Instruction Manual

**1T-SX-644 HDMI v1.4 FAST Switcher
with 3D / ARC**

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1.0   INTRODUCTION

The 1T-SX-644 HDMI v1.4 FAST Switcher with 3D / ARC allows selection of any of 4 inputs for display on an HDMI compliant display device. This version 1.4 HDMI device supports all standard High Definition Television formats, including 12-Bit Deep Color 1080p, plus PC formats through WUXGA. It also supports embedded HD-Audio, including Dolby® TrueHD and DTS-HD. Infrared Remote Control and RS-232 Control are standard features of the product.

Our professional video conversion products have been serving the industry for over twenty years. TV One 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. TV One 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

- HDMI 1.4, HDCP 1.4 and CEC1.4 Compliant
- Deep Color 36/30/24 Bit, 1080p @50/60Hz Support
- Allows switching of 4 inputs
- 3D Television Support
- Audio Return Channel Support (ARC)
- Fast Switching of all inputs
- HDCP Repeater Support
- Supports High Resolution PC Video Inputs through WUXGA
- Supports embedded Audio including Dolby® Digital TrueHD and DTS-HD
- IR Remote Control and RS-232 are standard features
- OSD (On Screen Display)

1.3   Getting the Best Results

There are many factors affecting the quality of results when switching HDMI type signals. Some basic precautions will ensure the best possible performance from your 1T-SX-644 HDMI v1.4 FAST Switcher with 3D / ARC.

- **Output display device** – The quality of the output signal will depend largely upon the type and quality of the HDMI display device used.   For instance, some video projectors just look better than others.
- **Distance between the switcher, the sources and the display** – This plays a major role in the final result. Long distances are possible, but special measures should be taken in order to avoid cable losses. These include using high quality cables. Line amplifiers may also be necessary for the longest runs.
- **Input/Output connection cables** – Low quality cables are susceptible to interference. They degrade signal quality due to poor matching and can cause elevated noise levels. Cables should be of the best quality.
- **Interference from nearby electrical devices** – These can have an adverse effect on signal quality. For example, an older computer monitor often emits very high electromagnetic fields that can interfere with the performance of video equipment in its proximity.

2.0   SPECIFICATIONS

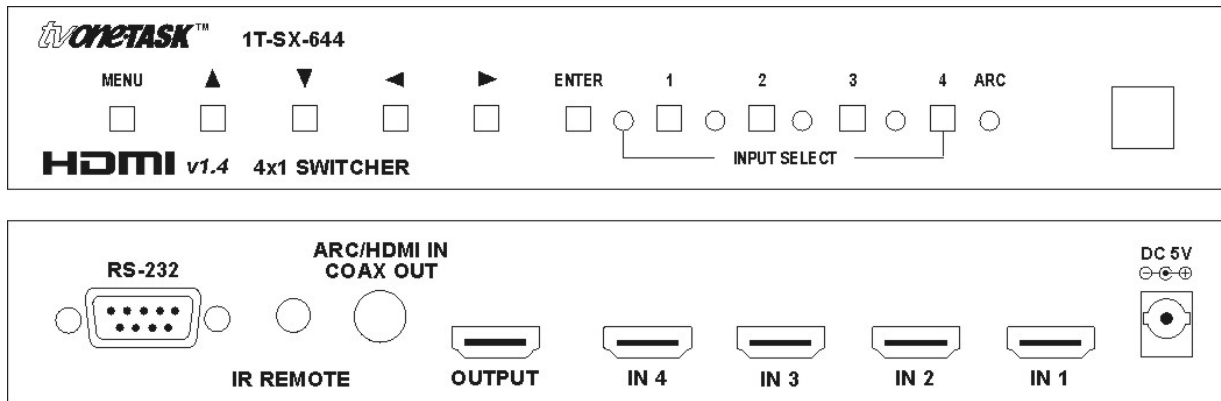| Supported Inputs	
Input Format	HDMI Version 1.4
Input Signal Types	HDMI (plus PC Video to WUXGA)
Supported Output	
Output Format	HDMI V1.4.
Output Signal Type	High Definition Multimedia Interface
Signal Characteristics	
Freq. Bandwidth	2.25Gbps (Single Link)
Compliance	HDMI 1.4, HDCP 1.4 & CEC1.4
Color Depth	Deep Color 36/30/24 Bit, 1080p
Repeater Operation	HDCP Repeater Support
Supported Audio	
Embedded Audio	Dolby® Digital TrueHD and DTS-HD
Return Audio Support	Audio Return Channel (ARC)
I/O Connections	
Input Connector	4x Type A HDMI Female
Output Connectors	1x Type A HDMI Female
Device Control	
Device Control	Front Panel, IR Remote w/OSD or RS-232
Environmental	
Operating Temperature	0° to +40° C (+32° to +104° F)
Operating Humidity	20% to 90%, Non-condensing
Storage Temperature	-10° to +60° C (+14° to +140° F)
Storage Humidity	20% to 90%, Non-condensing
Warranty	
Limited Warranty	3 Years Parts and Labor
Regulatory Approvals	
Main Unit	FCC, CE, RoHS
Power Supply	UL, CUL, CE, PSE, GS, RoHS
Mechanical	
Dimensions–HxWxD	1.2"x7.9"x 4" (30x200x102mm)
Weight	1.3 lbs (592g)
Power Requirement	
External Power Supply	100~240VAC to 5VDC/2A Locking Adapter
Accessories Included	
1x Power Adapter	US, UK or Euro
1x User Manual	
Model Number	
1T-SX-644	HDMI v1.4 Fast Switcher w/3D-ARC

3.0   CHECKING 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 1T-SX-644 HDMI v1.4 Fast Switcher w/3D-ARC
- 1x 100~240VAC to 5VDC Power Adapter
- 1x Instruction Manual
- 1x Infrared Remote Control

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 TV One immediately. Have the Model Number, Serial Number and Invoice available for reference when you call.

4.0   CONNECTING THE HARDWARE

Connect the HDMI Video Sources to the inputs of the 1T-SX-644 HDMI v1.4 Fast Switcher w/3D-ARC, connect its output to a HDMI Compliant monitor and lastly connect the AC to DC Power Adapter. The drawings below show the locations of the inputs, output, power switch and power connector.

4.1 Connecting the HDMI Inputs

You can connect any HDMI compliant device's output to any of the HDMI inputs. Make certain that the HDMI cable is securely plugged into the source device as well as the HDMI Switcher. Always use a high quality cable, as short a length as possible, for best results.

4.2 Connecting the HDMI Output

Using a high quality HDMI cable, connect the output of the HDMI Switcher to an HDMI compliant display device. Use the shortest cable run possible.

4.3 Connecting Power

The unit is shipped with a Power Adapter to convert 100~240VAC@50-60Hz to 5VDC. Connect the DC Output Cable from the Power Adapter to the back of the unit and then plug the Power Adapter into an AC Receptacle. Note that there is no power switch. The unit will power up as soon as you connect the AC Adapter to an appropriate AC source.

4.4 Optional Rack Mount Kit

The 1T-SX-644 HDMI v1.4 Fast Switcher w/3D-ARC can be mounted in a standard 19" equipment rack. To mount the units, the optional RM-230 Rack Mount kit must be purchased. Using this kit, either type HDMI switcher can be mounted in the rack. It is also possible to mount one of each switcher in the rack using the dual rack mount capability. It is not necessary to mount two of the same type of switchers.

5.0 OPERATING THE SWITCHER

The 1T-SX-644 HDMI v1.4 Fast Switcher w/3D-ARC may be operated via the Front Panel controls, the IR remote control or via RS-232 protocols.

5.1 Operation via the Front Panel

Inputs are selected by pressing the appropriate input select button. An LED will light adjacent to the selected input confirming your selection.

All other operations are accomplished via an On Screen Display (OSD) menu. The OSD menu is accessible from either the front panel or from the included Infra-Red remote control.

The OSD menu structure is displayed by pressing the Menu button on either the front panel or the remote.

The menu structure is shown below.

System Info

Press ▲ / ▼ to highlight an option.
Press [ENTER] to check the input/output device information and software version.
Press [MENU] to exit menu.
Press [ENTER] to confirm/exit the menu.

Sink EDID

Press ▲ / ▼ to highlight an option.
Press ◄ / ► to select the option.
Press [MENU] to exit menu.
Press [ENTER] to confirm/exit the menu.

Option	Description
Block Data	To check the sink Block0 & Block1's table of EDID.
Description:	To check the sink description of an EDID.

Source Infoframe

Press ▲ / ▼ to highlight an option.
Press ◄ / ► to select the option.
Press [MENU] to exit menu.
Press [ENTER] to confirm/exit the menu.

Option	Description
AVI (AVI Infoframe Data)	To check the source video infoframe packet.
AUD (Audio infoframe Data)	To check the source audio infoframe packet.

Input Select

Press ▲ / ▼ to highlight an option.
Press ◄ / ► to select the option.
Press [MENU] to exit menu.
Press [ENTER] to confirm/exit the menu.

Audio Return

Press ▲ / ▼ to highlight an option.
Press ◄ / ► to select the option.
Press [MENU] to exit menu.
Press [ENTER] to confirm/exit the menu.

Option	Description
Audio Return	On/Off

The audio return function requires some explanation as it is a new feature of HDMI 1.4.

The Audio Return Channel in HDMI 1.4 enables a TV, via a single HDMI cable, to send de-embedded audio data "upstream" to an A/V receiver or surround sound audio controller, increasing user flexibility and eliminating the need for a separate S/PDIF audio connection.

HDMI enabled Digital Television Displays have always been able to receive multi-channel audio through an HDMI connection, and this is still a typical situation, with the TV positioned "downstream" from content sources and any connected audio equipment. However, if a user had a TV with a built-in tuner or DVD player, and wanted to send content "upstream" from the TV back to the audio system once it had been decoded, a separate connection had to be installed from the display device back to the audio amplifier, typically an S/PDIF cable.

An Audio Return Channel-enabled TV can either send or receive audio via HDMI, upstream or downstream, depending on system set-up and user preferences which means that limitations of the S/PDIF approach are minimized.

When Audio Return is set to "Off", the standard rules of HDMI audio handling apply as summarized in the following chart: Examination of the chart will show that there are situations where you cannot always recover the decoded audio from the display device using the S/PDIF approach due to bandwidth limitations or due to the display device not being able to decode all audio formats.

Signal Type	HDMI Input	HDMI Output	Coaxial Output
Non-Compressed			
Digital PCM 2.0 (32K~192K)	Supported	Supported	Supported
Digital PCM 5.1 (48K~96K)	Supported	Supported	Unsupported
Digital PCM 7.1 (48K)	Supported	Supported	Unsupported
Compressed			
AC3 2.0 (48K)	Supported	Supported	Supported
AC3 5.1 (48K)	Supported	Supported	Supported
DTS 5.1 (48K)	Supported	Supported	Supported
AC3+ 7.1	Supported	Supported	Unsupported
DTS+ 7.1	Supported	Supported	Unsupported
Digital HBR Compression			
Dolby TrueHD 5.1	Supported	Supported	Unsupported
Dolby HD 5.1	Supported	Supported	Unsupported
DTS HD 5.1	Supported	Supported	Unsupported
DTS HD 7.1	Supported	Supported	Unsupported

Enabling Audio Return (turning it on via the OSD Menu), allows full support of audio that has been de-embedded at the display device using the same HDMI cable that sent the signal to the display device for the return audio path to the audio distribution system.

This is superior to using a separate S/PDIF coaxial cable from the display device back to the audio distribution system, particularly since there may be situations where the display device may not de-embed a particular signal type.

In that case, audio that's not decodable by the display device is de-embedded at the 1T-SX-644 and passed to the audio distribution system via the Coaxial Cable Output using short cables. Because of this capability, it doesn't matter if the display device is unable to de-embed the desired audio type due to hardware or software limitations.

The one requirement however is the display device must be capable of Return Audio capability so use of this functionality is dependent on the display device being fully HDMI 1.4 compliant.
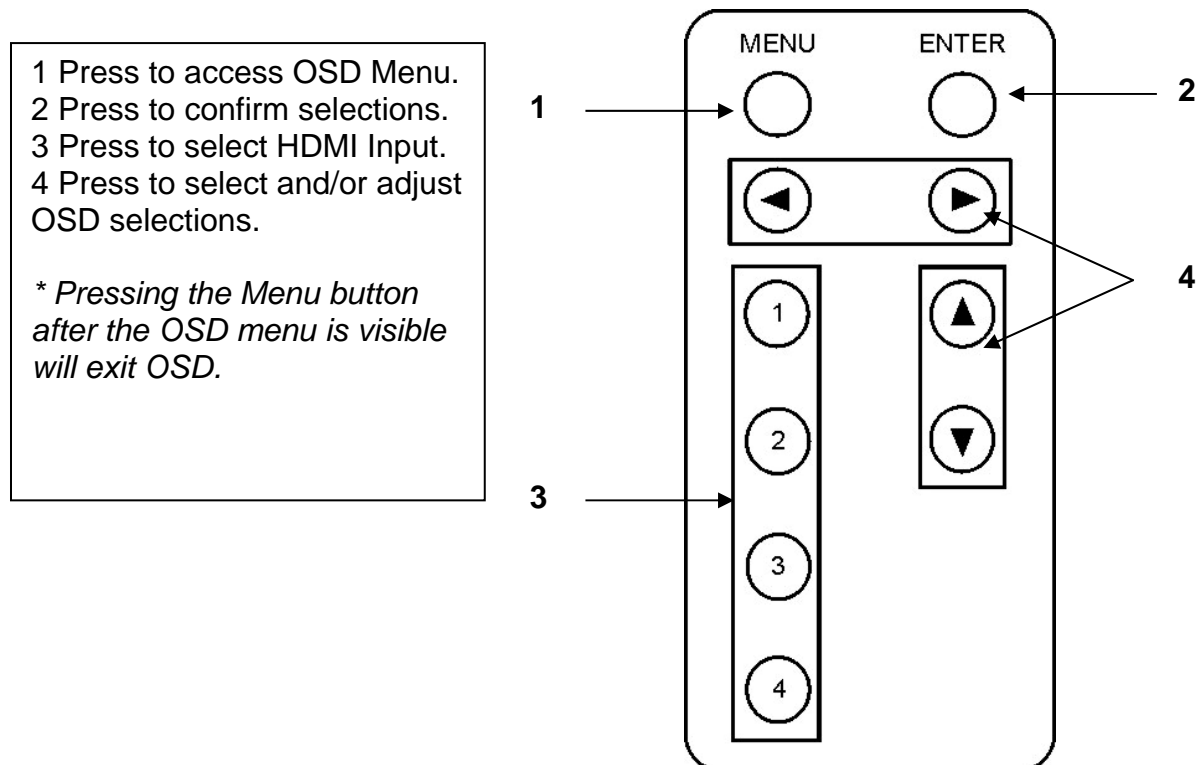
<u>Exit</u>

Press ▲/▼ to highlight an option.
Press [ENTER] to confirm/exit the menu.

5.2   Operation via Remote Control

Note: You may have to remove an insulator from the battery compartment of the Remote Control in order for the remote to receive power. The battery compartment slides out from the bottom of the unit.

5.2.1   Using the included Remote Control

1 Press to access OSD Menu.
2 Press to confirm selections.
3 Press to select HDMI Input.
4 Press to select and/or adjust OSD selections.

* Pressing the Menu button after the OSD menu is visible will exit OSD.

5.3   Operation via RS-232 Machine Control

Operation using RS-232 protocols is possible. The technical information needed is provided in the two charts which follow but if you are not technically inclined, seek help from an appropriately trained individual since cables will have to be constructed and programs written to use the RS-232 capabilities.

5.3.1   Connector Pin Outs

HDMI Switcher			Control Unit	
PIN	**Definition**		**PIN**	**Definition**
1	NC		1	NC
2	TxD	⟶	2	RxD
3	RxD	⟵	3	TxD
4	NC		4	NC
5	GND		5	GND
6	NC		6	NC
7	NC		7	NC
8	NC		8	NC
9	NC		9	NC

5.3.2   Communications Protocol

Baud Rate: 115200 bps
Data Structure: 8 Bits
Parity: None
Stop Bit: 1 Bit

5.3.3   Command Set

The table on the following page contains the command set that is available for control of the 1T-SX-644. You should adhere to this structure when controlling the unit via a computer or a hardwired controller.

Command Code	Response	Description
s port a	>Select Input Port A	Select Input Port A
s port b	>Select Input Port B	Select Input Port B
s port c	>Select Input Port C	Select Input Port C
s port d	>Select Input Port D	Select Input Port D
s menu 0	>OSD MENU Off	OFF : No Display On-Screen MENU
s menu 1	>OSD MENU On	ON : Display On-Screen MENU
s info 0	>OSD System Information Off	OFF : No Display On-Screen System Information
s info 1	>OSD System Information On	ON : Display On-Screen System Information
s menuct u	>MENU Cursor Up Move	MENU Project Up Move
s menuct d	>MENU Cursor Down Move	MENU Project Down Move
s menuct l	>MENU Cursor Left Move	MENU Project Left Move
s menuct r	>MENU Cursor Right Move	MENU Project Right Move
s menuct e	>MENU Cursor Enter	MENU Project Enter
s arctx 1	>ARC mode is on	ARC Mode Is On
s arctx 0	>ARC mode is off	ARC Mode Is Off
s reset	>System Reset	System Reset
r port	>Select port ?	Show Select Input Port Status
r arctx	>ARC mode is ?	Show ARC Mode Status
r fwver	>FW Version : Vx.xx	Show Firmware Version

6.0 TROUBLESHOOTING

In the event of problems, first make certain that the input and output cables are no more than 50 feet long (for signals to 1080i resolution) and are of the highest possible quality. Next, make certain that the Switcher is receiving power.

If all is well in these areas, remember that HDMI devices communicate with one another so the source devices and destination device must be fully HDMI capable. In addition, HDCP encryption requires additional processing which also is dependent on the equipment you have connected to the sources and destination device. If you experience problems using the 1T-SX-644 HDMI Switcher, you should attempt to determine what is wrong by attaching each of the source devices – one at a time – directly to the destination device using the same cables you are using with the expanded system. This is a way of determining if the problem is due to bad cables or a problem with the other devices. If you are unable to obtain a signal using this simplified path, suspect the cables, the source device(s) or the destination device.

After trying the above suggestions should the problem still persist, contact your dealer for additional suggestions before contacting TV One. Should the dealer's technical personnel be unable to assist you, contact TV One 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

TV One 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. TV One branded products based on TV One'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. TV One-task branded products, other than those based on TV One'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 TV One.

Should a product, in TV One's opinion, prove defective within this warranty period, TV One, at its option, will repair or replace this product without charge. Any defective parts

replaced become the property of TV One. 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 TV One and return the product to a location designated by TV One, 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. TV One assumes no liability to distributors, resellers or end-users or any third parties for any loss of use, revenue or profit.

TV One 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 TV One with respect to any defective products will be limited to the repair or replacement of such products. In no event shall TV One 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-SX-644 HDMI Switcher has been tested for compliance with appropriate FCC and CE rules and regulations. The Power Adaptor/Supplies have been tested for compliance with appropriate UL, CUL, CE, PSE, GS Rules, Regulations and/or Guidelines. These Products and Power Adapters 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 TV One at the appropriate location.

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End of Manual