Instruction Manual

MX-8488
HDMI v1.3 8x8 Matrix Switcher with HDBaseT over Cat.6

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1.0   INTRODUCTION

Thanks for purchasing this MX-8488 8x8 HDMI Matrix Switcher from tvONE. The MX-8488 is designed to distribute up to 8 HDMI sources (with 3D support) to up to 8 different destinations via HDBaseT over Cat.6. The MX-8488 supports HDMI (with HDCP) video with Deep Color, EDID and 7.1 channel audio. The video quality is excellent and the switcher uses single link (225MHz/6.75Gbps) video processing circuitry. The MX-8488 HDMI Matrix Switcher offers a convenient and cost effective method for the switching of high quality HDMI video. The MX-8488 is ready to provide an HDMI matrix switching solution ideal for boardroom, showroom, or exhibition use. Regardless of whether you use the IR remote, RS-232, Ethernet, or the front panel push button operation, control of the MX-8488 couldn't be easier.

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.5/6 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 MX-8488 has many features that enable it to perform in a superior manner. Among those features you will find:

- 8x HDMI inputs via HDMI Connectors
- 8x HDBaseT outputs via RJ45 Connectors
- HDMI v1.3, HDCP v1.1 and DVI v1.0 compliant
- Supports HDMI Deep Color and 3D video signals
- Supports 7.1 LPCM, Dolby TrueHD and DTS-HD Master Audio transmission
- Supports IR from both input and output locations
- 2RU Rack-mountable
- Front panel button controllable
- RS-232 controllable
- IR remote controllable
- Ethernet controllable (Web GUI and Telnet)
- Supports external and internal EDID settings
- Supports PC resolutions from VGA-WUXGA and video resolutions from 480i-1080p dependent upon the output display's EDID settings
- Supports PoH (Power over HDBaseT) on compatible receivers only

Note: The PoH function is designed for powering compatible receiver units only! Non-PoH tvONE receivers (1T-CT-652, 1T-CT-642, etc.) will need their own power supply. Receivers of another brand may not be compatible and are not supported.

2.0   SPECIFICATIONS

Video Inputs	
HDMI v1.3 (DVI Compatible)	8x via HDMI Type A Connectors
Video Outputs	
HDMI v1.3 (DVI Compatible)	8x via RJ45 Connectors
Additional I/O	
RS-232 Control Ethernet Control Infrared Receiver Infrared Transmitter Service	1x via DB9 Connector 1x via RJ45 Connector 9x 3.5mm mini-jack (IR Input) 9x 3.5mm mini-jack (IR Output) 1x Mini-USB
Supported Signals & Protocols	
Industry Standards	HDMI v1.3, HDCP v1.1, DVI 1.0, 3D, Infrared
General Specifications	
Video Bandwidth Maximum Resolutions Color Depth HD Audio Formats Supported Audio Sampling Rate IR Frequency	225 MHz/6.75 Gbps HD to 1080p@60Hz, PC to 1920x1200@60Hz 8-bit/10-bit/12-bit 7.1 LPCM, Dolby TrueHD, DTS-HD Master Audio Up to 192kHz 30-50kHz
Maximum Range	
Source to Matrix Matrix to HDBaseT Rx	15m (45') for 1080p/8-bit, 10m (30') for 1080p/12-bit 100m (325 ft.)
Control Methods	
Local Control	Front Panel via 13x Buttons
Remote Control	IR, RS-232 and Ethernet
Warranty	
Limited Warranty	3 Years Parts and Labor
Mechanical	
Size (H-W-D)	93 x 438 x 255mm (3.66" x 17.24" x 10.04")
Weight (Net)	4.46 kg (9.83 lbs.)
Environmental	
Operating Temperature	0° to +40°C (+32° to +104°F)
Operating Humidity	20% to 90%, Non-condensing
Storage Temperature	-20° to +60°C (-4° to +140°F)
Storage Humidity	10% to 85%, Non-condensing
Power Requirement	
Primary External Power Supply Optional External Power Supply (PoH Support)	1x 24VDC@6.25A, Push Lock Connector 1x 24VDC@6.25A, Push Lock Connector
Power Consumption (With PoH Support Enabled)	64W (120W)
Regulatory Approvals	
Main Unit	FCC, CE, RoHS
Power Supply	UL, CUL, CE, PSE, GS, RoHS
Accessories Included	
2x DC Power Adapters /w AC cords	US, UK or Euro Type
1x IR Remote Control 2x IR Transmitter 2x IR Receiver 1x Rack Mount Kit 1x Operations Manual	

3.0   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 MX-8488 Matrix Switcher
- 1x IR Remote Control
- 2x IR Transmitter
- 2x IR Receiver

- 2x DC Power Supplies
- 2x AC Power Cables
- 1x Rack Mount Kit
- 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.

4.0   CONNECTING THE HARDWARE

Please study the panel drawings below and become familiar with the signal inputs, outputs, power requirements plus any controls present.

To begin to configure the system, mount the unit with the supplied rack mounting hardware or place the unit on a flat surface that offers security and accessibility. Ensure that there is adequate ventilation and make sure that there is access to the rear and front panels.

You may now connect one of the supplied DC power supplies to the MAIN 24V port on the rear of the MX-8488 and then to a working AC outlet. If your configuration requires PoH support you can connect the second DC power supply at this time as well.
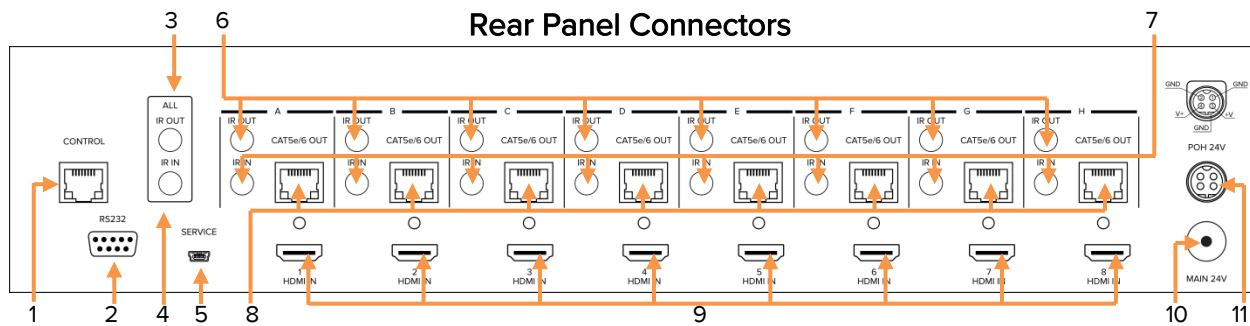*Note: If none of your HDBaseT receiver units require PoH (Power over HDBaseT) you should NOT connect the 2nd power supply!*

Ensure that the MX-8488 is in "Stand-by" mode (power LED is red) and turn off any equipment that will be a part of the installed system. Next, connect the input and output cables as required. When you plug in the cables, connect them securely and relieve the strain on the cables as much as possible so that they will not become unplugged.
Next, if you are using the RS-232 control function, connect the RS-232 cable at this time. If you are instead using the Ethernet functionality, connect the Ethernet cable at this time.

Turn the source and destination equipment on and then power on the MX-8488 Matrix Switcher (power LED will light green). You are now ready to operate the unit.

Note: To realize the full bandwidth capability of the switcher, you must use the highest quality cables available. Using poor quality cables or cables that are damaged will degrade the performance of the switcher and may result in an absence of signals entirely.

Rear Panel Connectors

3   6   7

ALL
IR OUT
IR IN

CONTROL

RS232

SERVICE

A   CAT5e/6 OUT   B   CAT5e/6 OUT   C   CAT5e/6 OUT   D   CAT5e/6 OUT   E   CAT5e/6 OUT   F   CAT5e/6 OUT   G   CAT5e/6 OUT   H   CAT5e/6 OUT

IR OUT   IR OUT   IR OUT   IR OUT   IR OUT   IR OUT   IR OUT   IR OUT
IR IN   IR IN   IR IN   IR IN   IR IN   IR IN   IR IN   IR IN

1 HDMI IN   2 HDMI IN   3 HDMI IN   4 HDMI IN   5 HDMI IN   6 HDMI IN   7 HDMI IN   8 HDMI IN

GND   GND
V+   -V
GND
POH 24V

MAIN 24V

1   2   4   5   8   9   10   11

1   CONTROL: This port is used to control the unit via Web GUI or Telnet. Connect your PC or control system via an Ethernet router or switch with an RJ45 terminated cable. (Sections 5.4 & 5.5) *Note: If you wish to directly connect your PC or control system to the unit you must use a crossover cable.*

2   RS-232: Used to connect a PC or control system with D-Sub 9-pin cable for the transmission of RS-232 commands. (Section 5.3)

3   ALL IR OUT: Connect to an IR Transmitter for local IR signal transmission. Place the IR Transmitter in direct line-of-sight of the equipment to be controlled. It will transmit all signals received from any connected HDBaseT Receivers with connected IR IN ports.

4   ALL IR IN: Connect to an IR Receiver for local IR signal reception. Ensure that the remote being used is within direct line-of-sight of the IR Receiver. It will send the IR signal out to all connected HDBaseT Receivers with connected IR OUT ports.

5   SERVICE: Manufacturer use only.

6   IR OUT A-H: Connect to individual IR transmitters for local IR signal transmission to individual source devices. Place the IR Transmitter in direct line-of-sight of the equipment to be controlled. It will transmit the signal received from a connected HDBaseT Receiver based on the current matrix routing settings.

7   IR IN 1-8: Connect to individual IR Receivers for local IR signal reception from discreet sources. Ensure that the remote being used is within direct line-of-sight of the IR Receiver. It will send the IR signal out to one or more of the connected HDBaseT Receivers based on the current matrix routing settings.

8   CAT5e/6 OUT A-H: Connect these Cat.6 output ports to the Cat.6 input ports on the HDBaseT Receivers you wish to use with RJ45 terminated Cat.6 cable.

9   HDMI IN 1-8: Connect to the HDMI input source devices (Blu-ray player, PC, etc.) with HDMI or DVI to HDMI cables.

10 DC 24V: Plug the supplied 24V DC power supply into the unit and connect the adaptor to an AC outlet to provide main power to the unit. (Required)

11 POH 24V: Plug the supplied 24V DC power supply into the unit and connect the adaptor to an AC outlet to provide power to connected HDBaseT Receivers that require PoH (Power over HDBaseT). *Note: If none of your HDBaseT receiver units require PoH (Power over HDBaseT) you should NOT connect this power supply!*

5.0   OPERATING THE UNIT

The MX-8488 is a special type of device called a Matrix Routing Switcher. A Matrix Switcher allows any input to be routed to any (or all) outputs whereas a regular routing switcher only allows the operator to select an input that will be sent to one dedicated output.

The MX-8488 can be controlled via any of four (5) methods: From the front panel, by use of the included Infrared Remote Controller, via serial (RS-232) or via Ethernet (Web GUI or Telnet).

If you have not done so already, press the POWER button on the front of the unit and observe that the power LED illuminates green to indicate that the unit is powered on. If the LED is red that indicated that the unit is in off/stand-by mode. If no light (red or green) is visible, make certain that the AC socket is providing the appropriate AC voltage and the DC power supply is securely plugged into the "MAIN 24V" power socket on the rear of the unit.

5.1   Control via the Front Panel

There are thirteen buttons on the unit including 8 input/output buttons, a "MENU/TAKE" button, a "LOCK" button, "IN" and "OUT" buttons, and the "POWER" button. Using these buttons, you can control all switching actions possible with the MX-8488. These actions are described below:

- To select one input to appear on one or more outputs, press the "IN" button followed by the input button that corresponds to the input (1-8) you want. Next press the "OUT" button followed by the output button(s) that correspond to the output(s) (A-H) you wish to send the signal to. You may now press the "TAKE" button and the selected paths will be completed from the input to the output(s). The LCD screen will also display each step of this process.

- The MX-8488 allows you to select between using the EDID of the display connected to Output A or using a built in "standard" EDID (1080p60, 8-bit color, 2.0 LPCM). To switch between these modes press the "MENU" button until the LCD screen displays "EDID Mode". Press "1" for the Standard EDID or "2" to use the EDID from the display on Output A.
  NOTE: Changing this setting may cause all outputs to briefly blink off while the new EDID settings are applied.

- You may press the "LOCK" button to restrict the use the front panel buttons. When the front panel lock is active the LED above the button will be lit. Press the "LOCK" button again to release the front panel lock.

Front Panel Controls
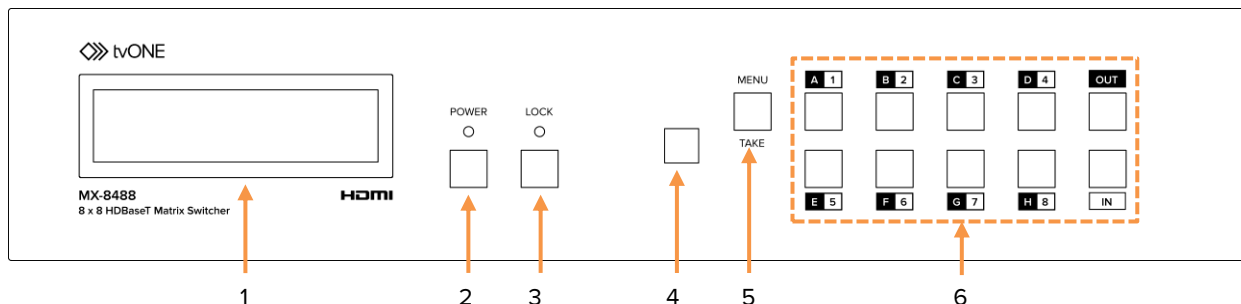
1   LCD: Displays the current I/O routing, EDID settings, Ethernet settings or functions as a live status display while you make changes to the I/O settings. Press the MENU button to step through each screen.
2   POWER: Press this button to turn the device on/off. The LED will illuminate green when the power is on and red when it is in stand-by mode.
3   LOCK: Press this button to lock out all of the buttons on the front panel. Press it again to unlock. The LED will illuminate green when the front panel is locked.
4   IR: IR Receiver window (accepts the remote control signal for this device only).
5   MENU/TAKE: Press this button to access the LCD menu system or to accept changes made to input/output routing selections.
6   1-8/A-H and IN/OUT: These buttons are used to directly change the input/output routing in the unit. Please see section 5.1 for more detail.

5.2   Remote Control Operation

1   POWER: Press this button to power the unit on or to place it into standby mode.

2   IN 1-8: Use these buttons to choose the input you wish to route to an output.

3   OUT A-H: Use these buttons to choose the output to send the selected input to.

Note: The remote can only be used to change single input to single output routing. It is not possible to make multiple output changes at one time with the remote control.

8
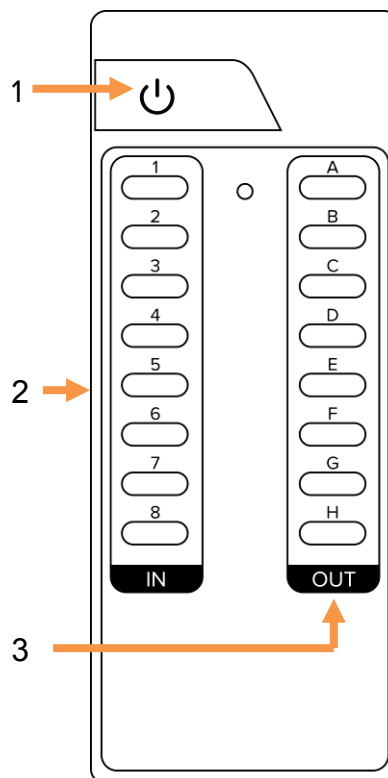
5.3   RS-232 Protocol

The connection between MX-8488 and controller with RS-232 modem cable.

MX-8488	
PIN	Assignment
1	NC
2	Tx
3	Rx
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

Remote Control	
PIN	Assignment
1	NC
2	Rx
3	Tx
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

RS-232

Transmission Format:

Baud Rate: 19200bps

Data Bit: 8 bits

Parity: None

Stop Bit: 1bit

Flow Control: None

COMMAND	DESCRIPTION
A1 - A8	Switch output A to input 1 - 8
B1 - B8	Switch output B to input 1 - 8
C1 - C8	Switch output C to input 1 - 8
D1 - D8	Switch output D to input 1 - 8
E1 - E8	Switch output E to input 1 - 8
F1 - F8	Switch output F to input 1 - 8
G1 - G8	Switch output G to input 1 - 8
H1 - H8	Switch output H to input 1 – 8
ABCD...H1 – ABCD...H8	Switch selected outputs (ABCD... etc.) to input 1 – 8 as a group
SETIP <IP> <Subnet> <Gateway>	Switches to Static IP mode and sets the IP, Subnet and Gateway
RSTIP	Resets the IP configuration to DHCP mode
IPCONFIG	Display the current IP config
P0	Power off
P1	Power on
I1 - I8	Switch all outputs to input 1 - 8
ST	Display current matrix state and firmware version
RS	System Reset
EM 1-2	Set EDID MODE (1=STD, 2=TV)
?	Display all available commands
QUIT	Exit (Telnet only)

Notes:
1. *RS-232 commands will be not executed unless followed with a carriage return (CR) command and for some systems a Line feed (LF) command. Commands are case-insensitive.*
2. *If the Telnet connection is idle for more than 10 minutes the port will automatically be closed.*

5.4   Telnet Control

Before attempting to use the Telnet control, ensure that both the MX-8488 (via the LAN port) and the PC/Laptop or control system being used are connected to the same active network.

You may now start your Telnet client of choice and connect directly to the unit's IP address. If you wish to use the Telnet software that is built into Windows XP, Vista and 7 please follow these instructions:

1. Go to the 'Start' menu and click on 'Run'.
2. After the 'Run' command windows opens type 'cmd' then press Enter. This will open the Windows command line interface (CLI).
3. Once in the Windows CLI type 'telnet' followed by the IP address of the unit you wish to control. This will connect to the unit and you will see the 'Telnet Command Service' prompt.
4. You may now begin sending commands directly to the unit. To receive a listing of all available commands please type '?'.

Note:
1. *The current IP address of the unit can be obtained from the LCD menu on the front panel.*
2. *Telnet commands will be not executed unless followed with a carriage return (CR) command and for some systems a Line feed (LF) command. Commands are case-insensitive.*

5.5   Web GUI Control

On a PC that is connected to same active network as the Matrix Switch, open a web browser and input the unit's IP address on the web address entry bar. The browser will bring up the MX-8488's Web GUI control page (see below for reference). All functions of the unit are controllable from the 3 screen tabs (Status, Control, Ethernet Settings).
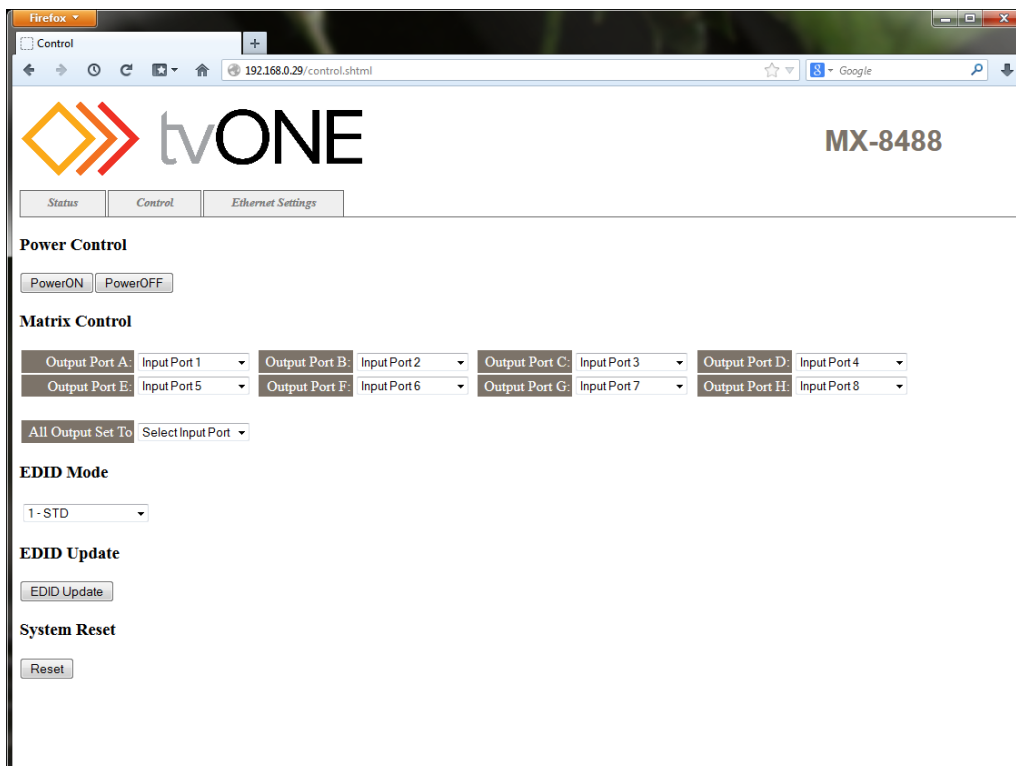
Note: The current IP address of the unit can be obtained from the LCD menu on the front panel.

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6.0   TROUBLESHOOTING

If the MX-8488 Matrix Switcher does not appear to be functioning, be certain that the source and all other devices connected to the unit are functioning correctly by connecting each device currently connected to the MX-8488 outputs directly to the destination device using a short length of cable. (In other words, bypass the MX-8488 to insure that the problem is not with the source or destination devices.) If the signal is present under those conditions, make certain that the power is present to the MX-8488 and that the EDID settings are appropriate. Check all cables for damage. Cables should be undamaged, as short as possible and should be premium quality.

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

As a final step before contacting technical support, use the Web GUI to perform a system reset will return the unit to the default settings. 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 two 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 MX-8488 Matrix Switcher has 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 is 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