double-click the U-disk, a file named of “READY.TXT” will be shown.
4. Directly copy the latest upgrade file (.bin) to the “BOOTDISK” U-disk.
5. Reopen the U-disk to check the filename “READY.TXT” whether automatically becomes “SUCCESS.TXT”, if yes, the firmware was updated successfully, otherwise, the firmware updating has failed. The name of upgrade file (.bin) should be confirm again, and then follow the above steps to update again.
6. Remove the USB cable after firmware upgrade.

# 10.0 SPECIFICATIONS

## TECHNICAL SPECIFICATIONS

### Video Input

|                       |                        |
|-----------------------|------------------------|
| Input                 | (4) HDMI 2.0           |
| HDMI Input Resolution | Up to 4Kx2K@60Hz 4:4:4 |
| HDCP Version          | 2.2                    |

### Video Output

|                        |                        |
|------------------------|------------------------|
| Output                 | (1) HDMI 2.0           |
| HDMI Output Resolution | Up to 4Kx2K@60Hz 4:4:4 |
| HDCP Version           | 2.2                    |
| HDMI Out current       | 50mA                   |

### Audio

|                        |  |
|------------------------|--|
| Output                 | (1) PCM via 3.5mm mini stereo audio jack |
| Audio Format           | PCM                                      |
| Audio Output Impedance | 70 Ohms                                  |
| Frequency Response     | 20Hz to 20kHz, ±3dB                      |

### Control

|         |   |
|---------|---|
| Control | Front panel button<br>IR IN via 3.5mm mini jack<br>RS-232 via 3.5mm mini jack |
|---------|---|

### General

|                        |  |
|------------------------|--|
| Bandwidth              | 18Gbps                                     |
| Operating Temp         | -10° - +55°C (14° to 131°F)                |
| Storage Temp           | -25° - +70°C (-13° to 158°F)               |
| Relative Humidity      | 10% - 90%                                  |
| Power supply           | Input: 100V - 240V AC; Output: 5V DC 1A    |
| Power Consumption      | 5W(Max)                                    |
| Replacement Power      | PS-05-10-LK                                |
| Supply                 |  |
| Dimensions (W x H x D) | 0.47" x 7.63" x 3.18"<br>(12 x 194 x 81mm) |
| Weight (Net)           | 180g (0.4 lbs)                             |

## 11.0 ORDERING INFORMATION

|              |  |
|--------------|--|
| 1T-SX-654    | 4x1 4K60 HDMI 2.0 switcher with HDCP 2.2 |
| ACC-PSU5V5-6 | Replacement PSU                          |

## 12.0 PANEL DRAWING



Top



Front



Back

## 13.0 LIMITED WARRANTY

Except for the limited warranty specifically set forth below, no warranty is made, either expressed or implied, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. In no event shall tvONE™ be liable for errors found within, or be liable for any direct, indirect or consequential damages or loss in connection with the purchase or use of the Product and any related hardware, software, or manual. The sole and exclusive liability of tvONE™ regardless of the form of action shall not exceed the purchase price of the Product described herein.

tvONE™ makes no warranties or representations that the Product or the Software will meet or satisfy the intended use or needs of You. You have the sole and exclusive obligation to make such determination. tvONE™ shall have no obligations of any type to You as a result of the Product and/or Software not satisfying or meeting the intended purpose or need of You.

tvONE™ warrants to the original purchaser that the Product 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 as follows:

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, C3, CX, A2, or S2.
2. tvONE™ products (other than (i) those based on tvONE™ 's CORIO™ technology mentioned above, and (ii) the ONERack™ products, mentioned below) are warranted for a period of two years from the date of purchase. This includes products with the model number prefix of 1T, with the exception of 1T-C2.
3. Magenta™ branded products are warranted for a period of three years from the date of purchase.
4. ONERack™ branded products are warranted for a period of one year from the date of purchase.
5. 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™ .



The liability of tvONE™ to the original purchaser with respect to any defective Product (as determined by tvONE™ in its sole but reasonable discretion) will be limited to (i) providing the original purchaser with a credit towards the purchase of additional products in an amount equal to the purchase price paid for the defective Product, (ii) the repair by tvONE™ of the defective Product, or (iii) the replacement by tvONE™ of such defective Product. In no event shall tvONE™ be responsible or liable for any damage arising from the use of such defective Product whether such damages be direct, indirect, consequential or otherwise, and whether such damages are incurred by the reseller, end-user or any third party. You are required to promptly provide written notice to tvONE™ after become aware of a defect in the Product. Should a Product, in tvONE™ 's sole but reasonable determination, prove defective within the applicable warranty period, tvONE™ will either, at its discretion,: (i) provide the original purchaser with a credit towards the purchase of additional products in an amount equal to the purchase price paid for the defective Product (in which event the Product must be returned to tvONE™); (ii) repair the defective Product; or (iii) replace the defective Product. Any defective parts replaced become the property of tvONE™. This warranty does not apply to any Product which has 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.

Any lawsuit arising out of, or related to, the sale of the Product (including but not limited to any warranty claims) must be brought within one year of the date the cause of action first accrues and must be brought in a state or federal court located in Hamilton County, Ohio.

Except for the limited warranty specifically set forth above, the Product is sold "as is". The above limited warranty is in lieu of all other warranties for the Product, expressed or implied, and is strictly limited to the applicable stated number of years from the date of purchase. tvONE™ assumes, and shall have, 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.

## 14.0 REGULATORY COMPLIANCE

This product has been tested for compliance with 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 is RoHS compliant.

## 15.0 LIABILITY STATEMENT

This product is intended for professional use. This product is not intended for use in a medical environment and does not have the required certifications for such use. Similarly, use aboard any aircraft or spacecraft while in flight or as an adjunct to any surface, airborne or marine navigation system or any offshore marine activity, including control of any watercraft, or any use similar to those specifically herein mentioned is prohibited. Use in the aforementioned circumstances would require additional testing and certification.

No warranty is made either expressed or implied including but not limited to any implied warranties of merchantability or fitness for a particular purpose. In no event shall the supplier or manufacturer of this product be liable for errors found within, or be liable for any direct, indirect or consequential damages or loss in connection with the purchase or use of this hardware, software or manual. The sole and exclusive liability to the supplier and manufacturer regardless of the form of action shall not exceed the replacement cost of the materials described herein.

tvONE reserves the right to revise any of its hardware and software products following its policy to modify and/or improve its products where necessary or desirable. This statement does not affect the legal rights of the user in any way. By using this equipment, you have indicated that you have agreed to the terms listed above. If you do not wish to agree or the above terms are contrary to your conditions of purchase you may return the equipment, unused, to your supplier. All third party trademarks and copyrights are recognized. The tvONE logo, Magenta logo, CORIO word and the CORIO logo are registered trademarks of tvONE. All other trademarks are the property of their respective holders.  
E&OE

## 16.0 CONTACT US

[www.tvone.com](http://www.tvone.com)

[info@tvone.com](mailto:info@tvone.com)

### tvONE NCSA

NORTH, CENTRAL AND SOUTH AMERICA

621 B Wilmer Avenue  
Cincinnati, Ohio 45226  
USA

Toll Free: +1-800-721-4044

US Main: +1-513-666-4210

US Tech: +1-513-666-4220

Sales: [sales@tvone.com](mailto:sales@tvone.com)

Support: [tech.usa@tvone.com](mailto:tech.usa@tvone.com)

### tvONE EMEA

EUROPE, MIDDLE EAST, AFRICA AND ASIA PACIFIC

Continental Approach, Westwood Industrial Estate,  
Margate, Kent CT9 4JG, UK

Tel: +44-1843-87331

Fax: +44-1843-873312

Sales: [sales.europe@tvone.com](mailto:sales.europe@tvone.com)

Support: [tech.europe@tvone.com](mailto:tech.europe@tvone.com)

Copyright 2018 tvONE. All rights reserved.

Information in this document is subject to change without notice. The software described in this document is furnished under a license agreement or nondisclosure agreement.

The software may be used or copied only in accordance with the terms of those agreements. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or any means electronic or mechanical, including photocopying and recording for any purpose other than the purchaser's personal use without the written permission of tvONE.

