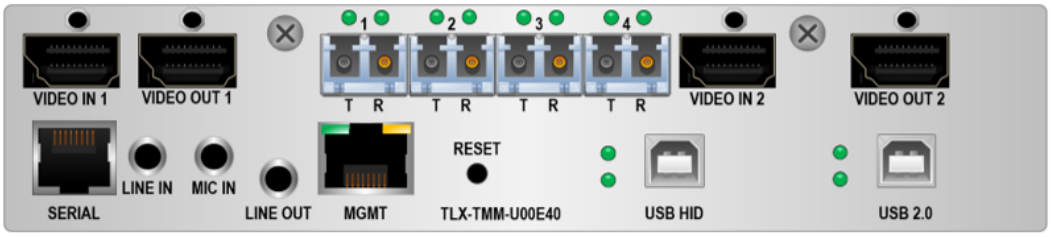
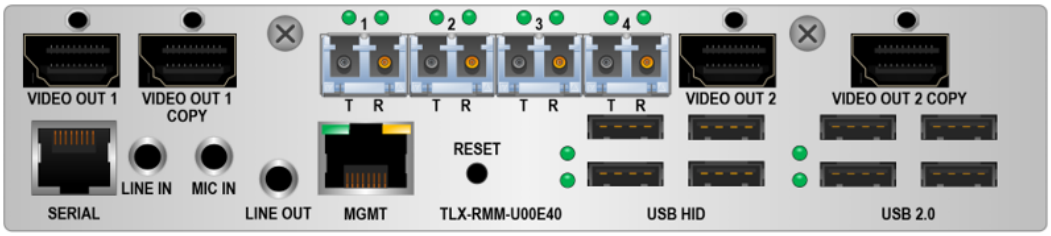
thinklogical®

A BELDEN BRAND

TLX VIDEO&KVM EXTENSION

PRODUCT MANUAL





Our complete line of

TLX Fiber-Optic Extenders

for use in the

CHS-1, CHS-2 & CHS-4 Chassis

Full 4K at 60Hz Video and KVM Fiber-Optic Extension Solutions over the Fewest Cables

Rev. J, September 2021

Thinklogical, A BELDEN BRAND • 100 Washington Street • Milford, Connecticut 06460 U.S.A.

Copyright Notice

Thinklogical, A **BELDEN** BRAND
100 Washington Street
Milford, Connecticut 06460 U.S.A.
Telephone: 1-203-647-8700

Subject: TLX Video & KVM Fiber-Optic Extension Modules Product Manual
Revision: J, September 2021

Website: https://www.thinklogical.com
Facebook: www.facebook.com/ThinklogicalUSA
LinkedIn: www.linkedin.com/company/thinklogical
YouTube: www.youtube.com/user/thinklogicalNA
Twitter: @thinklogical

Table of Contents

PREFACE

About Thinklogical A BELDEN BRAND

Thinklogical, a Belden Brand, is the leading manufacturer and provider of fiber-optic and CATx video, KVM, audio, and peripheral extension and switching solutions used in video-rich, big-data computing environments.

Thinklogical offers the only fiber-optic KVM Matrix Switches in the world that are accredited to the Common Criteria EAL4, TEMPEST SDIP 24 Level B, and NATO NIAPC Evaluation Scheme: GREEN and the U.S. DoD DISA JITC UCR 2013 APL information assurance standards. And Thinklogical Velocity products are the first system with both KVM and video matrix switching capabilities to be placed on the Unified Capabilities Approved Product List (UC APL) under the Video Distribution System (VDS) category.

Thinklogical products are designed and manufactured in the USA and are certified to the ISO 9001:2015 standard.

Thinklogical is headquartered in Milford, Connecticut and is owned by Belden, Inc., St. Louis, MO (http://www.belden.com). For more information about Thinklogical products and services, please visit https://www.thinklogical.com.

Note and Warning Symbols

Throughout this document, you will notice certain symbols that bring your attention to important information. These are **Notes** and **Warnings**. Examples are shown below.

Note: Important Notes appear in blue text preceded by a yellow exclamation point symbol, as shown here.

A note is meant to call the reader's attention to **helpful** information at a point in the text that is relevant to the subject being discussed.

Warning! All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, as shown here.

A warning is meant to call the reader's attention to **critical** information at a point in the text that is relevant to the subject being discussed.

Product Serial Number

Thinklogical products have a unique serial number, which includes a date-code, printed on an adhesive label that is affixed to the unit. The format for the date-code is *2 digits for the month*, dash, *2 digits for the year*, plus *at least four digits for a unique unit number*. For example: **06-210138** indicates the unit was built in the **6**th month of 20**21** and is unit number **138**.

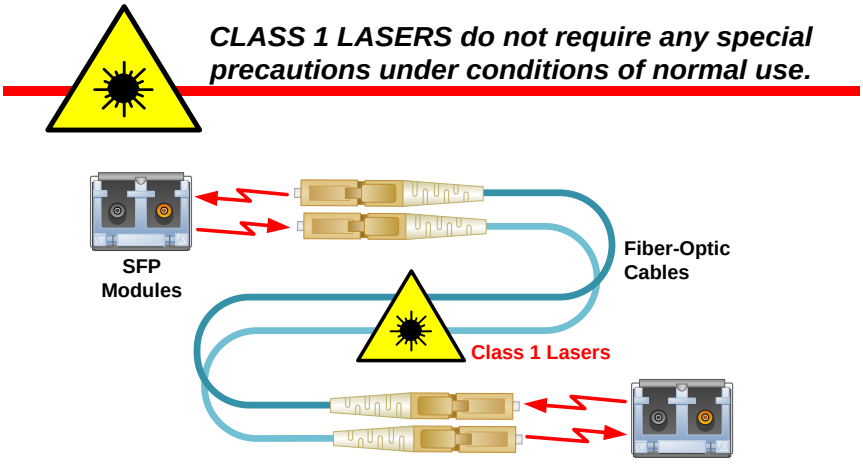
Connection to the Product

Connections and installation hardware for our products use industry-standard devices and methods. All wiring connections to the customer equipment are designed to minimize proprietary or customized connectors and cabling. Power connections are made with regionally appropriate power cords and approved methods.

READ THE INSTRUCTIONS THOROUGHLY BEFORE STARTING ANY PROCEDURE!

Class 1 Laser Information

TLX Extenders and Matrix Switches, like all Thinklogical fiber-optic products, are designed and identified as **Class 1 LASER products.** This means the maximum permissible exposure (MPE) cannot be exceeded when viewing the laser with the naked eye or with the aid of typical magnifying optics (e.g. magnifying glass, eye loupe, etc.).



Introduction

Introducing Thinklogical's newest family of switching and extension solutions, for uncompressed, high resolution video and KVM systems over fewer cables.

UNCOMPRESSED 4K

Features of the TLX Extension & Matrix Switch System

Offering a higher bandwidth solution, the TLX product line provides 10Gbps bandwidth per port to preserve signal integrity and provide uncompressed, high resolution video with no artifacts, latency or lost frames.

The TLX Product Family offers these features to enhance ease of integration:

- **Hybrid switching solutions (fiber and CATx)** start at 12 ports and scale up to 640 ports.
- **A higher bandwidth solution** to address new video resolutions and prepare for future protocols.
- **Reduces system cabling by half** by enabling transmission through higher bandwidth.
- Extend and switch:

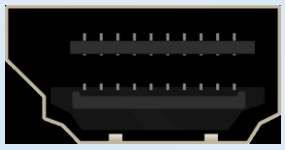
  Single display up to 4096x2160 @ 30Hz with full 4:4:4 color depth, over a single fiber or shielded CATx cable.

  Single display up to 4096x2160 @ 60Hz with full 4:4:4 color depth, over two fibers or two shielded CATx cables.

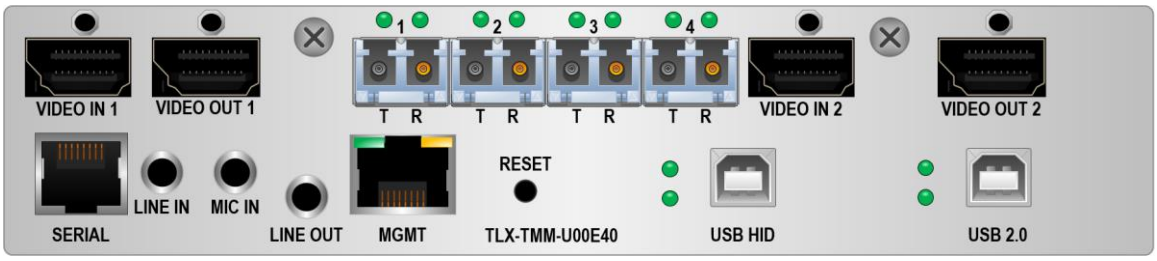
  Dual displays up to 4096x2160 @ 60Hz with full 4:4:4 color depth, over four fibers.
- Dual connectors on most TLX Extenders, offering support for both HDMI and DisplayPort, **reduces the number of extenders and converter cables required** and enables users to future-proof system designs.

DisplayPort 1.2 up to 4K @ 60Hz →

HDMI 1.4 up to 4K @ 30Hz / HDMI 2.0 up to 4K @ 60Hz →



This connector is installed on every TLX Video and KVM extender module.
(HDMI 2.0 is supported by the "E" versions of TLX extenders, only.)



***TLX-TMM-U00E40** Dual 60Hz Display Transmitter with USB HID, USB 2.0, RS-232 & Audio*

Product Overview

TLX Fiber-Optic Extenders are functionally equivalent to Thinklogical's Velocity Q-Series Video Extenders, but TLX uses a frame-based 10 Gbps transport.

- All TLX Extenders are compatible with each other, but *not* backwards compatible with Velocity 6.2208 Gbps transport.

TLX Video and KVM Extension Systems

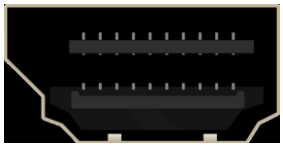
- Supports **HDMI 1.4** (4K @ 30Hz) and **HDMI 2.0** or **DisplayPort 1.2** (4K @ 60Hz) cables
- The 12G SDI Extender supports HD, 3G, 6G or 12G SDI with up to four **HD-BNC** inputs
- 10Gbps bandwidth per port
- Multi-mode fiber and single-mode fiber configurations
- Extension of up to 80km over fiber-optic cables
- Support for a single display up to 4096x2160 @ 30Hz over a single fiber-optic cable
- Support for a single display up to 4096x2160 @ 60Hz over two fiber-optic cables
- Support for two displays up to 4096x2160 @ 60Hz over four fiber-optic cables
- Supports HDCP content
- Local output port(s)
- Ethernet port for configuration, management and updates
- Supports either Line-in or embedded audio at the Receiver's Line-out port
- Support for unbalanced analog audio and serial RS-232
- Support for USB HID (1.5 Mbps) and USB 2.0 (480 Mbps), on KVM Extenders
- Modular, hot-swappable form factor
- Several chassis types available, for surface mount and rack mount applications (pg. 7).
- HID models work with *Hotkeys* (see *Appendix I: Flex Keys*, pg. 86)

DisplayPort & HDMI Connector

Thinklogical includes an innovative connector on its TLX Extenders. The connector can receive HDMI 1.4, HDMI 2.0 and DisplayPort 1.2 cables, reducing the number of extenders needed and eliminating the need for an external adapter or dongle to convert from DisplayPort to DVI or HDMI. It also allows the customer to upgrade from HDMI to DisplayPort with no change in equipment. When combined with a Thinklogical TLX Matrix Switch, it's easy to combine and connect HDMI/DVI and DisplayPort sources and displays.

Note: DisplayPort 1.2 Video Cables and **HDMI 2.0 Cables** support up to 4K @ 60Hz. **HDMI 1.4 Video Cables** support up to 4K @ 30Hz. Install *either* DisplayPort *or* HDMI cables at both the Transmitter and Receiver.

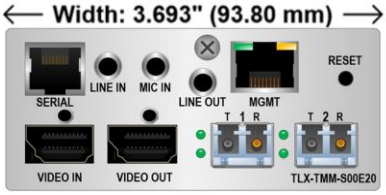
DisplayPort Connector →
HDMI Connector →



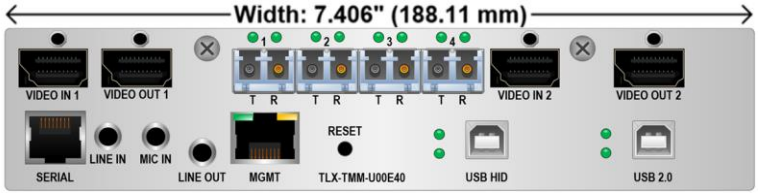
Form Factor

TLX extension systems are available in a modular form factor. The modular extenders are compact and hot-swappable, so users can field-configure any modular chassis. The optical modules, the SFPs, are also hot-swappable. **The modular system promotes system flexibility and scalability and reduces maintenance costs and down-time.**

Video & USB Modules:
Height: 1.592" (40.43 mm)
Depth: 6.366" (161.69 mm)
Width: 3.693" (93.80 mm)



KVM Modules:
Height: 1.592" (40.43 mm)
Depth: 6.366" (161.69 mm)
Width: 7.406" (188.11 mm)



The TLX Modular Extender Chassis Line

Several chassis types are compatible with all TLX modular extenders, allowing users to mix-and-match chassis types to reduce the overall footprint of the design. Users can choose from the rack mount chassis (housing up to four video extenders or up to two KVM extenders in a single rack unit) with redundant and hot-swappable power supplies, or from our more compact, space-saving designs for desktop applications.

Each TLX Chassis accommodates the full line of TLX Extender Products.

- The **CHS-4** is a rack-mount unit for up to 4 modules of HDMI, DVI, RGB or SDI in a 1RU chassis.
- The **CHS-2** is a desktop solution that accommodates one 7.4" or two 3.7" modules of HDMI, DVI, RGB or SDI in a compact, desktop chassis. Rack-mount attachments are available.

Both the CHS-4 and CHS-2 Chassis can combine a variety of modules in transmit/receive units for a space-saving and cost-effective solution.

- The **CHS-1** stand-alone chassis will accommodate one 3.7" TLX video module.

All TLX Chassis are powered by standard 100-240 VAC, 50-60 Hz.

CHS-000004 Chassis: Supports any combination of up to four TLX video modules. Dual interface and current sharing power supplies. Desktop or 19" rack-mount.

CHS-000002 Chassis: Supports up to two TLX video modules. Desktop only. Rack-mounts available.

CHS-000001 Chassis: Supports one TLX video module. Desktop only.

CHASSIS	H	D	W
CHS-000004	1.72"	14.00"	17.47"
CHS-000002	1.72"	10.66"	10.74"
CHS-000001	1.72"	10.66"	4.31"

Mixing TLX Modules and Non-TLX Modules in a Single Chassis

Besides TLX products, Thinklogical also carries the Q-Series line of 6G extension products in a modular form. **Non-TLX modules, such as Q-Series (VQM), are fully compatible with the CHS-4, CHS-2 and CHS-1 chassis as well as their own Q-4300, Q-2300 and Q-1300 chassis.** However, because VQM modules generate less heat than TLX modules, they were not deigned to allow air flow through their enclosures as in TLX modules.

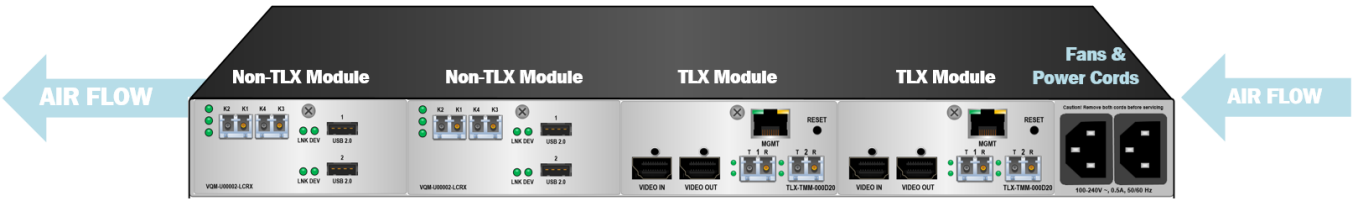
Air flow through VQM Modules

To avoid over-heating of TLX modules when mixed with non-TLX modules, the simple solution is to always install all non-TLX modules on the left side of the chassis (as looking from the back where the modules are loaded) **and install all TLX modules on the right side, next to the cooling-air intake fans** (The side next to the power cord receptacles). This will allow proper air flow over the warmer TLX modules and will prevent over-heating. *This is true for both the CHS-4 and CHS-2 Chassis and for both the Q-4300 and Q-2300 Chassis.*

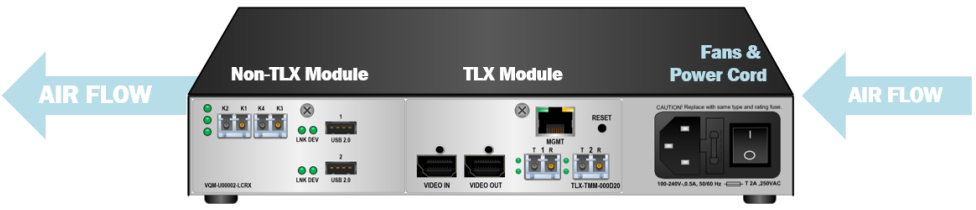
Warning! To avoid over-heating of TLX modules, always install all non-TLX modules on the left side of the chassis (as looking from the back where the modules are loaded) and install all TLX modules on the right side, next to the cooling-air intake fans (The side next to the power cord receptacles).

Note: Non-TLX modules, such as Thinklogical's Q-Series (VQM), were not designed to allow air flow through their enclosures as in TLX modules.

CHS-4 or Q-4300 Chassis



CHS-2 or Q-2300 Chassis



To avoid over-heating, always install all non-TLX modules on the left side of the chassis and install all TLX modules on the right.

Pluggable SFP+ Modules

Each TLX Extender Module contains one or more SFP+ modules that serve as the fiber-optic couplers for the fiber cables to and from the Thinklogical transmitter and receiver extenders.

The SFP+ Optical Module is a 10Gbs Short-Wavelength Transceiver designed for use in bi-directional Fiber-Optic Channel links. The modules are hot-pluggable and operate on 3.3VDC. Arrows on the bale indicate input and output.

Always use **dust caps** to protect against dust and damage when a fiber-optic connector is not attached to a device. All Thinklogical Extender SFPs are fully populated with dust plugs upon shipment.

Note: It is good practice to immediately install dust plugs in unused SFP modules and on the ferrules of unconnected fiber-optic cables.

LC-Type Fiber-Optic Cables

On TLX Extenders and Matrix Switches, fiber-optic cables connect an SFP's output port (Transmit) to any other SFP's input port (Receive).

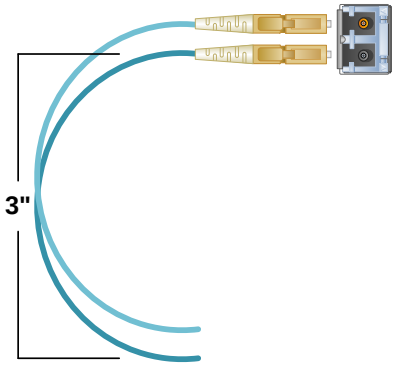
Requirements: Thinklogical recommends connecting the Transmitters, Receivers and Matrix Switch with OM3 Laser Enhanced Fiber-optic Cable, 50 or 62.5 microns, terminated with LC-type connectors. Multi-mode fiber can extend up to 400 meters (1300 feet) and Single-mode fiber can extend up to 80km (50 miles).

Handling Fiber-Optic Cable: Unlike copper cabling, fiber-optic cable requires special handling. A small speck of dust or a scratch to the ferrule tip (the end of the connector) can attenuate the optical signal, rendering the cable inoperable.

Warning! The ends of the connectors (the ferrule) should never come in contact with any foreign object, including fingertips. Always install a dust cap immediately on the ferrule of any unused fiber to protect the tip.

Dust cap installed on the ferrule.

Warning! Minimum bend diameter must be no less than 3". Be careful not to kink or pinch the fiber when using ties.

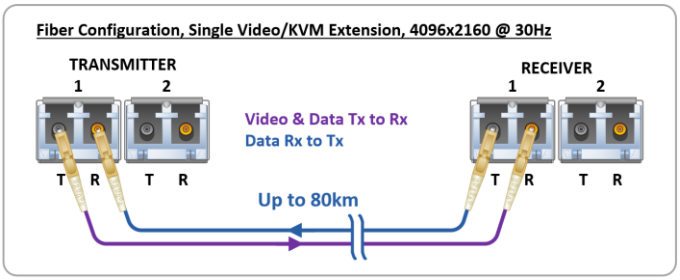


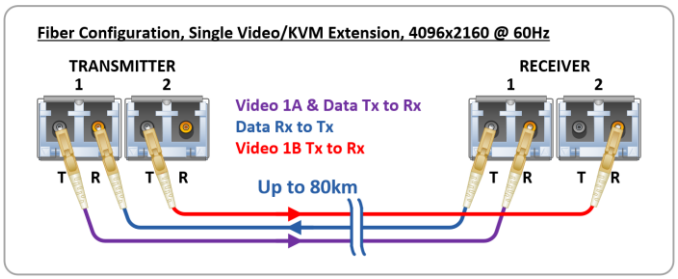
Thinklogical recommends SX+ Laser Enhanced Fiber-optic Cable, 50 or 62.5 microns, terminated with LC type connectors.

Multi-Mode:	**Up to 33 meters with Type OM1**
	Up to 82 meters with Type OM2
	Up to 300 meters with Type OM3
	Up to 400 meters with Type OM4
Single Mode:	**Up to 80km with Type OS2 9/125**

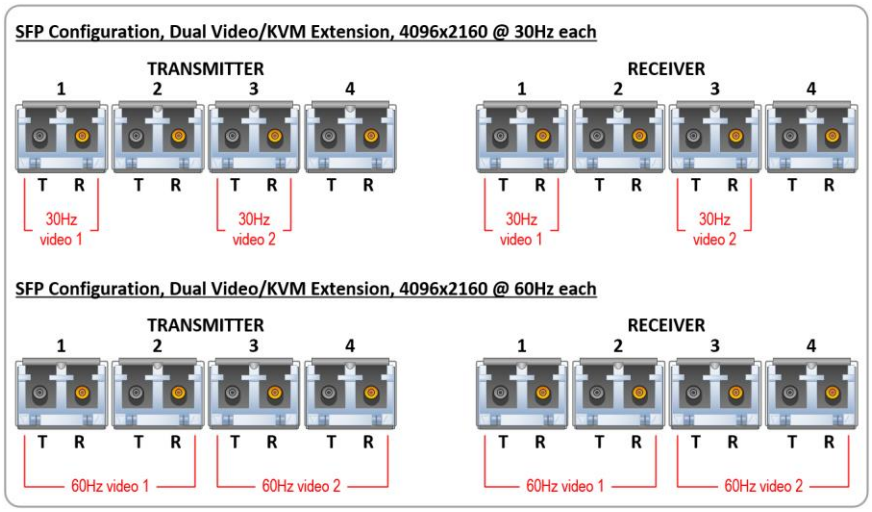
TLX Extender Fiber-Optic Cable Configurations

SINGLE VIDEO MODULES

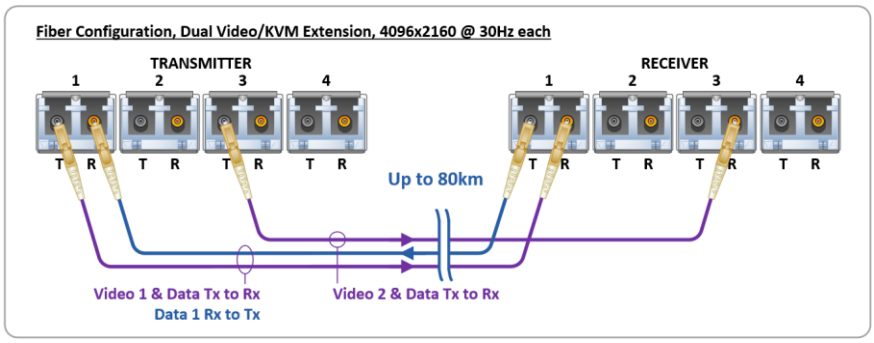


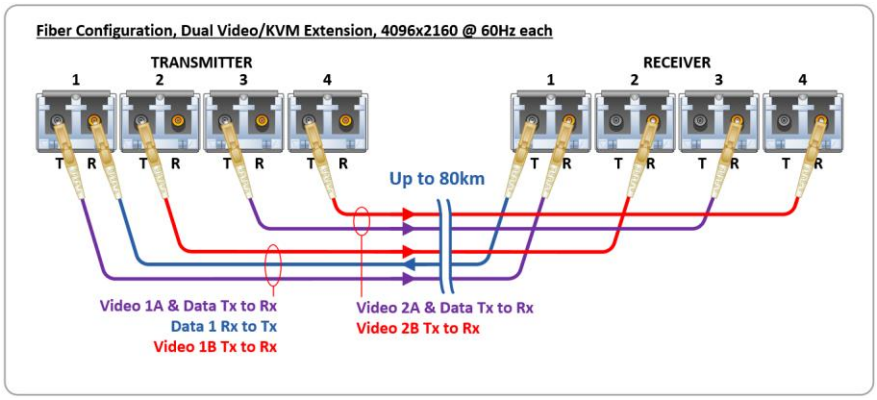


DUAL VIDEO MODULES



Note: On Dual Video models, SFPs 1 & 2 are Video 1 and SFPs 3 & 4 are Video 2.





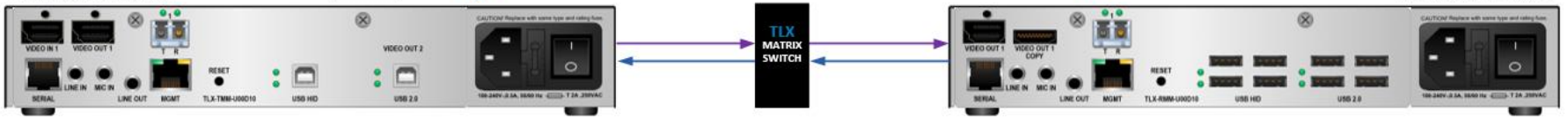
Cable Color Codes:
Video & Data Tx to Rx (fiber)
Data Rx to Tx (fiber)
Video Tx to Rx (fiber)

Sources

Thinklogical's proprietary multiplexing technology
combines video, audio and peripheral data on a single data stream for
up to 80km over a single fiber-optic cable

Destinations

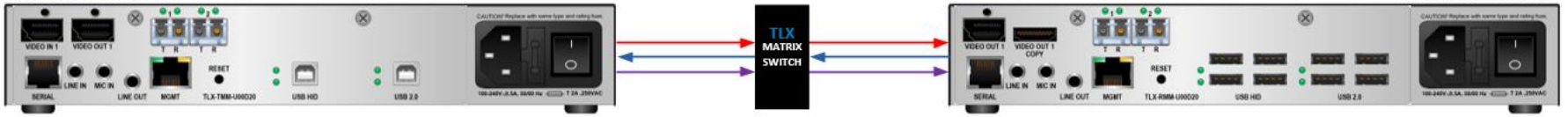
TLX-TMM-U00D10



TLX-RMM-U00D10

Single Display video or KVM extension up to 4096 x 2160 @ 30Hz *over one forward channel and one backchannel*

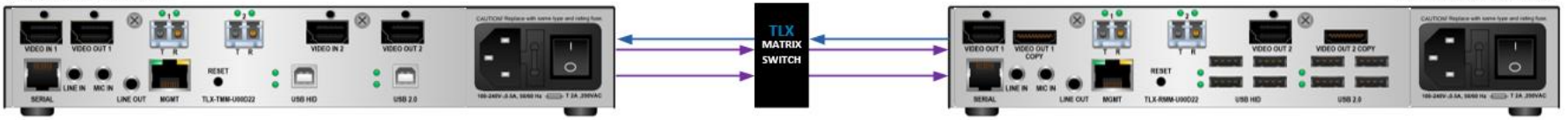
TLX-TMM-U00D20



TLX-RMM-U00D20

Single Display video or KVM extension up to 4096 x 2160 @ 60Hz *over two forward channels and one backchannel*

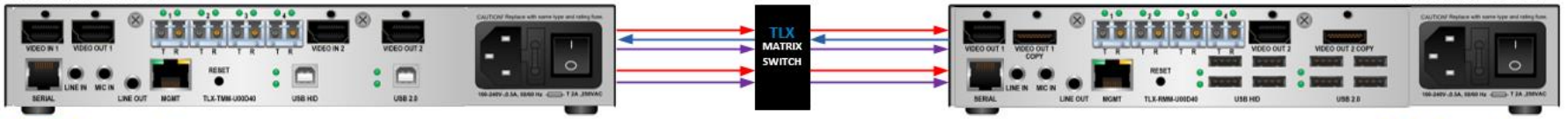
TLX-TMM-U00D22



TLX-RMM-U00D22

Dual Display video or KVM extension up to 4096 x 2160 @ 30Hz *over two forward channels and one backchannel*

TLX-TMM-U00D40

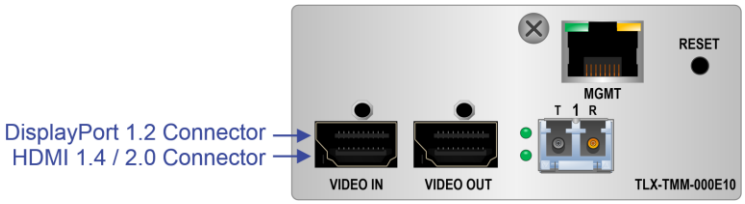


TLX-RMM-U00D40

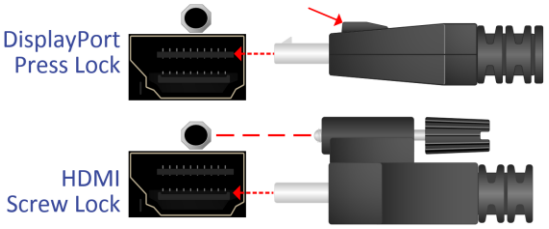
TLX Transmitters **Dual Display video or KVM extension up to 4096 x 2160 @ 60Hz *over four forward channels and one backchannel*** **TLX Receivers**

Operating Features

- **DisplayPort 1.2 Video head with loop out**
- **HDMI 1.4 / 2.0 Video Head with loop out**



Note: Install *either* DisplayPort *or* HDMI cables at both the Transmitter and Receiver.

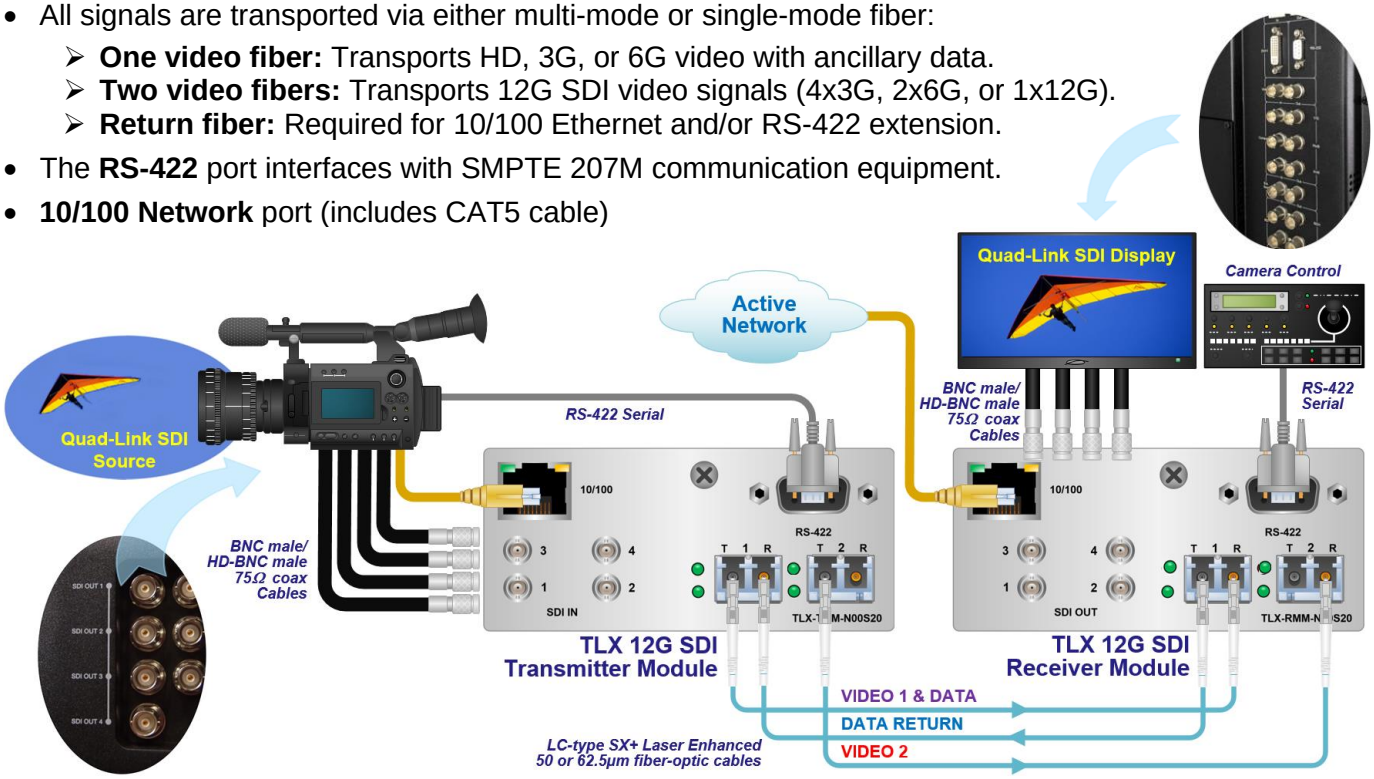


- **Mechanical lock for HDMI connectors**
- HDCP Compliant
- 10.3125G Fiber transceiver interface (SFP+)
- Fiber Protocol 802.3ae Compliant
- Audio Option
  - Supports standard L/R Audio; Line/Mic In, Line Out on both TX and RX.
- RS-232 Serial Port Extension Option (includes CAT5 cable and RJ45 to DB9 Adapters with Tx)
  - Maximum baud rate is 115,200.
- 10/100 NIC Extension Option (includes CAT5 cable)
- Text Overlay Option
- "E" models support HDMI 2.0
- The 12G SDI Extender supports HD, 3G, 6G or 12G SDI with up to four HD-BNC inputs (see pg. 13)
- KVM modules support USB HID and/or USB 2.0
- Redundant Video option (TLX-TMM-UR0**E**20/TLX-RMM-UR0**E**20, TLX-TMM-UR0**D**20/TLX-RMM-UR0**D**20)
- The Management (MGMT) Port
  - In-band System Management Interface
  - Ethernet on Module (i.e. Wiznet)
  - All front panel controls configurable via the Management Port
  - All front panel status reported via the Management Port
- Bi-color indicator LEDs
- EDID Table DDC Modes: Static, Dynamic, Local Acquire, Remote Acquire, Load Custom
  - Default LSI-DVI Table
  - Default 1080p DVI Table
  - Default 1080p HDMI Table
  - Default 4K 30 Hz
  - Default 4K 60 Hz
  - Custom Table loaded via Management interface
- Temperature sensor
- TLX Chassis Interface compliant (physical and protocol)
- Single-wide (3.7") and Dual-wide (7.4") TLX modules
- Power: 3A @ 5V Max.
- Fiber link will not reset on a single bit error.
- Remote Update of S/W and Firmware
- FPGA Configuration supports 'Golden Boot Image' as backup for failed update.
- Audio De-embedding in Receiver Module
  - Line Out User Selectable between TLX Line In or De-embedded Audio
- DisplayPort 1.2 cables included. HDMI 2.0 cables available.
- HID models work with *Hotkeys* (see *Appendix I: Flex Keys*, pg. 86)

The 12G SDI Extender

- **Part numbers:** TLX-TMM-N00S20 (Tx), TLX-RMM-N00S20 (Rx)
- The Transmitter accepts single, dual, or quad HD-BNC inputs (from a single video source).
- The Receiver can convert the received fiber-optic signal back to its equivalent SDI signal or convert specific formats for cross conversion. *(Appendix J: Supported Video Formats, pg. 92.)*
- Thinklogical recommends **Belden 6G (1694A) coaxial cable** or better to extend 12G SDI signals.

- 12G SDI Extenders support the following signal formats:
  - **1 x HD-SDI** (1.485/1.4835 Gbps), per SMPTE ST 292
  - **2 x HD-SDI** Dual-Link (1.485/1.4835 Gbps), per SMPTE ST 372
  - **1 x 3G-SDI** (2.97/2.967 Gbps), per SMPTE ST 425-1
  - **4 x 3G-SDI** Quad-Link (2.97/2.967 Gbps), per SMPTE ST 425-5
  - **1 x 6G-SDI** (5.94/5.934Gbps), per SMPTE ST 2081-10 MODE 1 and MODE 2
  - **2 x 6G-SDI** Dual-Link (5.94/5.934Gbps), per SMPTE ST 2081-11 MODE 1
  - **1 x 12G-SDI** (11.88/11.868 Gbps), per SMPTE ST 2082-10 MODE 1
  - **8**-bit and **10**-bit color
  - **RGB** and **YUV** color space
  - **4:2:2** and **4:4:4** encoding
- All signals are transported via either multi-mode or single-mode fiber:
  - **One video fiber:** Transports HD, 3G, or 6G video with ancillary data.
  - **Two video fibers:** Transports 12G SDI video signals (4x3G, 2x6G, or 1x12G).
  - **Return fiber:** Required for 10/100 Ethernet and/or RS-422 extension.
- The **RS-422** port interfaces with SMPTE 207M communication equipment.
- **10/100 Network** port (includes CAT5 cable)



TLX 12G SDI Extender Connections

(Also see Appendix B: 12G SDI Extender Quick Start Guide, pg. 43.)

Types of Connections

All physical connections to the product are industry-standard, commercially available and are found on the front panel of each module. All models are connected via fiber-optic cables (see pg. 9) to provide communications to and from the transmitter. The Transmitter connects to the CPU with supplied video cables (and audio, serial or network cables in applicable models). The Receiver provides an interface to the monitor(s) (and audio, serial or network devices in applicable models).

Fiber-Optic Cables Standard multi-mode fiber-optic cables up to 400 meters connect Transmitters to Receivers. Cables must be 50 or 62.5 microns, terminated with LC-type fiber-optic connectors.

Video Cables **Supplied: HDMI 2.0 video cables.** Note that HDMI 2.0 video and DisplayPort 1.2 support up to 4K @ 60Hz. HDMI 1.4 Video cables support up to 4K @ 30Hz. Install *either* HDMI *or* DisplayPort cables at both the Transmitter and Receiver. The 12G SDI Extender uses up to four 6G coaxial cables.

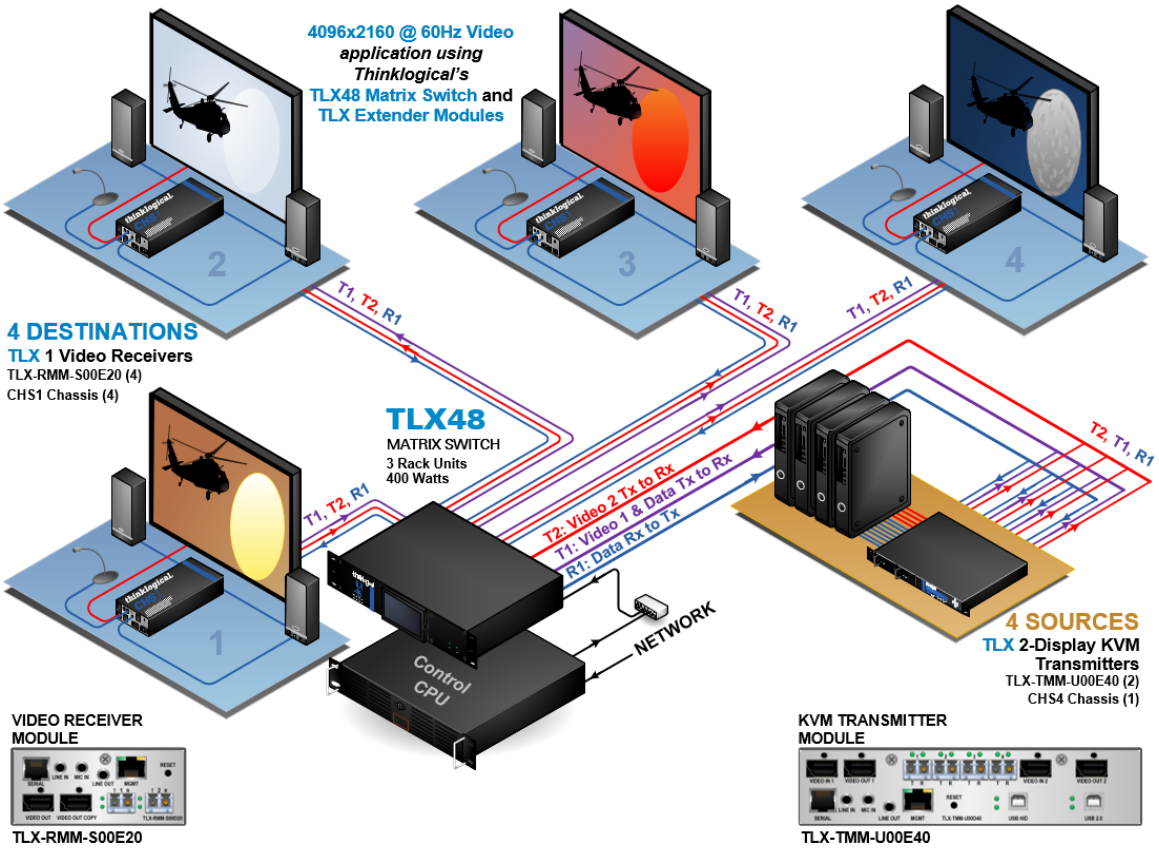
RS-232 Extenders can be configured as either DTE (data terminal equipment) or DCE (data communications equipment). On the Tx and Rx, set one to DTE (computer) and one to DCE (modem).

RS-422 The DB9-F ports on 12G SDI Extenders interface with SMPTE 207M communication equipment. Data direction can be changed from Master-mode to Tributary-mode via the module's front panel menu or management port. For example, to connect an Extender to a Tributary device (tape player), configure the Extender for Master mode. Conversely, to connect an Extender to a Master device (machine controller), configure the Extender for Tributary mode.

RS-422 Master Pinout	RS-422 Tributary Pinout
1. Frame Ground	1. Frame Ground
2. Receive A	2. Transmit A
3. Transmit B	3. Receive B
4. Receive Common	4. Receive Common
5. Spare	5. Spare
6. Transmit Common	6. Transmit Common
7. Receive B	7. Transmit B
8. Transmit A	8. Receive A
9. Frame Ground	9. Frame Ground

Transmitter A transmitter module connects to the computer and peripheral sources through standard copper cables. View TLX Transmitter connector configurations in detail on pgs. 27 through 31.

Receiver A receiver module connects to a viewing device (monitor, projector), audio and HID devices with standard cables. View TLX Receiver connector configurations in detail on pgs. 27 through 31.



The Management Port

TLX system configuration can be performed using the Front Panel LCD and Navigation Buttons on a CHS-4 or CHS-2 Chassis *(See TLX LCD Menu Options in Appendix G, pg. 55.)* **or, using a keyboard and mouse, via the MGMT Port, which provides remote management over the Ethernet through a computer connected to a common network.** *(See TLX User Menu Instructions in Appendix H, pg. 65.)*

The MGMT feature is necessary for managing configurations when using the CHS-1 Chassis, as there are no Navigation Buttons or LCD on this model.

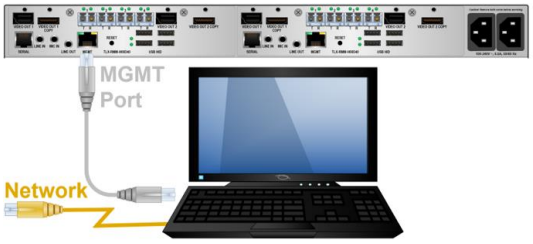
Setting Up the Extender Modules

- ## The CHS-4 and CHS-2 Chassis

Method 1: DHCP Mode

To access the MGMT Port remotely, first gather information from the chassis LCD:

1. Connect an Ethernet cable to the module's MGMT port and turn chassis power ON. The Chassis model and revision will be displayed on the front panel LCD.



2. Using the down arrow, scroll to the module's **Card Slot**. *(KVM Modules occupy Cards 2 and 4).*

3. Using the right arrow, Navigate to the **#Network Parameters** menu.

4. Using the right arrow, navigate to the **DHCP Mode**. Verify that DHCP is **ENABLED.** To ENABLE DHCP, press **enter.** The last letter of DISABLED will show an **underscore**, meaning it can be changed**.**

5. Press the up arrow. (enter) DHCP is now ENABLED**.**

6. Using the right arrow, navigate to the **Telnet Server** and verify that it is **ENABLED.**

7. Right arrow to **#Network Parameters,** then down arrow to **#Network Status.**

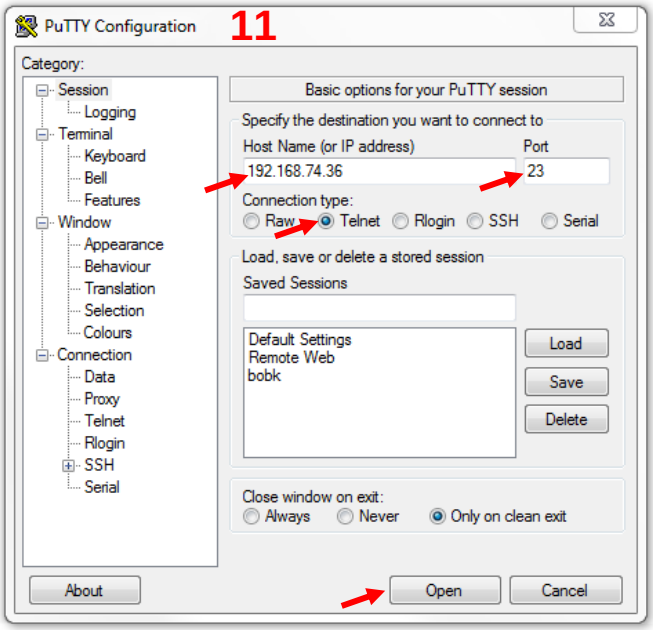
8. Right arrow to **Link State**. When connected to a DHCP network, shows **Linked, DHCP leased**.

9. Using the right arrow, navigate to **DHCP IP address** to retrieve the IP address.

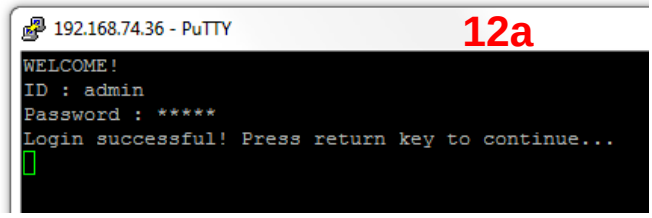
10. Open **PuTTY** (or a similar terminal program) on the computer.

11. Enter the **IP Address** and select **Telnet.** Ensure the Port is now **23.** Click **Open.**

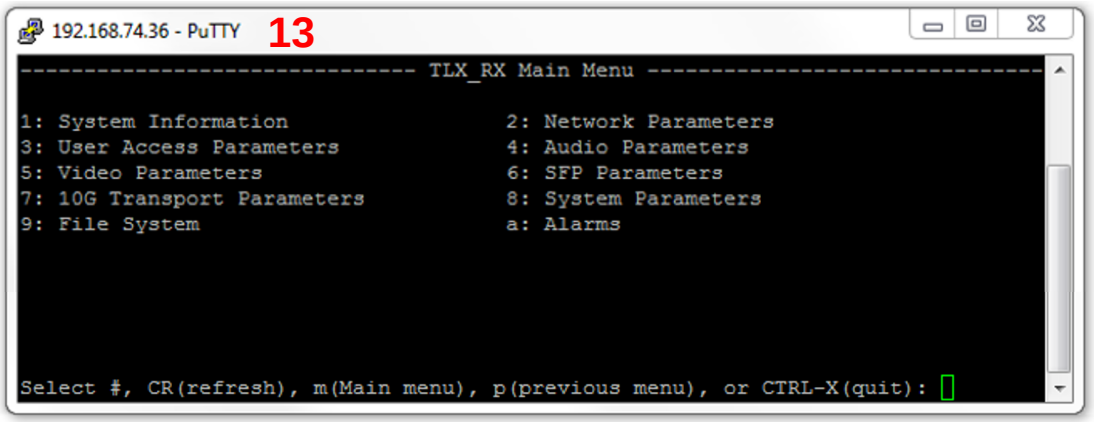
12. At the prompt, enter ID: **`admin`** Password: **`admin`**



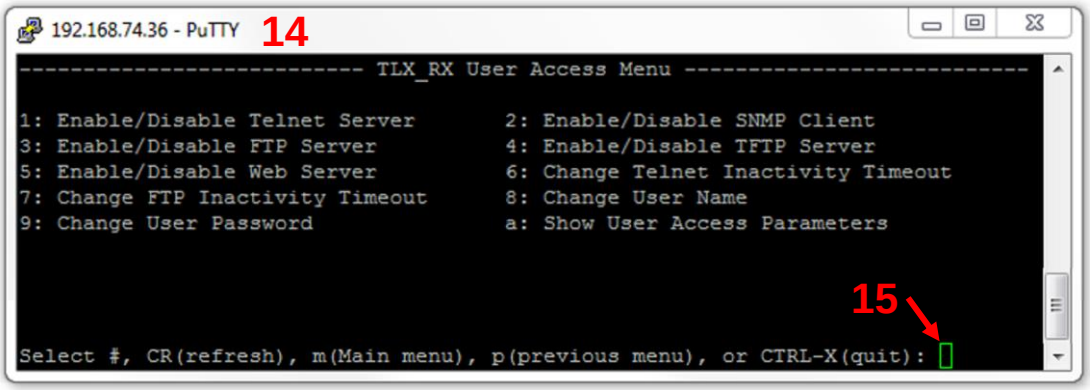
12a. Press the return key to continue.



13. From the **`Main Menu`**, select **`3: User Access Parameters.`**



14. Select **`5: Enable/Disable Web Server.`**



15. Enter **`y`** (Enable Web Server) at the bottom of the screen prompt, then **Ctrl x** to exit.

Method 2: *Static* IP Address Mode

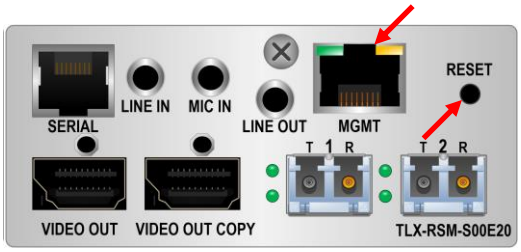
To access the MGMT Port remotely, first gather information from the chassis LCD:

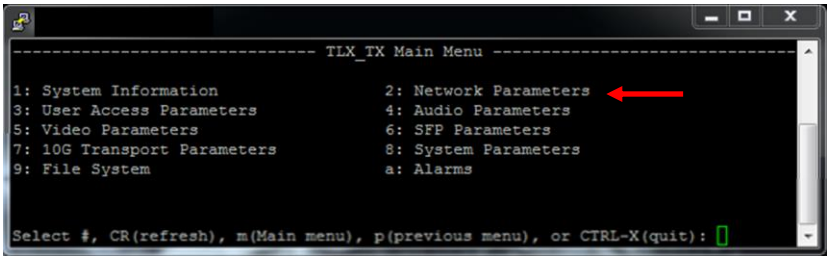
1. Connect an Ethernet cable to the module's MGMT port.
2. Select the module's **Card Slot** from the LCD menus.
3. On the chassis front panel LCD, Navigate to the ***Network Parameters** menu.
4. Using the Right Arrow Button, navigate to the **DHCP Mode**. Verify that DHCP is **DISABLED.**
5. Using the Right Arrow Button, navigate to the **Telnet Server**. Verify that it is **ENABLED.**
6. Navigate to the **Network Parameters Menu** and then to **Static IP Address**. Use the arrow and enter buttons to create an address. Extenders are shipped with a default static IP address, but this can be modified by the user via this menu option if desired.
7. Refer to **How to Configure a PC with a Static IP Address** on pg. 21.

• The CHS-1 Chassis

The CHS-1 has no LCD or Navigation buttons, therefore the MGMT Port must be used.

Connect an Ethernet cable to the module's MGMT port.





Thinklogical's installed default addresses:

TX IP Address: 192.168.1.101
RX IP Address: 192.168.1.102
IP Mask: 255.255.255.0
Gateway: 192.168.1.1

1. Once connected via MGMT Port, the address can be changed using option **`2: Network Parameters`** on the main menu.
2. The new IP Address takes effect once the current telnet session is terminated.
3. Pressing the RESET button next to the MGMT Port will return any addresses that have been changed by the user back to the factory defaults listed above.
4. Refer to **How to Configure a PC with a Static IP Address** on pg. 21.

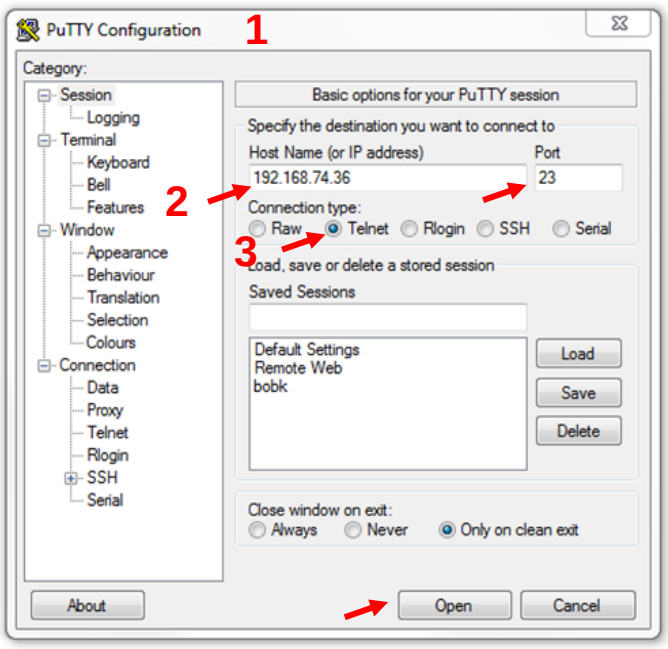
Access an Extender Module via the Management Port

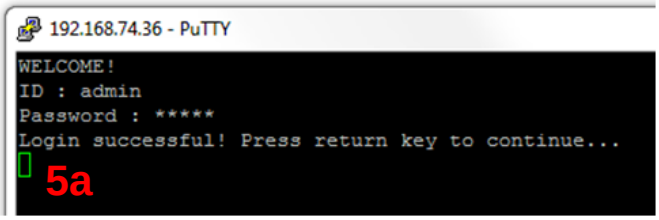
1. Open **PuTTY** (or a similar terminal program) on the computer. The window below will appear.

2. In the **Host Name (or IP address)** window, enter the address from Step 9, pg. 15.

3. Select the **Telnet** button. Verify that the Port number is now **23**. Click OPEN.

4. A **`WELCOME!`** window will appear (right).



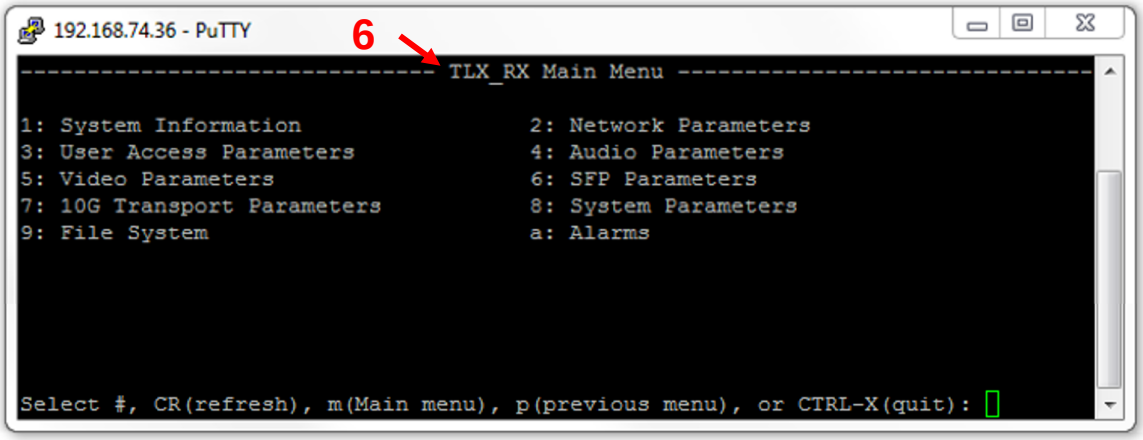


5. At the prompt, enter: **`ID : admin`**

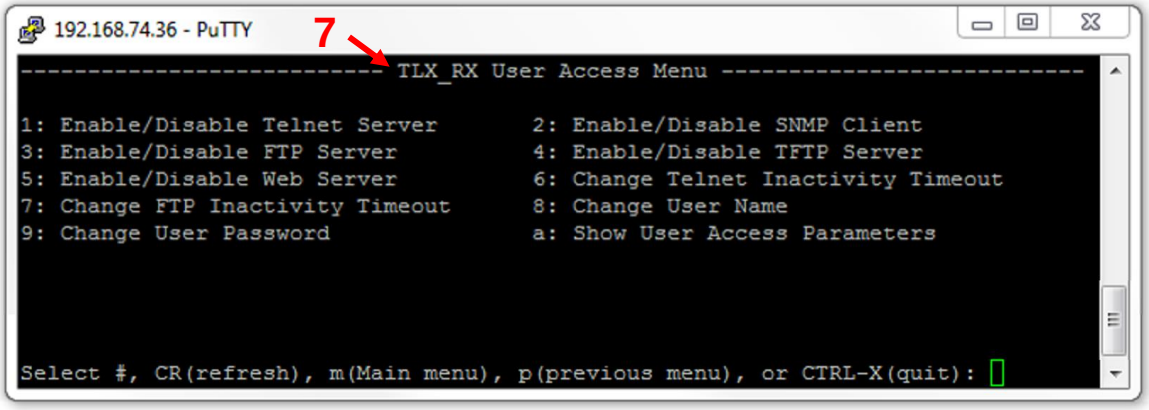
`Password : admin` (above, right).

5a. At successful login, press the **Return** key to continue.

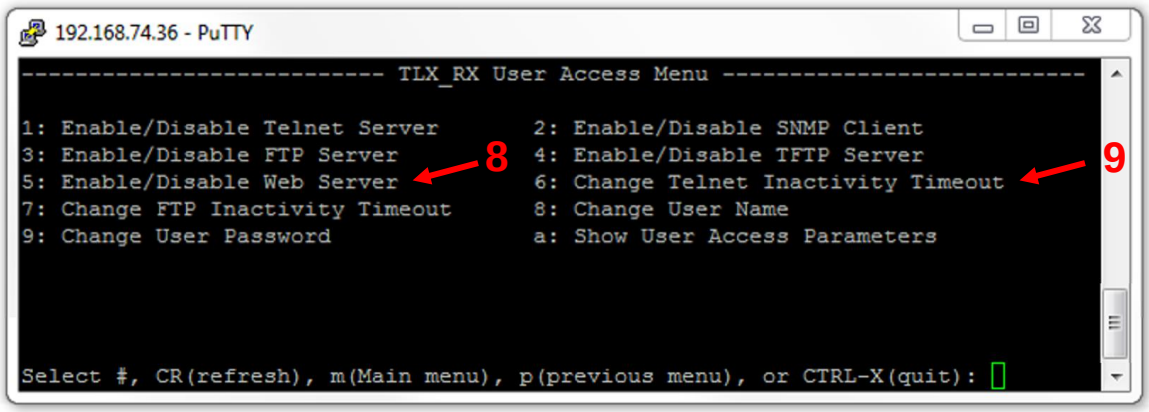
6. The Main Menu will open (below).



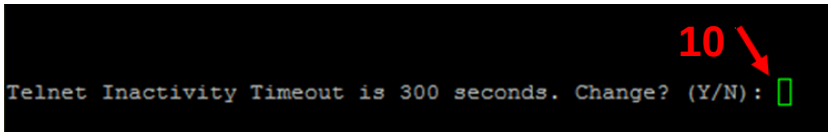
7. For example, click on selection **`3: User Access Parameters`** in the Main Menu (Step 6) and key modifiable parameters can be accessed (below). Enter **m** to return to the Main Menu.



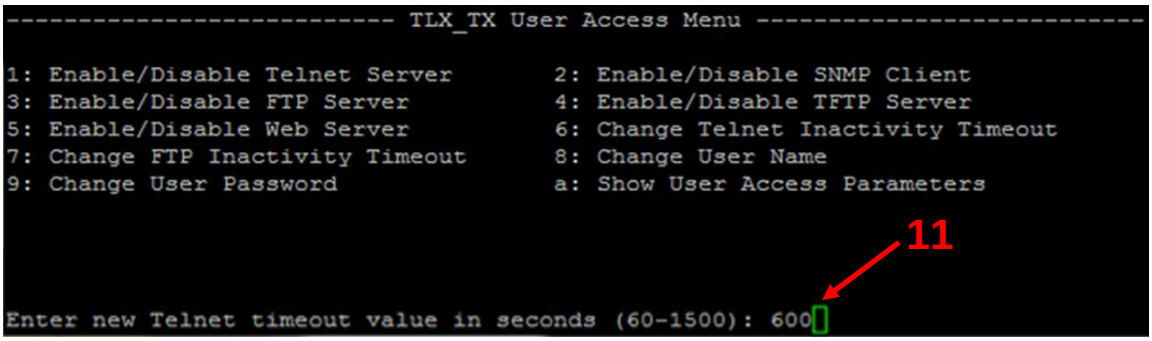
8. From this menu, users can change or enable key modifiable parameters, such as **`5: Enable/Disable Web Server`**, for example.



9. These parameters can be viewed and modified by selecting from within the menu. For example, entering **`6: Change Telnet Inactivity Timeout`** (above), will allow users to change the timeout from the default 300 seconds.



10. Change the **`Telnet Inactivity Timeout`** by entering **`Y`** (above).



11. Enter a value in seconds between 60 and 1500 (*600*, in this example, above). Press ENTER

```
------------------------- TLX_TX User Access Menu -------------------------

1: Enable/Disable Telnet Server       2: Enable/Disable SNMP Client
3: Enable/Disable FTP Server          4: Enable/Disable TFTP Server
5: Enable/Disable Web Server          6: Change Telnet Inactivity Timeout
7: Change FTP Inactivity Timeout      8: Change User Name
9: Change User Password               a: Show User Access Parameters


New timeout value is 600 seconds.
Telnet session must end for change to take effect. Press any key to continue:
```

13

12

12. As shown on the bottom line, the new timeout value is now set at 600 seconds. **The Telnet session must end for the change to take effect.**

13. Verify the settings by entering **`a: Show User Access Parameters`** in the User Access menu. (**`User Access Parameters`** menu shown below.)

```
------------------------ TLX_TX USER ACCESS PARAMETERS -----------

                        Telnet Server:    Enabled
                        SNMP Client:      Disabled
                        FTP Server:       Disabled
                        TFTP Server:      Disabled
                        Web Server:       Disabled

Select any key to continue:
```

14. Press any key to return to the **`User Access Menu`** (below). From there, the bottom selections will return you to the **m (`Main menu`), `p (previous menu)`**, etc.

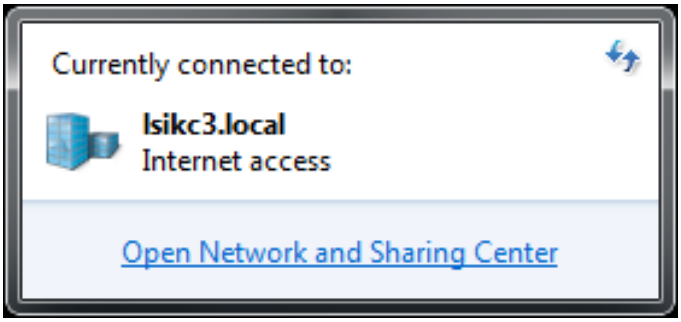
```
------------------------- TLX_TX User Access Menu -------------------------

1: Enable/Disable Telnet Server       2: Enable/Disable SNMP Client
3: Enable/Disable FTP Server          4: Enable/Disable TFTP Server
5: Enable/Disable Web Server          6: Change Telnet Inactivity Timeout
7: Change FTP Inactivity Timeout      8: Change User Name
9: Change User Password               a: Show User Access Parameters


Select #, CR(refresh), m(Main menu), p(previous menu), or CTRL-X(quit):
```

14

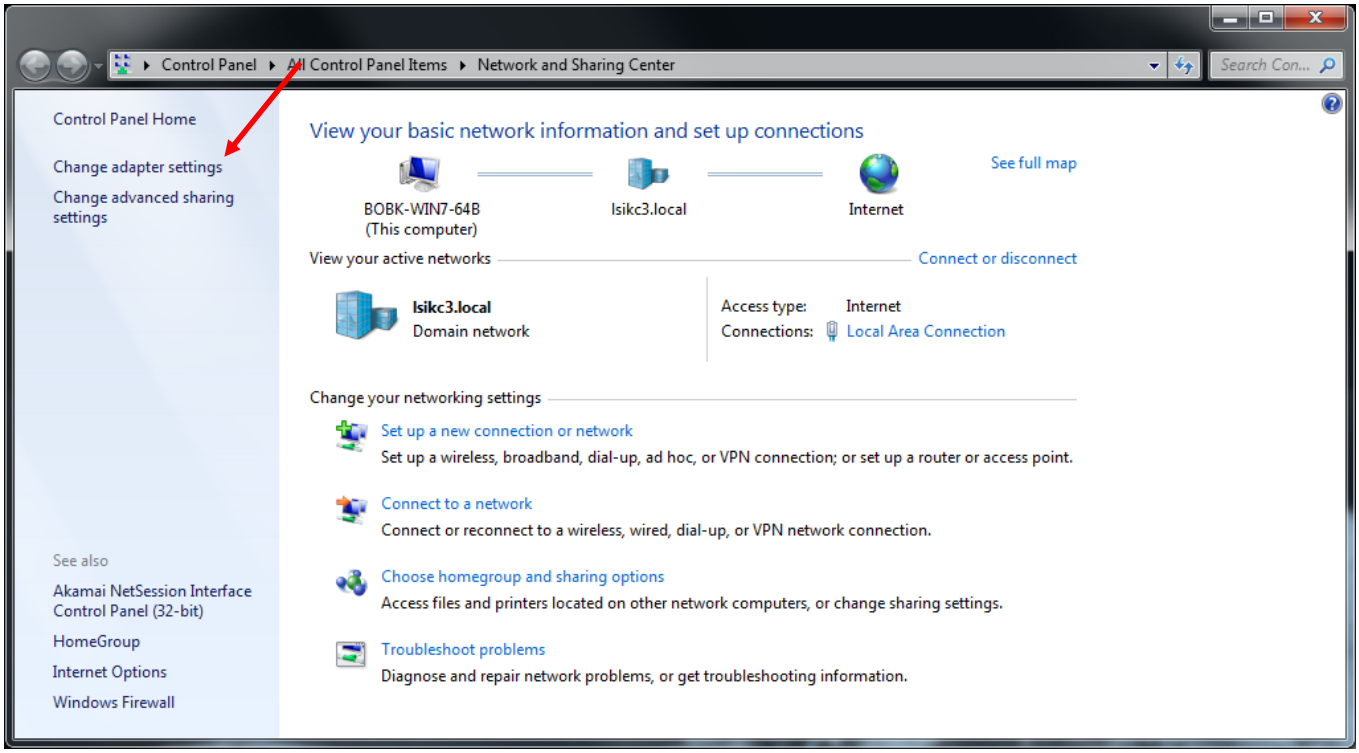
How to Configure a PC with a Static IP Address

1. On the PC monitor's bottom tool bar, click on the Network icon (below).

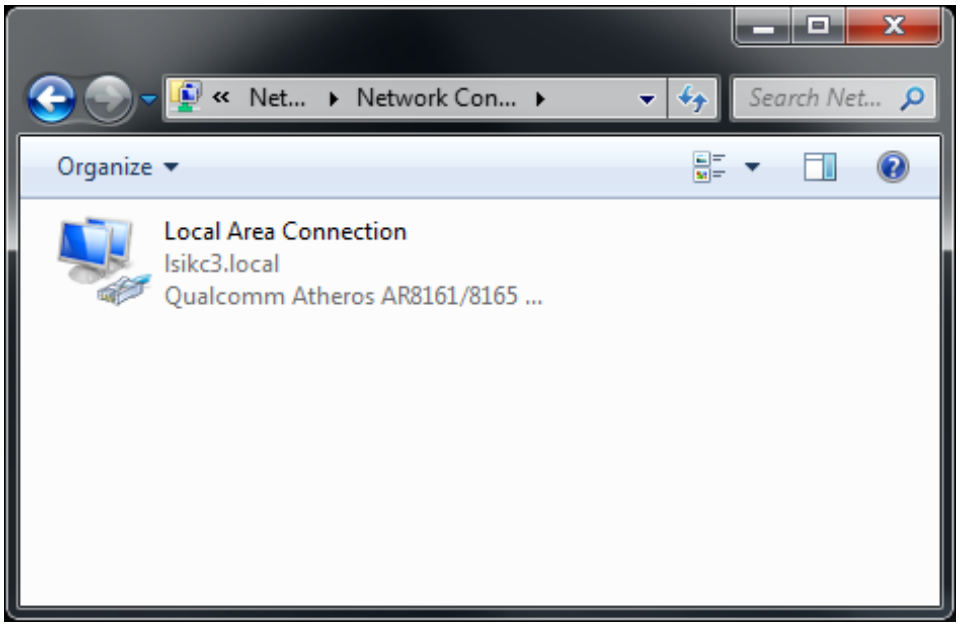
2. Click on Open Network and Sharing Center (below).



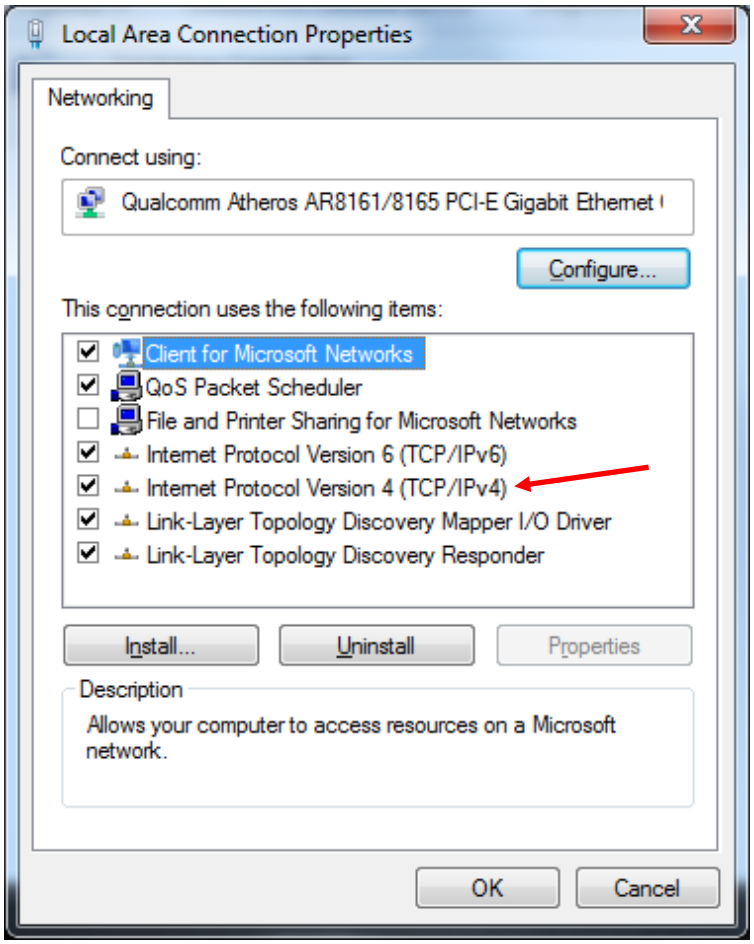
3. Click on **Change adapter settings**

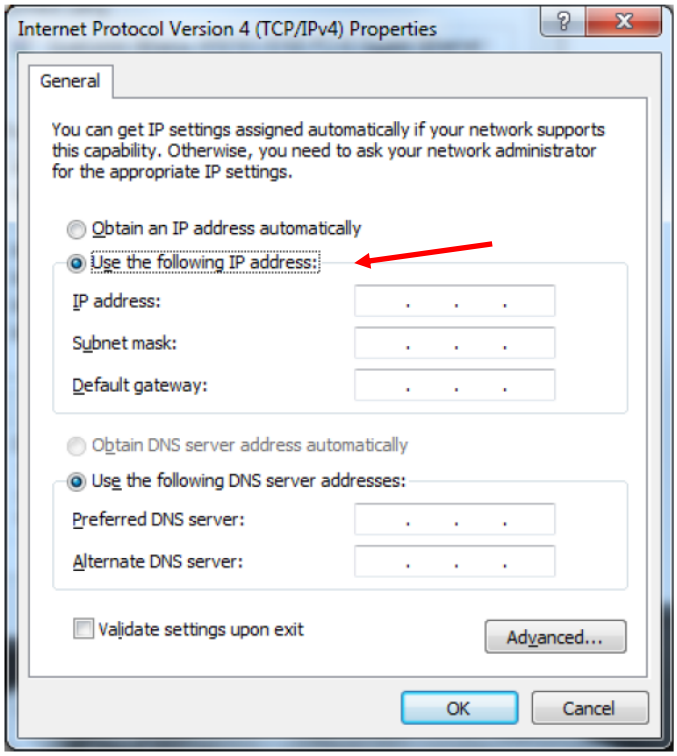


4. Right click on the adapter to be configured (Local Area Connection in this example) and select **Properties**.



5. Select **Internet Protocol Version 4 (TCP/IPv4)**, then click on **Properties.**





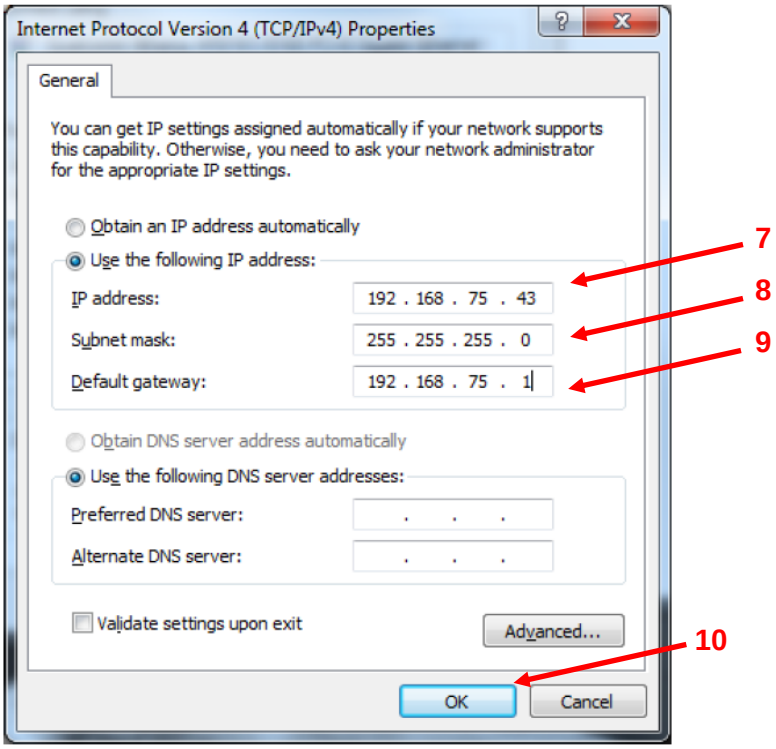
6. Click on the **Use the Following IP address** button.

7. Enter a **Network address** (192.168.75 in this example) and a **Host address** (43 in this example) in the **IP address:** box as shown below.

8. Click on **Subnet mask:** The default address will appear automatically.

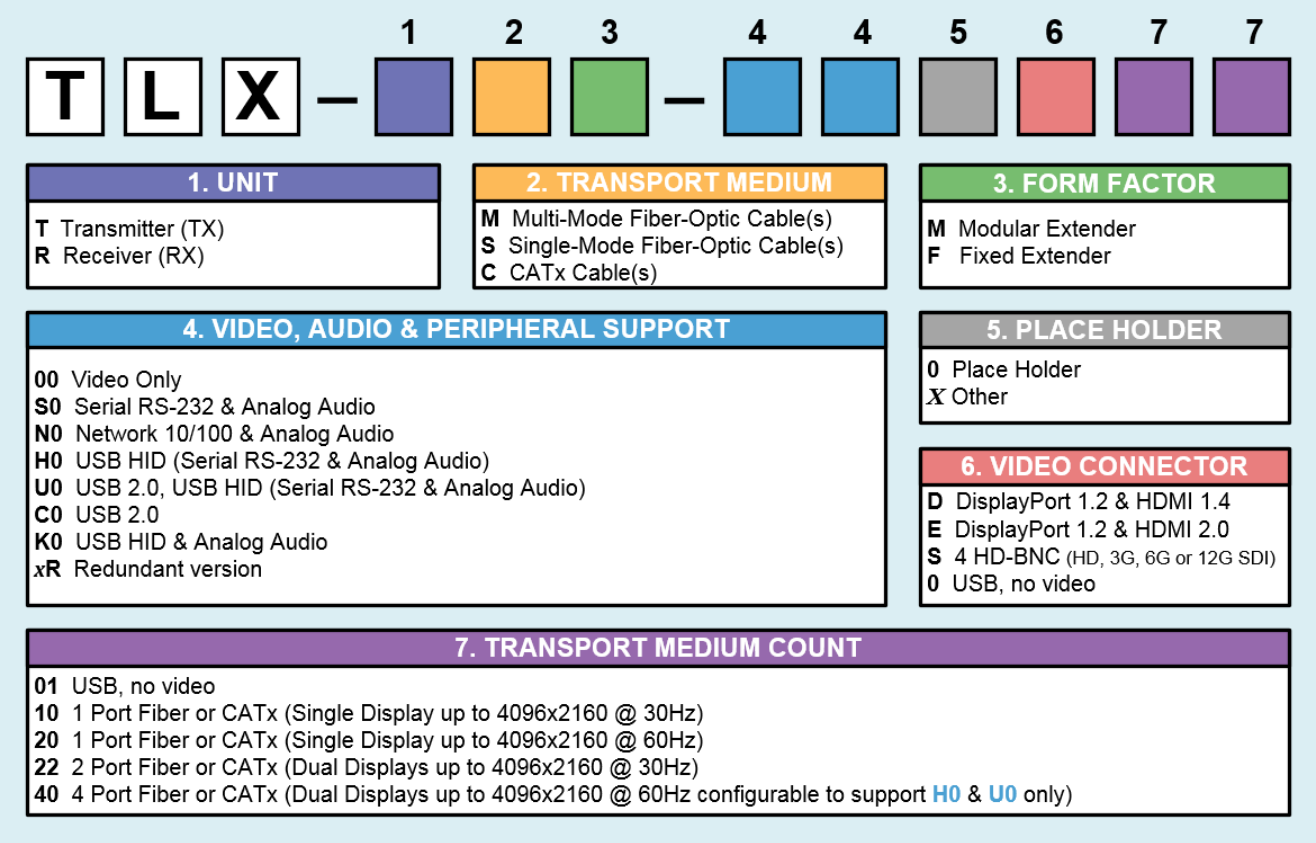
9. Enter the **Default gateway address** (the Network address 192.168.75 and 1 for the Host address).

10. Click **OK** and the configuration is complete.

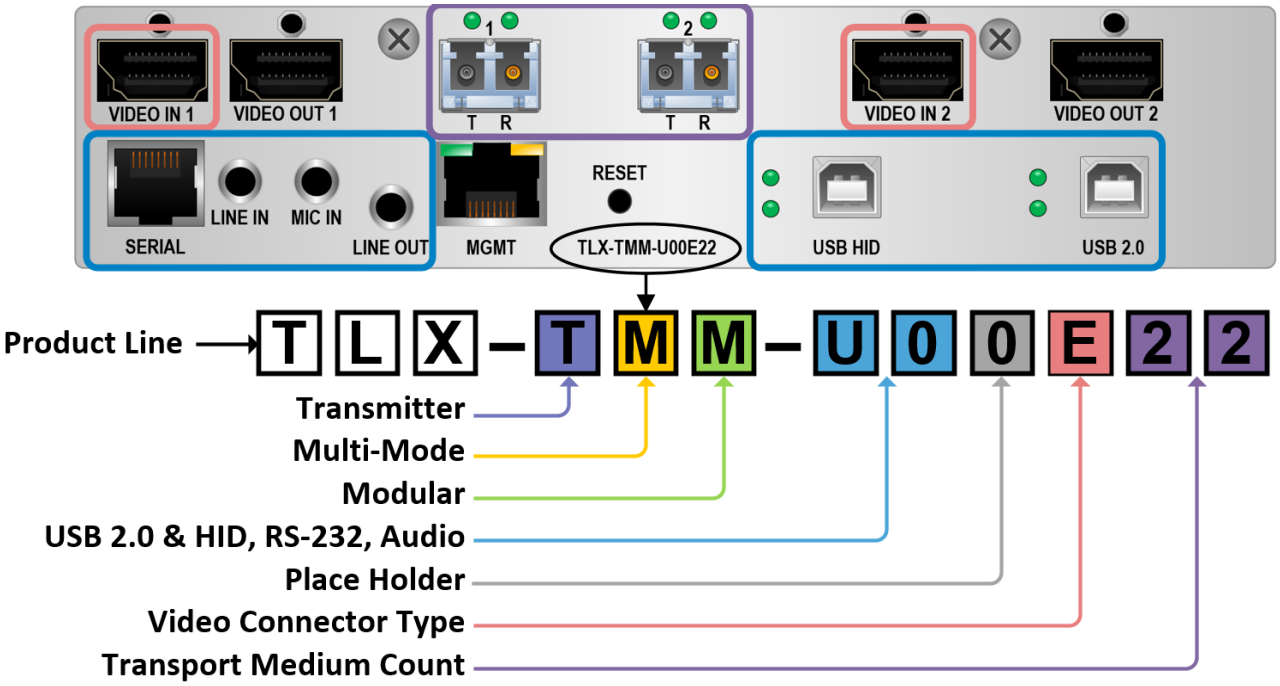


TLX Part Number Guide

The following guide breaks down the individual elements of each TLX Video and KVM Extender part number. Use this guide, and the examples that follow, when ordering Thinklogical extender products.



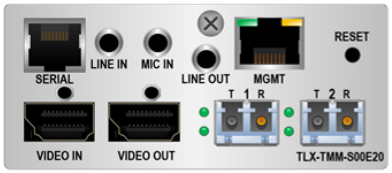
For example:



Module Dimensions

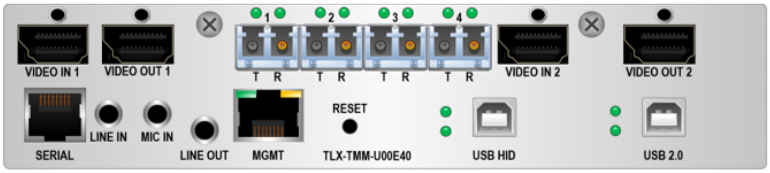
Video & USB Modules:

Height: 1.592" (40.43 mm)
Depth: 6.366" (161.69 mm)
Width: 3.693" (93.80 mm)



KVM Modules:

Height: 1.592" (40.43 mm)
Depth: 6.366" (161.69 mm)
Width: 7.406" (188.11 mm)



Multi-Mode Video:

TLX-TMM-000E10, TLX-RMM-000E10
TLX-TMM-000D10, TLX-RMM-000D10
TLX-TMM-S00E10, TLX-RMM-S00E10
TLX-TMM-S00D10, TLX-RMM-S00D10
TLX-TMM-N00E10, TLX-RMM-N00E10
TLX-TMM-K00E10, TLX-RMM-K00E10
TLX-TMM-K00D10, TLX-RMM-K00D10
TLX-RMM-K0SE10
TLX-RMM-K0SD10

TLX-TMM-000E20, TLX-RMM-000E20
TLX-TMM-000D20, TLX-RMM-000D20
TLX-TMM-S00E20, TLX-RMM-S00E20
TLX-TMM-S00D20, TLX-RMM-S00D20
TLX-TMM-N00E20, TLX-RMM-N00E20
TLX-TMM-K00E20, TLX-RMM-K00E20
TLX-TMM-K00D20, TLX-RMM-K00D20
TLX-RMM-K0SE20
TLX-RMM-K0SD20

Single-Mode Video:

TLX-TSM-000E10, TLX-RSM-000E10
TLX-TSM-000D10, TLX-RSM-000D10
TLX-TSM-S00E10, TLX-RSM-S00E10
TLX-TSM-S00D10, TLX-RSM-S00D10
TLX-TSM-N00E10, TLX-RSM-N00E10
TLX-TSM-K00E10, TLX-RSM-K00E10
TLX-TSM-K00D10, TLX-RSM-K00D10
TLX-RSM-K0SE10
TLX-RSM-K0SD10

TLX-TSM-000E20, TLX-RSM-000E20
TLX-TSM-000D20, TLX-RSM-000D20
TLX-TSM-S00E20, TLX-RSM-S00E20
TLX-TSM-S00D20, TLX-RSM-S00D20
TLX-TSM-N00E20, TLX-RSM-N00E20
TLX-TSM-K00E20, TLX-RSM-K00E20
TLX-TSM-K00D20, TLX-RSM-K00D20
TLX-RSM-K0SE20
TLX-RSM-K0SD20

Multi-Mode USB:

TLX-TMM-U00001, TLX-RMM-U00001
TLX-TMM-UR0001, TLX-RMM-UR0001
TLX-TMM-H00001, TLX-RMM-H00001
TLX-TMM-HR0001, TLX-RMM-HR0001
TLX-TMM-C00001, TLX-RMM-C00001

Single-Mode USB:

TLX-TSM-U00001, TLX-RSM-U00001
TLX-TSM-UR0001, TLX-RSM-UR0001
TLX-TSM-H00001, TLX-RSM-H00001
TLX-TSM-HR0001, TLX-RSM-HR0001
TLX-TSM-C00001, TLX-RSM-C00001

Multi-Mode KVM:

TLX-TMM-H00E10, TLX-RMM-H00E10
TLX-TMM-H00D10, TLX-RMM-H00D10
TLX-TMM-H00E20, TLX-RMM-H00E20
TLX-TMM-H00D20, TLX-RMM-H00D20
TLX-TMM-H00E22, TLX-RMM-H00E22
TLX-TMM-H00D22, TLX-RMM-H00D22
TLX-TMM-H00E40, TLX-RMM-H00E40
TLX-TMM-H00D40, TLX-RMM-H00D40

TLX-TMM-U00E10, TLX-RMM-U00E10
TLX-TMM-U00D10, TLX-RMM-U00D10
TLX-TMM-U00E20, TLX-RMM-U00E20
TLX-TMM-U00D20, TLX-RMM-U00D20
TLX-TMM-U00E22, TLX-RMM-U00E22
TLX-TMM-U00D22, TLX-RMM-U00D22
TLX-TMM-U00E40, TLX-RMM-U00E40
TLX-TMM-U00D40, TLX-RMM-U00D40

Single-Mode KVM:

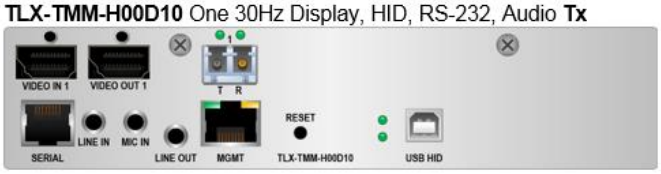
TLX-TSM-H00E10, TLX-RSM-H00E10
TLX-TSM-H00D10, TLX-RSM-H00D10
TLX-TSM-H00E20, TLX-RSM-H00E20
TLX-TSM-H00D20, TLX-RSM-H00D20
TLX-TSM-H00E22, TLX-RSM-H00E22
TLX-TSM-H00D22, TLX-RSM-H00D22
TLX-TSM-H00E40, TLX-RSM-H00E40
TLX-TSM-H00D40, TLX-RSM-H00D40

TLX-TSM-U00E10, TLX-RSM-U00E10
TLX-TSM-U00D10, TLX-RSM-U00D10
TLX-TSM-U00E20, TLX-RSM-U00E20
TLX-TSM-U00D20, TLX-RSM-U00D20
TLX-TSM-U00E22, TLX-RSM-U00E22
TLX-TSM-U00D22, TLX-RSM-U00D22
TLX-TSM-U00E40, TLX-RSM-U00E40
TLX-TSM-U00D40, TLX-RSM-U00D40

The above list also applies to available Redundant versions.

KVM EXTENDER "D" ONE-DISPLAY MODULES (*All support DisplayPort 1.2. "D" supports HDMI 1.4*)

TLX-TMM-H00D10 One 30Hz Display, HID, RS-232, Audio **Tx**

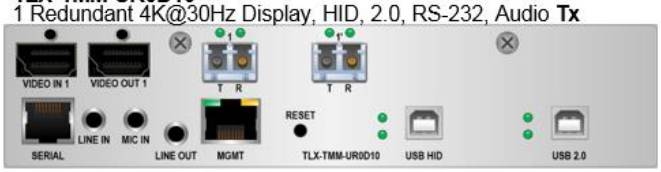


TLX-RMM-H00D10 One 30Hz Display, HID, RS-232, Audio **Rx**

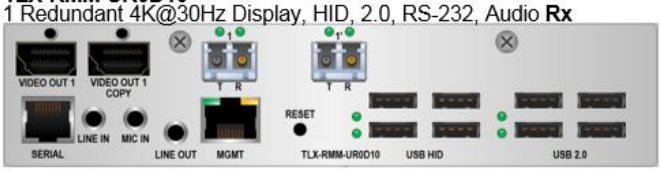
TLX-TMM-U00D10 One 30Hz Display, HID, 2.0, RS-232, Audio **Tx**

TLX-RMM-U00D10 One 30Hz Display, HID, 2.0, RS-232, Audio **Rx**

TLX-TMM-UR0D10
1 Redundant 4K@30Hz Display, HID, 2.0, RS-232, Audio **Tx**



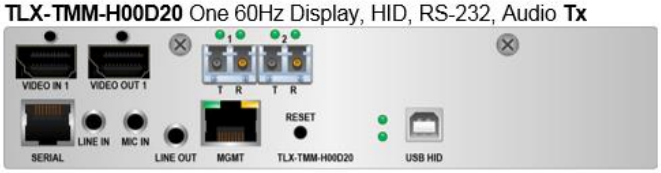
TLX-RMM-UR0D10
1 Redundant 4K@30Hz Display, HID, 2.0, RS-232, Audio **Rx**



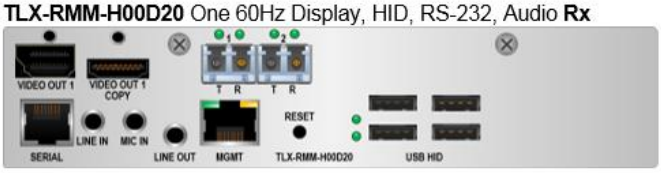
TLX-TMM-0R0D10 1 Redundant 4K@30Hz Display **Tx**

TLX-RMM-0R0D10 1 Redundant 4K@30Hz Display **Rx**

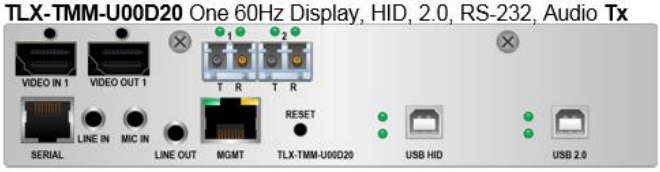
TLX-TMM-H00D20 One 60Hz Display, HID, RS-232, Audio **Tx**



TLX-RMM-H00D20 One 60Hz Display, HID, RS-232, Audio **Rx**

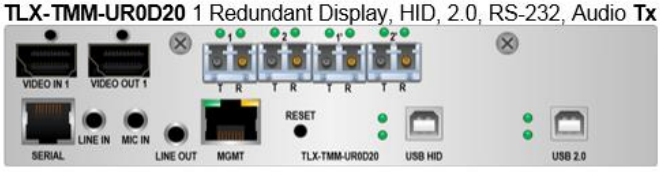


TLX-TMM-U00D20 One 60Hz Display, HID, 2.0, RS-232, Audio **Tx**

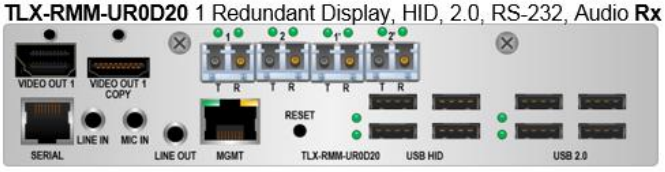


TLX-RMM-U00D20 One 60Hz Display, HID, 2.0, RS-232, Audio **Rx**

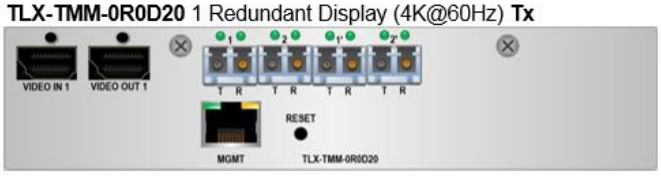
TLX-TMM-UR0D20 1 Redundant Display, HID, 2.0, RS-232, Audio **Tx**



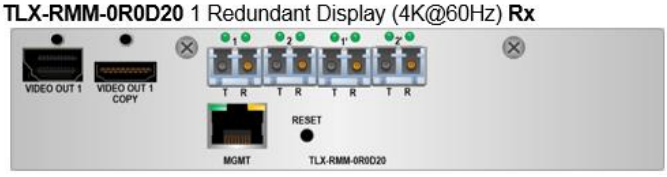
TLX-RMM-UR0D20 1 Redundant Display, HID, 2.0, RS-232, Audio **Rx**



TLX-TMM-0R0D20 1 Redundant Display (4K@60Hz) **Tx**



TLX-RMM-0R0D20 1 Redundant Display (4K@60Hz) **Rx**



KVM EXTENDER "E" ONE-DISPLAY MODULES (*All support DisplayPort 1.2. "E" supports HDMI 2.0*)

TLX-TMM-H00E10 One 30Hz Display, HID, RS-232, Audio **Tx**

TLX-RMM-H00E10 One 30Hz Display, HID, RS-232, Audio **Rx**

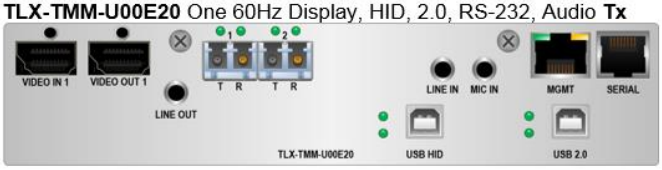
TLX-TMM-U00E10 One 30Hz Display, HID, 2.0, RS-232, Audio **Tx**

TLX-RMM-U00E10 One 30Hz Display, HID, 2.0, RS-232, Audio **Rx**

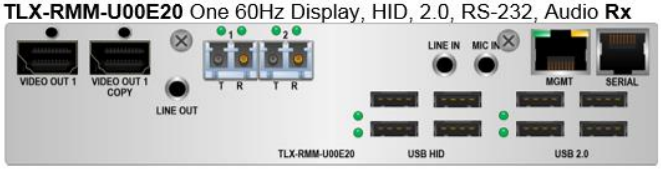
TLX-TMM-H00E20 One 60Hz Display, HID, RS-232, Audio **Tx**

TLX-RMM-H00E20 One 60Hz Display, HID, RS-232, Audio **Rx**

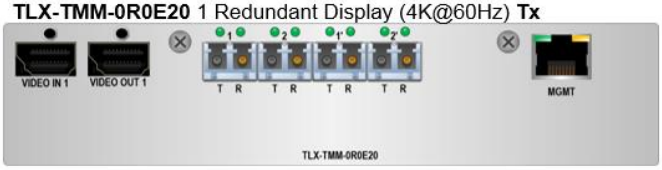
TLX-TMM-U00E20 One 60Hz Display, HID, 2.0, RS-232, Audio **Tx**



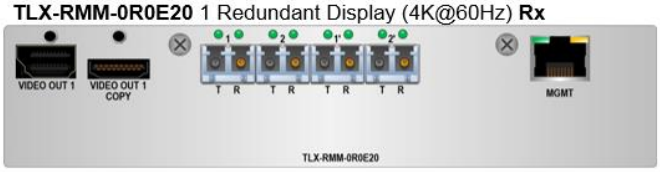
TLX-RMM-U00E20 One 60Hz Display, HID, 2.0, RS-232, Audio **Rx**



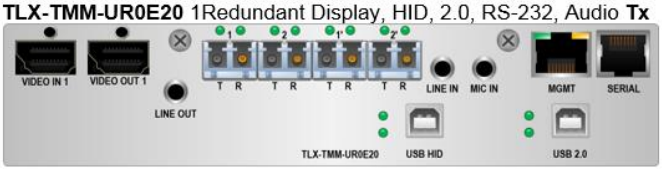
TLX-TMM-0R0E20 1 Redundant Display (4K@60Hz) **Tx**



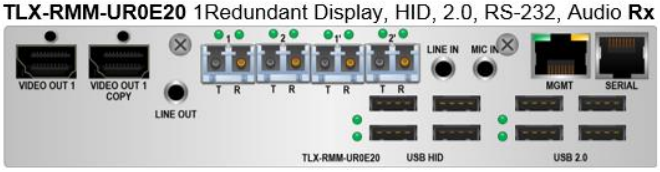
TLX-RMM-0R0E20 1 Redundant Display (4K@60Hz) **Rx**



TLX-TMM-UR0E20 1Redundant Display, HID, 2.0, RS-232, Audio **Tx**



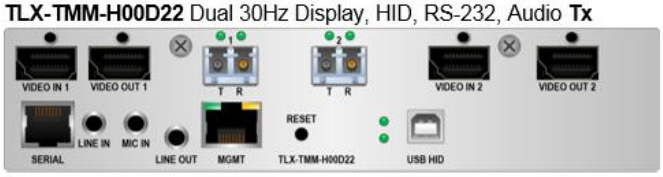
TLX-RMM-UR0E20 1Redundant Display, HID, 2.0, RS-232, Audio **Rx**



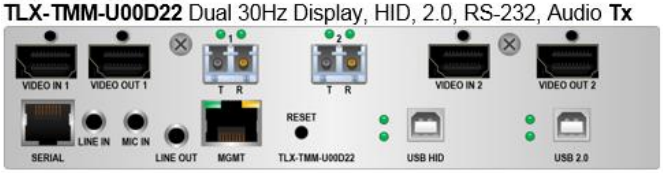
KVM EXTENDER "D" and "E" DUAL-DISPLAY MODULES

(*All support DisplayPort 1.2. "D" supports HDMI 1.4. "E" supports HDMI 2.0*)

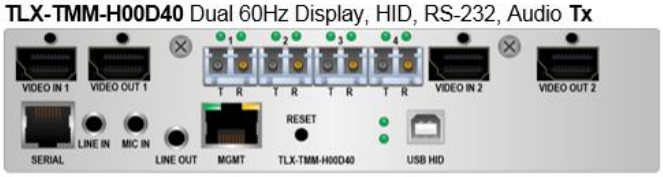
TLX-TMM-H00E22
TLX-TMM-H00D22 Dual 30Hz Display, HID, RS-232, Audio **Tx**



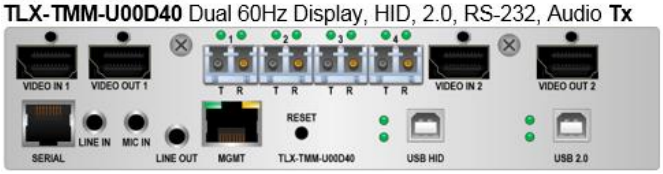
TLX-TMM-U00E22
TLX-TMM-U00D22 Dual 30Hz Display, HID, 2.0, RS-232, Audio **Tx**



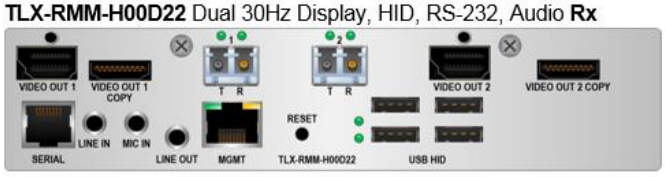
TLX-TMM-H00E40
TLX-TMM-H00D40 Dual 60Hz Display, HID, RS-232, Audio **Tx**



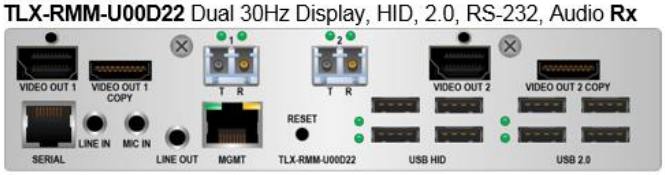
TLX-TMM-U00E40
TLX-TMM-U00D40 Dual 60Hz Display, HID, 2.0, RS-232, Audio **Tx**



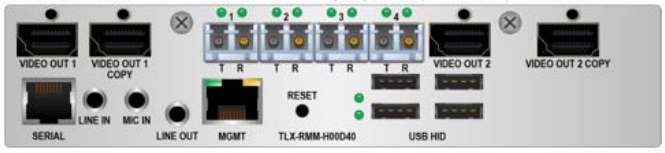
TLX-RMM-H00E22
TLX-RMM-H00D22 Dual 30Hz Display, HID, RS-232, Audio **Rx**



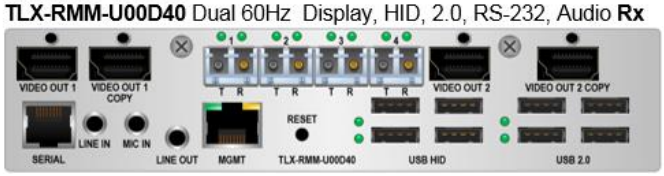
TLX-RMM-U00E22
TLX-RMM-U00D22 Dual 30Hz Display, HID, 2.0, RS-232, Audio **Rx**



TLX-RMM-H00E40
TLX-RMM-H00D40 Dual 60Hz Display, HID, RS-232, Audio **Rx**

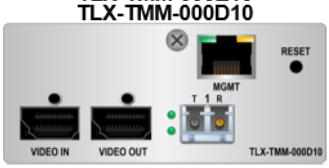


TLX-RMM-U00E40
TLX-RMM-U00D40 Dual 60Hz Display, HID, 2.0, RS-232, Audio **Rx**

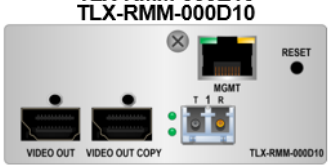


VIDEO EXTENDER MODULES (*All support* DisplayPort 1.2. *"D" supports* HDMI 1.4, *"E" supports* HDMI 2.0)

TLX-TMM-000E10
TLX-TMM-000D10

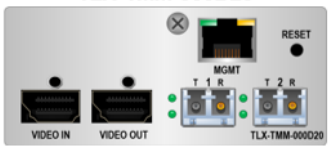


TLX-RMM-000E10
TLX-RMM-000D10

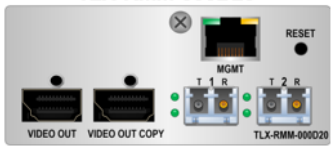


1 Display 4K@30Hz, Modules

TLX-TMM-000E20
TLX-TMM-000D20

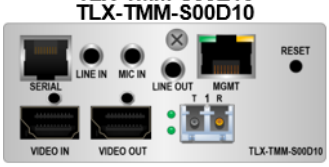


TLX-RMM-000E20
TLX-RMM-000D20

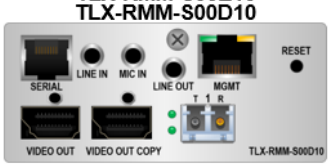


1 Display 4K@60Hz, Modules

TLX-TMM-S00E10
TLX-TMM-S00D10

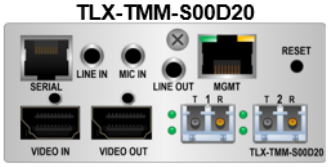


TLX-RMM-S00E10
TLX-RMM-S00D10

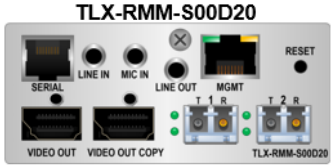


1 Display 4K@30Hz, RS-232, Audio Modules

TLX-TMM-S00E20
TLX-TMM-S00D20

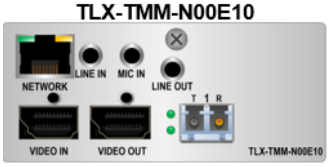


TLX-RMM-S00E20
TLX-RMM-S00D20

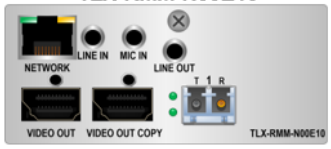


1 Display 4K@60Hz, RS-232, Audio Modules

TLX-TMM-N00E10

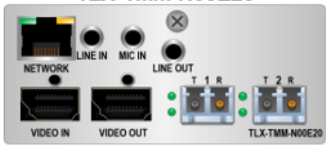


TLX-RMM-N00E10

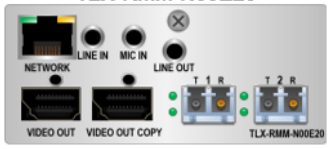


1 Display 4K@30Hz, Network, Audio Modules

TLX-TMM-N00E20

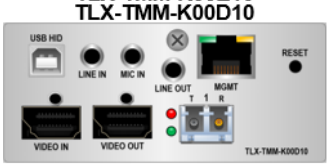


TLX-RMM-N00E20

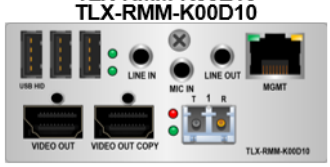


1 Display 4K@60Hz, Network, Audio Modules

TLX-TMM-K00E10
TLX-TMM-K00D10

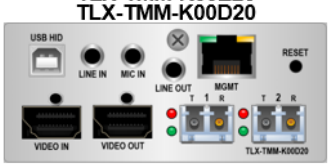


TLX-RMM-K00E10
TLX-RMM-K00D10

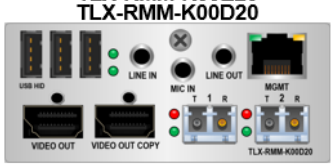


1 Display 4K@30Hz, Audio, USB HID Modules

TLX-TMM-K00E20
TLX-TMM-K00D20



TLX-RMM-K00E20
TLX-RMM-K00D20

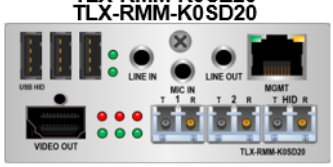


1 Display 4K@60Hz, Audio, USB HID Modules

TLX-RMM-K0SD10
TLX-RMM-K0SE10

1 Display 4K@30Hz, Audio, USB HID, Separate Data Path RX

TLX-RMM-K0SE20
TLX-RMM-K0SD20



1 Display 4K@60Hz, Audio, USB HID, Separate Data Path RX

12G SDI DISPLAY EXTENDER MODULE

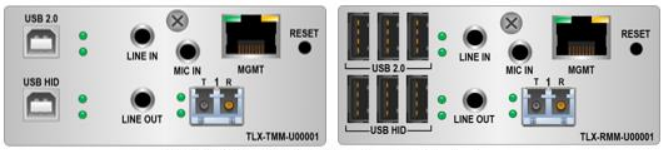
TLX-TMM-N00S20

TLX-RMM-N00S20

HD, 3G, 6G or 12G SDI, 4 BNC-mini coax, Serial RS-422

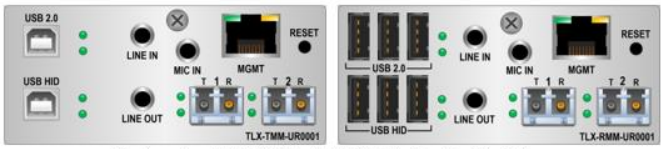
USB 2.0 & USB HID EXTENDER MODULES

TLX-TMM-U00001 **TLX-RMM-U00001**



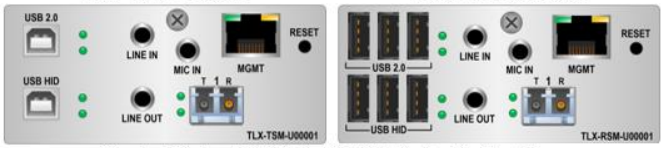
USB 2.0, USB HID, Audio Modules

TLX-TMM-UR0001 **TLX-RMM-UR0001**



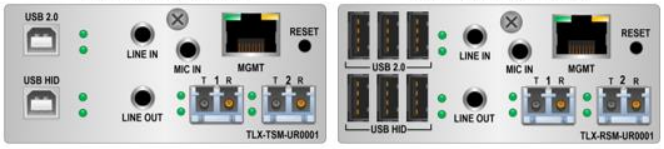
Redundant USB 2.0, USB HID, Audio Modules

TLX-TSM-U00001 **TLX-RSM-U00001**



Single-Mode, USB 2.0, USB HID, Audio Modules

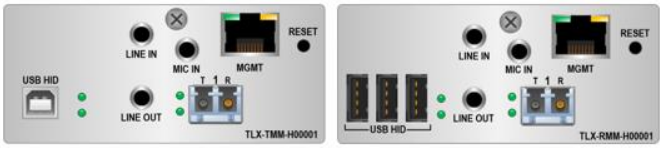
TLX-TSM-UR0001 **TLX-RSM-UR0001**



Single-Mode, Redundant USB 2.0, USB HID, Audio Modules

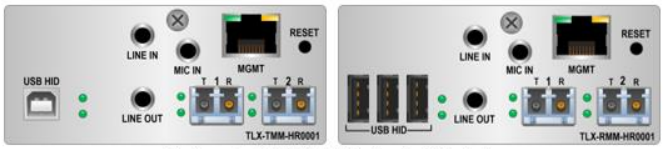
USB HID EXTENDER MODULES

TLX-TMM-H00001 **TLX-RMM-H00001**



USB HID, Audio Modules

TLX-TMM-HR0001 **TLX-RMM-HR0001**

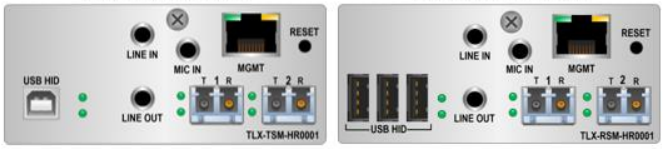


Redundant USB HID, Audio Modules

TLX-TSM-H00001 **TLX-RSM-H00001**

Single-Mode USB HID, Audio Modules

TLX-TSM-HR0001 **TLX-RSM-HR0001**



Single-Mode, Redundant USB HID, Audio Modules

USB 2.0 EXTENDER MODULES

TLX-TMM-C00001 **TLX-RMM-C00001**

USB 2.0 Modules

TLX-TSM-C00001 **TLX-RSM-C00001**

Single-Mode, USB 2.0 Modules

Supplied Cables

All Transmitters, by default, come with **HDMI 2.0** cables (supports 4K @ 60Hz) - quantity depending upon the model. **DisplayPort 1.2** cables are available upon request. (12G SDI modules excluded.)

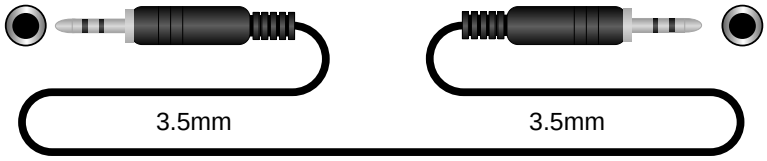
Some KVM and Video Transmitters will also be supplied with **Audio** and/or **USB A-B** cables (2 each) where applicable. Both Transmitters and Receivers with Network or Serial Ports are supplied with **CAT5** cables and **RJ45 to DB9 Adapters** (see Appendix D, pg. 47) where applicable.

Supplied with all TLX Video or KVM Transmitters:

DisplayPort 1.2 to DisplayPort 1.2, locking (CBL000104-002MR)

Supplied with TLX Video & KVM Transmitters where applicable:

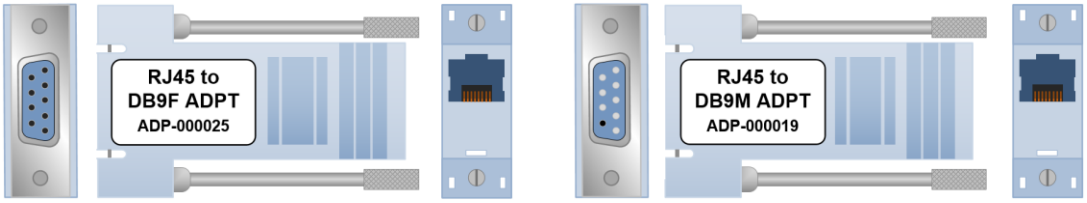
5mm to 3.5mm Audio Cable, 6 Feet (CBL000016-006FR) – 2 each



USB A-B Cable, 6 Feet (CBL000015-006FR) – as applicable

CAT5 Serial Cable, 6 Feet (CBL000001-006FR) – 1 each

RJ45 to DB9 F & M Adapters (ADP-000025, ADP-000019)* – 1 each



*See pin-outs in Appendix D, pg. 47

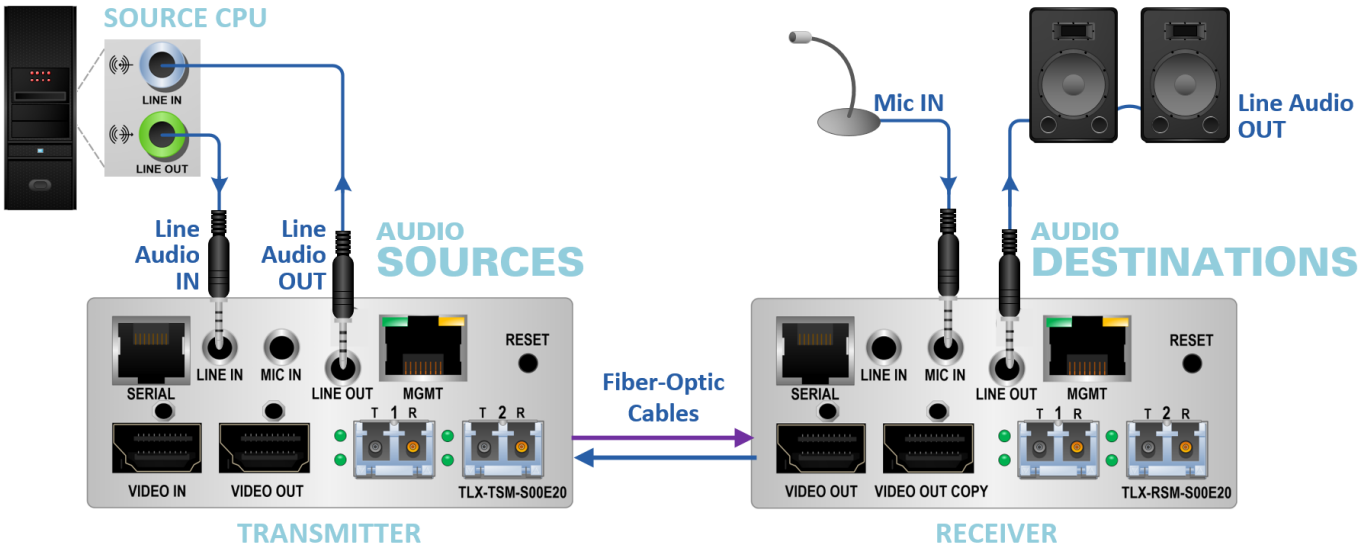
TLX Video and KVM Module Technical Specifications

CABLES (excluding 12G SDI Extenders)	
Supplied Copper Video Cables (Tx only)	**CBL000104-002MR** DisplayPort 1.2 to DisplayPort 1.2 2M *1 each:* **TLX-TMM-000E10, TLX-TMM-S00E10, TLX-TMM-N00E10, TLX-TMM-H00E10, TLX-TMM-U00E10, TLX-TMM-K00E10 TLX-TMM-000E20, TLX-TMM-S00E20, TLX-TMM-N00E20, TLX-TMM-H00E20, TLX-TMM-U00E20, TLX-TMM-K00E20** **TLX-TMM-000D10, TLX-TMM-S00D10, TLX-TMM-H00D10, TLX-TMM-U00D10, TLX-TMM-K00D10 TLX-TMM-000D20, TLX-TMM-S00D20, TLX-TMM-H00D20, TLX-TMM-U00D20, TLX-TMM-K00D20** *2 each:* **TLX-TMM-000E22, TLX-TMM-S00E22, TLX-TMM-H00E22, TLX-TMM-U00E22 TLX-TMM-H00E40, TLX-TMM-U00E40 TLX-TMM-UR0E20, TLX-TMM-0R0E20** **TLX-TMM-000D22, TLX-TMM-S00D22, TLX-TMM-H00D22, TLX-TMM-U00D22 TLX-TMM-H00D40, TLX-TMM-U00D40 TLX-TMM-UR0D20** *HDMI 2.0 cables available upon request:* **CBL000108-002MR** HDMI 2.0 to HDMI 2.0, locking 2M
Supplied Copper Peripheral Cables (Tx only)	**CBL000015-006FR** USB A-B Cable, 6FT **CBL000016-006FR** 3.5mm Male to 3.5mm Male Plug, 6FT *1 each:* **TLX-TMM-H00E10, TLX-TMM-H00E20, TLX-TMM-H00E22, TLX-TMM-H00E40, TLX-TMM-K00E10, TLX-TMM-K00E20** **TLX-TMM-H00D10, TLX-TMM-H00D20, TLX-TMM-H00D22, TLX-TMM-H00D40, TLX-TMM-K00D10, TLX-TMM-K00D20** *2 each:* **TLX-TMM-U00E10, TLX-TMM-U00E20, TLX-TMM-UR0E20, TLX-TMM-U00E22, TLX-TMM-U00E40** **TLX-TMM-U00D10, TLX-TMM-U00D20, TLX-TMM-UR0D20, TLX-TMM-U00D22, TLX-TMM-U00D40**
Fiber-Optic Transmission Distances	Multi-Mode: **Up to 33 meters with Type OM1** **Up to 82 meters with Type OM2** **Up to 300 meters with Type OM3** **Up to 400 meters with Type OM4** Single Mode: **Up to 80km with Type OS2 9/125 for all distances**
ELECTRICAL	
Input Rating	**100-240VAC, 1.5A, 50-60Hz**
Max. DC Power Consumption	*Equal to max. output of a single chassis Power Supply.* **100W 1A** (4 modules) **50W .5A** (2 modules) **25W .5A** (1 module)

THERMAL	
Heat Load	*Equal to max. DC Power consumption x 3.412* 4 Modules: **341** BTU/HR 2 Modules: **171** BTU/HR 1 Module: **85.3** BTU/HR
Operating Temperature Ranges	**Normal operating temp. is 0° to 50°C ambient.** *Internal temp. indications for PC Board and FPGA.* • Board operating temp. range is 0 to 80°C. • Board operating temp. range is 45 to 65°C at ambient 25°C. *Temp. Alarm is active (LED=Red) when Board temp. is >70°C.* • FPGA operating temp. range is 0 to 100°C. • FPGA operating temp. range is 50 to 75°C at ambient 25°C.
WARRANTY	**12 months from date of shipment. Extended warranties available.**

TLX Video and KVM Modules Audio Specifications

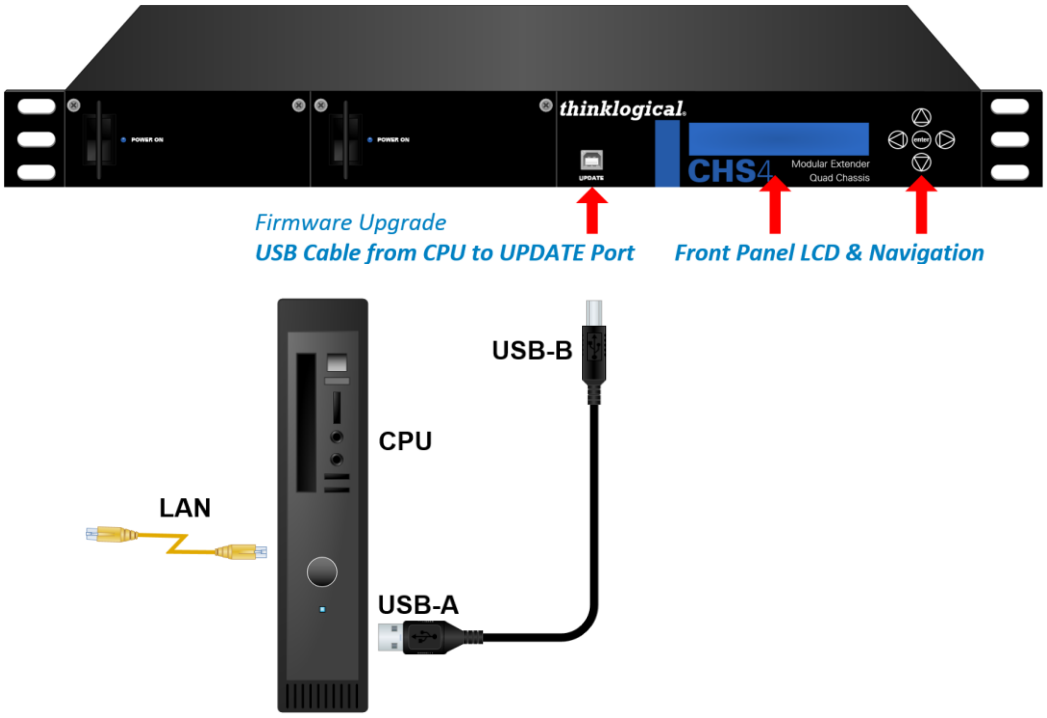
AUDIO	
Line	Full Scale Input Voltage: **2.8 VDC p-p, (2.3dBu, 1 Vrms)** Full Scale Output Voltage: **3.25 VDC p-p, (3.4dBu, 1.15 Vrms)** Frequency Response: **20-20kHz** Input Impedance: **6.8KΩ** Output Impedance: **470Ω**
Mic	Full Scale Input Voltage: **0.085 VDC p-p, (-28dBu, 0.030 Vrms)** Frequency Response: **20-20kHz** Input Impedance: **38KΩ**



Standard TLX Audio Line In/Line Out Configuration

FPGA and Firmware Update Applications

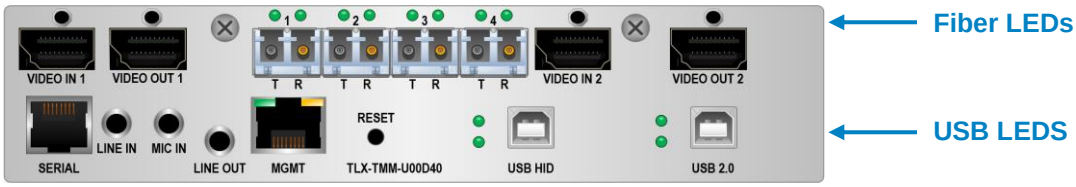
FPGA and Firmware Update Applications are available through Thinklogical's Technical Support Department. Please call us at **1-203-647-8700** or contact us at **support@thinklogical.com** and we'll be happy to provide you with all the assistance you'll need to keep your system up and running at its optimum performance level.



Status Indicator LEDs

The LED status indicators on the TLX modules are provided as troubleshooting aides in diagnosing and resolving technical problems, so that a technician can easily assess the status of the module.

All **Transmitter and Receiver SFP LEDs** are **RED** and **GREEN** and can be in one of three states: OFF, FLASHING or ON. In the case of dual video modules, the *return* fibers are monitored by the 'R' LEDs and will operate the same regardless of which return port is used (SFP 1-4).



ALL LEDS FLASHING RED IN UNISON INDICATES THAT THE MODULE IS IN ALARM!

A module will be declared in ALARM if any of the following conditions exist:

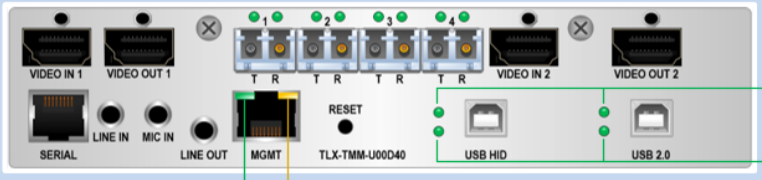
- Over the maximum temperature threshold (module or chassis)
- Fan failure
- Incorrect firmware checksum value

The tables on the following pages detail the various LED states of each module type:

Transmitter and Receiver USB HID and USB 2.0 Status LEDs

Transmitter USB Status LEDs			
Top LED	**Bottom LED**	**HID STATUS**	**CONDITIONS**
ON	ON	HID connected	Forward and backchannel fiber Tx to Rx is OK. Host connected to Tx HID port
ON	OFF	HID unconnected	Forward and backchannel fiber Tx to Rx is OK. Host not connected to Tx HID port
OFF	ON	HID connected	No forward and/or backchannel fiber Tx to Rx (LS_CONN = No)

Top LED	Bottom LED	2.0 STATUS	CONDITIONS
ON	ON	2.0 connected	Forward and backchannel fiber Tx to Rx is OK. Host connected to Tx 2.0 port
ON	OFF	2.0 unconnected	Forward and backchannel fiber Tx to Rx is OK. Host not connected to Tx 2.0 port
FLASH	OFF	2.0 connected	No forward and/or backchannel fiber Tx to Rx (LS_CONN = No)

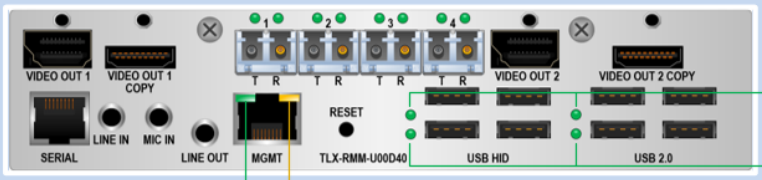


TRANSMITTER MODULE

Network MGMT RJ45 Port LEDs:
Yellow LED on = Link
Green LED flashing = Activity

Receiver USB Status LEDs			
Top LED	**Bottom LED**	**HID STATUS**	**CONDITIONS**
ON	ON	HID connected	Forward and backchannel fiber Tx to Rx is OK. Host connected to Rx HID port
ON	OFF	HID unconnected	Forward and backchannel fiber Tx to Rx is OK. Host not connected to Rx HID port
OFF	ON	HID connected	No forward and/or backchannel fiber Tx to Rx (LS_CONN = No)

Top LED	Bottom LED	2.0 STATUS	CONDITIONS
ON	ON	2.0 connected	Forward and backchannel fiber Tx to Rx is OK. Host connected to Rx 2.0 port
ON	OFF	2.0 unconnected	Forward and backchannel fiber Tx to Rx is OK. Host not connected to Rx 2.0 port
FLASH	OFF	2.0 connected	No forward and/or backchannel fiber Tx to Rx (LS_CONN = No)



RECEIVER MODULE

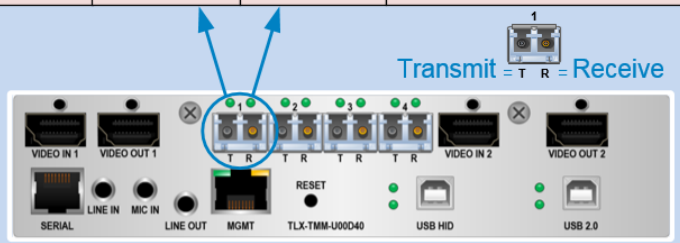
Network MGMT RJ45 Port LEDs:
Yellow LED on = Link
Green LED flashing = Activity

Transmitter and Receiver SFP Status LEDs (KVM Modules)

Transmitter Status LEDs (SFPs 1-4)			
FIBER STATUS	**LEFT LED**	**RIGHT LED**	**NORMAL CONDITION (with Back Channel)**
T ACTIVE VIDEO OK	FLASH GREEN	N/A	T active and transmitting valid video
R ACTIVE DATA OK	N/A	FLASH GREEN	R locked onto link receiving data

FIBER STATUS	LEFT LED	RIGHT LED	OTHER CONDITIONS
T ERROR	FLASH RED	N/A	Error if T is not active
R ERROR	N/A	FLASH RED	R receiving signal but cannot lock onto data
T ACTIVE NO VIDEO	FLASHING RED-GREEN	N/A	No video/Invalid video
R ACTIVE NO DATA	N/A	GREEN ON	R locked onto link
R INACTIVE	N/A	OFF	No signal to R (no back channel)

MOD. STATUS	ALL LEFT LEDS	ALL RIGHT LEDS	ALARM CONDITIONS
ALARM	FLASH RED	FLASH RED	Over temp or Fan fail

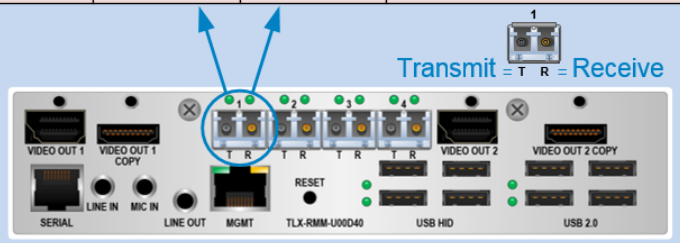


TRANSMITTER MODULE

Receiver Status LEDs (SFPs 1-4)			
FIBER STATUS	**LEFT LED**	**RIGHT LED**	**NORMAL CONDITION (with Back Channel)**
T ACTIVE	FLASH GREEN	N/A	T active and transmitting valid data
R ACTIVE VIDEO OK	N/A	FLASH GREEN	R receiving data and video

FIBER STATUS	LEFT LED	RIGHT LED	OTHER CONDITIONS
T OFF	FLASH RED	N/A	Error if T is not active
R ERROR	N/A	FLASH RED	R receiving signal but cannot lock onto data
T ACTIVE	GREEN ON	N/A	T is on and active
R ACTIVE NO VIDEO	N/A	FLASHING RED-GREEN	R locked onto data, no video
R INACTIVE	N/A	OFF	No signal to R

MOD. STATUS	ALL LEFT LEDS	ALL RIGHT LEDS	ALARM CONDITIONS
ALARM	FLASH RED	FLASH RED	Over temp or Fan fail



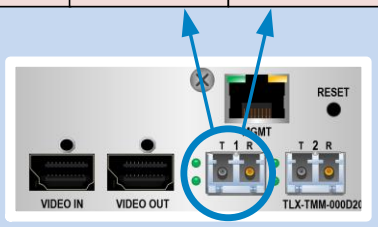
RECEIVER MODULE

Transmitter and Receiver SFP Status LEDs (Video Modules)

Transmitter Status LEDs (SFPs 1 & 2)			
FIBER STATUS	**TOP LED**	**BOTTOM LED**	**NORMAL CONDITION (with Back Channel)**
T ACTIVE VIDEO OK	FLASH GREEN	N/A	T active and transmitting valid video
R ACTIVE DATA OK	N/A	FLASH GREEN	R locked onto link receiving data

FIBER STATUS	TOP LED	BOTTOM LED	OTHER CONDITIONS
T ERROR	FLASH RED	N/A	Error if T is not active
R ERROR	N/A	FLASH RED	R receiving signal but cannot lock onto data
T ACTIVE NO VIDEO	FLASHING RED-GREEN	N/A	No video/Invalid video
R ACTIVE NO DATA	N/A	GREEN ON	R locked onto link
R INACTIVE	N/A	OFF	No signal to R (no back channel)

MOD. STATUS	ALL TOP LEDS	ALL BTM LEDS	ALARM CONDITIONS
ALARM	FLASH RED	FLASH RED	Over temp or Fan fail



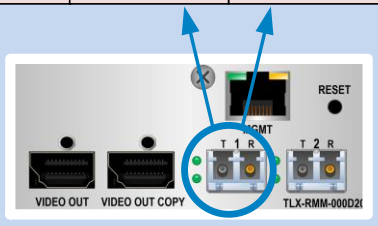
Transmit = Receive

TRANSMITTER MODULE

Receiver Status LEDs (SFPs 1 & 2)			
FIBER STATUS	**TOP LED**	**BOTTOM LED**	**NORMAL CONDITION (with Back Channel)**
T ACTIVE	FLASH GREEN	N/A	T active and transmitting valid data
R ACTIVE VIDEO OK	N/A	FLASH GREEN	R receiving data and video

FIBER STATUS	TOP LED	BOTTOM LED	OTHER CONDITIONS
T OFF	FLASH RED	N/A	Error if T is not active
R ERROR	N/A	FLASH RED	R receiving signal but cannot lock onto data
T ACTIVE	GREEN ON	N/A	T is on and active
R ACTIVE NO VIDEO	N/A	FLASHING RED-GREEN	R locked onto data, no video
R INACTIVE	N/A	OFF	No signal to R

MOD. STATUS	ALL TOP LEDS	ALL BTM LEDS	ALARM CONDITIONS
ALARM	FLASH RED	FLASH RED	Over temp or Fan fail



Transmit = Receive

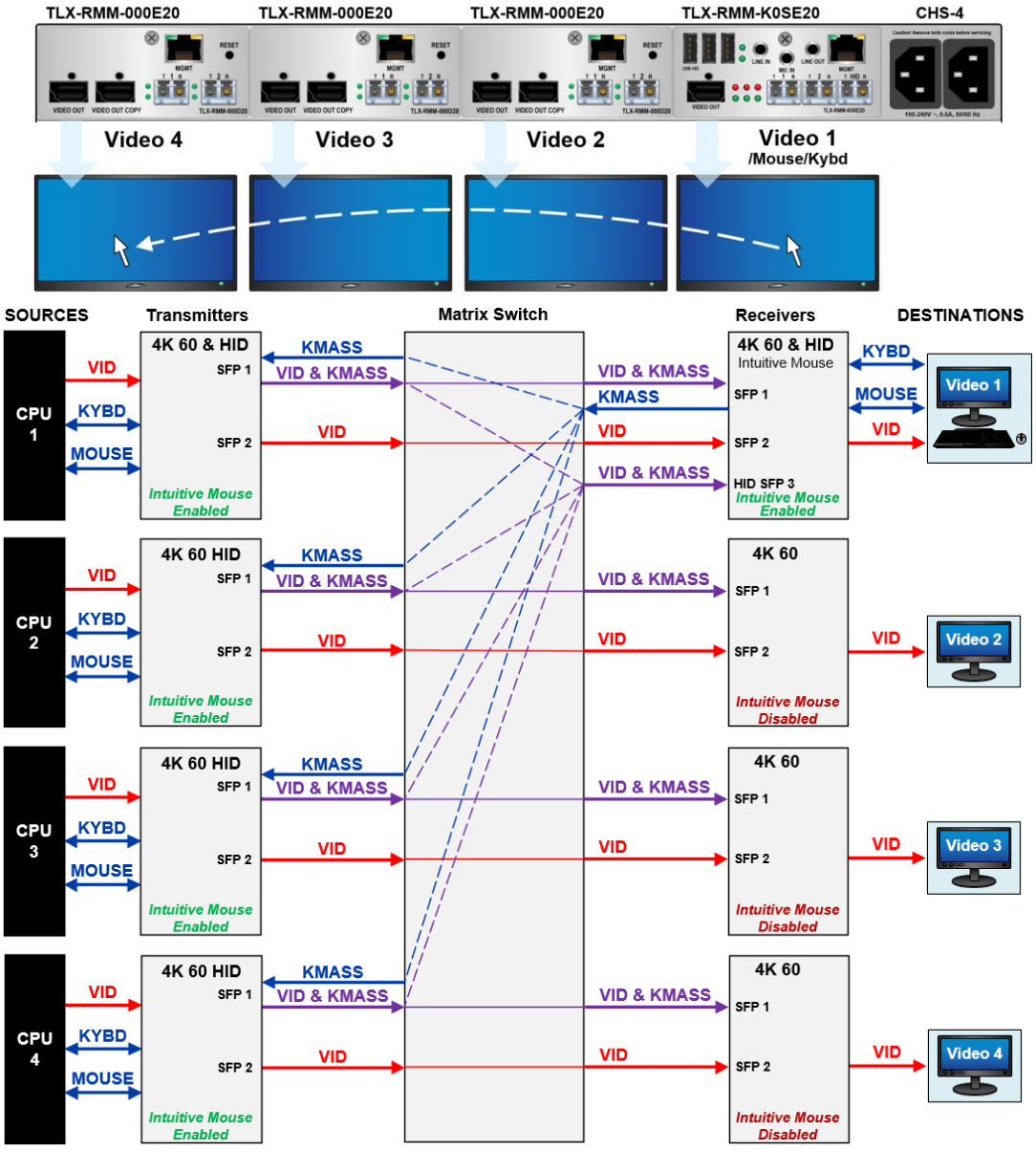
RECEIVER MODULE

Intuitive Mouse

Intuitive Mouse**,** when used with System Management Portfolio,* allows movement between isolated computer systems by moving the mouse cursor across display borders. When the cursor scrolls beyond the screen border from one computer to another, the keyboard, mouse, audio and USB device mapping switch accordingly. *All TLX Extenders support Intuitive Mouse, as do some Velocity extenders*.

Intuitive Mouse must be enabled at both the Transmitter Module and the Receiver Module:

- **Rx:** In the chassis `LCD System Menu`, scroll to the Rx module that will control Intuitive Mouse and select `ALLOW OOB` (*O*ut *O*f *B*and), then `ENABLE`. Select `Intuitive Mouse` (`MS Screen Select` on 'D' Receivers), then `ENABLE`. Scroll to <u>all other</u> Rx modules at this workstation and disable `OOB` and `Intuitive Mouse`.
- **Tx:** In the chassis `LCD System Menu`, enable `Intuitive Mouse` on <u>all</u> transmitters.

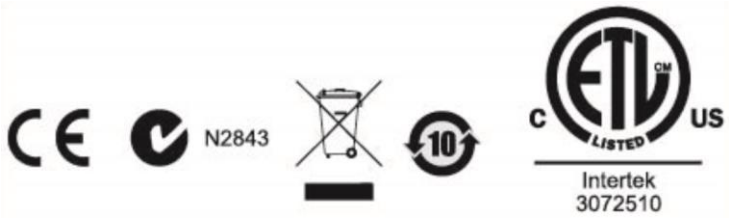


*See the *SMP Product Manuals,* available at https://www.thinklogical.com

Regulatory & Safety Compliance

Symbols Found on Our Products

Markings and labels on our products follow industry-standard conventions. Regulatory markings found on our products comply with all required domestic and many international requirements.



Regulatory Compliance

Thinklogical's® products are designed and made in the U.S.A. These products have been tested by a certified testing laboratory and found compliant with the following standards for both domestic USA and many international locations:

North America

Safety
UL 62368-1:2014Ed.2
CSA C22.2#62368-1:2014Ed.2

LASER Safety
CDRH 21 CFR 1040.10
Class 1 LASER Product
Canadian Radiation Emitting Devices Act, REDR C1370
IEC 60825:2001 Parts 1 and 2
Class 1 LASER Product

Electromagnetic Interference
FCC 47CFR Part 15 Subpart B: 2013 Class A
Industry Canada ICES-003: 2016 Ed. 6

Australia & New Zealand

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective action.

European Union

Declaration of Conformity

Manufacturer's Name & Address: **Thinklogical,** A **BELDEN** BRAND
100 Washington Street
Milford, Connecticut 06460 USA

Thinklogical's products comply with the requirements of the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC, the RoHS Directive 2011/65/EU, the WEEE Directive 2012/19/EU and carry the CE marking accordingly.

Standards with Which Our Products Comply

Safety
IEC 62368-1:2014Ed.2+C1
CB Scheme Certificate

Electromagnetic Emissions

CENELEC EN 55022:2010 +AC:2011

Electromagnetic Immunity

EN 55024:2011+A1
CENELEC EN 55032:2015
EN 61000-3-2:2000 Harmonics
EN 61000-3-3:2008 Flicker
EN 61000-4-2:2009 Electro-Static Discharge Test
EN 61000-4-3:2006 A1:2008, A2:2010 Radiated Immunity Field Test
EN 61000-4-4:2004 Electrical Fast Transient Test
EN 61000-4-5:2006 Power Supply Surge Test
EN 61000-4-6:2009 Conducted Immunity Test
EN 61000-4-11:2004 Voltage Dips & Interrupts Test

Supplementary Information

The following statements may be appropriate for certain geographical regions and might not apply to your location:

- This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. *Cet appareil numérique de la classe A respecte toutes les exigencies du Règlement sur le matérial brouilleur du Canada*.
- This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective action.
- This equipment has been tested and found compliant with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications in which case the user may be required to make adequate corrective measures at their own expense.
- This Class A digital apparatus complies with Canadian ICES-003 and has been verified as compliant within the Class A limits of the FCC Radio Frequency Device Rules (FCC Title 47, Part 15, Subpart B CLASS A), measured to CISPR 22:1993 limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment.
- The user may notice degraded audio performance in the presence of electro-magnetic fields.

How to Contact Us

Customer Support

Website: https://www.thinklogical.com

Check out our website for current products, support documents and useful information about all the products and services we offer, including:

- **Technical Specification Sheets**
- **Quick-Start Guides**
- **Product Manuals** (for viewing online or for download)
- **Chat live with a Technical Service Representative**

Email: mailto:support@thinklogical.com

For product support, technical issues or questions, product repairs and request for Return Merchandise Authorization.

Telephone: 1-203-647-8700

Please contact our expert sales staff in Milford, CT **Monday - Friday from 8:30am to 5:00pm**, Eastern Time Zone. If leaving a voice message, please provide a preferred time to call back.

Fax: 1-203-783-9949

Please indicate the nature of the fax on your cover sheet and provide contact information.

Product Support

Warranty

Thinklogical warrants this product against defects in materials and workmanship for a period of one year from the date of delivery, with longer terms available at time of purchase on most products. Thinklogical and its suppliers disclaim all other warranties. Please refer to your product invoice for the Warranty Terms & Conditions.

Defect remedy shall be the repair or replacement of the product, provided that the defective product is returned to the authorized dealer within a year from the date of delivery.

If you wish to return your device, contact the Thinklogical authorized dealer where you purchased the device, or if you purchased directly, call Thinklogical at **1-800-647-8700**.

Return Authorization

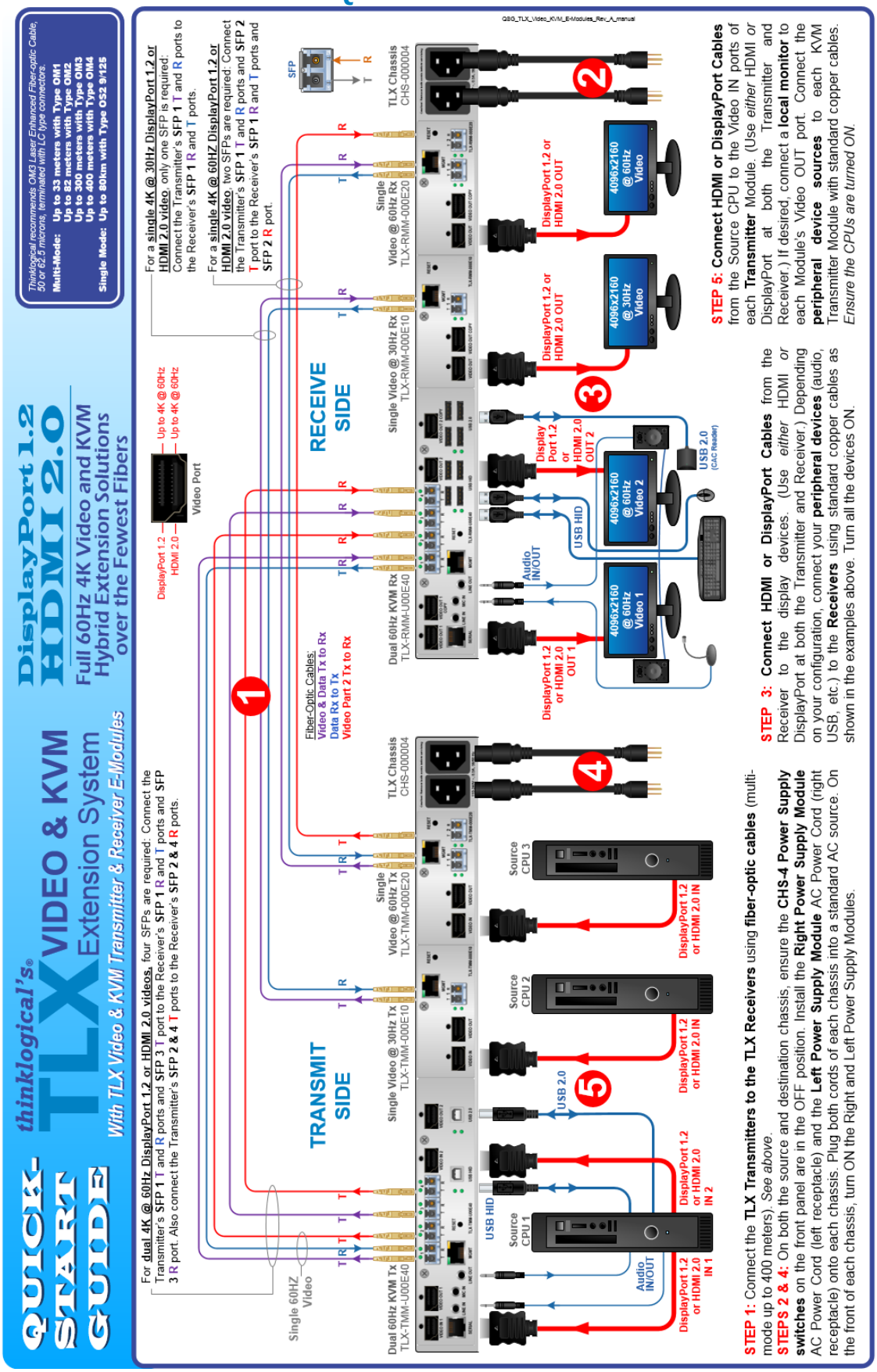
If you must return a product to Thinklogical directly, please contact us at **1-203-647-8700**. Customer Support will ask you to describe the problem and will issue you a **R**eturn **M**erchandise **A**uthorization **number** (RMA#). Pack the device in its original box, if possible, and return it with the RMA# printed on the outside of the box. **DO NOT return a product to Thinklogical without a *Return Merchandise Authorization*.**

Our Address

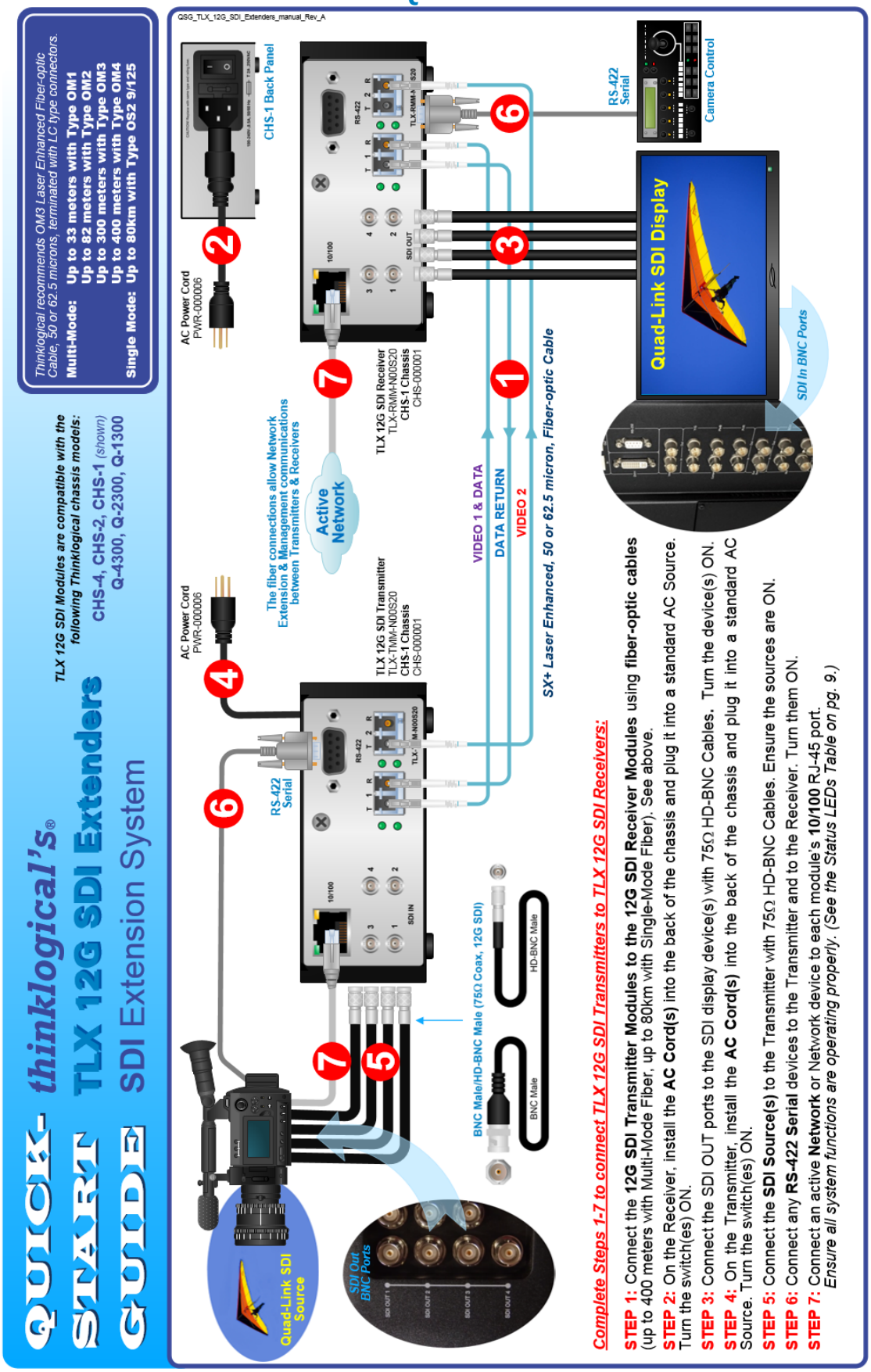
If you have any product issues or questions or need technical assistance with your Thinklogical system, please call us at **1-203-647-8700** and let us help. If you need to write us or return a product, please use the following address:

Please include the Return Merchandise Authorization number: **Thinklogical,** A **BELDEN** BRAND
100 Washington Street
Milford, CT 06460 USA
Attn: *RMA#*

Appendix A: *TLX Video & KVM Quick Start Guide*



Appendix B: *TLX 12G SDI Extender Quick Start Guide*



thinklogical®

TLX KVM/Dual Video Extender Module
FPGA Program Code Update Procedure

The following procedure documents the process for updating the FPGA Program Code, using a Windows-based computer, including the following TLX KVM/Dual Video Extender Modules in a CHS-2 or CHS-4 Chassis:
(**T**=Tx, **R**=Rx, **MM**=Multi-Mode, **SM**=Single-Mode, **D**=HDMI 1.4, **E**=HDMI 2.0)
TLX-TMM/TSM-H00D/E22, -U00D/E22, -H00D/E40, -U00D/E40
TLX-RMM/RSM-H00D/E22, -U00D/E22, -H00D/E40, -U00D/E40

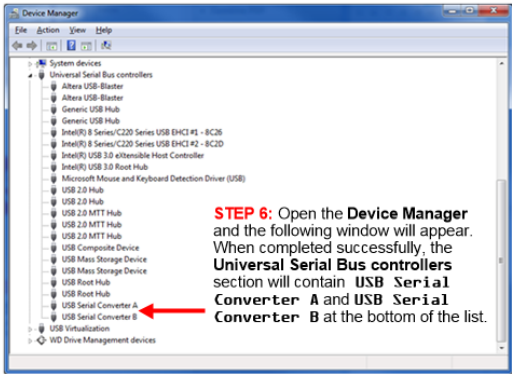
STEP 1: FPGA Update Preparation: Please contact your ***thinklogical*** Sales Representative or Customer Service (**1-203-647-8700**) for access to the FPGA Download Update application and firmware.

STEP 2: Install the provided FPGA Download Update application on the system's CPU.

STEP 3: Save the FPGA program code update file provided by Thinklogical to a known location on the CPU. The program code update file will have a file extension of "**.lbf**". This is the file that will be retrieved in Step 10.

STEP 4: Use the Navigation buttons ▼ to get to **`*System`**. Scroll right ▶ to **`Allow FPGA Update`**. Press *enter*. Use the down arrow ▼ to select `Yes` and press *enter*.

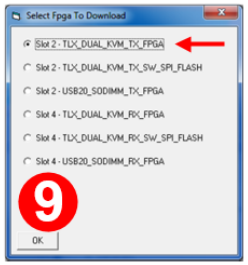
STEP 5: Connect a USB cable from the front panel of the CHS-2 or CHS-4 chassis to the CPU. (When connecting Thinklogical equipment to your PC for the first time, it may take a few moments for Windows to correctly install the required drivers.) Open the Windows *Device Manager* to check that all drivers are installed correctly.



STEP 6: Open the **Device Manager** and the following window will appear. When completed successfully, the **Universal Serial Bus controllers** section will contain **`USB Serial Converter A`** and **`USB Serial Converter B`** at the bottom of the list.

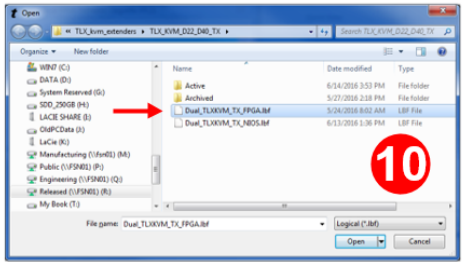
STEP 7: Once the drivers are installed, go to the **Start** menu and choose: **Start → All Programs → FPGA_Download → FPGA_Download.** The window at left will appear.
Select *Identify Product*.

STEP 8: If you do not see **`Q4300RACK_CTRL`** (CHS4 Chassis) or **`Q2300RACK_CTRL`** (CHS2 Chassis) call Thinklogical for assistance. Otherwise, select *Open File*.

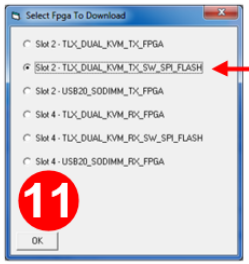


STEP 9: You will see a window similar to this, depending on how many slots in the chassis are occupied (2 in this example). As shown, there are three firmware options for each of the TLX KVM modules. **Slot 2 is a TX module and Slot 4 is an RX module.** To upgrade the TX, for example, first select: **`Slot 2-TLX_DUAL_KVM_TX_FPGA`** (left).

The procedures are the same whether updating a Tx or Rx module. Screen options will reflect either choice. The Tx module update is shown here.

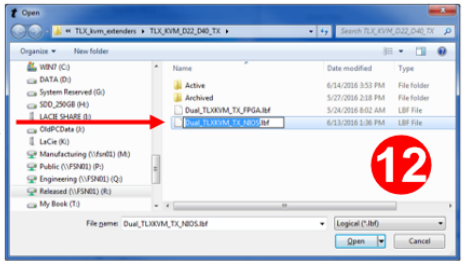


STEP 10: A dialog box similar to the one above will appear. **Navigate to the folder with the unzipped firmware files from Step 3 (`Dual_TLXKVM_TX_FPGA-1bf`).** The dialog box will already be populated with the correct file name. Click *Open*. (This will take approximately 10 minutes.) When complete, the Upgrade window will open.



STEP 11: Select *Open File*. A window similar to this one will open. Select: **`Slot2-TLX_DUAL_KVM_TX_SW_SPI_FLASH`.**

STEP 12: A window similar to this one will open. Select: **`Dual_TLXKVM_TX_NIOS-1bf`** and click *Open*. This will take about 3 minutes. The *Update* window will open again.



STEP 13: Select *Open File* and repeat the steps above to update the RX modules.

STEP 14: Power-cycle the chassis to make the new firmware active. **If you have any problems, please call *thinklogical* for help: 203-647-8700**

TLX KVM/Single Video Extender Modules

thinklogical®

FPGA Program Code Update Procedure

The following procedure documents the process for updating the FPGA Program Code, using a Windows-based computer, including the following TLX KVM/Single Video Extender Modules in a CHS-2 or CHS-4 Chassis:
(T=Tx, R=Rx, **MM**=Multi-Mode, **SM**=Single-Mode, D=HDMI 1.4, E=HDMI 2.0, **S**=HD, 3G, 6G, 12G SDI)

TLX-TMM/TSM-H00D/E10, -U00D/E10, -H00D/E20, -U00D/E20
TLX-RMM/RSM-H00D/E10, -U00D/E10, -H00D/E20, -U00D/E20
TLX-TMM/TSM-000E10, -S00E10, -K00E10, -N00E10, -000E20, -S00E20, -K00E20, -N00E20, -N00S20
TLX-RMM/RSM-000E10, -S00E10, -K00E10, -N00E10, -000E20, -S00E20, -K00E20, -N00E20, -N00S20

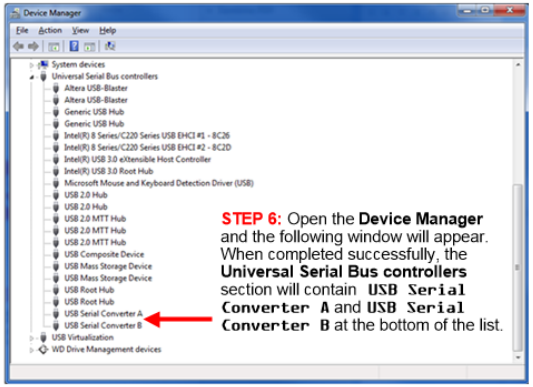
STEP 1: FPGA Update Preparation: Please contact your ***thinklogical*** Sales Representative or Customer Service (**1-203-647-8700**) for access to the FPGA Download Update application and firmware.

STEP 2: Install the provided FPGA Download Update application on the system's CPU.

STEP 3: Save the FPGA program code update file provided by Thinklogical to a known location on the CPU. The program code update file will have a file extension of "**.lbf**". This is the file that will be retrieved in Step 10.

STEP 4: Use the Navigation buttons ▼ to get to `*System*`. Scroll right ▶ to `Allow FPGA Update`. Press *enter*. Use the down arrow ▼ to select `Yes` and press *enter*.

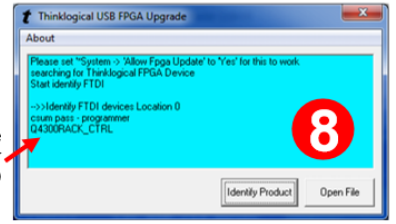
STEP 5: Connect a USB cable from the front panel of the CHS-2 or CHS-4 chassis to the CPU. (When connecting Thinklogical equipment to your PC for the first time, it may take a few moments for Windows to correctly install the required drivers.) Open the Windows *Device Manager* to check that all drivers are installed correctly.



STEP 6: Open the **Device Manager** and the following window will appear. When completed successfully, the **Universal Serial Bus controllers** section will contain `USB Serial Converter A` and `USB Serial Converter B` at the bottom of the list.

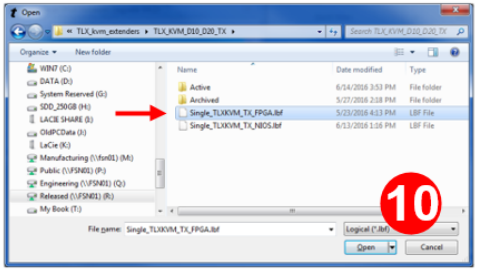
STEP 7: Once the drivers are installed, go to the **Start** menu and choose: **Start → All Programs → FPGA_Download → FPGA_Download.** The window at left will appear.
Select *Identify Product.*

STEP 8: If you do not see `Q4300RACK_CTRL` (CHS4 Chassis) or `Q2300RACK_CTRL` (CHS2 Chassis) call Thinklogical for assistance. Otherwise, select *Open File.*



STEP 9: You will see a window similar to this, depending on how many slots in the chassis are occupied (2 in this example). As shown, there are three firmware options for each of the TLX KVM modules. **Slot 2 is a TX module and Slot 4 is an RX module.** To upgrade the TX, for example, first select: `Slot 2-TLX_SINGLE_KVM_TX_FPGA` (left).

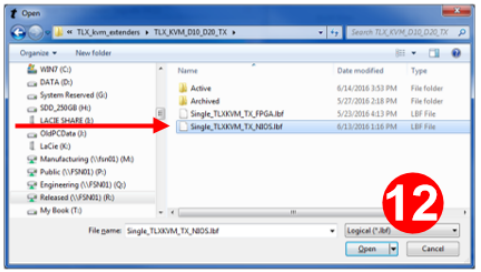
The procedures are the same whether updating a Tx or Rx module. Screen options will reflect either choice. The Tx module update is shown here.



STEP 10: A dialog box similar to the one above will appear. **Navigate to the folder with the unzipped firmware files from Step 3 (`Single_TLXKVM_TX_FPGA-lbf`).** The dialog box will already be populated with the correct file name. Click *Open*. (This will take approximately 10 minutes.) When complete, the Upgrade window will open.

STEP 11: Select *Open File.* A window similar to this one will open. Select: `Slot2-TLX_SINGLE_KVM_TX_SW_SPI_FLASH`.

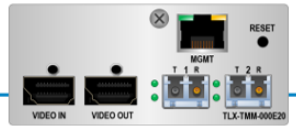
STEP 12: A window similar to this one will open. Select: `Single_TLXKVM_TX_NIOS-lbf` and click *Open*. This will take about 3 minutes. The *Update* window will open again.



STEP 13: Select *Open File* and repeat the steps above to update the RX modules.

STEP 14: Power-cycle the chassis to make the new firmware active. **If you have any problems, please call *thinklogical* for help: 203-647-8700**

thinklogical®
TLX Video Extender Module
FPGA Program Code Update Procedure



The following procedure documents the process for updating the FPGA Program Code, using a Windows-based computer, for the following TLX Video Extender Modules in a CHS-2 or CHS-4 Chassis:
TLX-TMM/TSM-0000E10, -S000E10, -0000E20, -S000E20
TLX-RMM/RSM-0000E10, -S000E10, -0000E20, -S000E20 *(and corresponding 'D' versions)*

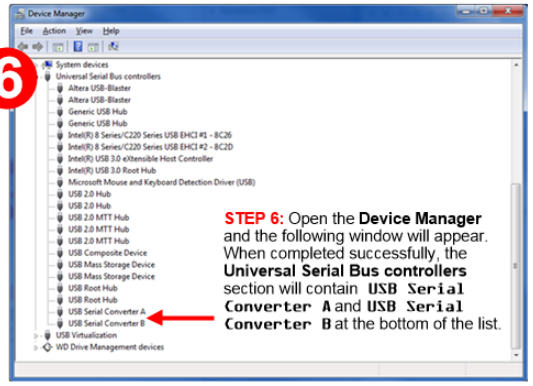
STEP 1: FPGA Update Preparation: Please contact your ***thinklogical*** Sales Representative or Customer Service (**1-203-647-8700**) for access to the FPGA Download Update application and firmware.

STEP 2: Install the provided FPGA Download Update application on the system's CPU.

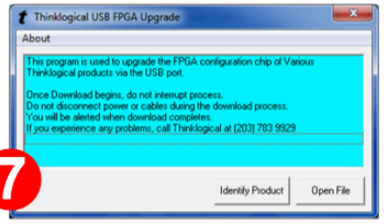
STEP 3: Save the FPGA program code update file provided by Thinklogical to a known location on the CPU. The program code update file will have a file extension of "**.lbf**". This is the file that will be retrieved in Step 10.

STEP 4: Use the Navigation buttons ▼ to get to **`*System.`** Scroll right ▶ to **`Allow FPGA Update.`** Press *enter*. Use the down arrow ▼ to select `Yes` and press *enter*.

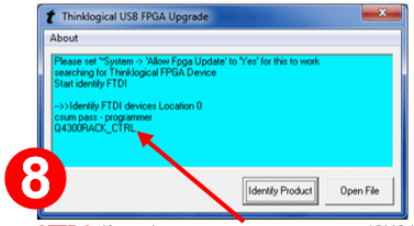
STEP 5: Connect a USB cable from the front panel of the CHS-2 or CHS-4 chassis to the CPU. (When connecting Thinklogical equipment to your PC for the first time, it may take a few moments for Windows to correctly install the required drivers.) Open the Windows *Device Manager* to check that all drivers are installed correctly.



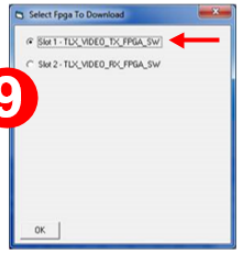
STEP 6: Open the **Device Manager** and the following window will appear. When completed successfully, the **Universal Serial Bus controllers** section will contain **`USB Serial Converter A`** and **`USB Serial Converter B`** at the bottom of the list.



STEP 7: Once the drivers are installed, go to the **Start** menu and choose: **Start → All Programs → FPGA_Download → FPGA_Download.** The window above will appear. Select *Identify Product.*



STEP 8: If you do not see **`Q4300RACK_CTRL`** (CHS4 Chassis) or **`Q2300RACK_CTRL`** (CHS2 Chassis) call Thinklogical for assistance. Otherwise, select *Open File.*

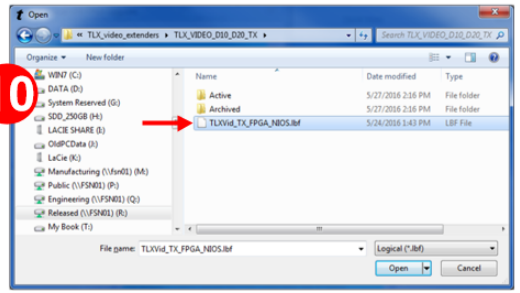


STEP 9: You will see a window similar to this, depending on how many slots in the chassis are occupied (2 in this example). As shown, there is one firmware option for each of the TLX Video modules.

Slot 1 is a TX module and Slot 2 is an RX module.

To upgrade the TX, for example, select:
`Slot 1-TLX_VIDEO_TX_FPGA_SW` (left).

(The procedures are the same whether updating a Tx or Rx module. Screen options will reflect either choice. The Tx module update is shown here.)



STEP 10: A dialog box similar to this will appear. **Navigate to the folder with the unzipped firmware files from Step 3 (`TLXVid_TX_FPGA_NIOS.lbf`).** The dialog box will already be populated with the correct file name.

Click *Open*.

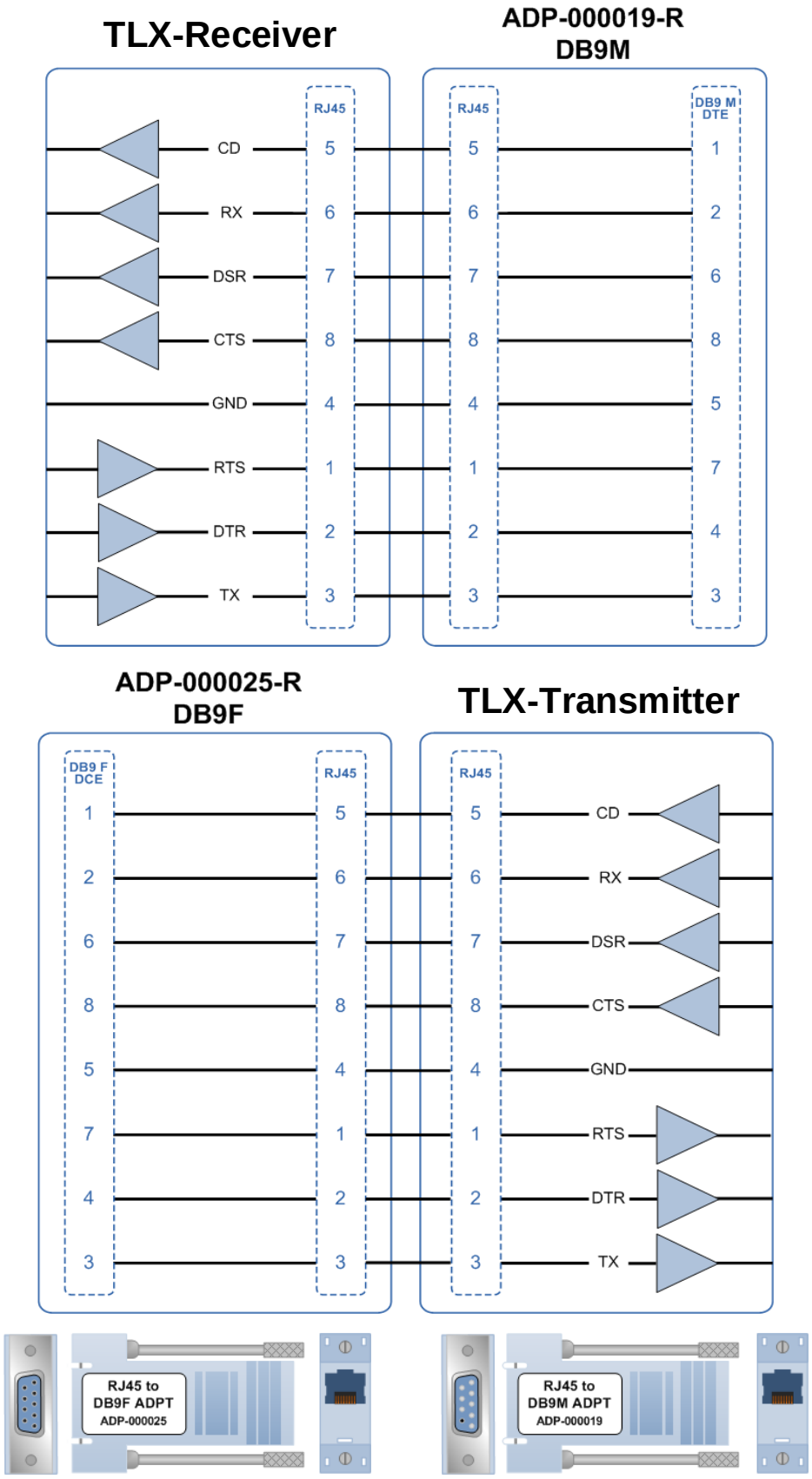
(This will take approximately 10 minutes.)

The *Update* window will open again.

STEP 11: Select *Open File* and repeat the steps above to update the RX modules.

STEP 12: Power-cycle the chassis to make the new firmware active. **If you have any problems, please call *thinklogical* for help: 203-647-8700**

Appendix D: RJ45 to DB9 Adapter Pin-outs



Appendix E: EDID and DDC for TLX Modules

Extended **D**isplay **I**dentification **D**ata (EDID) is a data structure provided by a digital display to describe its identity (*manufacturer's name, product type, serial number, etc.*) and capabilities (*native timing, frequency range, video and audio formats, etc.*) to a video source.

EDID is what enables a modern personal computer to know what kind of monitor is connected.

With this information the CPU and video card can determine what resolutions the monitor is capable of. EDID is defined by a standard published by the **V**ideo **E**lectronics **S**tandards **A**ssociation (VESA). The EDID also includes such information as the phosphor or filter type, timings supported by the display, display size, luminance data and pixel mapping data for digital displays.

Display Data Channel (DDC) is a VESA standard transport medium between a CPU's graphics adapter and monitor used to pass EDID, and **can be either unidirectional or bidirectional**. *(TLX supports unidirectional only.)*

TLX Modules EDID Table				
Feature:	**Remote Dynamic**	**Remote Static**	**Local Static**	**Load Default**
Supports HDCP	**Yes**	**Yes**	**Yes**	**Yes**
Supports Monitor calibration	**No**	**No**	**No**	**No**
Monitor on Rx side required to boot video	**No**	**No**	**No**	**No**
EDID table loaded from Rx	**Yes**	**Yes**	**No**	**No**
EDID table loaded from Tx	**No**	**No**	**Yes**	**No**
EDID table stored in non-volatile memory	**Yes**	**Yes**	**Yes**	**Yes**

NOTE: Most DVI-D graphics adapters will not boot if a valid EDID table is not received at power up.

Default DDC Modes for TLX Models:

Remote Dynamic Mode

The unit acts as a direct connection between the RX and TX. In this mode DDC data is read at the RX and sent to the TX. Once verified at the TX the information is written into a PROM on the TX and provided to the CPU video card. The RX will not send DDC data to the TX unless a different display is connected to the RX.

Advantage: Allows CPU video card to boot when there is no fiber connection to the RX.

Limitations: No communication link from the CPU to the display. Remote Dynamic prevents the use of monitor configuration /color tuning.

Remote Static Mode

Remote Static Mode is a subset of Dynamic Mode in that once a transfer from the RX to the TX is completed successfully, no other transfer will be made unless specifically requested. The DDC data stored in the TX PROM will not change regardless of display changes.

Advantage: Allows the user to acquire and use an EDID table regardless of changes in connection at the RX.

Limitations: No communication link from the CPU to the display. Remote Static prevents the use of monitor configuration/color tuning. This may result in no video if a display with lower resolution capability is subsequently connected.

Local Static Mode

Local Static mode operates in the same manner as Remote Static mode, except that the EDID table is read from a monitor plugged into the local port of the TX. The TX will read the DDC from the locally connected monitor until it reads a valid EDID table. The table will then be stored on the TX and presented to the CPU.

Advantages: The TX does not need to be connected to the video card or RX. The EDID table can be loaded before the TX is installed.

Limitations: No communication link from the CPU to the display. This prevents the use of monitor configuration/ color tuning and may result in loss of remote video if a display with lower resolution capability is connected to the RX.

Default EDID Table

Multiple EDID Tables are present. One supports common resolutions, i.e. 1920x1200, 3840x2160, etc.

Advantage: Sends a valid EDID table to the CPU to boot the graphics adapter .

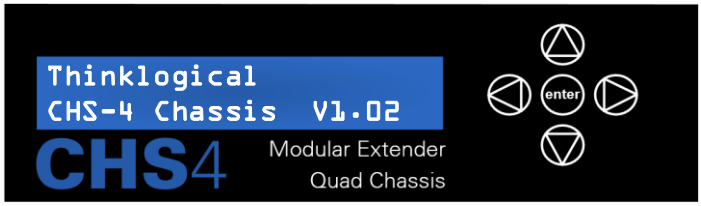
Limitations: Default EDID table may not support required resolutions.

How to Change DDC Modes

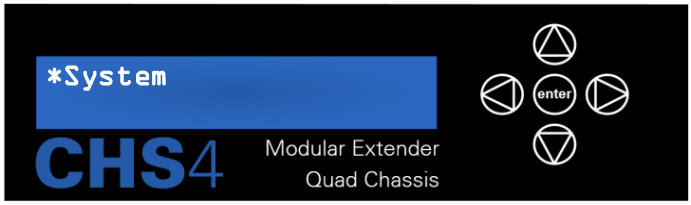
Navigating the LCD Menus

A DDC mode can be modified from either the Transmitter or the Receiver. If the Transmitter and Receiver are set for different modes, the Transmitter determines which mode will take effect once the Transmitter and Receiver are connected via fiber-optic cables.

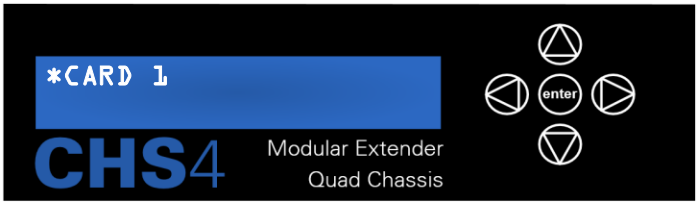
Main Root Menu: At power-up, the initial display identifies the device and software version number.



By pressing the down arrow you will enter the (CHS-2 or CHS-4) chassis **Main Menu**. (The *Terminal Interface* feature is necessary for configuring the CHS-1 Chassis, as there are no Navigation Buttons or LCD on this model.) There is a separate root menu for each of the four modules. When a new module is inserted into a CHS-2 or CHS-4 slot, the chassis reads the card automatically. **The main root menu items are displayed with an asterisk ***



Use the up or down arrows to scroll to the ***Card** (module) menus. Scroll right or left to select a particular card. (Card 1 in this example.)

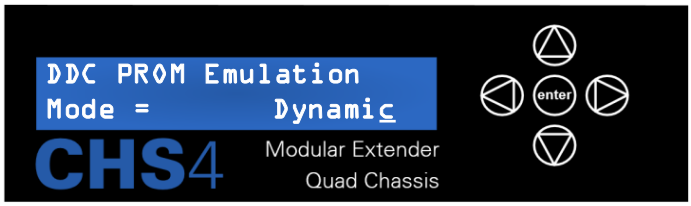


The root menu displays are all similar for cards 1-4

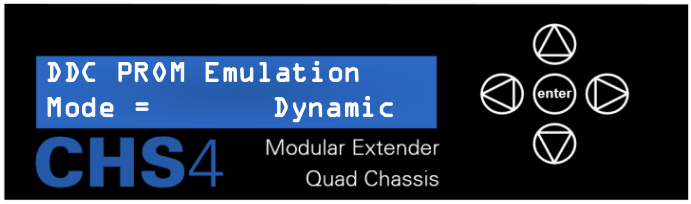
Note: In the front panel LCD menus, the word CARD is used in place of MODULE, but refers to the same devices described elsewhere throughout this document.

Once the card is selected, scroll up or down to the **#DDC Parameters** menu.

In **#DDC Parameters** use the left arrow or right arrow to review settings and make allowable changes. Navigate to **DDC PROM Emulation**, then press **enter**. An underscore will appear under the last character of the displayed mode, as shown below. Scroll up or down through the options. **This is where the Static, Local Static and Dynamic Modes can be selected.**



Once the desired mode is displayed, press the **enter** button to select that mode. The last character will no longer be underscored (see below), indicating that the mode is now active.



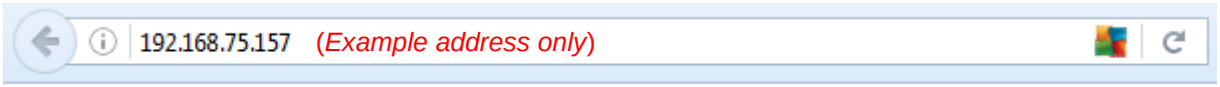
Appendix F: Monitor a Device with a Web Interface

The following describes a method of monitoring a TLX device by means of a web interface.

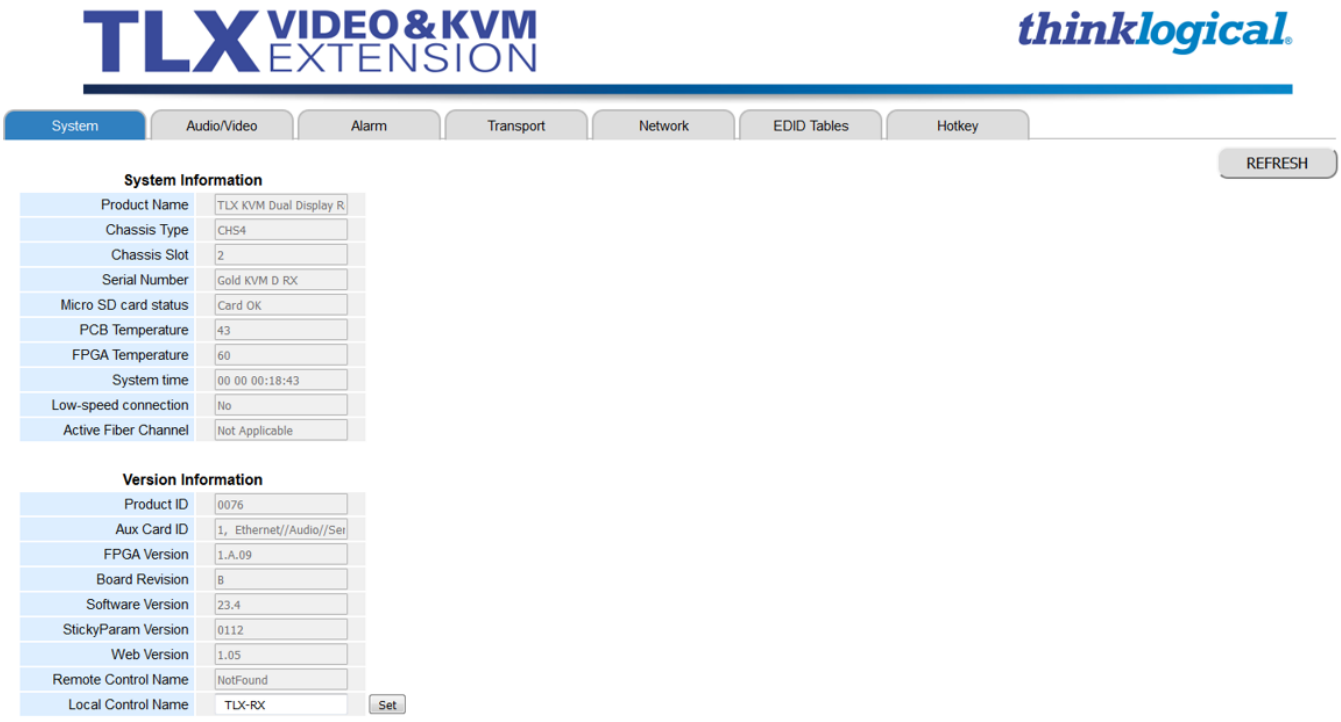
If you have not already set up your network interface as described, beginning on pg. 15, complete Steps 1-6 below. Otherwise, skip to Step 6.

1. Whether using a device's front panel LCD (if one is present) or its management port, press **enter** and note the current **Network IP Address**.
2. A menu will appear. Select **M** to get to the **Main Menu**.
3. Select **2** to get into **Network Parameters**.
4. *If your network configuration is set for DHCP*, select **6** to show the current **Network Status**. The device's IP address is the entry labeled "**DHCP leased IP address**".
5. *If your network configuraiton is set to static*, select **5** to show the '**Network Parameters**'. The device's IP address is the entry labled "**Static IP address**".
6. **Enter the module's IP address** in the URL bar of the web browser.

Example: If the static or dynamic address is, for example 192.168.75.157, open your web browser of choice and enter this IP address in the URL field at the top of the page, as shown below:



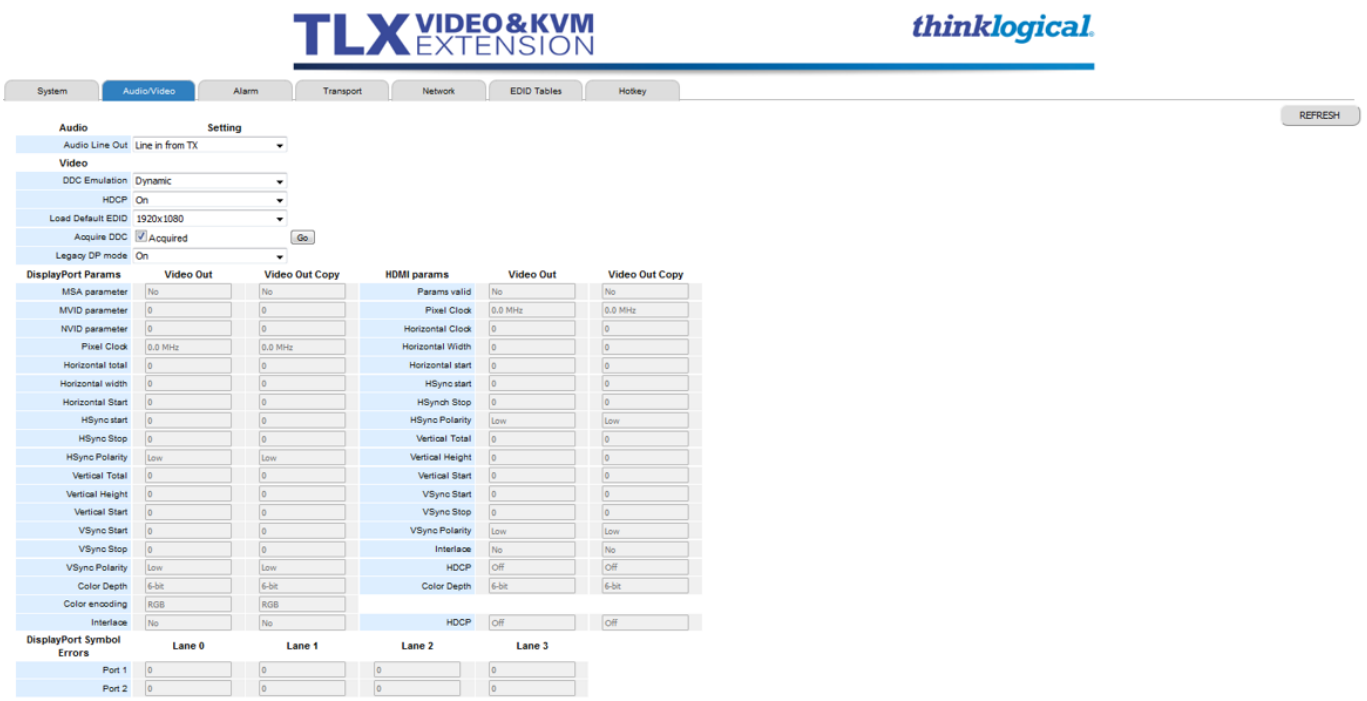
The System Tab



The **System** tab shows device information, such as **product name, chassis type, versioning information** and **current device temperatures.**

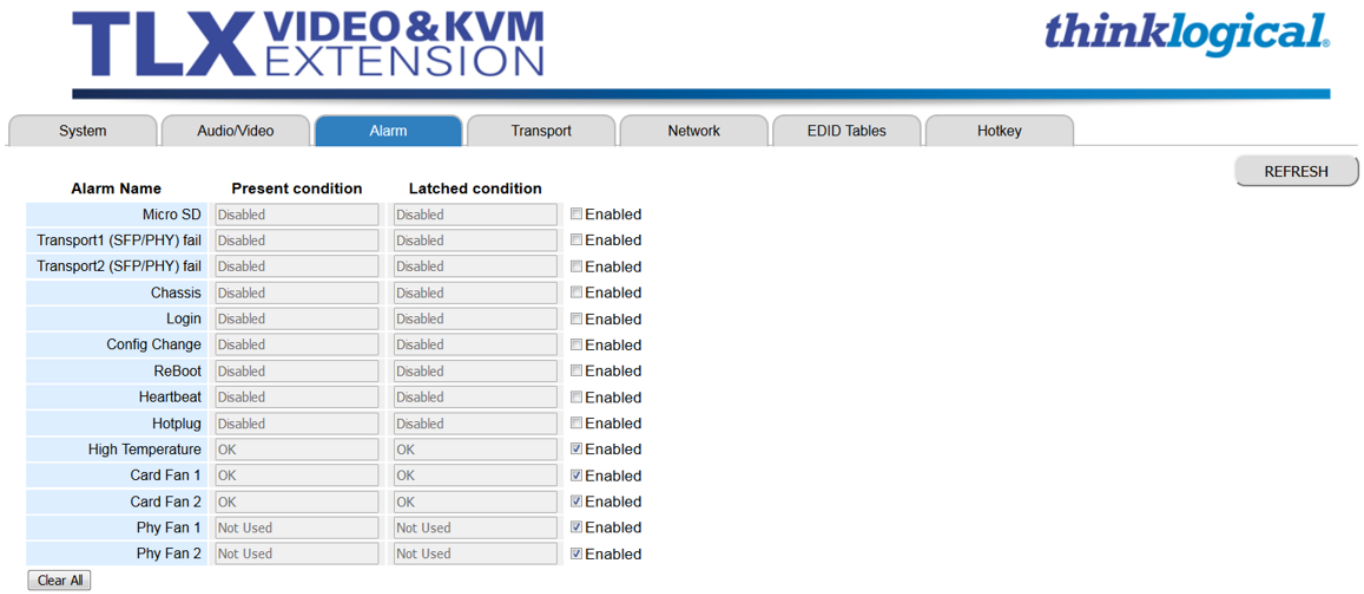
Local Control Name is the default, but this can be changed by typing a new name and selecting 'set'.

The Audio/Video Tab



The **Audio/Video** tab shows telemetry related to the audio and video parts of the system. Options can be changed by selecting its pull down box. Once selected, the new option will be active.

The Alarm Tab

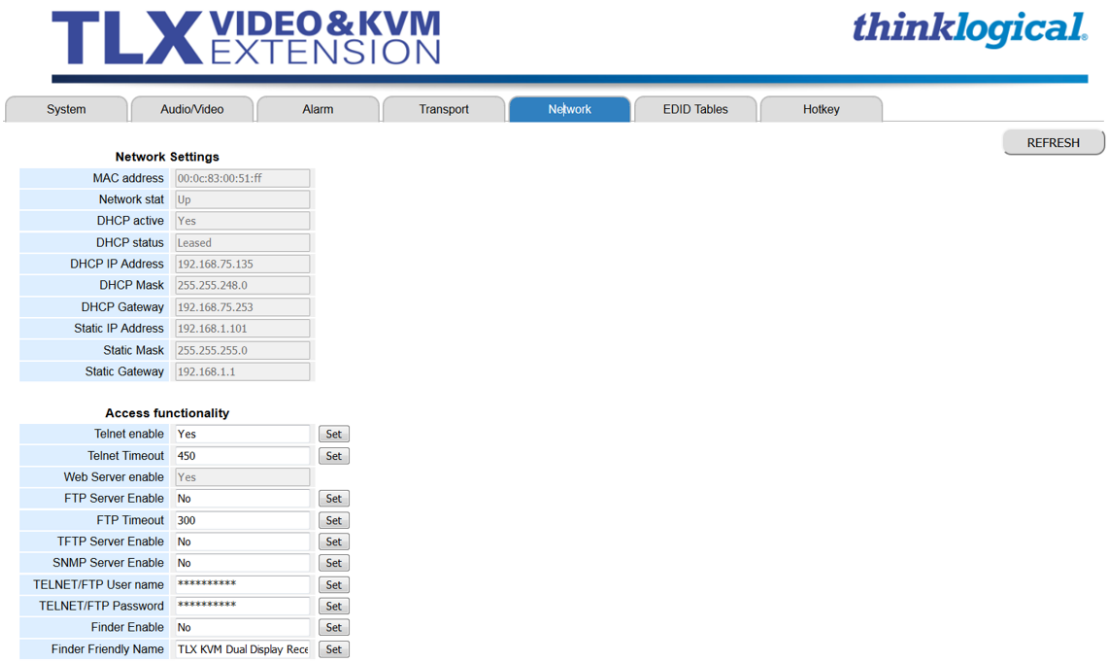


The **Alarm** tab shows current and latched conditions of the system's alarms. Each one can be enabled and disabled individually by selecting an alarm's checkbox. All alarms are cleared when the '**Clear All**' button is selected.

The Transport Tab

The **Transport** tab shows information related to the physical transport, whether PHY in the case of CATx cable or SFP in the case of fiber.

The Network Tab

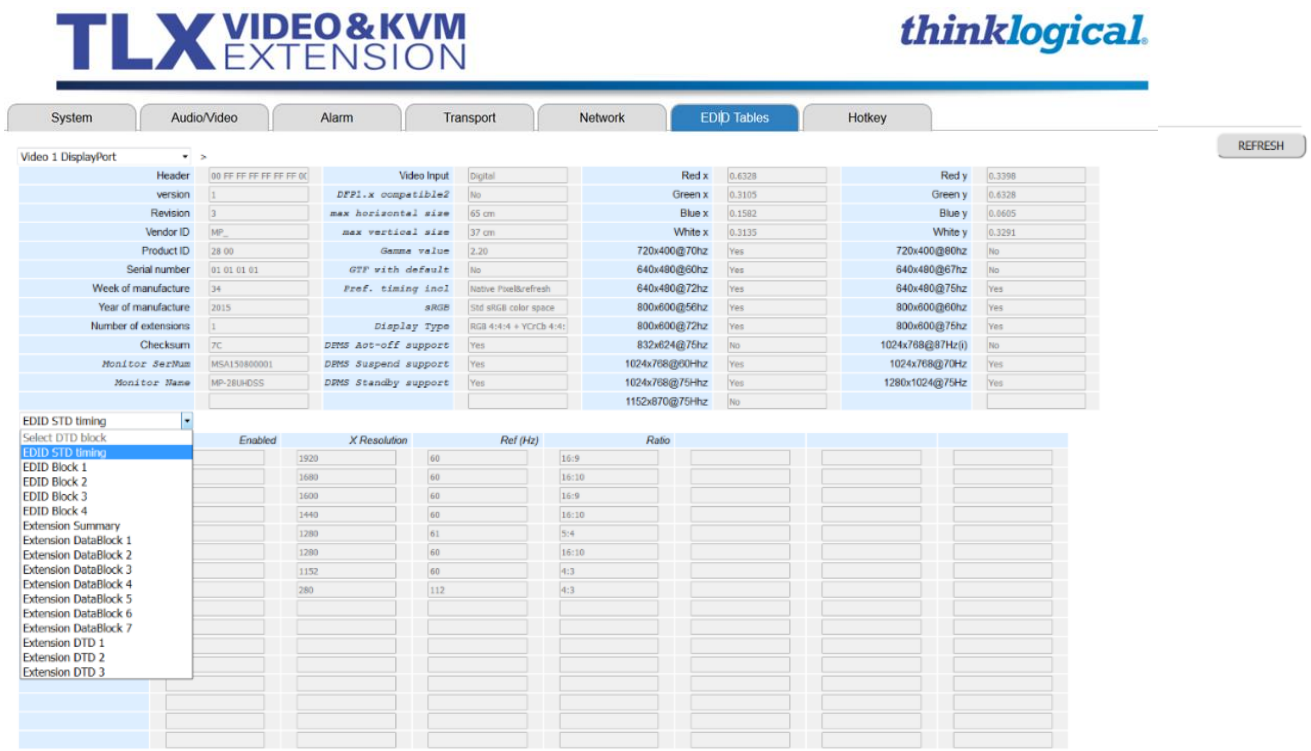


The **Network** tab shows the current network state. When DHCP is active, the DHCP IP address is the physical address used to communicate to the device. Conversely, when inactive, the static IP address should be used.

Servers like **Telnet** and **FTP** can be toggled ON or OFF by typing “No” in the appropriate field and selecting the associated ‘Set’ button.

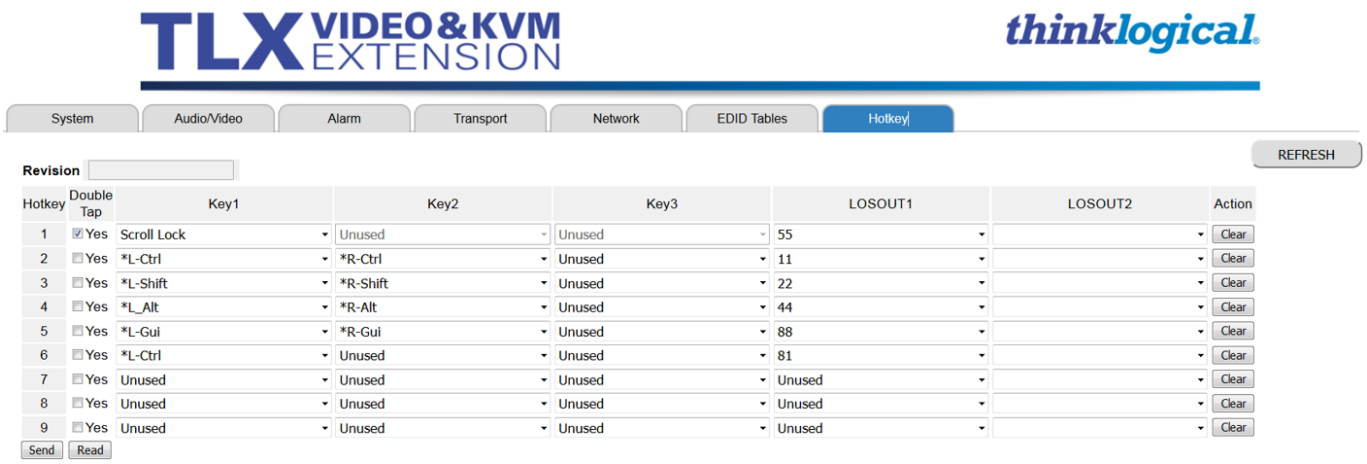
The EDID Tables Tab

The **EDID Tables** tab gives users visibility into the available EDID tables. These are dynamically loaded and can be used for both Display Port and HDMI.



If present, one can also view the four **EDID blocks, extension summary, extension datablock** and **extension DTD blocks.**

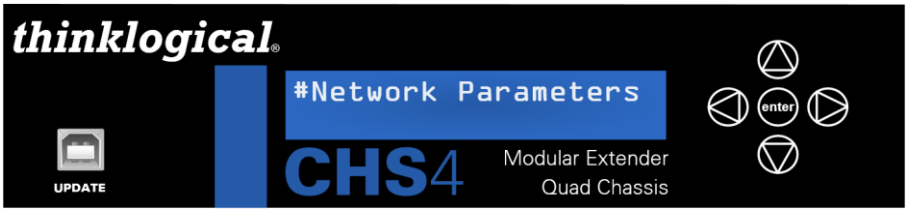
The Hotkey Tab



Manage **Hotkeys** from this tab. See more on using Hotkeys and setting-up *Flex Keys* in *Appendix I*, pg. 86.

Appendix G: TLX LCD Menu Options

Below is a list of the TLX LCD Menu Options as displayed on the CHS-4 and CHS-2 Chassis. ("#" indicates a root menu.) Use the Arrows and Enter buttons to navigate.



 # Network Parameters

- Static IP Addr
- Static Subnet Mask
- Static Gateway Addr
- DHCP Mode
- Network Speed/Duplex
- Telnet Server
- Restart Network

 # Network Status

- Mgmt Link State
- DHCP IP Addr
- DHCP IP Subnet Mask
- Static Gateway Addr.
- MAC Address
- Network Link Status

 # System Parameters
- Card Type
- FPGA Rev
- Board Temp in C
- Low Speed Connected
- Line-out-source
- Audio SFP Source
- Redund or Sep Audio
- Local Ctrl Name
- Remote Ctrl Name
- HDCP Mode
- Sink Legacy DP Mode
- Enhanced DP <--> HDMI Mode
- Allow Out of Band (RX Only)
- Collaboration Enable (RX Only)
- No Router Switch (RX Only)
- Server Keep Alive (TX Only)
- Server Auto Logout (TX Only)
- Intuitive Mouse
- MS Screen Select
  - (Intuitive Mouse RX “D” Only)
- Reduced Ms Descr (TX Only)
- MsSwitch Toggle
- Clk Recovery Sensitivity
- RS232 Port
- Load Factory Defaults

 # SFP1 Parameters
- SFP1 Vendor
- SFP1 Part Number
- SFP1 Wavelength
- SFP1 Temperature
- SFP1 TX Power
- SFP1 RX Power
- SFP1 TX Bias

 # SFP2 Parameters
- SFP2 Vendor
- SFP2 Part Number
- SFP2 Wavelength
- SFP2 Temperature
- SFP2 TX Power
- SFP2 RX Power
- SFP2 TX Bias

 # SFP3 Parameters
- SFP3 Vendor
- SFP3 Part Number
- SFP3 Wavelength
- SFP3 Temperature
- SFP3 TX Power
- SFP3 RX Power
- SFP3 TX Bias

 # SFP4 Parameters
- SFP4 Vendor
- SFP4 Part Number
- SFP4 Wavelength
- SFP4 Temperature
- SFP4 TX Power
- SFP4 RX Power
- SFP4 TX Bias

 # DDC Parameters
- DDC PROM Emulation
- Load EDID Table
- Acquire DDC

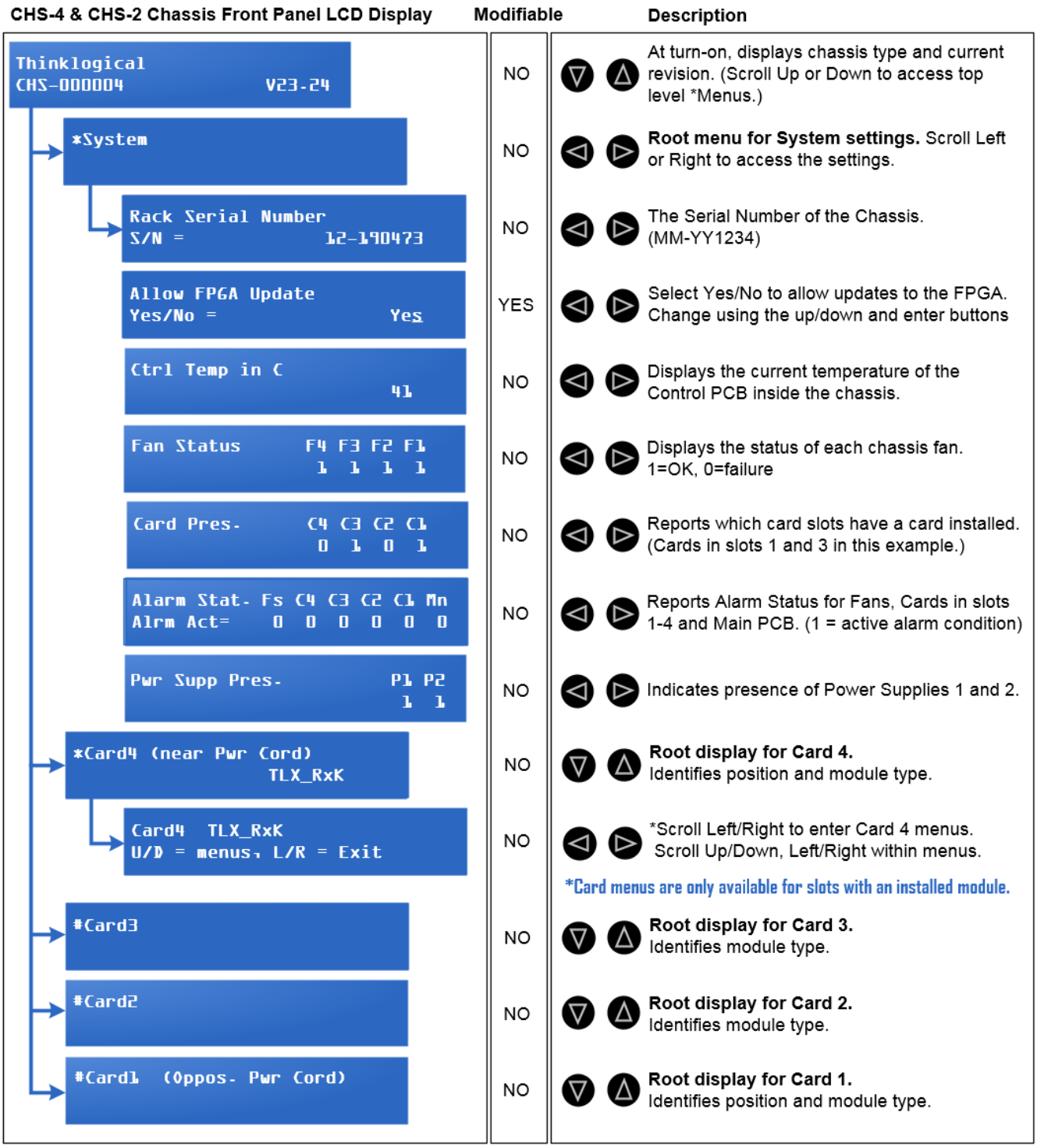
 # Fiber 1 Parameters
- F1 VLAN ID
- F1 Source MAC Addr
- F1 Dest. MAC Addr
- F1 QoS Level

 # Fiber 2 Parameters
- F2 VLAN ID
- F2 Source MAC Addr
- F2 Dest. MAC Addr
- F2 QoS Level

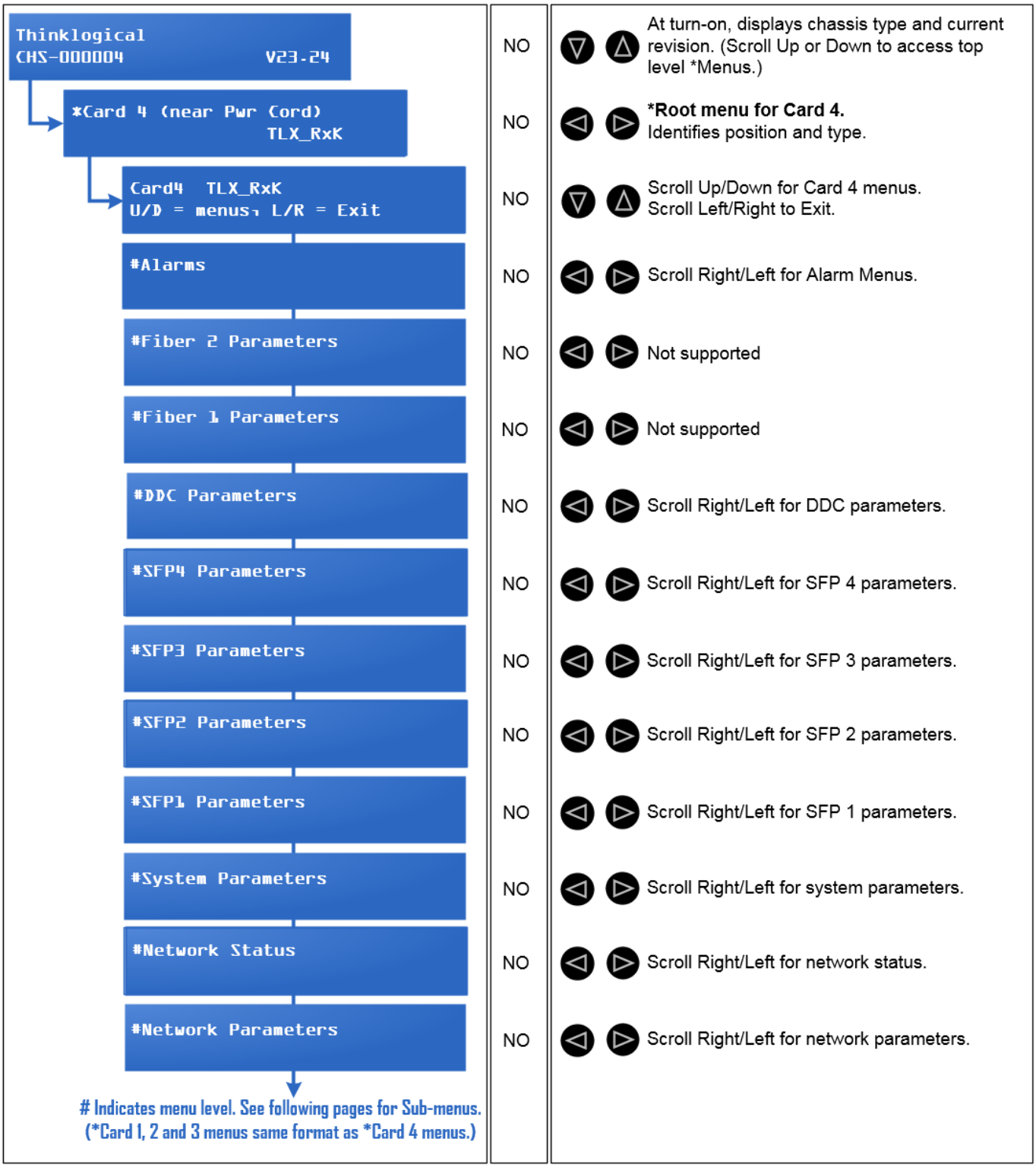
 # Alarms
- Micro_SD Card Failure
- SFP1 Loss of Signal
- SFP2 Loss of Signal
- SFP3 Loss of Signal
- SFP4 Loss of Signal
- Chassis Error
- Login Error
- System Reboot
- Configuration Changed
- Remote Heartbeat Lost
- Hotplug Lost
- High Temperature Alarm
- Card Fan1 Failure
- Card Fan2 Failure
- Clear Alarms

There are many varieties of TLX Modules, each with its own menu of features and parameters. **The following guide depicts a typical TLX module configuration with a typical compliment of menus** (CHS-4 Chassis and TLX Receiver Modules). A CHS-4 or CHS-2 Chassis loaded with a different set of modules may display a different set of menus, but button navigation is much the same as in the examples depicted below.

The Home Menu and Chassis Parameters



The Extender Module Menus



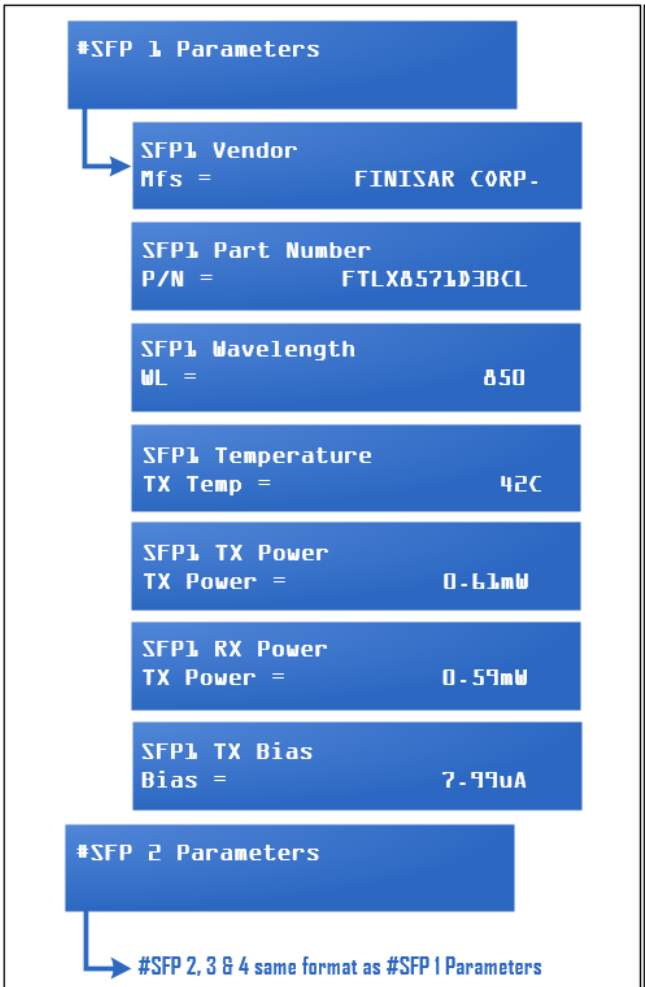
CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
#Alarms	YES	Scroll Right/Left for Alarm Menus.
		Alarm conditions:
Micro_SD Card Failure Off	YES	Read only. Displays latched state of alarm.
SFP1 Loss of Signal On	YES	
SFP2 Loss of Signal On	YES	
SFP3 Loss of Signal On	YES	
SFP4 Loss of Signal On	YES	
Chassis Error Off	YES	
Login Error Off	YES	
System Reboot On	YES	
Configuration Changed Off	YES	
Remote Heartbeat Lost On	YES	
Hot plug Lost On	YES	
High Temperature Alarm On	YES	
Card Fan 1 Failure On	YES	
Card Fan 2 Failure Off	YES	Read only. Displays latched state of alarm.
Clear Alarms YES	YES	ENTER – change Up/Down – Toggle – Yes, No ENTER – If display is YES, clears latched state of all alarms.

CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
#Network Parameters	YES	Scroll Right/Left for Network Parameters.
Static IP Addr- IP = 192-168-001-101	YES	ENTER – change Left/Right – move cursor over digit Up/Down – Scroll digit 0...9 ENTER – Save Setting
Static Subnet Mask Subnet = 255-255-255-000	YES	ENTER – change Left/Right – move cursor over digit Up/Down – Scroll digit 0...9 ENTER – Save Setting
Static Gateway Addr- GW = 192-168-001-001	YES	ENTER – change Left/Right – move cursor over digit Up/Down – Scroll digit 0...9 ENTER – Save Setting
DHCP Mode DHCP = ENABLED	YES	ENTER – change Left/Right – Toggle: ENABLED-DISABLED Up/Down – N/A ENTER – Save Setting
Network Speed/Duplex Not Supported	YES	*With Network Extension only*: ENTER – change Left/Right – Toggle:10Mbps Full 10Mbps Half 100Mbps Full 100Mbps Half-Auto Up/Down – N/A, ENTER – Save Setting
Telnet Server Telnet = ENABLED	YES	ENTER – change Left/Right – Toggle: ENABLED-DISABLED Up/Down – N/A ENTER – Save Setting
Restart Network Yes/No = NO	YES	ENTER – change UP/Down Toggle: YES–NO ENTER – If display YES, restarts network Display returns to NO
#Network Status	NO	Detects the Link State, Mask and addresses
Mgmt Link State Linked, HDCP leased	NO	Displays Management Port Link state: Link Down, Linked DHCP leasing, Linked DHCP leased, Linked static settings
DHCP IP Addr- IP = 192-168-075-086	NO	Displays leased DHCP IP address. If no DHCP lease, displays 000.000.000.000.
DHCP IP Subnet Mask Subnet = 255-255-255-000	NO	Displays leased DHCP IP subnet mask. If no DHCP lease, displays 000.000.000.000.
Static Gateway Addr- GW = 192-168-075-253	NO	Displays leased DHCP IP gateway address. If no DHCP lease, displays 000.000.000.000.
MAC Address MAC = 00:0c:83:00:44:81	NO	Displays Management Port MAC Address.
Network Link Status Not Supported	NO	*With Network Extension only*: Displays Network Link Status.

CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
#System Parameters	NO	Scroll Right/Left for System Parameters.
Card Type Type = 0x76	NO	A factory-assigned hexadecimal number for each card type.
FPGA Rev Rev = 0001-05-24	NO	Installed FPGA Revision. Displays "Golden" if running Golden Image.
Software Rev Rev = 6-10	NO	Displays installed Software Revision. Displays "Golden" if running Golden Image.
Serial Number S/N = 03-200441	NO	The Card's Serial Number (MM-YY1234)
FPGA Temp in C 40	NO	Current temperature of the FPGA in degrees Celsius
Board Temp in C 41	NO	Current temperature of the main PCB in degrees Celsius
Low Speed Connected YES	NO	Detects if Low Speed is connected. (Yes, Receive Only or No)
Line-out Source Line-in from TX	NO	ENTER – change Up/Down – (TX) Scroll – Line-in at TX, Embedded at TX, Select at RX Up/Down – (RX) If TX setting is Select at RX, Scroll – Line-in at TX, Embedded at TX. Or setting is read-only and selection set on TX. ENTER – Save Setting
Audio SFP Source Mode = HID SFP	YES	*Supported on 3SFP RX*. ENTER – change Up/Down – Toggle – Video SFP, HID SFP ENTER – Save Setting
Redund or Sep Audio Mode = Sep Audio	YES	*Supported on UAH RX, 2 SFPs:* ENTER – change Up/Down – Toggle – Redundant, SepAudio ENTER – Save Setting
Local Ctrl Name Name = TLX_Rx_4	NO	*Name assigned by admin:* ENTER – change Left/Right – move cursor over character Up/Down – Scroll printable characters ENTER – Save Setting
Remote Ctrl Name Name = TLX_Tx_2	NO	Reads the assigned name from the remote extender.
HDCP Mode HDCP = ENABLED	YES	*Valid on extenders with video:* ENTER – change Up/Down – Scroll – HDCP 1.4, HDCP 2.2, HDCP 1.4 and HDCP2.2, DISABLED. ENTER – Save Setting
Sink Legacy DP Mode Legacy DP = DISABLED	YES	*Valid on extenders with video:* ENTER – change Up/Down –Toggle – DISABLED, ENABLED ENTER – Save Setting

CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
#System Parameters continued:		
Enhanced DP<->HDMI Mode Mode = DISABLED	YES	*Valid on extenders with video:* ENTER – change Up/Down –Toggle – DISASBLED, ENABLED ENTER – Save Setting
Server Keep Alive Yes/No = NO	YES	*Valid on Transmitters with HID:* ENTER – change Up/Down – Toggle – YES, NO. ENTER – Save Setting
Server Auto Logout Yes/No = NO	YES	
Intuitive Mouse Mode = NO	YES	
Reduced Mouse Descriptor Yes/No = NO	YES	
Apple Keyboard Yes/No = NO	YES	*Valid on Transmitters with HID:* ENTER – change Up/Down – Toggle – YES, NO. ENTER – Save Setting
Allow Out Of Band Yes/No = NO	YES	*Valid on Receivers with HID:* ENTER – change Up/Down –Toggle – DISASBLED, ENABLED ENTER – Save Setting
Collaboration Enabled Yes/No = NO	YES	
NoRouter Switch Yes/No = N/A	YES	
Intuitive Mouse Mode = DISABLED	YES	
MsSwitch Toggle Mode = No	YES	*Valid on Receivers with HID:* ENTER – change Up/Down –Toggle – YES, NO ENTER – Save Setting
Clk Recovery Sensitivity Mode = Normal	YES	*Valid on extenders with video:* ENTER – change Up/Down – Toggle – NORMAL, HIGH. ENTER – Save Setting
RS232 Port DTE or DCE = DTE	YES	*Valid on extenders with serial:* ENTER – change Up/Down –Toggle – DCE, DTE ENTER – Save Setting
Load Factory Defaults Yes/No = NO	YES	ENTER – change Up/Down –Toggle – YES, NO ENTER – If displaying YES, loads factory default settings. Display returns to NO

CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
#DDC Parameters	NO	Scroll Right/Left for DDC Parameters.
DDC PROM Emulation Mode = Dynamic	YES	ENTER – change Up/Down –Scroll – Dynamic, Static, Local Static ENTER – Save setting.
Load EDID Table EDID = Load Table	YES	ENTER – change Up/Down –Scroll through tables ENTER – Load displayed table. When complete, displays “Table Loaded OK” for a few seconds, then returns to “Load Table”
Acquire DDC Yes/No = No	YES	ENTER – change Up/Down –Toggle – YES, NO ENTER – If displaying YES, Acquire EDID table and set DDC emulation mode to static.
Head 1 HDMI EDID: TLL_19201080	NO	READ ONLY Displays Monitor name for active HDMI table on Head 1
Head 2 HDMI EDID: TLL_19201080	NO	READ ONLY Displays Monitor name for active HDMI table on Head 2. If extender does not have a second Head, “Not available” is displayed.
Head 1 DP EDID: TLL_1080P	NO	READ ONLY Displays Monitor name for active DisplayPort table on Head 1
Head 2 DP EDID: TLL_1080P	NO	READ ONLY Displays Monitor name for active DisplayPort table on Head 2. If extender does not have a second Head, “Not available” is displayed.

CHS-4 & CHS-2 Chassis Front Panel LCD Display	Modifiable	Description
	NO NO NO NO NO NO NO NO NO	Scroll Right/Left for SFP 1 Parameters. (In degrees Celsius) Scroll Right/Left for SFP 2 Parameters.

Appendix H: TLX User Menu Instructions

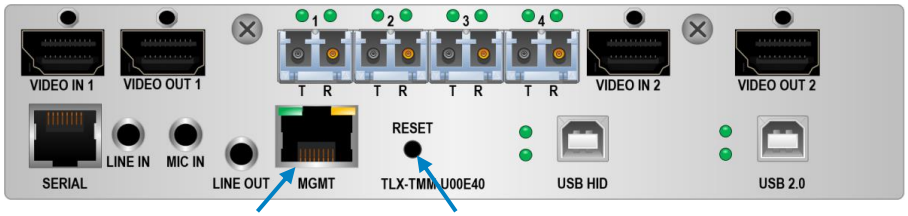
TLX system configuration can be performed using a keyboard and mouse, via the MGMT Port, which provides remote management over the Ethernet through a computer connected to a common network. The MGMT feature is necessary for managing configurations when using the CHS-1 Chassis, as there are no Navigation Buttons or LCD on this model.

General Navigation Rules

1) The top line displays the name of the current screen viewed.
2) Characters can be entered in upper or lower case.
3) Typing 'M' navigates back to the main menu.
4) Typing 'P' navigates to the previous menu.
5) Typing <enter> refreshes the current screen.
6) To select a function in the current screen, type the number or letter associated with the function followed by <enter>.
7) Many functions require additional entries. The screens will prompt the user accordingly.
8) Certain status screens automatically refresh every few seconds.
9) TLX Extenders vary in both hardware and software configuration. The screen menus are common to all TLX extenders, however, based on individual configurations, some screen selections and options may vary from one extender type to another. In most cases selections and options will be added or omitted.

Factory Default Reset Button

Many extenders have a factory default Reset button on the connector panel. Pressing and holding this button for 10 seconds while the unit is running will reset the unit to its factory default settings.



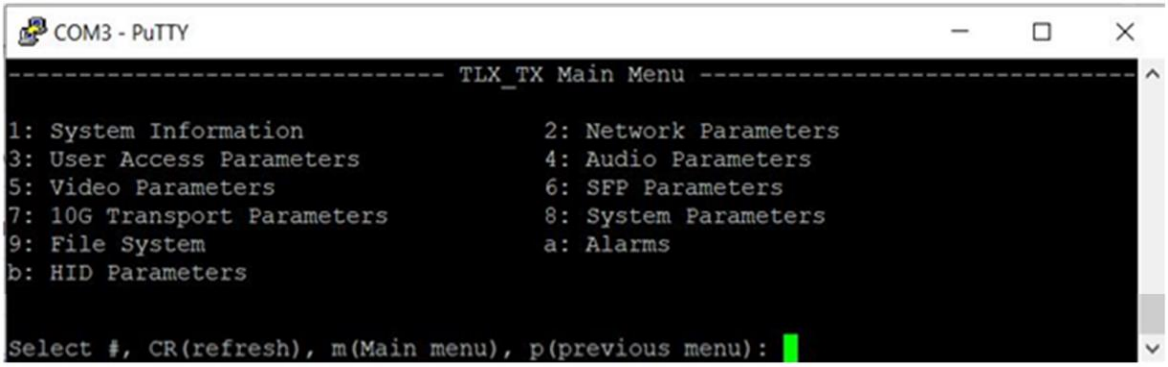
MGMT Port *Reset to default settings*

Network MGMT port LEDs:

Yellow LED on = Link

Green LED flashing = Activity

TLX Main Menu

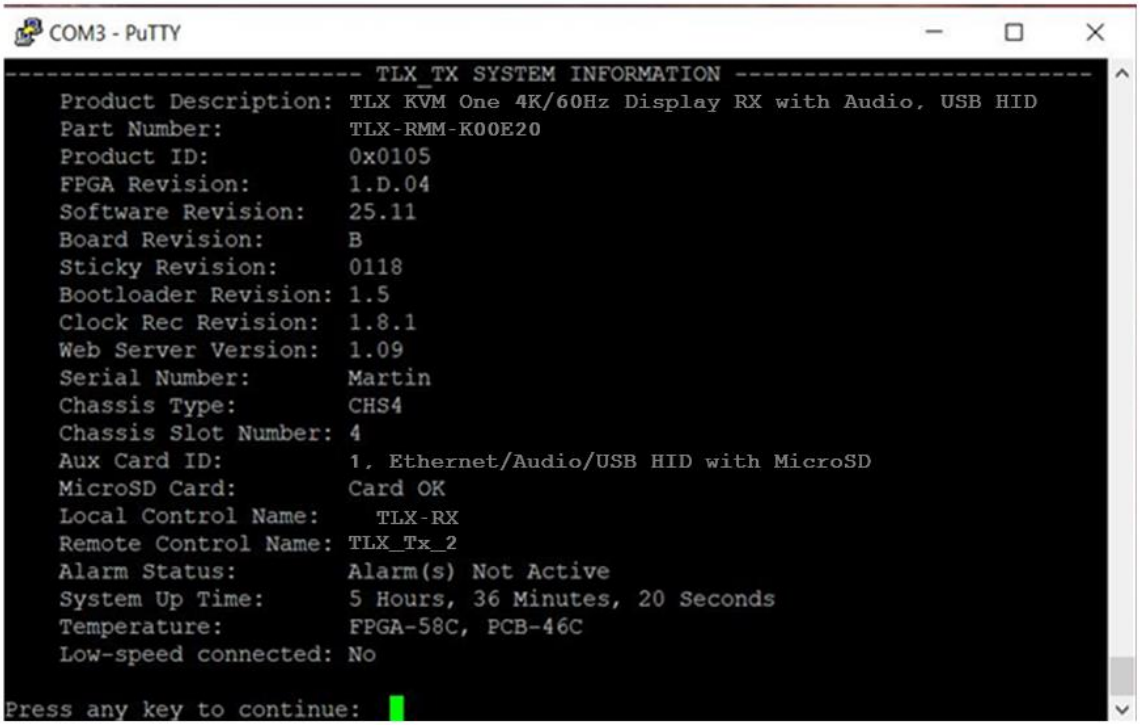


After logging in, type <enter> to display the Main Menu.

(From any screen, typing 'M' will return to the Main Menu.)

1) **System Information:** Select to display hardware and software configurations and general system status.
2) **Network Parameters:** Select to view or modify Network settings and to view Network status on the rear panel Ethernet Management Port.
3) **User Access Parameters:** Select to view or modify Ethernet Management Port access settings for the internal Web, FTP and Telnet servers.
4) **Audio Parameters:** Select to view or modify audio settings
5) **Video Parameters:** Select to enter the Video Parameter sub menus
6) **SFP Parameters:** Select to view SFP status. *On CATX Extenders this selection is called* "CATX Parameters."
7) **10G Transport Parameters:** Select to view the Ethernet Transport Settings on a Fiber interface. *This selection is not currently supported.*
8) **System Parameters:** Select to enter System Parameters sub menus.
9) **File System:** Select to access files on the internal micro SD card.
a) **Alarms:** Select to view alarms and modify alarm settings.
b) **HID Parameters:** Select to view or modify HID settings.

System Information Screen

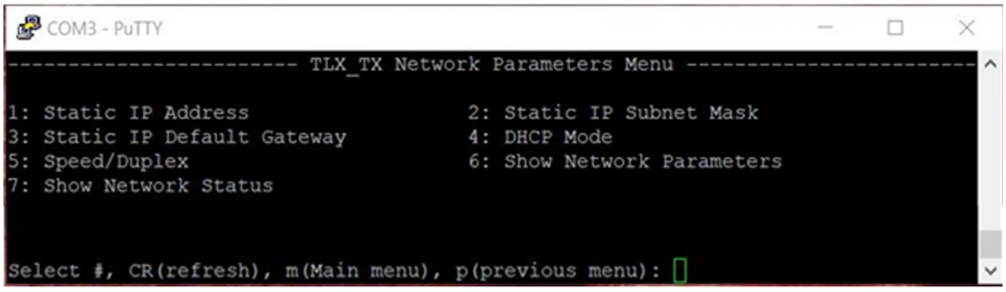


The System Information Screen displays the following information:

1) **Product Description:** Description of the installed TLX Device.
2) **Part Number:** Thinklogical part number of the TLX Device.
3) **Product ID:** Unique identifier of the TLX Device. Used for system purposes along with the SMI.
4) **FPGA Revision:** Version of the embedded FPGA code. Format is M.mm.bb where M = major revision, mm = Minor revision, bb = build revision. *If the unit is running out of the Golden Image, the revision number will be followed by the text* "(Golden)".
5) **Software Revision:** Version of the embedded control CPU firmware. Format is MM.bb where MM is major revision, bb = build revision. *If the unit is running out of the Golden Image, the revision number will be followed by the text* "(Golden)".
6) **Board Revision:** Version of the main circuit assembly. Format is A, B, C, etc.
7) **Sticky Revision:** Version of internal non-volatile storage memory.
8) **Bootloader Revision:** Version of the embedded boot code. Format is MM.bb where MM is major revision, bb = build revision.
9) **Clock Rec Revision:** Version of the embedded clock recovery CPU firmware. Format is M.mm.bb where M = major revision, mm = Minor revision, bb = build revision.
10) **Web Server Version:** Version of the embedded web server. Format is MM.bb where MM is major revision, bb = build revision.
11) **USBC PDAPP Revision:** Version of the USBC PD Controller firmware. Displayed for USBC extenders only.
12) **Serial Number:** Factory programmed serial number.
13) **Chassis Type:** Indicates the chassis in which the extender is installed.
14) **Chassis Slot:** Indicates the chassis slot number in which the extender is installed.
15) **Aux Card ID:** Identifier and description of the axillary assembly card installed on the extender.
16) **MicroSD Card:** Status of the internal micro SD card. If the card is functional, will report "Card OK", otherwise will report the error code.
17) **Local Control Name:** Control name of the extender. Used for system purposes in switched environments.

18) **Remote Control Name:** Control name of the remote extender attached to this unit. Will report the remote's control name if there is a fiber connection from the remote to this unit. Otherwise this field will report "Not Found". Used for system purposes in switched environments.
19) **Alarm Status:** Indicates "Alarm(s) Active" if any enabled alarms are active. Otherwise reports "Alarm(s) Not Active".
20) **System Up Time:** Displays System up-time since the last power cycle or reset in days, hours, minutes, and seconds.
21) **Temperature:** Displays the embedded FPGA temperature and main circuit card assembly temperature in Celsius.
22) **Low-Speed Connected:** Displays status of the control link over the fiber to the remote extender attached to this unit.
    a. If there is a full duplex control link, displays "Yes".
    b. If there is only a received control link, displays "Receive Only".
    c. If there is no control link, displays "No".
23) **Active Fiber Channel:** Indicates which fiber channel is currently in use. Either "Primary" or "Secondary". Displayed for redundant extenders only.

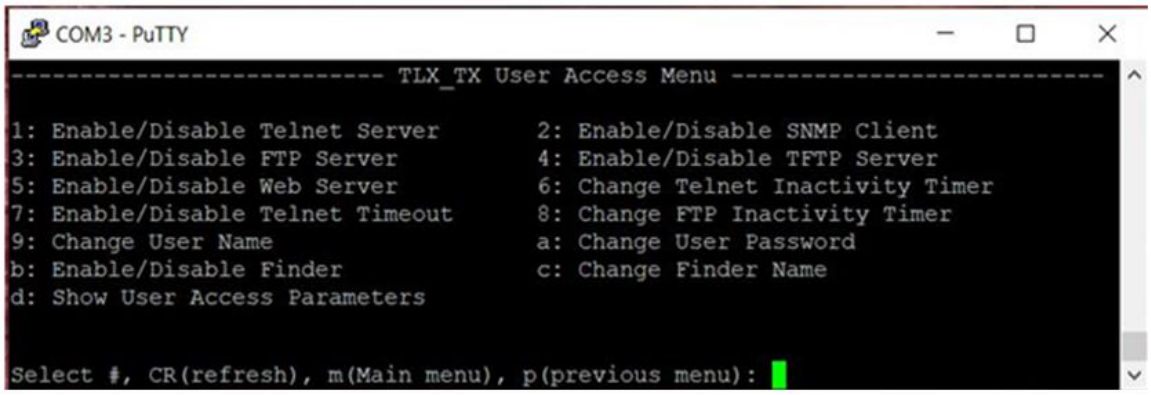
Network Parameters Menu



1) **Static IP Address:** Select to change the IP Address for the rear panel Ethernet Management Port. The selection will display the current setting and query the user to change it, then show the proper format to enter the address. The selection will display an error message if the entry was made incorrectly. Factory default is 192.168.1.101 for transmitters and 192.168.1.102 for receivers.
2) **Static IP Subnet Mask:** Select to change the IP subnet mask for the rear panel Ethernet Management Port. The selection will display the current setting and query the user to change it, then show the proper format to enter the mask. The selection will display an error message if the entry was made incorrectly. Factory default is 255.255.255.0.
3) **Static IP Default Gateway:** Select to change the IP address of the default gateway for the rear panel Ethernet Management Port. The selection will display the current setting and query the user to change it, then show the proper format to enter the address. The selection will display an error message if the entry was made incorrectly. Factory default is 192.168.1.1.
4) **DHCP Mode:** Select to change the DHCP mode. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". When DHCP is enabled, the static IP settings are ignored and the unit requests IP configuration from an external DHCP server. Factory default is disabled.
5) **Speed/Duplex:** Select to change the speed/duplex settings of the rear panel Ethernet Management Port. The selection will display the current setting and query the user to change it, then display the list of speed/duplex options and number to type for each option. Factory default is auto.
6) **Show Network Parameters:** Select to display the MAC address and the current configuration of the rear panel Ethernet Management Port.
7) **Show Network Status:** Select to display the status of the rear panel Ethernet Management port. Shows DHCP configured IP information and Ethernet link status.

Note: Changes to Network Parameters do not take place until the Telnet session is terminated.

User Access Menu



1) **Enable/Disable Telnet Server:** Select to enable or disable the Telnet Server. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". *Changes to this setting do not take place until the Telnet session is terminated.*

Warning! Disabling the Telnet server will lock the user out. The Telnet server can only be re-enabled by loading the factory default configuration through either the front panel LCD screens or by the rear panel reset button. Factory default is enabled.

2) **Enable/Disable SNMP Client:** Select to enable or disable the Telnet Server. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". *This setting is for future use. SNMP is currently not supported by the TLX extenders. Factory default is disabled.*
3) **Enable/Disable FTP Server:** Select to enable or disable the FTP Server. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
4) **Enable/Disable TFTP Server:** Select to enable or disable the TFTP Server. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
5) **Enable/Disable Web Server:** Select to enable or disable the Web Server. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is enabled.
6) **Change Telnet Inactivity Timer:** Select to change the inactivity timeout for the Telnet server. No keystrokes detected over the timeout period will automatically terminate the current Telnet Session. The selection will display the current setting and query the user to change it. The timeout period is configurable from 60 to 1800 seconds. Factory default is 450 seconds.
7) **Enable/Disable Telnet Timeout:** Select to enable or disable the Telnet timeout feature. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Note that for security purposes, this setting is *not* stored in non-volatile memory. Disabling the Telnet Timeout is only for the current Telnet session. Once the session is terminated this setting will revert to "Enabled".
8) **Change FTP Inactivity Timer:** Select to change the inactivity timeout for the FTP server. No keystrokes detected over the timeout period will automatically terminate the current FTP Session. The selection will display the current setting and query the user to change it. The timeout period is configurable from 60 to 1800 seconds. Factory default is 300 seconds.
9) **Change User Name:** Select to change the user login name. The selection will prompt the user to enter the current password before allowing the change. The new user name can be 1 to 30 characters in length. Factory default is "admin".

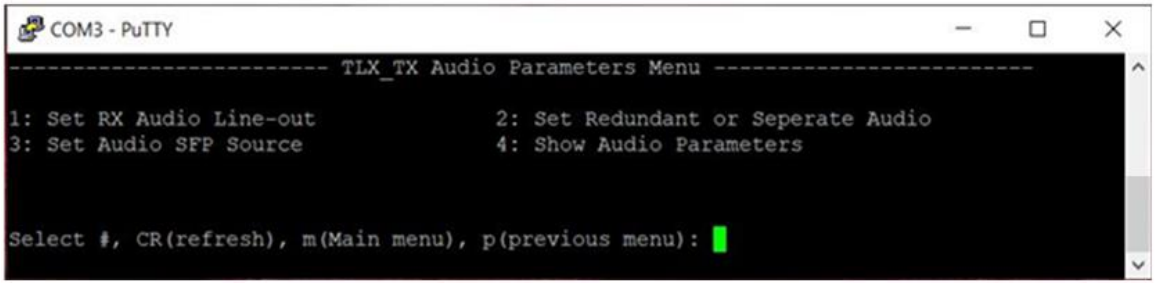
a) **Change User Password:** Select to change the user password. The selection will prompt the user to enter the current password before allowing the change. The new password can be 1 to 30 characters in length. Factory default is "admin".

b) **Enable/Disable Finder:** Select to enable or disable the Finder. The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is enabled. *The Finder is a custom UDP utility that searches for TLX networked devices that can be seen from the rear panel Ethernet Management Port.*

c) **Change Finder Name:** Select to change the Finder name associated with this unit. The selection will display the current setting and query the user to change it. The new finder name can be 1 to 30 characters in length. Factory default is the product name shown in the System Information Screen truncated to 30 characters.

d) **Show User Access Parameters:** Select to display the list of current User Access Parameter settings.

Audio Parameters Menu



1) **Set Rx Audio Line-out:** Select to configure the audio line out setting on the receiver. The selection will display the current setting and query the user to change it. This parameter is atypical in that it is stored on the transmit extender, but the feature operates on the corresponding receive extender. As such the parameter selection differs between Transmitter and Receiver. Transmitter parameter options are:
   a. Embedded at TX: The Receiver line out-source is embedded audio coming in on the first video head on the Transmitter.
   b. Line-in at TX: The Receiver line out-source is the line in audio jack on the Transmitter's rear panel.
   c. Select at RX: The Receiver line out-source is configured at the receiver.

   If the Transmitter option is set to "Select at Rx", then the Receiver parameter options are:
   a. Embedded at TX: The Receiver line out-source is embedded audio coming in on the first video head.
   b. Line-in at TX: The Receiver line out-source is the line in audio jack on the Transmitter's rear panel.

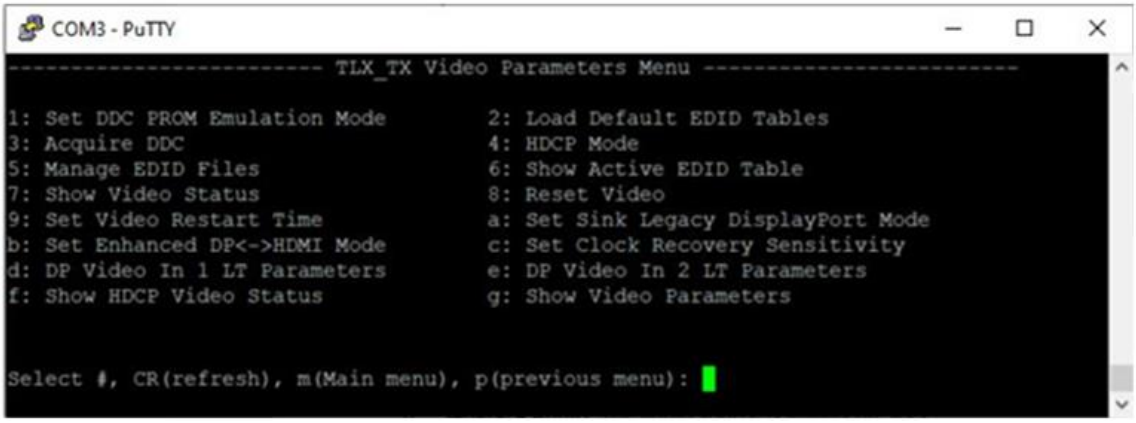
   If the Transmitter option is set to either "Line-in at TX" or "Embedded at TX" then the setting cannot be changed at the Receiver and it will display "set by TX".
   Factory default is "Line-in at TX".

2) **Set Redundant or Separate Audio:** This feature is only supported on Redundant TLX UAH receive extenders (with 2 SFPs). Select to enable either redundant or separate audio. The selection will display the current setting and query the user to change it. Factory default is Redundant.
   a. Redundant Audio: Audio source will be on the primary fiber link (SFP1). If the primary fiber channel loses signal the audio source will switch to the secondary fiber link (SFP2). If the secondary fiber link loses signal the audio source will switch back to the primary fiber link. Default on power up is the primary fiber link.
   b. Separate Audio: The audio source is always on SFP2.

3) **Set Audio SFP Source:** This feature is only supported on the RX extender with separate data path. Select to enable either the video SFP (SFP1) or the HID SFP. Factory default is "Video SFP"

4) **Show Audio Parameters:** Select to display the list of current Audio Parameter settings.

Video Parameters Menu



1) **Set DDC PROM Emulation Mode:** Select to configure the DDC emulation mode on the transmitter. The selection will display the current setting and query the user to change it. The parameter options are defined below. *Factory default is Static*.
    a. Static: (Factory default) In static mode the transmit extender does not accept the EDID table from the receiver extender. It presents to its attached video source the EDID table stored in its local non-volatile memory.
    b. Dynamic: In Dynamic mode the receive extender reads the EDID table from its attached monitor and forwards the table to the transmitter over the fiber link (requires a back channel). The transmit extender stores this table in its local non-volatile memory and presents the table on its attached video source.
    c. Local Static: Local Static mode is used in conjunction with the Acquire DDC feature. In Local Static mode, when Acquire DDC is selected, the transmit extender reads the EDID table from its local monitor, stores this table in its local non-volatile memory and presents the table on its attached video source. This is a one-time event. Select Acquire DDC again to re-read the EDID table from the local monitor. *Transmit extenders without local copy video output ports do not support Local Static mode*.
2) **Load Default EDID Tables:** Select to navigate to the Load EDID Tables Menu.
3) **Acquire DDC:** Select to acquire, store, and present an EDID table to the transmit extenders attached video source. Acquire DDC functionality differs based on DDC PROM emulation mode, as follows:
    a. Dynamic and Static: In Dynamic mode Acquire DDC reads the next table coming in from the receive extender, stores the table in its local non-volatile memory, presents the table on its attached video source and then stays or switches to Static Mode
    b. Local Static: See above definition (1c) for Local Static Mode.
4) **HDCP Mode:** Select to configure the HDCP mode on the transmitter. The selection will display the current setting and query the user to change it. The parameter options are enable and disable. Factory default is “Enabled”.
5) **Manage EDID Files:** Select to navigate to the EDID/DPCD Table Management Menu.
6) **Show Active EDID Table:** Select to navigate to the Show EDID Tables Meu.
7) **Show Video Status:** Select to navigate to the Video Status Menu
8) **Reset Video:** Select this option to reset the video circuits on the extender.

9) **Set Video Restart Time[1]:** Select to change the DisplayPort Video Re-start used to reset the DisplayPort video circuits in the event that video remains out of sync. The selection will display the current setting and query the user to change it. The timeout period is configurable from 60 to 65535 milliseconds. Factory default is 50 milliseconds.

a) **Set Sink Legacy DisplayPort Mode:** Select to configure TP2 only during link training. Enabling this feature forces TP2 and disabling this feature allows either TP2 or TP3.

b) **Set Enhanced DP<->HDMI Mode:** Select to configure the DisplayPort to HDMI translation of the video signal transported over the fiber interface between transmitter and receiver. May be required to run 720P video over DisplayPort. The selection will display the current setting and query the user to change it. The parameter options are enable and disable. Factory default is “Disabled”.

c) **Set Clock Recovery Sensitivity:** Select to configure the clock recovery sensitivity mode on the extender. The selection will display the current setting and query the user to change it. The parameter options are “Normal” and “High”. Factory default is “Normal”.

d) **DP Video-In 1 LT Parameters:** Select to navigate to DP Video In 1 Link Training Settings Menu.

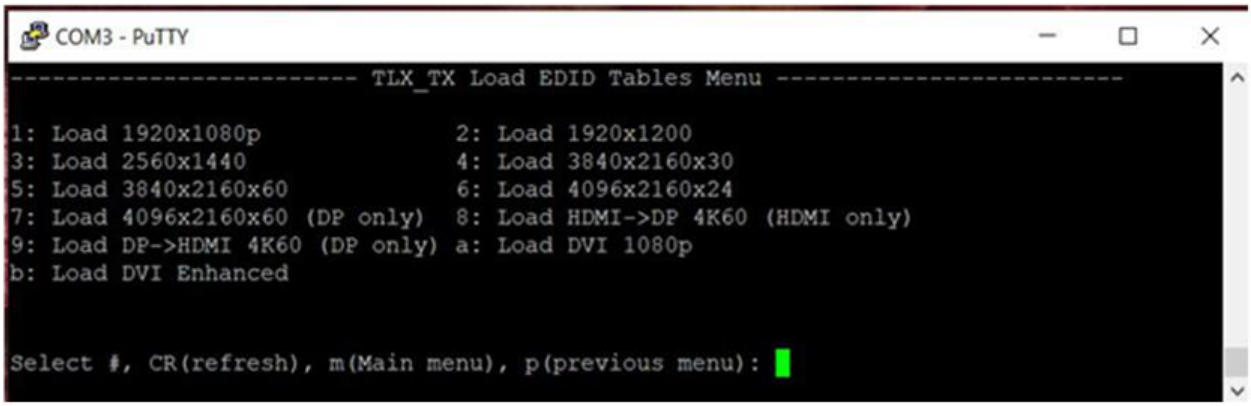
e) **DP Video-In 2 LT Parameters:** Select to navigate to DP Video In 2 Link Training Settings Menu.

f) **Show HDCP Video Status:** Select to display the list of public HDCP public Key Selection Vectors (KSVs) that are connected to the extender and the repeater KSV list that is associated with the extender.

g) **Show Video Parameters:** Select to display the list of current Video Parameter settings.

[1]*This feature is no longer supported on any extender and will be removed in future firmware releases.*

Load EDID Tables Menu



The Load EDID Tables Menu allows loading of default Thinklogical (TLL) EDID tables with standard timings into the transmitter. The selected table is stored in the transmitter's local non-volatile memory and presented to the attached video source. The EDID table is loaded to both heads on the DUAL extenders, for both the DisplayPort and HDMI video inputs. The unit is then forced to Static DDC emulation mode.

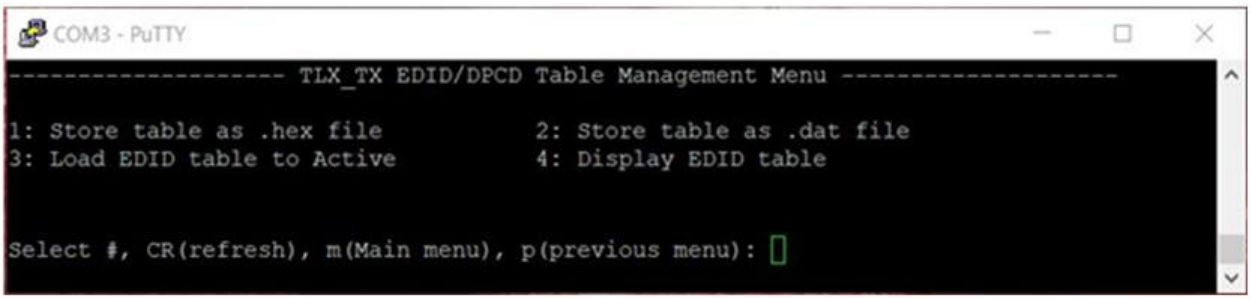
1) **Load 1920x1080P:** Loads the default TLL 1080P table for both DP and HDMI video in ports.
2) **Load 1920x1200:** Loads the default TLL 1920x1200 table for both DP and HDMI video in ports.
3) **Load 2560x1440:** Loads the default TLL 2560x144- table for both DP and HDMI video in ports.
4) **Load 3840x2160x30:** Loads the default TLL 3840x2160 30Hz table for both DP and HDMI video in ports.
5) **Load 3840x2160x60:** Loads the default TLL 3840x2160 60Hz table for both DP and HDMI video in ports.
6) **Load 4096x2160x24:** Loads the default TLL 4096x2160 24Hz table for both DP and HDMI video in ports.
7) **Load 4096x2160x60:** Loads the default TLL 4096x2160 60Hz table for the DP video in port.
8) **Load HDMI->DP 4K60:** Loads the default TLL 3840x2160 60Hz table with DP-specific timing for the HDMI video in port. Used for translating between HDMI sources and DisplayPort monitors.
9) **Load DPI->HDMI 4K60:** Loads the default TLL 3840x2160 60Hz table with HDMI-specific timing for the DP video in port. Used for translating between DisplayPort sources and HDMI monitors.

a) **Load DVI 1080P:** Loads the default TLL DVI 1080P table for both DP and HDMI video in ports.

b) **Load DVI Enhanced:** Loads the default TLL DVI Enhanced table for both DP and HDMI video in ports

.

EDID/DPCD Table Management Menu



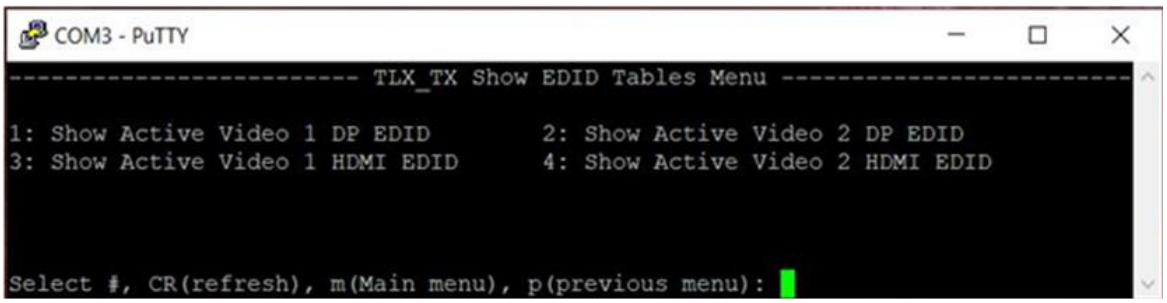
The EDID/DPCD Table management menu allows for micro SD card storage and retrieval of active HDMI and DisplayPort EDID tables.
Using FTP via the Ethernet management port, EDID tables can be loaded onto the micro SD card. Then, using this menu, the tables can be transferred from the micro SD card into the transmitter's local non-volatile memory and presented to the video source.
Likewise, this menu can be used to store active EDID and DPCD tables in the transmitter's local non-volatile memory onto the micro SD card. Then, using FTP via the Ethernet management port, the tables can be retrieved from the micro SD card.

Note: **•The file system on the SD card is FAT16. File names must follow the FAT16 8dot3 convention.**
•The file system is flat, single directory only. Sub-directories are not allowed.

Files can be either .hex or .dat (ascii) formats.

1) **Store table as .hex file:** Stores an active table onto the micro SD card in .hex format.
    a. Enter the video head where the table will be used (for head 1 or head 2)
    b. Enter the table type (1 for DP EDID, 2 for DP DPCD, 3 for HDMI EDID)
    c. Enter the file name in FAT16 8dot3 format.
2) **Store table as .dat file:** Stores an active table onto the micro SD card in .dat format.
    a. Enter the video head where the table will be used (for head 1 or head 2)
    b. Enter the table type (1 for DP EDID, 2 for DP DPCD, 3 for HDMI EDID)
    c. Enter the file name in FAT16 8dot3 format.
3) **Load EDID Table to Active:** Retreives an EDID table file from the micro SD card and loads into the transmitter's non-volatile memory and presents it to the video source.
    a. Enter the video head where the table will be used (for head 1 or head 2)
    b. Enter the table type (1 for DP EDID, 2 for HDMI EDID)
    c. Enter the file name in FAT16 8dot3 format. The micro SD card directory is displayed to help find the correct file name.
4) **Display EDID Table:** Retreives an EDID table file from the micro SD and the decodes the EDID structure for viewing using the EDID Display menu.
    a. Enter the file name in FAT16 8dot3 format. The micro SD card directory is displayed to help find the correct file name.
    b. The user interface jumps to the EDID Display Menu to decode the EDID structure from the file. Refer to the section on the EDID Display Menu.

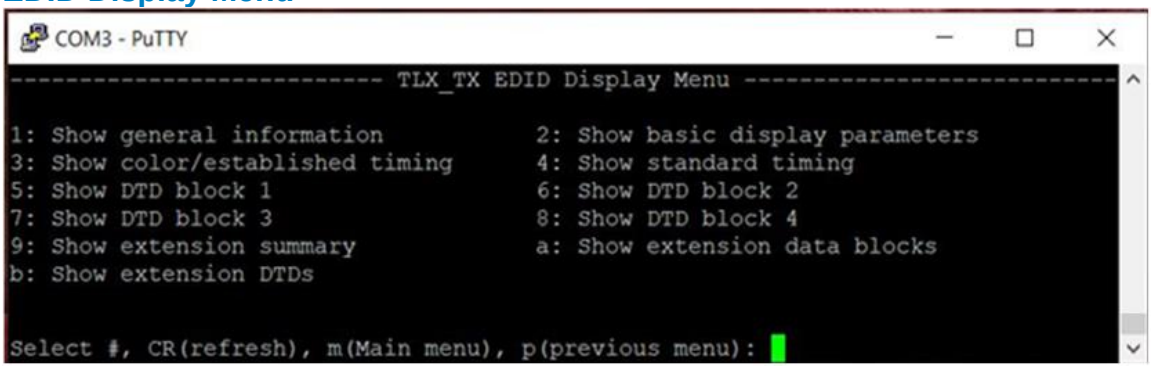
Show EDID Tables Menu



The Show EDID tables menu provides a tool to display the active EDID tables in the extender. The menu provides the option of which table to use as follows:

1) **Show Active Video 1 DP EDID:** Selects the active DP EDID table on Head 1 and navigates to the EDID Display Menu.
2) **Show Active Video 2 DP EDID:** Selects the active DP EDID table on Head 2 and navigates to the EDID Display Menu.
3) **Show Active Video 1 HDMI EDID:** Selects the active HDMI EDID table on Head 2 and navigates to the EDID Display Menu.
4) **Show Active Video 2 HDMI EDID:** Selects the active HDMI EDID table on Head 2 and navigates to the EDID Display Menu.

EDID Display Menu



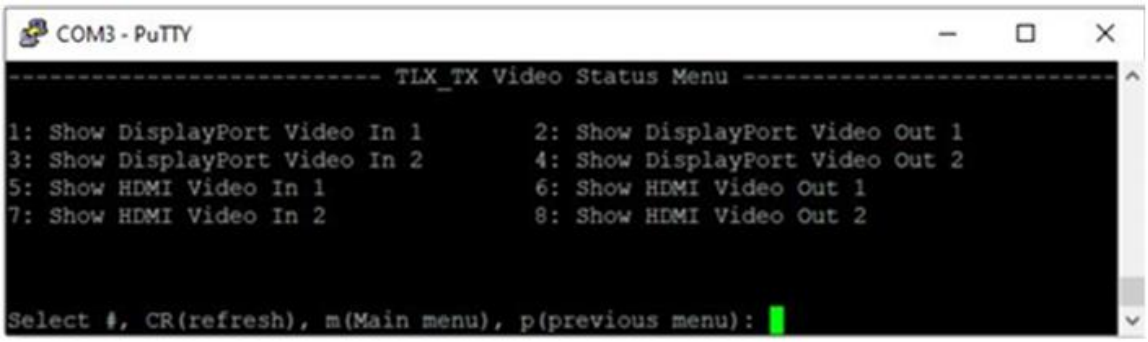
The EDID Display Menu is a tool to view the information contained within the EDID table. The menu selections dive into different segments of the table and present the information on the screen in readable format.

1) **Show general information:** Select to view the head and tail of the first EDID block.
2) **Show basic display parameters:** Select to view basic parameters.
3) **Show color/established timing:** Select to view color and established timing information.
4) **Show standard timing:** Select to view standard timing information.
5) **Show DTD 1:** Select to view detailed timing descriptor 1.
6) **Show DTD 2:** Select to view detailed timing descriptor 2.
7) **Show DTD 3:** Select to view detailed timing descriptor 3.
8) **Show DTD 4:** Select to view detailed timing descriptor 4.
9) **Show extension summary:** Select to view the summary of the first extension block (if present).

a) **Show extension data blocks:** Select to view each of the extension data blocks. There can be one to four extension data blocks. The selection will query which block to view.

b) **Show extension DTDs:** Select to view each of extension detailed timing descriptors. There can be one to four extension DTDs. The selection will query which block to view.

Video Status Menu

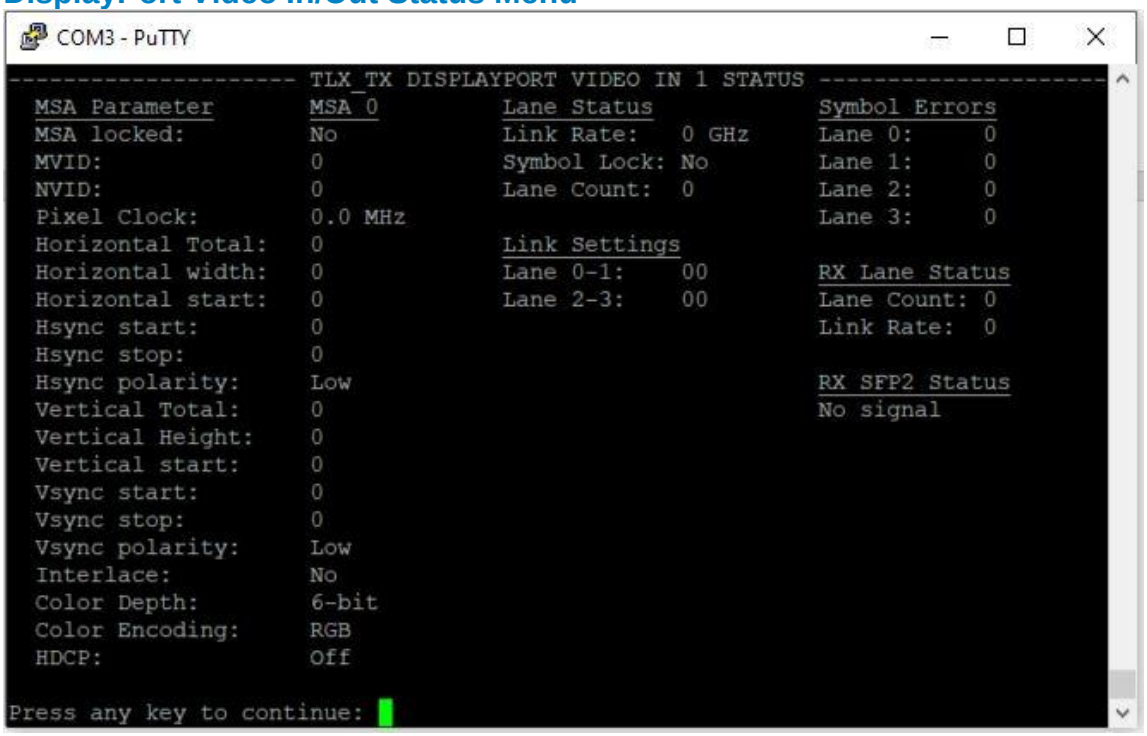


The Video Status Menu is a submenu allowing selection of the video port to query.

1) **Show DisplayPort Video In 1:** Select to view DisplayPort video status on Head 1 input.
2) **Show DisplayPort Video Out 1:** Select to view DisplayPort video status on Head 1 output.
3) **Show DisplayPort Video In 2:** Select to view DisplayPort video status on Head 2 input.
4) **Show DisplayPort Video Out 2:** Select to view DisplayPort video status on Head 2 output.
5) **Show HDMI Video In 1:** Select to view DisplayPort video status on Head 1 input.
6) **Show HDMI Video Out 1:** Select to view DisplayPort video status on Head 1 output.
7) **Show HDMI Video In 2:** Select to view DisplayPort video status on Head 2 input.
8) **Show HDMI Video Out 2:** Select to view DisplayPort video status on Head 2 output.

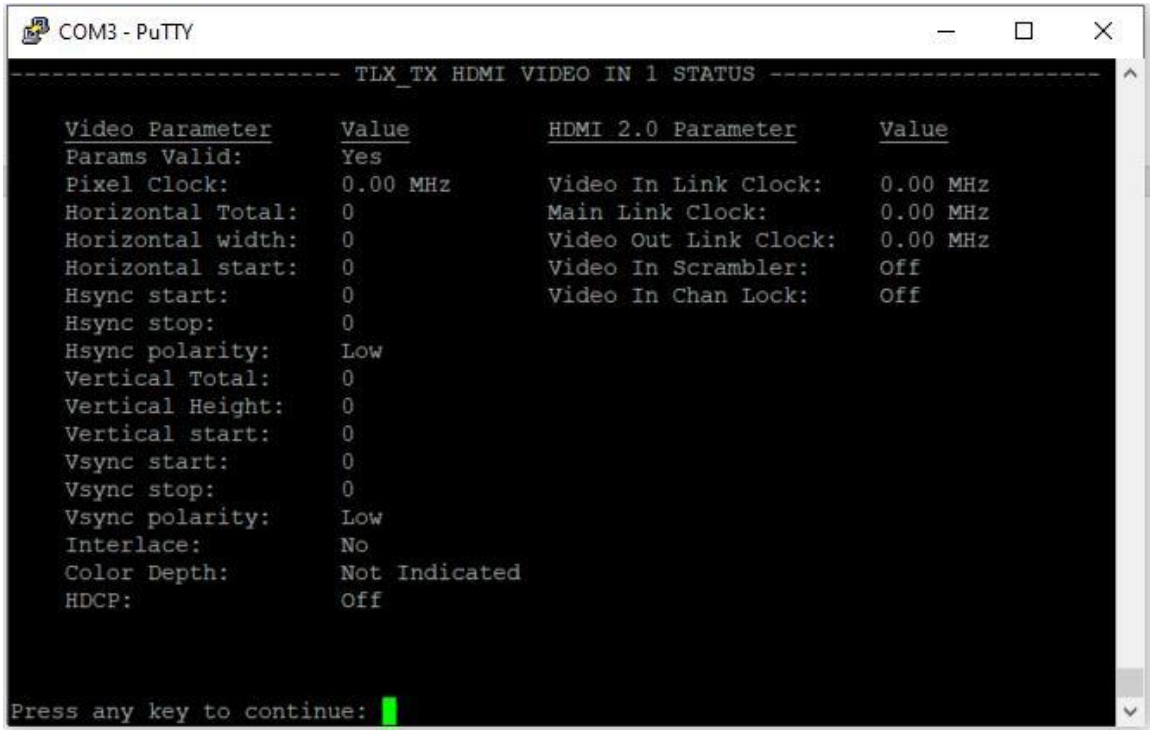
Note:
- **Transmit extenders will show both video in and video out options. Receive extenders will only show video out options.**
- **The menu will show all selections regardless of extender configuration. For example, DisplayPort Video-In 2 and HDMI Video-In 2 selections are on a single head. Head 2 is not available and selecting Head 2 status may show invalid information.**

DisplayPort Video In/Out Status Menu



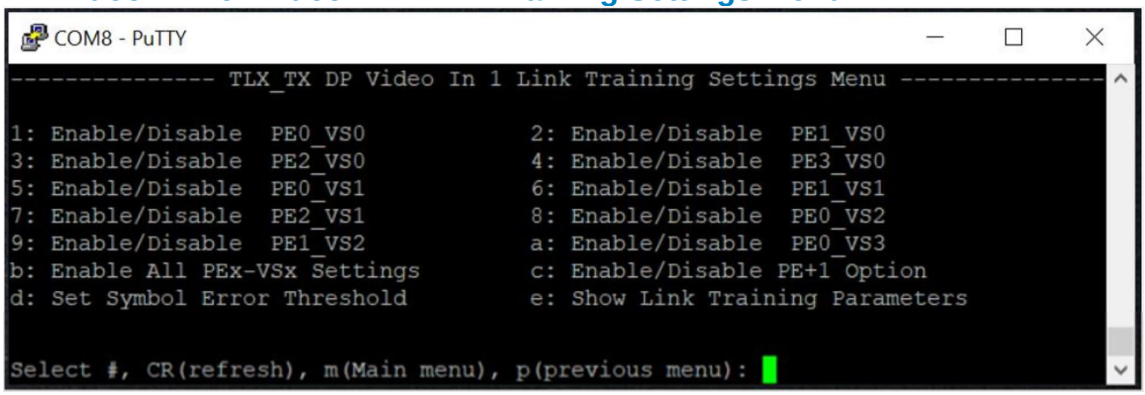
1) **Column 1:**
   a. Shows Main Stream Atributes (MSA), also known as video timing parameters.
   b. Shows HDCP status for the port: On or Off.
2) **Column 2:**
   a. Lane Status: Shows link status for the port
   b. Link Settings: Shows the DPCD data field for final link adjustement settings (PE and VS) achieved during link training.
3) **Column 3:**
   a. Symbol Errors: Shows a running count of post link training symbol errors for each lane.
   b. RX Lane Status: Shows the link settings at the receive extender port. Requires back channel fiber. This status is used to manually confirm that the DisplayPort bandwidth on the receive extender can accommodate the video bandwidth requirement.
   c. RX SFP2 Status: Shows second SFP status on the video head at the receiver. This status is used to manually confirm that the DisplayPort bandwidth on the receive extender can accommodate the video bandwidth requirement.

HDMI Video In/Out Status Menu



1) **Column 1:**
   a. Shows video timing parameters.
   b. Shows HDCP status for the port: On or Off.
2) **Column 2:**
   a. Shows HDMI physical link parameters

DP Video In 1 or Video In 2 Link Training Settings Menu

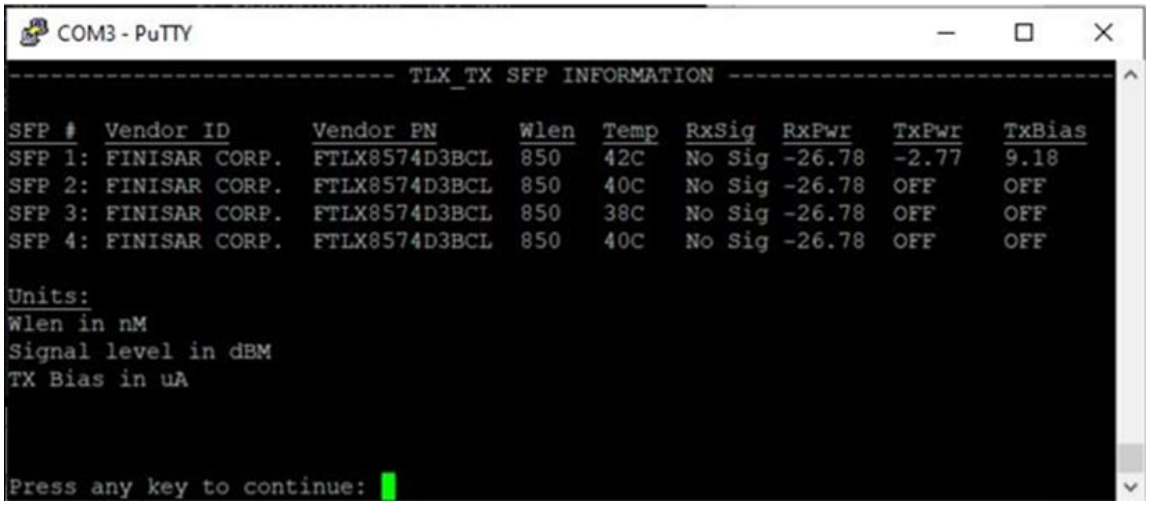


The DP Video In 1 and Video In 2 Settings Menu allows the customization of link training parameters in the unlikely event that the TLX Transmitter has problems link training with its video source.
PE0-3 are Pre-emphasis settings 0-3 and VS0-3 are voltage swing settings 0-3, as defined in the DPCD definition of the DisplayPort 1.4 standard.

1) **Enable/Disable PE0_VS0:** Select to enable or disable PE0/VS0. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
2) **Enable/Disable PE1_VS0:** Select to enable or disable PE1/VS0. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
3) **Enable/Disable PE2_VS0:** Select to enable or disable PE2/VS0. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
4) **Enable/Disable PE3_VS0:** Select to enable or disable PE3/VS0. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
5) **Enable/Disable PE0_VS1:** Select to enable or disable PE0/VS1. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
6) **Enable/Disable PE1_VS1:** Select to enable or disable PE1/VS1. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
7) **Enable/Disable PE2_VS1:** Select to enable or disable PE2/VS1. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
8) **Enable/Disable PE0_VS2:** Select to enable or disable PE0/VS2. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
9) **Enable/Disable PE1_VS2:** Select to enable or disable PE1/VS2. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.

a) **Enable/Disable PE0_VS3:** Select to enable or disable PE0/VS3. The selection will display the current setting and query the user to change it. Factory default is “Enabled”.
b) **Enable all PEx_VSx Settings:** Select to enable all PE/VS settings.
c) **Enable/Disable PE+1 Option:** Select to enable or disable the PE+1 request during link training after valid clock recovery and symbol lock. Factory default is “Enabled”.
d) **Set Symbol Error Threshold:** Select to set the symbol error threshold used for kicking hot plug on symbol errors. The selection will display the current value and query the user to change it. The threshold range is 10-255 errors. Factory default is 10 errors.
e) **Show Link Training Parameters:** Select to display the list of current Link Training settings.

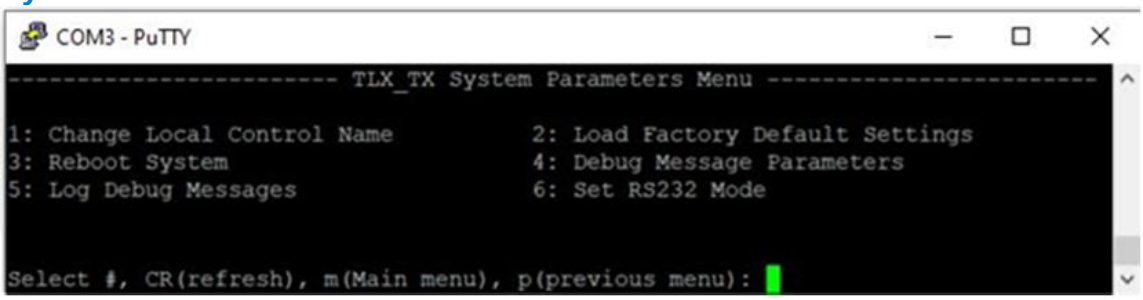
SFP Information Screen



Displays information regarding the SFPs installed on the extender. The number of SFPs available depends on extender type. If the SFP is not installed, it will be displayed as "Not Installed".

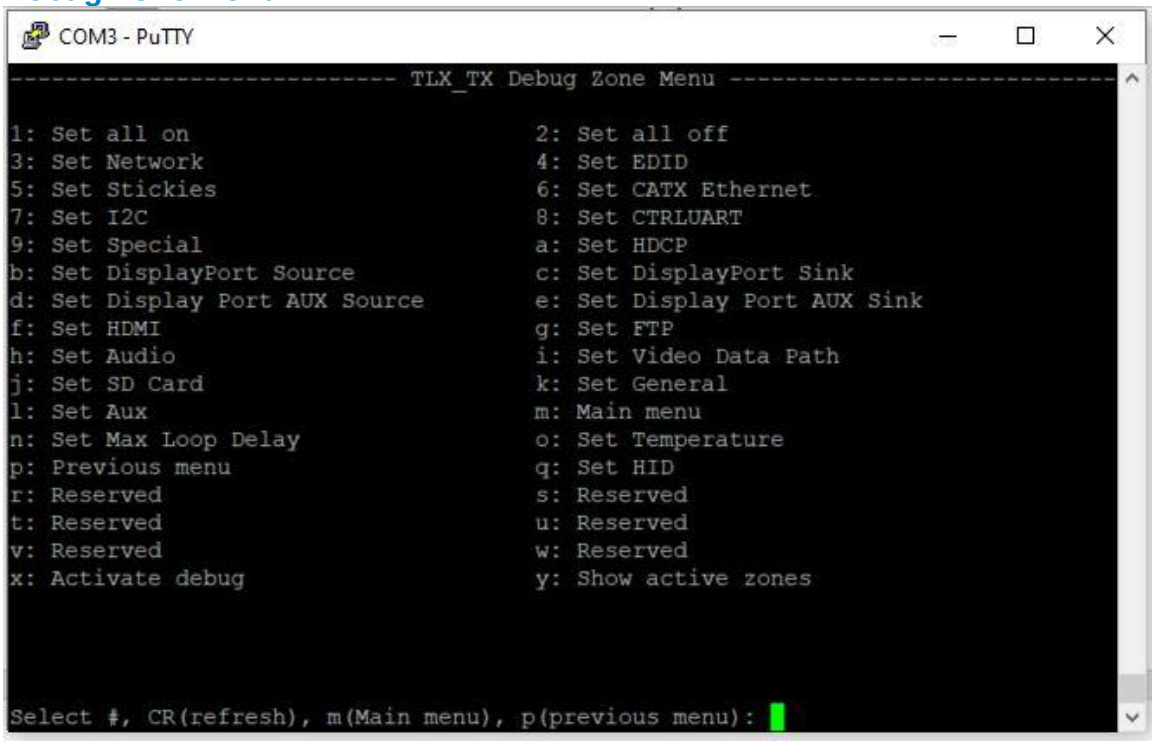
SFP #: Number identifying SFP. Typically, SFP1 is the leftmost SFP on the extender's rear panel.
Vendor ID: Name of SFP manufacturer.
VENDOR PN: SFP manufacturer part number.
Wlen: Wavelength of the optics.
Temp: Internal temperature reading of the SFP in Celsius.
RxSig: Receive signal indicator. A good receive optical signal displays "OK Sig", otherwise "No Sig".
RxPwr: Receive signal strength in dBM.
TxPwr: Transmit signal strength in dBM.
TxBias: Transmit bias in micro Amperes.

System Parameters Menu



1) **Change Local Control:** View or change the Local Control Name of the TLX extender. Used for system purposes in switched environments. The selection will display the current setting and query the user to change it. The Local Control name can be 1 to 8 characters in length. Factory default is "TLX-TX" for transmit extenders and "TLX-RX" for receive extenders.
2) **Load Factory Default Settings:** Select to Load Factory Default settings into the TLX extender.
3) **Reboot System:** Select to reboot the system.
4) **Debug Message Parameters:** Navigates to the Debug Zone Menu.
5) **Log Debug Messages:** Navigates to the Debug Log Menu.
6) **Set RS232 Mode:** Select to view or change the mode of the rear panel RS232 serial extension port. Options are DTE and DCE. The selection will display the current setting and query the user to change it. Factory default is "DCE" on transmit extenders and "DTE" on receive extenders.
    a. **DTE:** RS232 interface emulates Data Terminal Equipment
    b. **DCE:** RS232 interface emulates Date Communication Equipment.

Debug Zone Menu



Debug Zones provide a method of selecting debug messages specific to individual features and functionality. When activated, debug messages print to the display real time, indicating status and events happening to hardware blocks and software routines internal to the unit.

1: Set all on: Select to turn on all debug zones.

2: Set all off: Select to turn off all debug zones.

Selections 3: through w: Select to toggle the debug zone on or off.

x: Activate debug: Select to run the active debug zones.

y: Show active zones: Select to view state of each debug zone. Will display the state of all zones, either on or off.

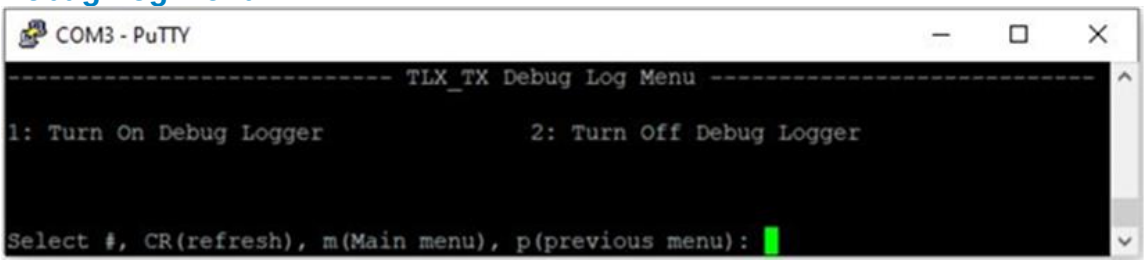
To run a group of debug zones:

1) Turn on the debug zones of interest.
2) Show active zones to confirm the zones are set as required.
3) Select “Activate debug”

Debug messages will appear as events take place. Debug messages will continue to print while navigating and viewing other screens.

If debug messages are printing excessively to the point of making Navigation viewing difficult, type <CTRL-C> to temporarily stop the debug messages. Type <CTRL-C> a second time to resume.

Debug Log Menu

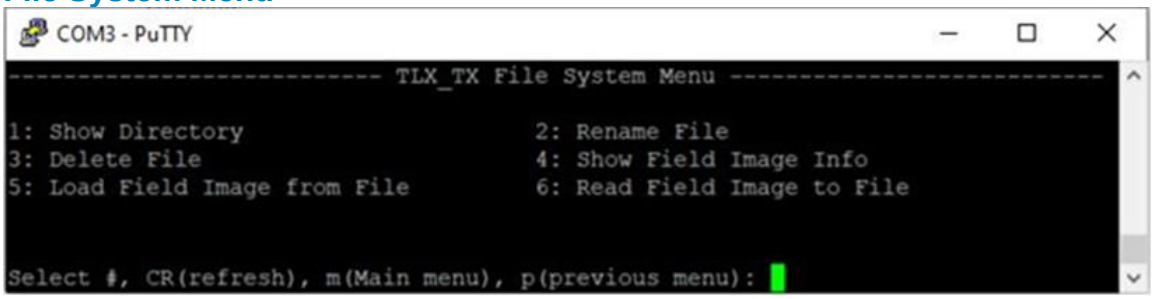


The Debug Log Menu provides a method of storing debug messages on the micro SD card for retreival using FTP.

1) To turn on logging select “Turn On Debug Logger:”
2) Enter a file name in FAT16 8dot3 format. A message will display “Logging is on. Press any key to continue: ”
3) Navigate to the Debug Zone Menu, turn on and activate debug zones of interest.
4) Debug messages will be displayed to the screen and logged in the micro SD card file.
5) To turn off logging select “Turn Off Debug Logger:”

The user can now log into the extender with FTP and retreive the log file.

File System Menu



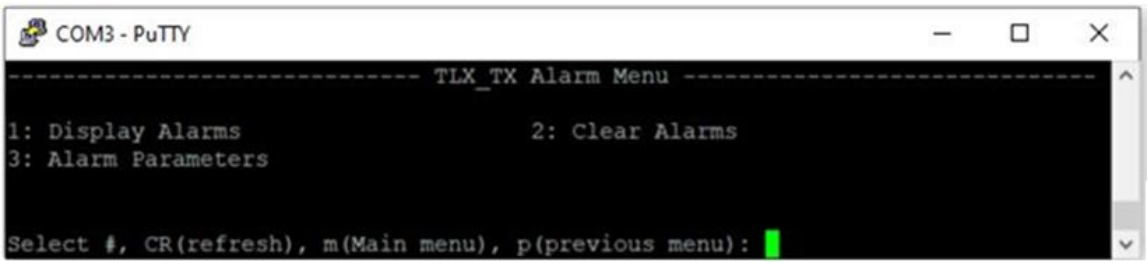
The File System Menu provides viewing and manipulation of files on the internal micro SD card.

1) **Show Directory:** Select to display a list of the files on the micro SD card. Note the internal web server files are stored on micro SD card. Other files might include EDID or log files. These files are accessible through the rear panel Ethernet Management Port via FTP.
2) **Rename File:** Select to rename a file. The selection will display a list of all files and query for the file to rename. Enter the full file name of the file to rename, then enter the new file name in FAT16 8dot3 format.
3) **Delete File:** Select to delete a file. The selection will display a list of all files and query for the file to delete. Enter the full file name of the file to delete.
4) **Load Field from File:** Not supported.
5) **Show Field Image Info:** Not Supported.
6) **Read Field Image to File:** Not Supported.

Note: Do not delete or rename web server files. Doing so will likely cause a web server malfunction. The web server files are:

a. comm.js
b. favicon.ico
c. ie.css
d. index.htm
e. jquery.js
f. prod1.jpg
g. testResp.js
h. thinklog.png
i. top_page.jpg
j. version.js
k. yui-min.js

Alarm Menu



The Alarm Menu provides viewing and configuration of extender alarms. Each alarm has two states:

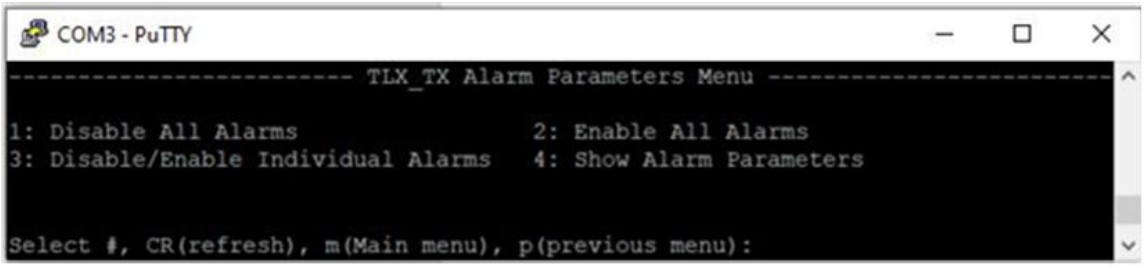
- **Current Status:** A real-time snapshot of the alarm state.
- **Latched Status:** Indication that an alarm event has occurred. Remains active until cleared.

1) **Displays Alarms:** Select to display the status of alarms. For each alarm the selection displays both the current status and latched status.
2) **Clear Alarms:** Select to clear the latched state of all alarms.
3) **Alarm Parameters:** Navigates to the Alarm Parameters Menu.

The list of alarms includes:

1) **Micro SD Card Error:** Indicates problem with micro SD card
2) **SFP1 Loss of Signal:** Indicates loss of signal on SFP1.
3) **SFP2 Loss of Signal:** Indicates loss of signal on SFP2.
4) **SFP3 Loss of Signal:** Indicates loss of signal on SFP3.
5) **SFP4 Loss of Signal:** Indicates loss of signal on SFP4.
6) **Chassis Error:** Not Supported.
7) **Login Error:** Indicates a failed attempt to login with Telnet or FTP.
8) **Config Changed:** Indicates that the extender configuration was changed.
9) **System Reboot:** Indicates that the system has performed a reboot
10) **Heartbeat Lost:** Indicates a failure in a full duplex control link between a transmit extender and a receive extender.
11) **Video Hot Plug Lost:** Indicates a hot plug was removed from a video output port.
12) **High Temperature:** Indicates that the extender experienced an over-temperature reading for its main PCB or FPGA.
13) **Card FAN1:** Indicates failure on the extender fans.
14) **Card FAN2:** Indicates failure on the extender fans (identical to FAN1).
15) **PHY FAN1:** Indicates failure on the CATX Extender Ethernet PHY Fan.
16) **PHY FAN2:** Indicates failure on the CATX Extender Ethernet PHY fan (identical to PHY FAN1).

Alarm Parameters Menu

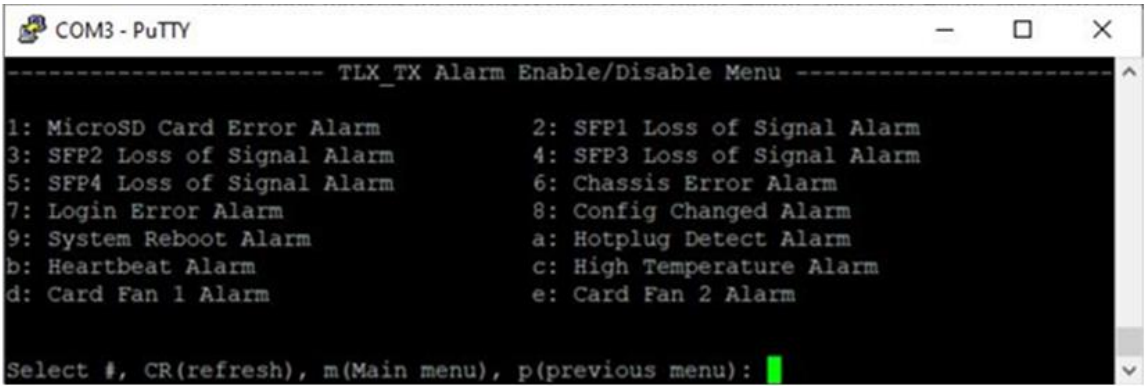


The Alarm Parameters Menu provides configuration of alarm masks.

1) **Disable All Alarms:** Select to disable (mask) all alarms.
2) **Enable All Alarms:** Select to enable (unmask) all alarms.
3) **Disable/Enable Individual Alarms:** Select to navigate to the Alarm Enable/Disable Menu
4) **Show Alarm Parameters:** Select to view the configuration of each alarm.

The default masking for alarms are High Temperature Alarm, Card Fan1 Alarm and Card Fan 2 Alarm unmasked. All other alarms masked.

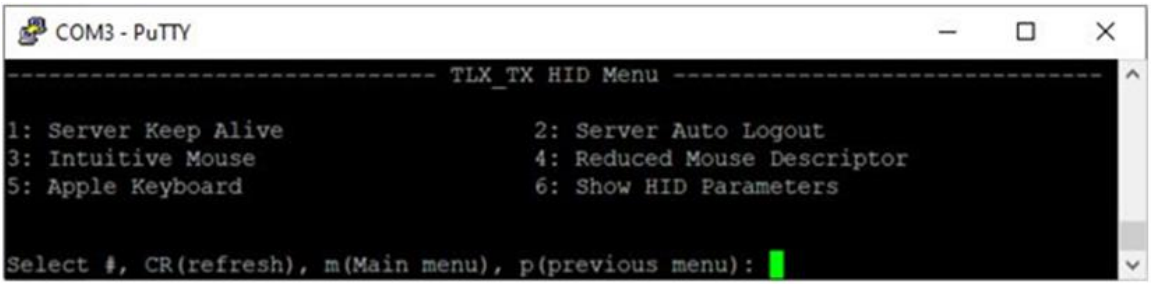
Alarm Enable/Disable Menu



The Alarm Enable/Disable Menu provides configuration of individual alarm masks.

Select the Alarm to change. Select to enable or disable a listed alarm mask. The selection will display the current setting and query the user to change it.

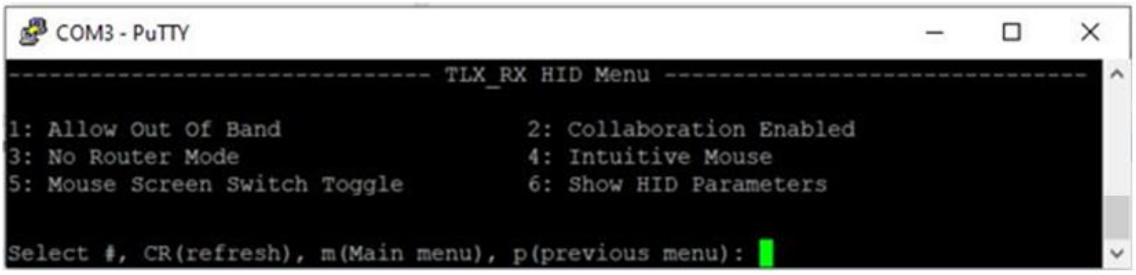
Transmitter HID Menu



The HID Menu provides configuration of transmitter HID parameters.

1) **Server Keep Alive:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
2) **Server Auto Logout:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
3) **Intuitive Mouse:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
4) **Reduced Mouse Descriptor:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
5) **Apple Keyboard:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
6) **Show HID Parameters:** Select to view all HID parameters.

Receiver HID Menu



The HID Menu provides configuration Receiver HID parameters.

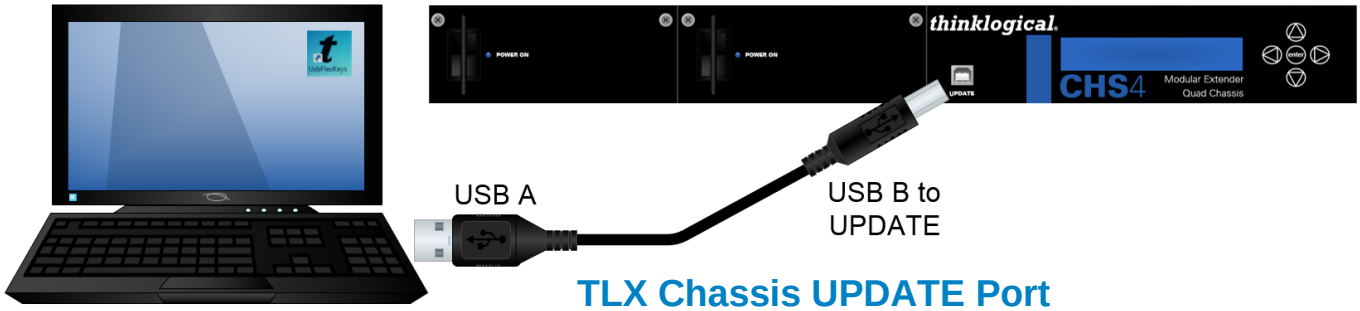
1) **Allow Out of Band:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
2) **Collaboration Enabled:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
3) **No Router Mode:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
4) **Intuitive Mouse:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
5) **Mouse Screen Switch Toggle:** The selection will display the current setting and query the user to change it. The setting toggles between "Enabled" and "Disabled". Factory default is disabled.
6) **Show HID Parameters:** Select to view all HID parameters.

Appendix I: Flex Keys

Flex Keys is a Thinklogical Tool featuring a set of default **Hotkeys**, or "shortcuts" to executing certain actions that installs onto a Windows PC. *Flex Keys* allows the administrator to create unique hot keys to enable actions that are not in Thinklogical's default Hotkey Manager Legend. *Hotkeys will not work on extenders without HID capabilities.*

Modifying Flex Keys

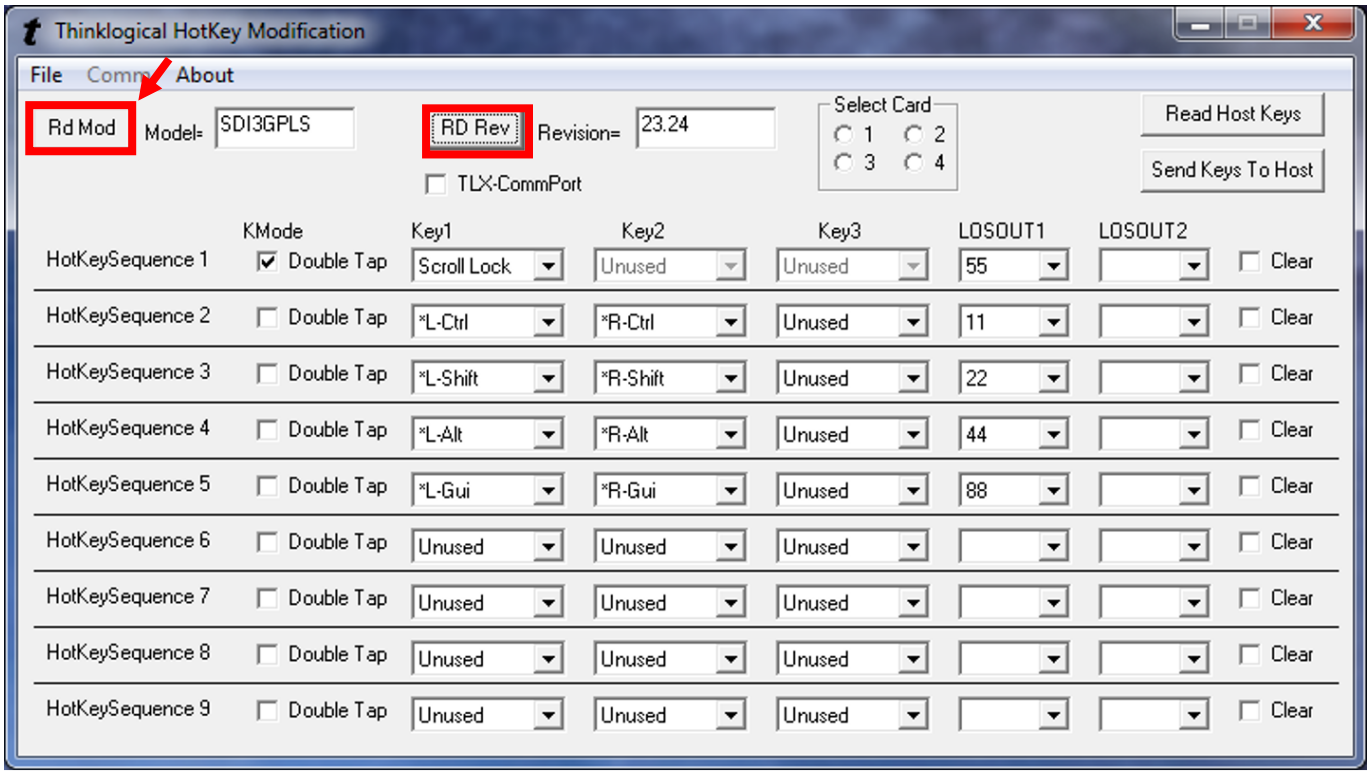
1. Connect the Windows PC to the **UPDATE** port located on the front of the Receiver Chassis. Any changes will be saved to that Receiver.



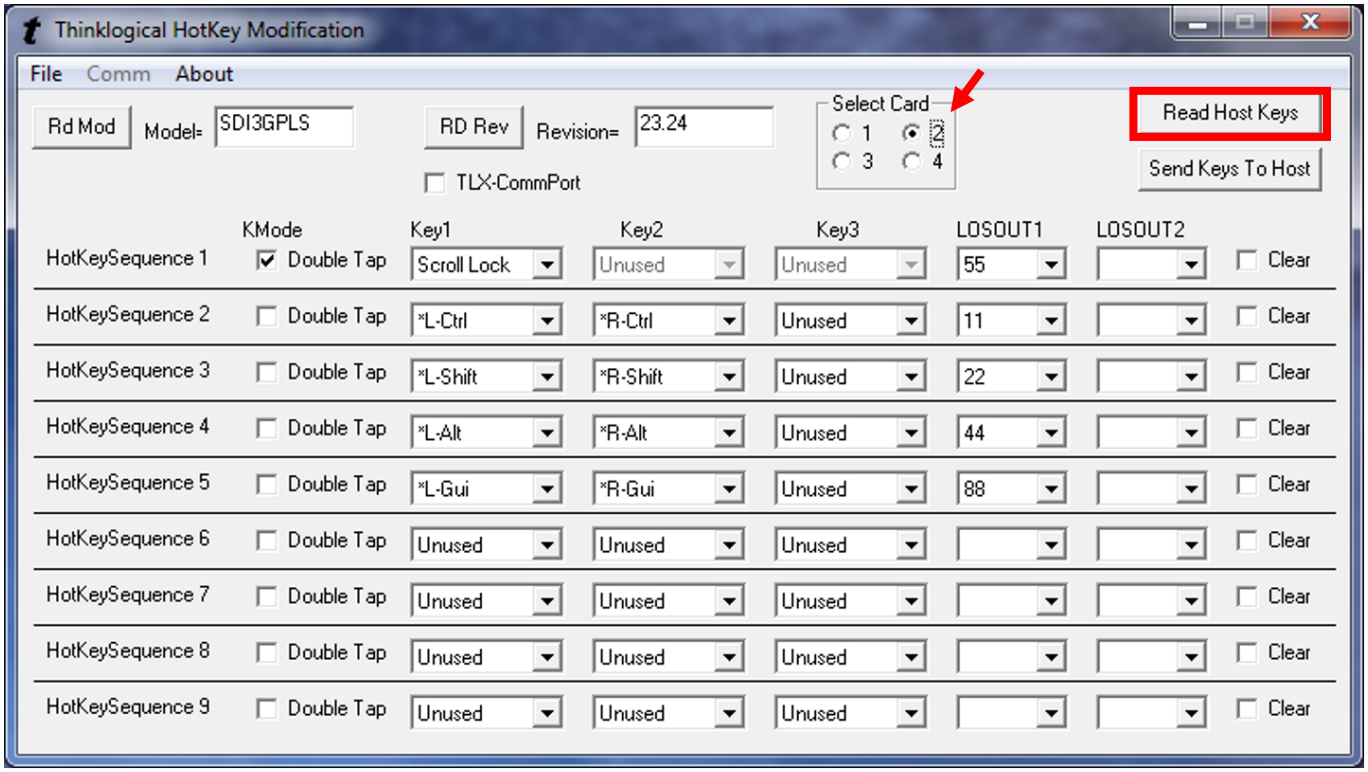
TLX Chassis UPDATE Port

2. Click on the **UsbFlexKeys** icon.

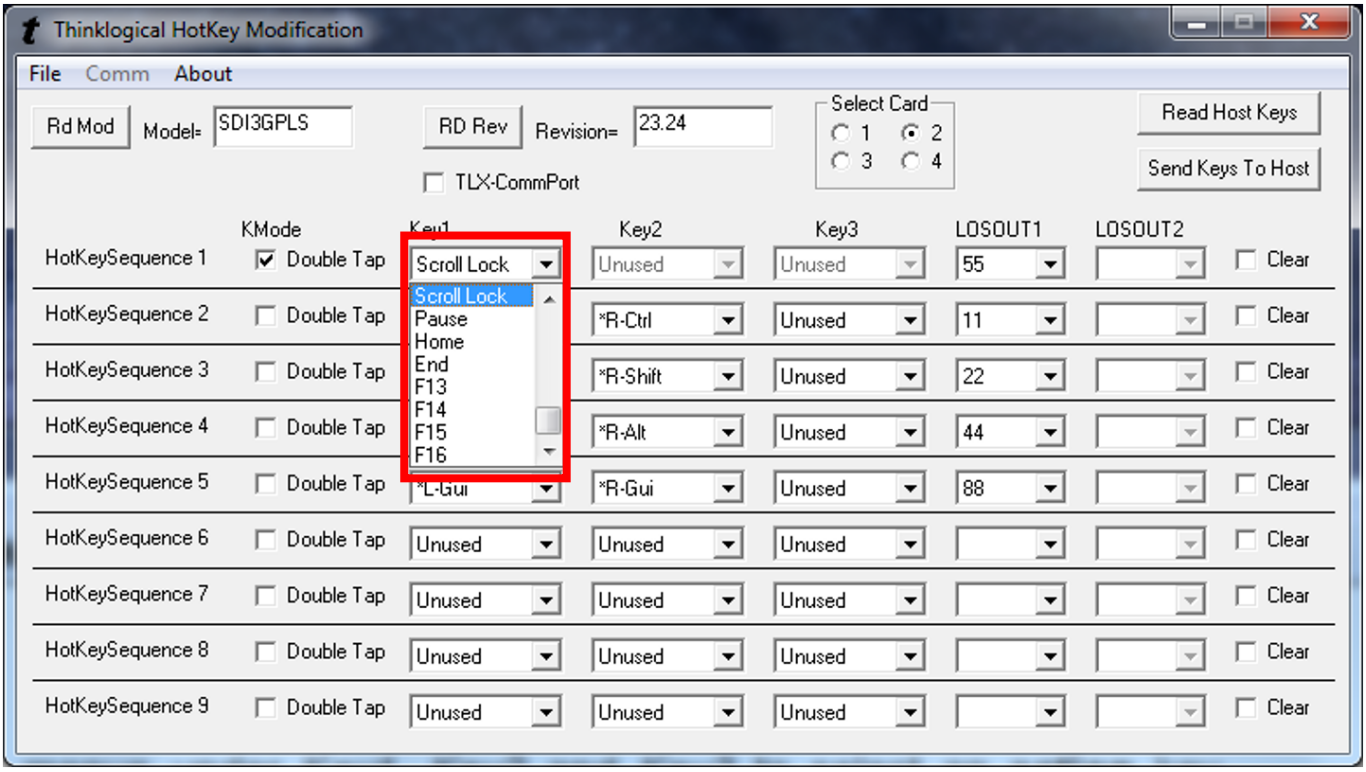
3. The saved HOST or UPDATE settings are read here. Click on *Rd Mod* to establish a connection to the Host. The *Chassis* Model and Revision are displayed.



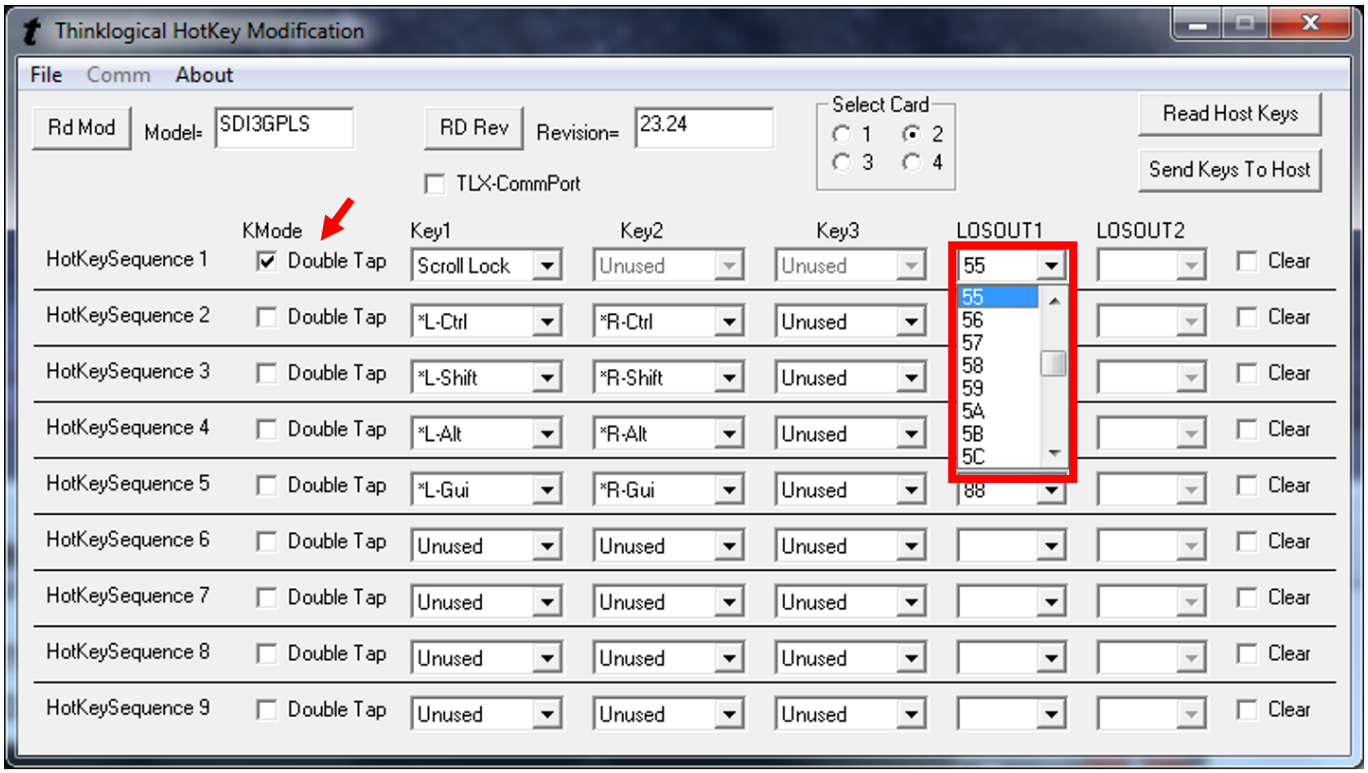
4. Select the appropriate **card slot** and click on **Read Host Keys**.



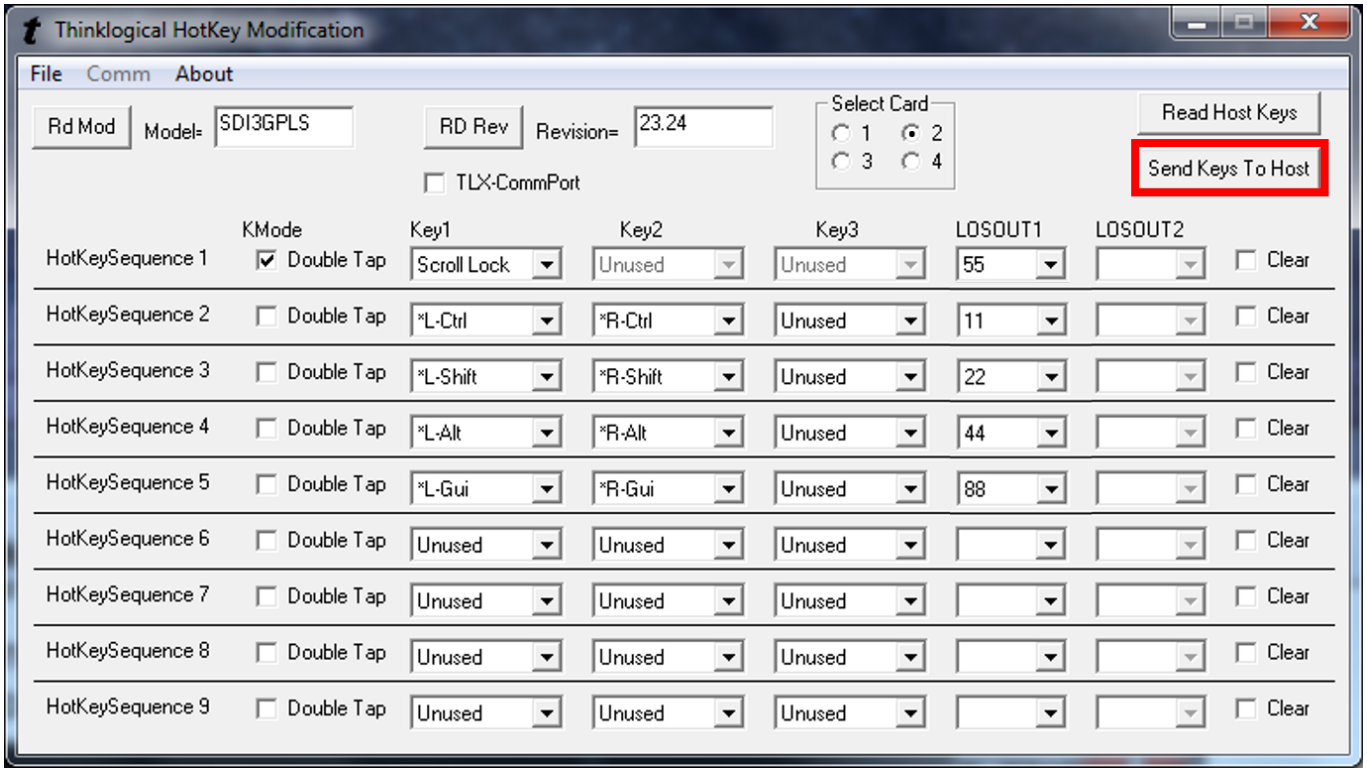
5. Left-click on the pull-down menus under *Key1, Key2* and *Key3* to select an **action** key. These are the *Hotkeys* that will be pressed on the keyboard.



6. Under LOSOUT1, select the **code** desired, which may be a unique code for this application. Selecting **Double Tap** (as in "Scroll lock/Scroll lock") requires only one key. Non-Double Tap can use a sequence of up to three keys (Key1, Key2 and Key3).



7. When the desired settings are selected, click on *Send Keys to Host* to **apply** the new settings.

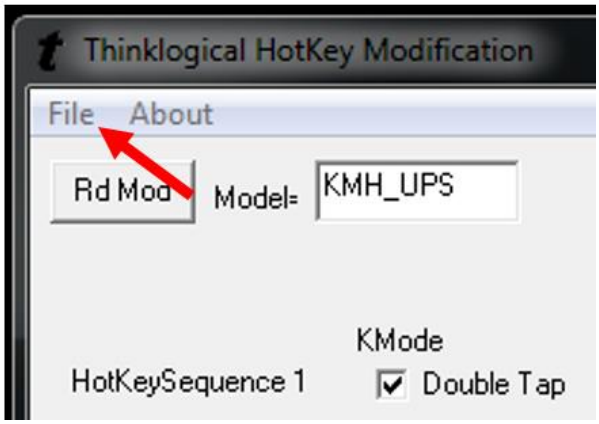


8. To **restore** a Receiver to its **default** settings:

a. Open Flex Keys without reading the device. (No USB cable to the PC as shown in Step 1.)
b. Click on *Send Keys to Host*. This will send the default Key Table to the device.
c. Click on *Rd Mod* to verify that the keys have returned to their default settings.

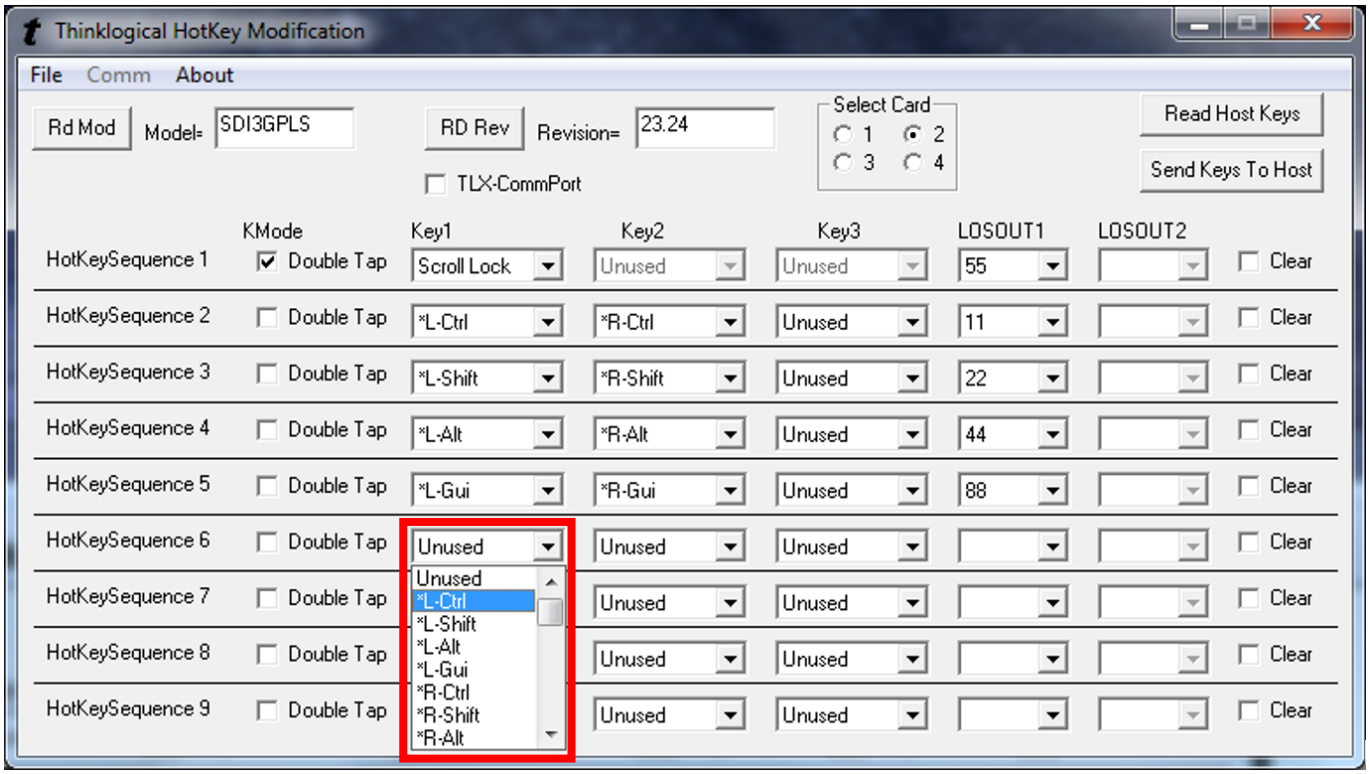
Or:

a. Click on *File* (Upper left)
b. Open **default.conf**
c. Click on *Save*

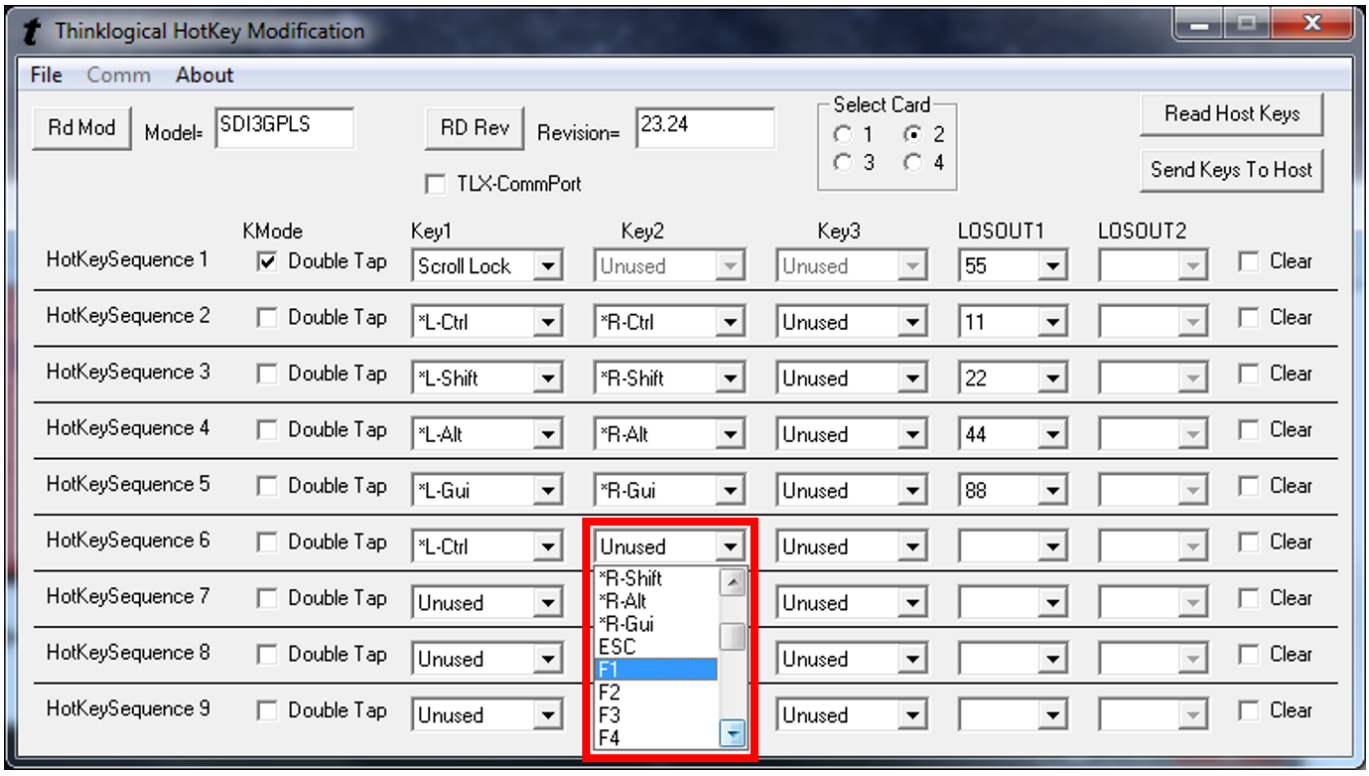


Create Custom Actions

1. By left-clicking on an "unused" **Key1 drop-down menu**, users can select from a list of key sequences. In this case, *Left Ctrl* is selected for Key 1.

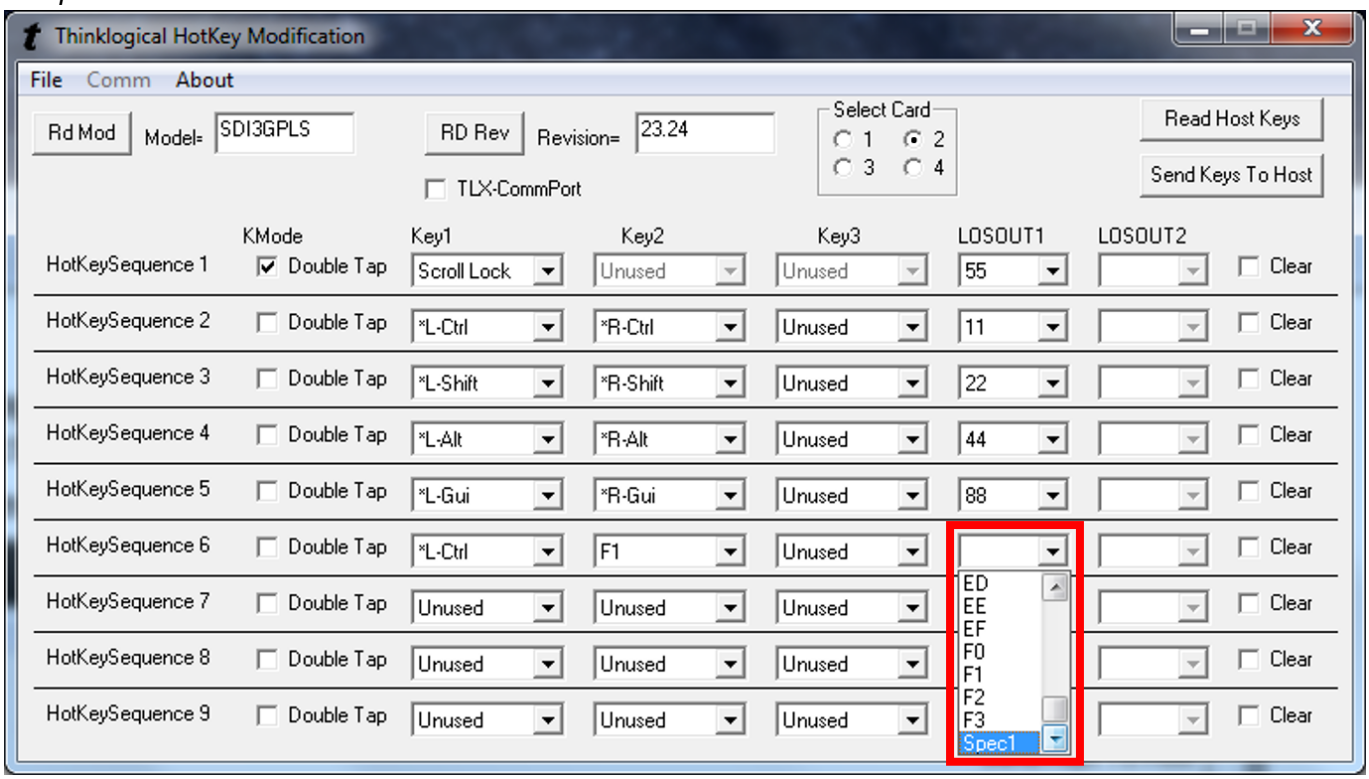


2. Left-click on the **Key2 drop-down menu** to select the Key 2 sequence. In this case, *F1* is selected for Key 2.

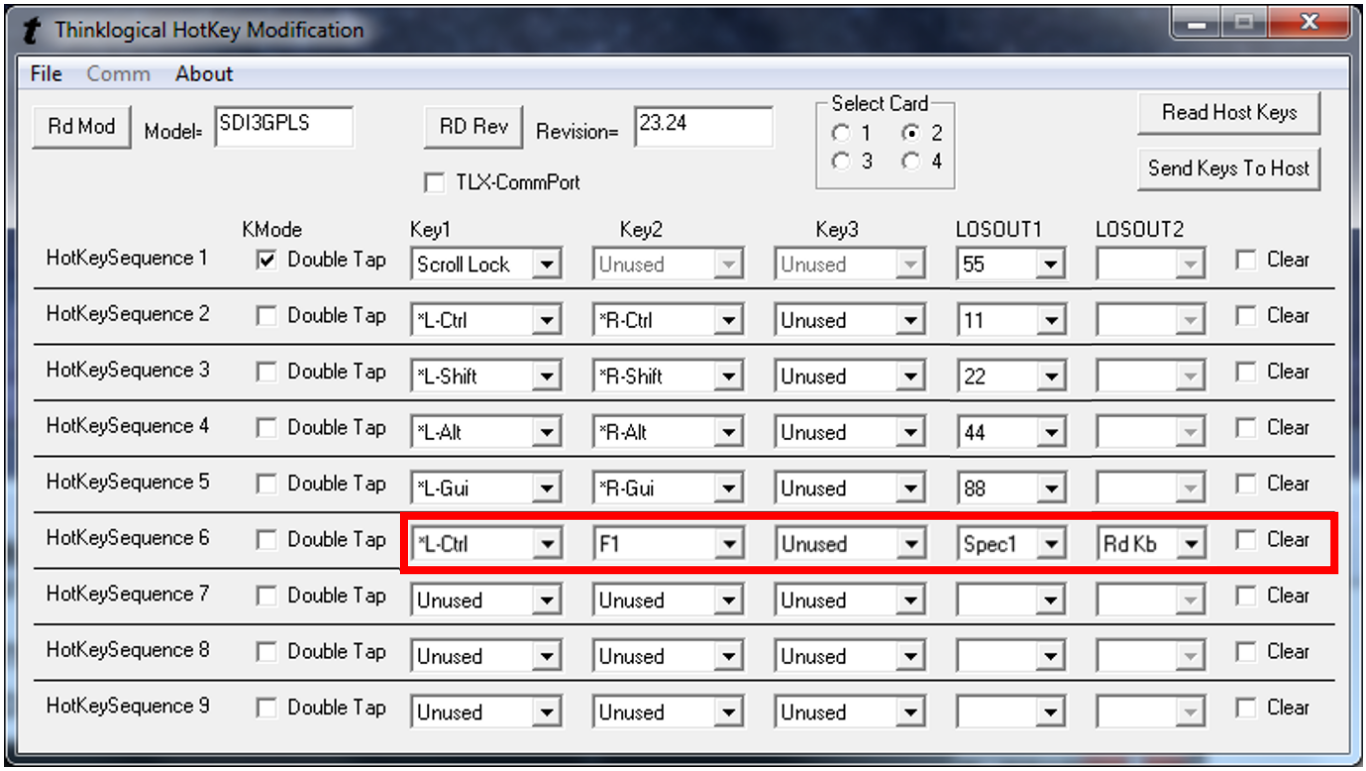


3. Left-click on the **LOSOUT1 drop-down menu** and select from a list of hex values, so that pressing *L-Ctrl* and *F1* will execute the function associated with that value.

A **non-hex value** can be entered by scrolling to the bottom of the LOSOUT1 list and clicking on *Spec1*.



4. By selecting *Spec1*, the LOSOUT2 value will automatically become *Rd Kb* (Read Keyboard), meaning it will "read" the next thing typed. **The user must now enter a non-hex numerical value, which will become an action associated with *L-Ctrl* and *F1.*** To clear the entries, click the *Clear* box to the right.



Appendix J: Supported SDI Video Formats

TLX 12G SDI Extender Resolution Support - SDI to SDI

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
1920 x 1080	4:4:4	RGB	10	23.98	3G
1920 x 1080	4:4:4	RGB	10	24	3G
1920 x 1080	4:4:4	RGB	10	25	3G
1920 x 1080	4:4:4	RGB	10	29.97	3G
1920 x 1080	4:4:4	RGB	10	30	3G
1920 x 1080	4:4:4	RGB	10	50i	3G
1920 x 1080	4:4:4	RGB	10	59.94i	3G
1920 x 1080	4:4:4	RGB	10	60i	3G
1920 x 1080	4:2:2	YCbCr	10	50	3G
1920 x 1080	4:2:2	YCbCr	10	59.94	3G
1920 x 1080	4:2:2	YCbCr	10	60	3G
1920 x 1080	4:2:2	YCbCr	12	23.98	3G
1920 x 1080	4:2:2	YCbCr	12	24	3G
1920 x 1080	4:2:2	YCbCr	12	25	3G
1920 x 1080	4:2:2	YCbCr	12	29.97	3G
1920 x 1080	4:2:2	YCbCr	12	30	3G

2048 x 1080	4:4:4	RGB	10	23.98	3G
2048 x 1080	4:4:4	RGB	10	24	3G
2048 x 1080	4:4:4	RGB	10	25	3G
2048 x 1080	4:4:4	RGB	10	29.97	3G
2048 x 1080	4:4:4	RGB	10	30	3G
2048 x 1080	4:4:4	RGB	12	23.98	3G
2048 x 1080	4:4:4	RGB	12	24	3G
2048 x 1080	4:4:4	RGB	12	25	3G
2048 x 1080	4:4:4	RGB	12	29.97	3G
2048 x 1080	4:4:4	RGB	12	30	3G
2048 x 1080	4:2:2	YCbCr	10	47.95	3G
2048 x 1080	4:2:2	YCbCr	10	48	3G
2048 x 1080	4:2:2	YCbCr	10	50	3G
2048 x 1080	4:2:2	YCbCr	10	59.94	3G
2048 x 1080	4:2:2	YCbCr	10	60	3G
2048 x 1080	4:2:2	YCbCr	12	23.98	3G
2048 x 1080	4:2:2	YCbCr	12	24	3G
2048 x 1080	4:2:2	YCbCr	12	25	3G
2048 x 1080	4:2:2	YCbCr	12	29.97	3G
2048 x 1080	4:2:2	YCbCr	12	30	3G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
3840 x 2160	4:4:4	RGB	10	23.98	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	24	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	30	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	12	25	4x3G, 12G
3840 x 2160	4:4:4	RGB	12	29.97	4x3G, 12G
3840 x 2160	4:4:4	RGB	12	30	4x3G, 12G
3840 x 2160	4:2:2	YCbCr	10	23.98	6G
3840 x 2160	4:2:2	YCbCr	10	24	6G
3840 x 2160	4:2:2	YCbCr	10	25	6G
3840 x 2160	4:2:2	YCbCr	10	29.97	6G
3840 x 2160	4:2:2	YCbCr	10	30	6G
3840 x 2160	4:2:2	YCbCr	10	50	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	10	59.94	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	10	60	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12	23.98	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12	24	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12	25	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12	30	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12	30	4x3G, 2x6G, 12G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
4096 x 2160	4:4:4	RGB	10	23.98	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	24	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	30	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	12	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	12	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	12	30	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10	23.98	6G
4096 x 2160	4:2:2	YCbCr	10	24	6G
4096 x 2160	4:2:2	YCbCr	10	25	6G
4096 x 2160	4:2:2	YCbCr	10	29.97	6G
4096 x 2160	4:2:2	YCbCr	10	30	6G
4096 x 2160	4:2:2	YCbCr	12	23.98	4x3G, 12G
4096 x 2160	4:2:2	YCbCr	12	24	4x3G, 12G
4096 x 2160	4:2:2	YCbCr	12	25	4x3G, 12G
4096 x 2160	4:2:2	YCbCr	12	29.97	4x3G, 12G
4096 x 2160	4:2:2	YCbCr	12	30	4x3G, 12G
4096 x 2160	4:2:2	YCbCr	10	47.95	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10	48	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10	50	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10	59.94	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10	60	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10	23.98	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10	24	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10	30	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12	30	4x3G, 2x6G, 12G

Note: 720p is not supported

TLX 12G SDI Extender Resolution Support - SDI to HDMI

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
1920 x 1080	4:4:4	RGB	10	23.98	3G
1920 x 1080	4:4:4	RGB	10	24	3G
1920 x 1080	4:4:4	RGB	10	25	3G
1920 x 1080	4:4:4	RGB	10	29.96	3G
1920 x 1080	4:4:4	RGB	10	30	3G
1920 x 1080	4:4:4	RGB	10	50i	3G
1920 x 1080	4:4:4	RGB	10	59.94i	3G
1920 x 1080	4:4:4	RGB	10	60i	3G
1920 x 1080	4:2:2	YCbCr	12*	29.97	3G
1920 x 1080	4:2:2	YCbCr	12*	30	3G
2048 x 1080	4:4:4	RGB	10	23.98	3G
2048 x 1080	4:4:4	RGB	10	24	3G
2048 x 1080	4:4:4	RGB	10	25	3G
2048 x 1080	4:4:4	RGB	10	29.97	3G
2048 x 1080	4:4:4	RGB	10	30	3G
2048 x 1080	4:4:4	RGB	12	23.98	3G
2048 x 1080	4:4:4	RGB	12	24	3G
2048 x 1080	4:4:4	RGB	12	25	3G
2048 x 1080	4:4:4	RGB	12	29.97	3G
2048 x 1080	4:4:4	RGB	12	30	3G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
3840 x 2160	4:4:4	RGB	10	23.98	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	24	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	10	30	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	12	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	12	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	RGB	12	30	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	10*	23.98	6G
3840 x 2160	4:2:2	YCbCr	10*	24	6G
3840 x 2160	4:2:2	YCbCr	10*	25	6G
3840 x 2160	4:2:2	YCbCr	10*	29.97	6G
3840 x 2160	4:2:2	YCbCr	10*	30	6G
3840 x 2160	4:2:2	YCbCr	10*	50	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	10*	59.94	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	10*	60	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12*	23.98	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12*	24	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12*	25	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12*	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:2:2	YCbCr	12*	30	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	10*	23.98	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	10*	24	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	10*	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	10*	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	10*	30	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12*	25	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12*	29.97	4x3G, 2x6G, 12G
3840 x 2160	4:4:4	YCbCr	12*	30	4x3G, 2x6G, 12G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
4096 x 2160	4:4:4	RGB	10	23.98	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	24	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	RGB	10	30	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10*	23.98	6G
4096 x 2160	4:2:2	YCbCr	10*	24	6G
4096 x 2160	4:2:2	YCbCr	10*	25	6G
4096 x 2160	4:2:2	YCbCr	10*	29.97	6G
4096 x 2160	4:2:2	YCbCr	10*	30	6G
4096 x 2160	4:2:2	YCbCr	10*	50	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10*	59.94	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	10*	60	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	12*	23.98	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	12*	24	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	12*	25	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	12*	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:2:2	YCbCr	12*	30	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10*	23.98	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10*	24	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10*	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10*	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	10*	30	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12*	25	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12*	29.97	4x3G, 2x6G, 12G
4096 x 2160	4:4:4	YCbCr	12*	30	4x3G, 2x6G, 12G

Note: 720p is not supported

*Color depth is scaled to 8 bits

TLX 12G SDI Extender Resolution Support - HDMI to SDI

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
1920 x 1080	4:4:4	RGB	10	23.98	3G
1920 x 1080	4:4:4	RGB	10	24	3G
1920 x 1080	4:4:4	RGB	10	29.97	3G
1920 x 1080	4:4:4	RGB	10	30	3G
1920 x 1080	4:2:2	YCbCr	8	23.98	1.5G
1920 x 1080	4:2:2	YCbCr	8	25	1.5G
1920 x 1080	4:2:2	YCbCr	8	29.97	1.5G
1920 x 1080	4:2:2	YCbCr	8	30	1.5G
1920 x 1080	4:2:2	YCbCr	8	50	3G
1920 x 1080	4:2:2	YCbCr	8	59.94	3G
1920 x 1080	4:2:2	YCbCr	8	60	3G
1920 x 1080	4:2:2	YCbCr	10	23.98	1.5G
1920 x 1080	4:2:2	YCbCr	10	24	1.5G
1920 x 1080	4:2:2	YCbCr	10	25	1.5G
1920 x 1080	4:2:2	YCbCr	10	29.97	1.5G
1920 x 1080	4:2:2	YCbCr	10	30	1.5G
1920 x 1080	4:2:2	YCbCr	10	50	3G
1920 x 1080	4:2:2	YCbCr	10	59.94	3G
1920 x 1080	4:2:2	YCbCr	10	60	3G

2048 x 1080	4:4:4	RGB	10	23.98	3G
2048 x 1080	4:4:4	RGB	10	24	3G
2048 x 1080	4:4:4	RGB	10	25	3G
2048 x 1080	4:2:2	YCbCr	10	24	1.5G
2048 x 1080	4:2:2	YCbCr	10	48	1.5G
2048 x 1080	4:2:2	YCbCr	10	50	1.5G
2048 x 1080	4:2:2	YCbCr	10	59.94	1.5G
2048 x 1080	4:2:2	YCbCr	10	60	1.5G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
3840 x 2160	4:4:4	RGB	10	23.98	12G
3840 x 2160	4:4:4	RGB	10	24	12G
3840 x 2160	4:4:4	RGB	10	25	12G
3840 x 2160	4:4:4	RGB	10	29.97	12G
3840 x 2160	4:4:4	RGB	10	30	12G
3840 x 2160	4:2:2	YCbCr	8	23.98	6G
3840 x 2160	4:2:2	YCbCr	8	24	6G
3840 x 2160	4:2:2	YCbCr	8	25	6G
3840 x 2160	4:2:2	YCbCr	8	29.97	6G
3840 x 2160	4:2:2	YCbCr	8	30	6G
3840 x 2160	4:2:2	YCbCr	8	50	12G
3840 x 2160	4:2:2	YCbCr	8	59.94	12G
3840 x 2160	4:2:2	YCbCr	8	60	12G
3840 x 2160	4:2:2	YCbCr	10	23.98	6G
3840 x 2160	4:2:2	YCbCr	10	25	6G
3840 x 2160	4:2:2	YCbCr	10	29.97	6G
3840 x 2160	4:2:2	YCbCr	10	30	6G
3840 x 2160	4:4:4	YCbCr	8	23.98	12G
3840 x 2160	4:4:4	YCbCr	8	24	12G
3840 x 2160	4:4:4	YCbCr	8	29.97	12G
3840 x 2160	4:4:4	YCbCr	8	30	12G
3840 x 2160	4:4:4	YCbCr	8	59.94	12G
3840 x 2160	4:4:4	YCbCr	8	60	12G
3840 x 2160	4:4:4	YCbCr	10	23.98	12G
3840 x 2160	4:4:4	YCbCr	10	25	12G
3840 x 2160	4:4:4	YCbCr	10	29.97	12G
3840 x 2160	4:4:4	YCbCr	10	30	12G

Video Resolution	Chroma Sub-Sampling	Color Space	Color Depth	Refresh Rate (Hz)	SDI Rate
4096 x 2160	4:4:4	RGB	10	23.98	12G
4096 x 2160	4:4:4	RGB	10	24	12G
4096 x 2160	4:4:4	RGB	10	25	12G
4096 x 2160	4:4:4	RGB	10	29.97	12G
4096 x 2160	4:4:4	RGB	10	30	12G
4096 x 2160	4:2:2	YCbCr	8	23.98	12G
4096 x 2160	4:2:2	YCbCr	8	24	12G
4096 x 2160	4:2:2	YCbCr	8	25	12G
4096 x 2160	4:2:2	YCbCr	8	29.97	12G
4096 x 2160	4:2:2	YCbCr	8	30	12G
4096 x 2160	4:2:2	YCbCr	8	50	12G
4096 x 2160	4:2:2	YCbCr	8	59.94	12G
4096 x 2160	4:2:2	YCbCr	8	60	12G
4096 x 2160	4:2:2	YCbCr	10	23.98	12G
4096 x 2160	4:2:2	YCbCr	10	24	12G
4096 x 2160	4:2:2	YCbCr	10	25	12G
4096 x 2160	4:2:2	YCbCr	10	29.97	12G
4096 x 2160	4:2:2	YCbCr	10	30	12G
4096 x 2160	4:2:2	YCbCr	10	50	12G
4096 x 2160	4:2:2	YCbCr	10	59.94	12G
4096 x 2160	4:2:2	YCbCr	10	60	12G

Note: 720p is not supported