thinklogical®

A BELDEN BRAND

Integrated Client Transmitter and CHS-HP4 Chassis

PRODUCT MANUAL

Revision G, May 2019

Thinklogical, A BELDEN BRAND • 100 Washington Street • Milford, Connecticut 06460, USA

Copyright Notice

Subject: Integrated Client Transmitter Product Manual
Revision: G, May 2019

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Thinklogical, A BELDEN BRAND
100 Washington St.
Milford, CT 06460

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.

CERTIFIED ISO 9001:2015 COMPANY

MADE IN USA

About this Product Manual

This product manual is divided into four sections: **System Features, Set-Up & Installation, Regulatory & Safety Requirements** and **Thinklogical Support.** These are sub-divided to help you find the topics and procedures you are looking for. This manual also includes a *Table of Contents* and *Appendices*.

Section 1 – Safety & Regulatory Requirements: **Pg. 7.** Thinklogical® strongly recommends that you read this section prior to starting the hardware assembly.

Section 2 – Product Features: **Pg. 9.** Details the features and functions of your equipment.

Section 3 – Set-Up and Installation: **Pg. 17.** Contains all the requirements and procedures necessary to connect and install your equipment, including FPGA updates.

Section 4 – Thinklogical Support: Pg. 23. Thinklogical provides the best customer support in the industry. If you have any questions or wish to contact us for any reason, please refer to this section of the manual.

Note and Warning Symbols

Throughout this manual 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 or important** information at a point in the text that is relevant to the subject being discussed. *Please read this information thoroughly.*

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. *Please read this information thoroughly.*

READ THE INSTRUCTIONS THOROUGHLY BEFORE STARTING ANY PROCEDURE!

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 four digits for a unique unit number. For example, **02-190125** indicates the unit was built in the **2**nd month of 20**19** and is unit number **125**.

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.

Firmware Updates

See **APPENDIX B: Integrated Client Transmitter FPGA Program Code Update Procedure**, pg. 25.

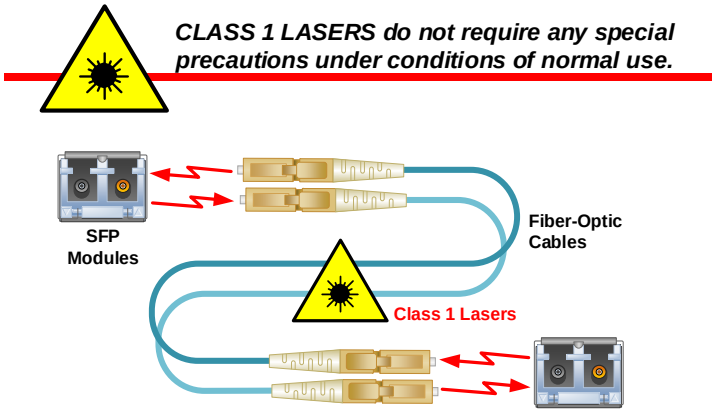
See **APPENDIX C: FPGA Download and Installation Procedure**, pg. 26.

Firmware updates are available through Thinklogical®. For technical assistance, please call us at **1-203-647-8700**.

Section 1: Regulatory & Safety Requirements

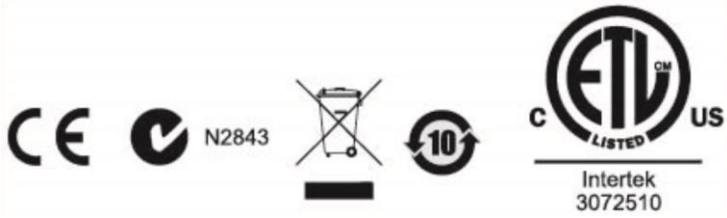
Class 1 Laser Information

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. telescope or microscope).



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.

Section 2: Product Features

Noted for its design, features, cost efficiency and performance in serving professional users, the Integrated Client Transmitter is a full-featured virtual machine desktop client combined with a high-performance keyboard, video and mouse (KVM) Transmitter Extender.

This compact, all-in-one module eliminates the need for a separate client device in extended virtual desktop infrastructure (VDI) applications, increasing system security, reducing IT complexity, and using up to 50% less rack space than traditional configurations.

Thinklogical's **Integrated Client Transmitter** hosts any standard VDI Client software, including those produced by VMware®, Citrix®, Microsoft® and Linux and is compatible with most third party accredited software images.

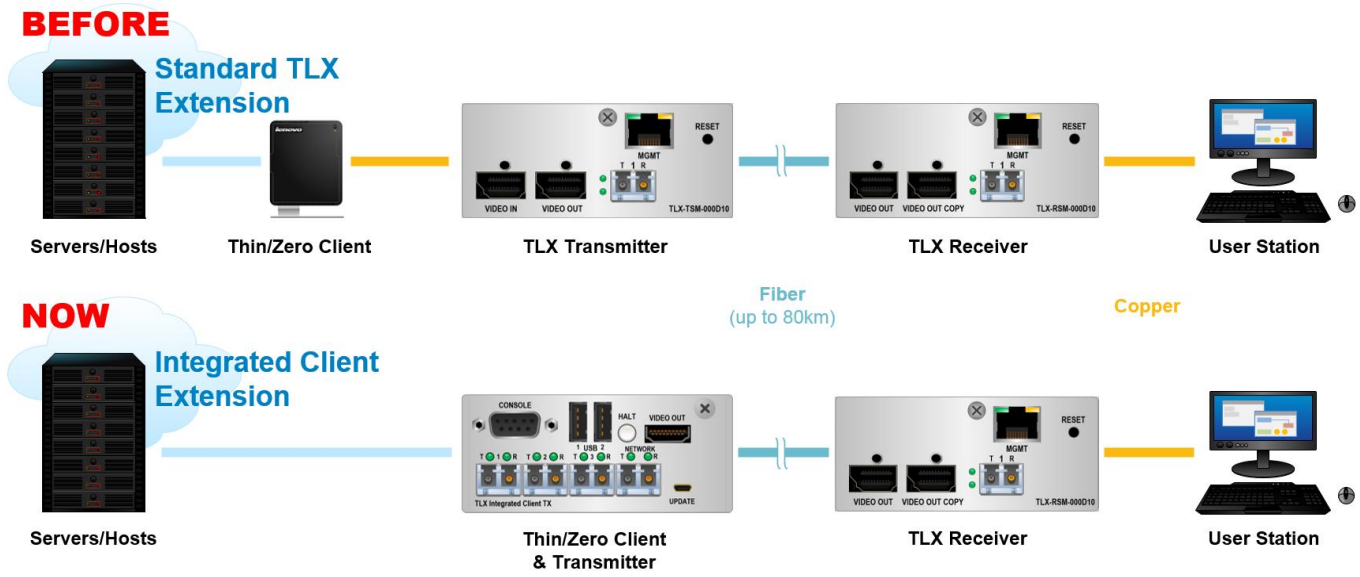
Before Thinklogical's Integrated Client solution, VDI meant purchasing and back-racking separate zero/thin client machines in a secure IT space, attaching them to rack-mounted transmitters, and then extending the connections to the display, keyboard and mouse via a receiver located at the user's work station.

Thinklogical's integrated approach dramatically increases the security of a VDI infrastructure by removing network cables from the user location and putting them behind the Transmitter in a secure rack room.

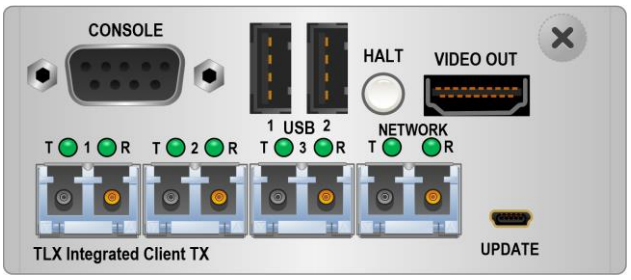
The high-density system is modular, hot-swappable and supports **up to four Integrated Client Transmitters per CHS-HP4 Chassis**. Configurations support single-head or dual-head systems with uncompressed frame rate resolutions up to 4K at 30Hz.

Compatible with Thinklogical's Velocity, Q-Series and TLX line of products.

Reduce Power, Cabling, Heat and Noise



Integrated Client Transmitters

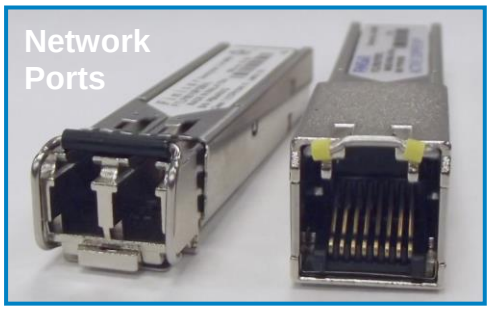


The *Integrated Client Transmitter Module* comes in both **10G** and **6G** configurations, both featuring a **7th Generation Intel U Processor Platform**, enabling superior processing power, enhanced graphics, and the intrinsic Intel architecture advantage (i.e., software development, open source code, etc.), *thus saving rack-space by eliminating the need for a separate Thin/Zero Client and Transmitter and the many connecting cables.*

Transmitter Design Features

Each module occupies one of four slots of the CHS-HP4 1RU Chassis:

- **Redundant, current-sharing, hot-swappable power supplies**: 2A @ 12V typical, 3A @ 12V max.
- **Intel Processor Daughter Card**
- **3 or 4 SFPs** (2 for dual-head 10G or 6G KVM Transmitter, 1 optional for USB 2.0, 1 for Network)
  - Network Port available with either a Fiber-Optic or a Copper SFP.

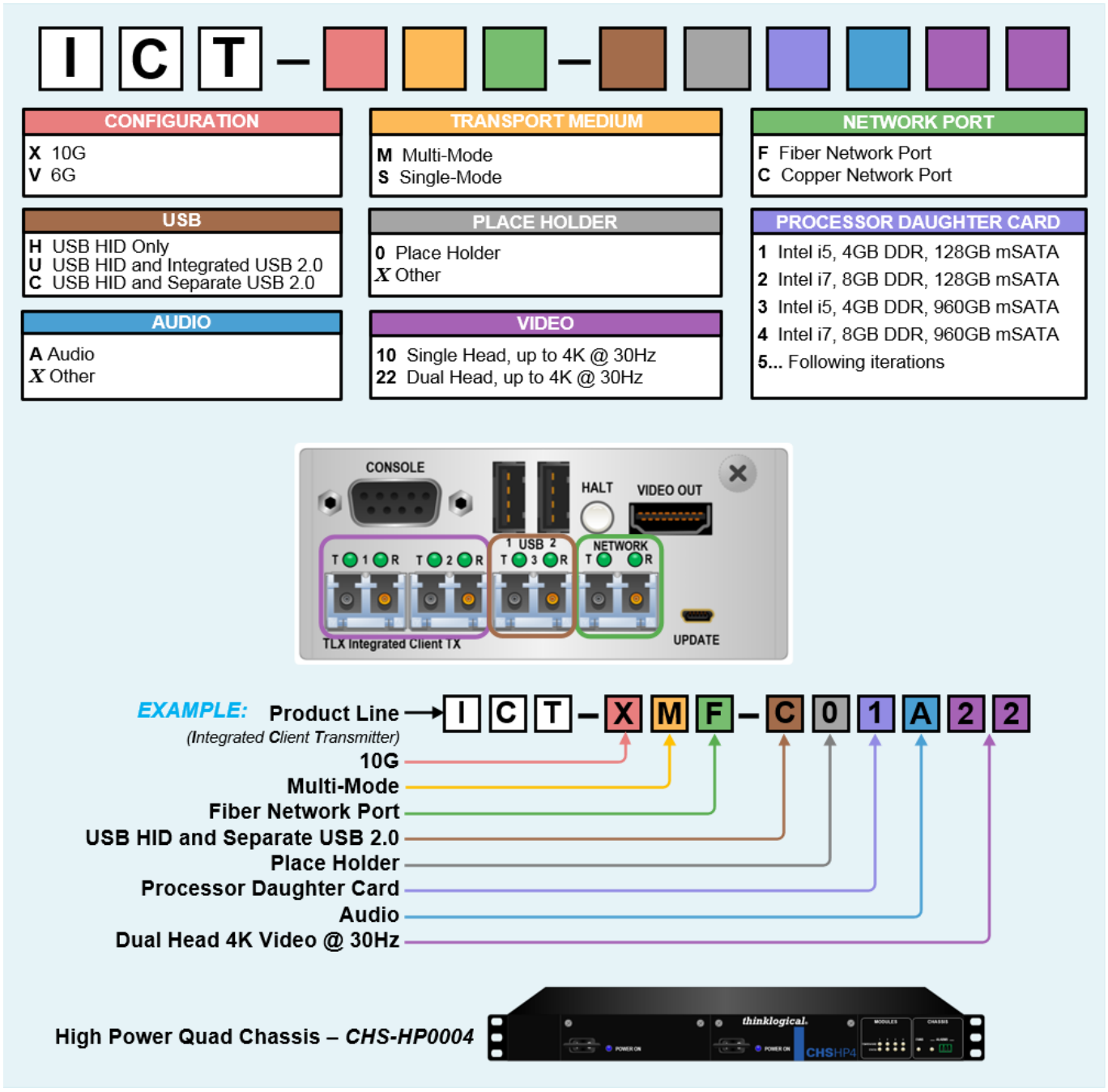


- **Dual-purpose USB mini-B Update Port:**
  - *Firmware Updates* via FPGA Download Utility (see pg. 25).
  - *ICT Control and Status* via terminal emulator (see pg. 19).
    - **Baud Rate:** 38.4K, **Data Bits:** 8, **Parity:** None, **Stop Bits:** 1, **Flow Control:** None
  - 1 USB Mini-B cable supplied, per chassis
- **HDMI 1.4**
  - Maximum Resolution: 4096x2160 @ 30Hz, 24bpp
  - No compression – No latency, artifacts, jitter or dropped frames
- **Analog Audio**
- **Local Access / Control / Status**
  - Gigabit Ethernet (Fiber or RJ45)
  - USB 2.0 (2 ports)
  - DB9 DCE Linux Command Console Port (RS232)
  - Halt Button
  - Bi-color Status LED's

Ordering/Configuration Guide

The Integrated Client Transmitter is available in 6G and 10G, Multi-Mode and Single-Mode, with a copper or fiber Network Port and with any combination of USB HID, Integrated USB 2.0 and Separate USB 2.0. The configuration is encoded in the Part Number, as shown below.

Follow the part numbering scheme below when ordering Integrated Client Transmitters.



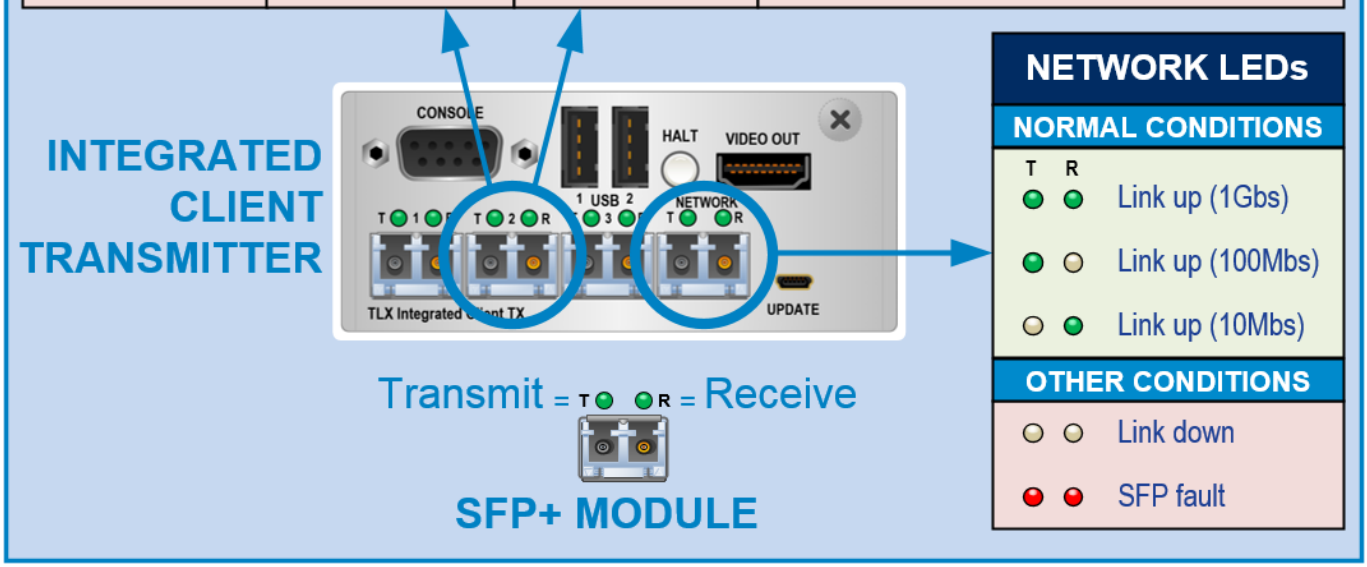
The Status LEDs

Each **Integrated Client Transmitter**'s SFP+ modules have helpful **Status LEDs** to allow users to asses the condition of each connection at a glance.

Integrated Client Transmitter SFP Status LEDs			
FIBER STATUS	**LEFT LED**	**RIGHT LED**	**NORMAL CONDITION (with Back Channel)**
T ACTIVE VIDEO/DATA OK	FLASH GREEN	N/A	T active and transmitting valid video/data
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/DATA	FLASHING RED-GREEN	N/A	No video or data / Invalid video or data
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 L. LEDS	ALL R. LEDS	ALARM CONDITIONS
ALARM	FLASH RED	FLASH RED	Over temp or Fan fail



See **APPENDIX A: Integrated Client Transmitter & CHS-HP4 Chassis Quick Start Guide**, pg. 24.

The CHS-HP4 *High Power Quad Chassis* (CHS-HP0004)

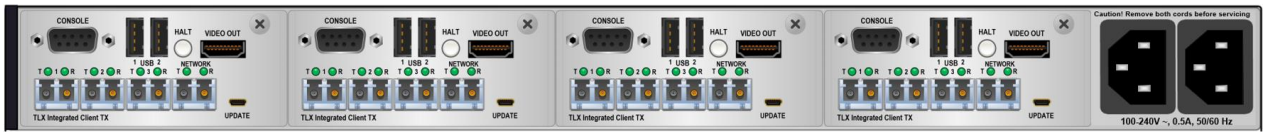
The CHS-HP4, or the *High Power Quad Chassis*, is a 1 RU chassis that accommodates up to four hot-swappable **Integrated Client Transmitters** for use with Thinklogical fiber-optic extension systems. *The CHS-HP4 does not accommodated other Thinklogical products.*

Chassis Design Features:

- Dual, redundant, hot-swappable, load-sharing **Power Supplies**.
- Six **Cooling Fans**.
- Bi-color **LED indicators** on the Chassis Front Panel for individual module temperature and status, as well as chassis fan status and alarms.
- Front Panel **Dry Alarm Contacts**.
- EIA 19" **rack-mount brackets**
- Four Integrated Client Tx Modules in **1 RU** of rack space
- Designed for Integrated Client Transmitter modules **ONLY**

Power Supply 1 *Power Supply 2* *Status & Alarm LEDs*

The CHS-HP4 front panel



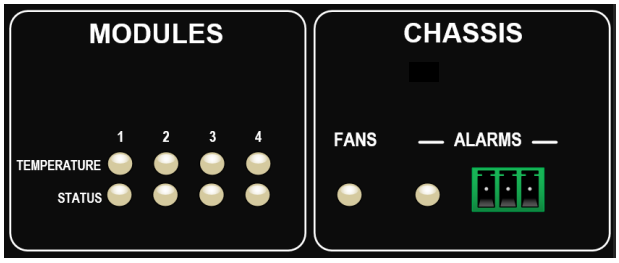
Mod. 1 *Mod. 2* *Mod. 3* *Mod.4* *AC Input*

The CHS-HP4 rear panel

The CHS-HP4 does not contain a microprocessor or FPGA. Monitor and control functions such as fan speed and alarm status indicators are always performed by the Integrated Client Tx Module installed **furthest from the cooling fans.** *Three or fewer modules can be installed in any configuration.*

Front Panel TEMPERATURE, STATUS and ALARM LEDs

When mounted in a rack, the Front Panel should be unobstructed and accessible so that the **Module Temperature and Status LEDs** and the **Chassis Fans and Alarms LEDs** are visible.



The **Module TEMPERATURE** indicator is driven by the installed module(s).

Blue = normal operation **Red** = **over-temperature state**

The **Module STATUS** indicator is also driven by the installed module(s).

Blue = normal operation **Red** = **status alert**

The **Chassis FAN** indicator is driven by the module installed furthest from the cooling fans.

Blue = normal operation **Red** = **slow or stopped fan**

The **Chassis ALARM Indicator** monitors the temperature, status and chassis fan signals.

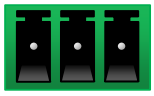
Blue = normal operation **Red** = **temperature, status and/or fan failure**

The **Temperature and Status LEDs** are ON for slots with installed modules only. All others will be OFF.

The **Chassis Fans LED** will be ON if at least one module installed. If no modules are installed, the indicator will be OFF.

The **Chassis Alarm LED** will be ON if at least one module installed. If no modules are installed, the indicator will be OFF.

The **Chassis Alarm contacts** are Form C Dry Contacts with a nominal switching capacity of 1A @ 30VDC. There are connections for **normally open**, **common** and **normally closed** contacts. Contacts will change state in response to an alarm condition.

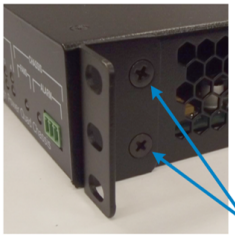


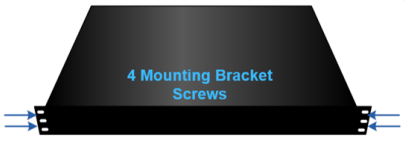
Desktop or Rack-Mount the Chassis

You may choose to place your **CHS-HP4 Chassis** on or under a **shelf or desktop** (rubber feet included, under-desk mounting brackets, Kit ENCA000797, available), or **rack-mount** it using the supplied EIA 19" mounting brackets. In any mounting configuration, the front panel should be visible and unobstructed so that the Power Supplies, Alarm and Status LEDs are accessible. All connections are made on the rear of the chassis. *The CHS-HP4 Chassis does not need to be opened or accessed.*

The sturdy, metal case allows units to be stacked as needed **(maximum of four units per stack, with a minimum of two inches of clearance between stacks for adequate ventilation)**.

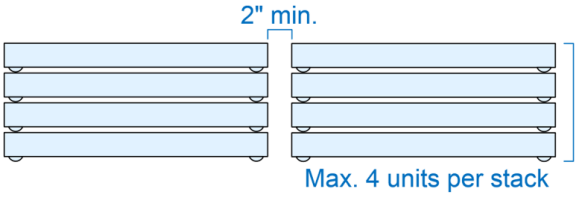
RACK-MOUNT OR DESKTOP OPTIONS:
The CHS-HP4 can be mounted in a standard EIA 19" rack or on a shelf or desktop.



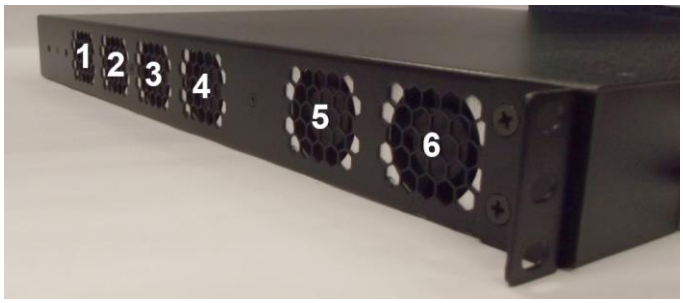


Remove power from the unit!
Each mounting bracket is secured by two screws and can be safely removed from the chassis for desktop mounting.
All screws should be reinstalled into the chassis after the brackets have been removed.

2 Mounting screws per bracket



The Cooling Fans



The Cooling Fans for the CHS-HP4 provide sufficient cooling airflow acoss the power supplies and up to four installed modules. Typical rack-mount installation of the chassis is horizontal, but the chassis will be sufficiently cooled with proper vertical mounting. (*See next paragraph*.)

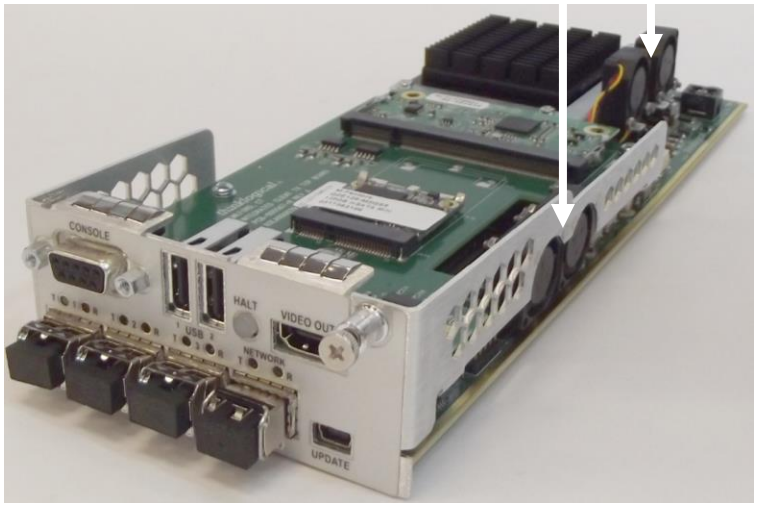
The Chassis Cooling Fans are identified as 1- 6

Mounting the Chassis Vertically

If the chassis is to be mounted vertically within a rack, ensure the orientation show at right to allow proper cooling air-flow.

Each Integrated Client Transmitter also features four **on-board cooling fans** to provide additional airflow throughout the chassis.

Proper Vertical-mounting of the CHS-4 Chassis ⇨



The Power Supply Modules

The CHS-HP4 is powered by two 12V Power Supply Modules. Both Supplies have an ON/OFF switch and a blue LED to indicate that power is ON.

Integrated Client Transmitter Technical Specifications

PHYSICAL	
Chassis CHS-HP0004	**Rack Size: EIA 19"** **Height: 1 RU** **Depth: 17.00"** **Weight** (Chassis only)**: 9.0 lbs.** (4.08 kg) **Shipping Weight: 11 lbs.** (4.99 kg) **Weight** (Chassis & 4 Modules)**: 13.8 lbs.** (6.26 kg) **Shipping Weight: 15 lbs.** (6.80 kg)
Chassis Status LEDs	**Module Temp (1-4), Module Status (1-4), Chassis Fans, Chassis Alarm, Power Supplies 1-2**
Integrated Client Transmitter	**Weight** (1 ICT module)**: 1.2 lbs.** (.54 kg) **Shipping Weight: 2 lbs.** (.91 kg)
ICT Interfaces	**1 Serial Console, 2 USB-A, 1 HDMI Video Out, 2 or 3 fiber SFPs, 1 RJ-45 *or* fiber Network SFP, 1 USB-mini-B Update**
ENVIRONMENTAL	
Temperature	**Operating: 0° to 50°C** (32°F to 122°F) **Ambient** **Storage: -20°C to 70°C** (-4°F to 158°F)
Humidity	**Operating: 5% to 95%, non-condensing** **Storage: Unlimited**
Altitude	**Operating: Thinklogical components are rated to 1000m max. elevation. Max. operating temp. derates by 3% for every 330m > 1000m** **Storage: Unlimited**
ELECTRICAL	
Input Rating	**100-240VAC, 1.5A, 50-60Hz** (current to nearest 0.1A)
Max. DC Power Consumption	***Equal to max. output of a single Power Supply.***
THERMAL	**Heat load (BTU/HR): *Equal to DC Power consumption x 3.1412***
RELIABILITY	**MTBF** (calculated)**: 46.7K hrs.**
REGULATORY	**US / Canada EN 90650, FCC 47 CFR Part 15, ICES, CE**
WARRANTY	**1 Year from date of shipment. Extended warranties available.**

Section 3: Set-Up & Installation

Contents

When you receive your Thinklogical® CHS-HP4 Chassis, you should find the following items in the quantities specified in your order:

- CHS-HP4 Chassis
- Integrated Client Transmitters (in customer-specified quantities)
- Two Power Supplies
- Two Power Cords – PWR-000006-R (International connections may differ)
- One USB-A to USB mini-B cable
- Product Manual CD

Unpacking the CHS-HP4 Chassis

The CHS-HP4 is designed to be mounted in a standard EIA 19" rack (or on a desktop: See pg. 14). All physical connections to the product use industry-standard connectors. Non-supplied cables that may be needed are commercially available. All connections are found on the rear of the unit.

BEFORE STARTING ANY PROCEDURE, IT IS RECOMMENDED THAT YOU READ THE INSTRUCTIONS THOROUGHLY!

Step 1 Carefully remove the chassis from its shipping package and inspect it to make certain that it is in good condition.

Step 2 Verify that the Power Supplies and Modules are fully seated in the chassis and that the screws are secure.

Step 3 Ensure that all the SFP modules are sealed with a removable dust plug.

Step 4 When the device has been inspected and found to be in suitable condition, the installation process can begin.

Note: Whether mounting the chassis in a rack or on a desktop, insure that air flow to the fans is not restricted (minimum 2" of free space on all sides).

Note: A red status LED on the chassis front panel will illuminate if any of the sensors detect an over temperature condition.

Connecting to the CHS-HP4 Chassis

Power-ON the Chassis

- Ensure that the two power supplies and the modules are fully seated before applying power.
- Plug both AC line cords (PWR-000006) into the Power Supply input and connect them to a standard AC source.
- Connect the system's fiber-optic and copper cables.
- Ensure that all devices on the Receiver side are properly connected and powered ON.
- On the Front Panel, turn the Power Supply Switches ON (I). *The installed modules will also turn on*.
- Ensure that all functions are operating properly.

*See **APPENDIX A: Integrated Client Transmitter Quick Start Guide**, pg. 24.*

Pluggable SFP+ Modules

Each Integrated Client Transmitter contains up to four SFP+ modules (also called *SFP)* that serve as the **optic couplers** for the fiber cables to and from 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.

Always use **dust caps** to protect against dust and damage when a fiber optic connector or port is not attached to a device. All Thinklogical 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.

Fiber-Optic Cables

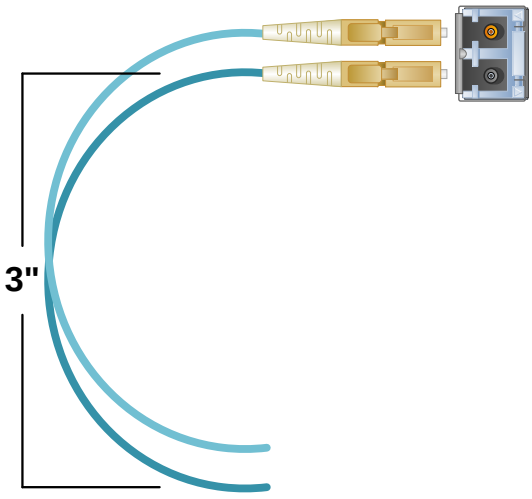
On most Thinklogical products, fiber-optic cables connect an SFP's output port (Transmit) to any other SFP's input port (Receive).

Requirements: Thinklogical recommends connecting Extenders and Matrix Switches with SX+ 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, in-cluding fingertips. Always install a dust cap immediately on the ferrule of any unused fiber to protect the tip.

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.

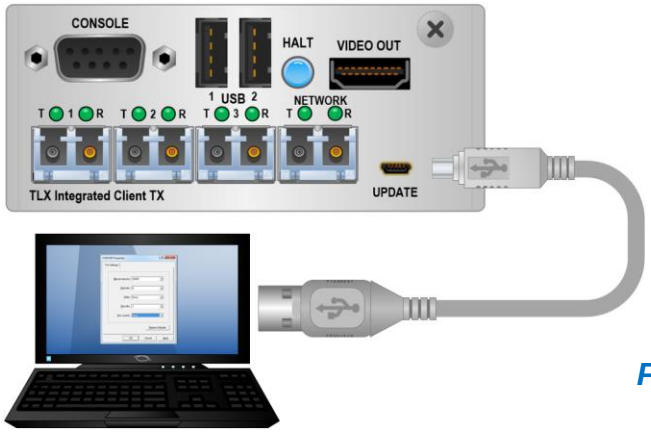
Multi-Mode:	**Up to 33 meters with Type OM1**
	Up to 82 meters with Type OM2
	Up to 300 meters with Type OM3
	Up to 400 meters with Type OM4
Single Mode:	**Up to 80km with Type OS2 9/125**

The Update Port (Firmware Updates & Control/Status)

In addition to firmware updates (see pg. 26), the **Update Port** provides Status and Configuration reports and can be used for debug. A USB mini-B Cable is provided with every CHS-HP4 Chassis.

Open a terminal emulator and connect to a module's UPDATE port with the USB mini-B cable. Select the Port Settings shown in Fig. 1:

Baud Rate: 38.4K, **Data Bits:** 8, **Parity:** None, **Stop Bits:** 1, **Flow Control:** None. Select *OK*.



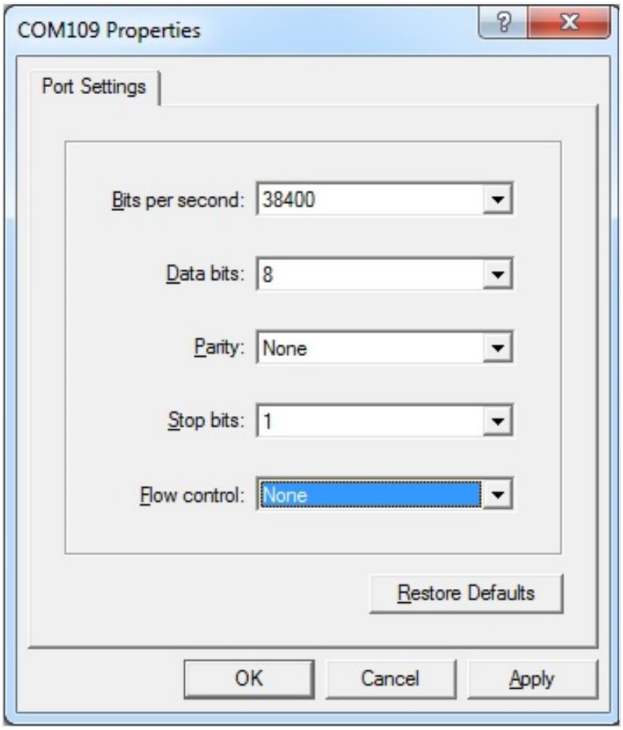


Fig. 1

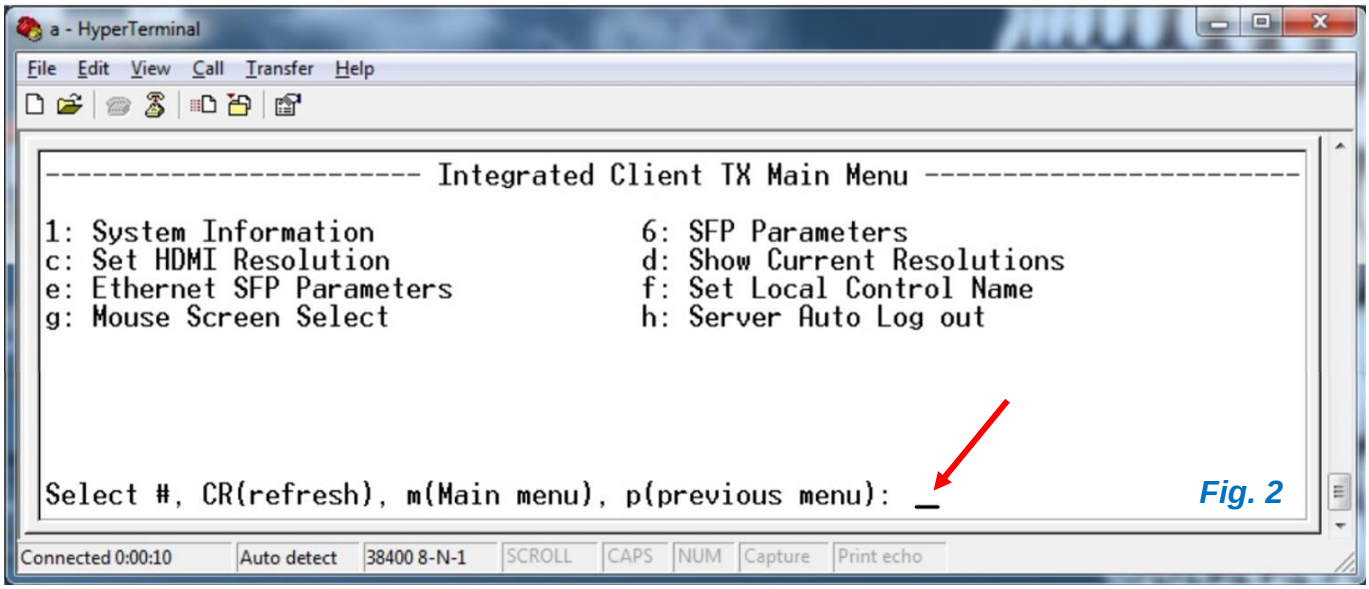


Fig. 2

From the **Main Menu**, make a selection by typing it at the prompt at the bottom of the page. *See examples on the following pages.*

Other Main Menu selections include:

f: Set Local Control Name: Enables the renaming of the ICT Module name (8 characters max.).

g: Mouse Screen Select: Enables support of Thinklogical's *Intuitive Mouse* feature.

h: Server Auto Log out: Enables automatic log-off of the O.S. upon disconnecting the keyboard / mouse fiber link.

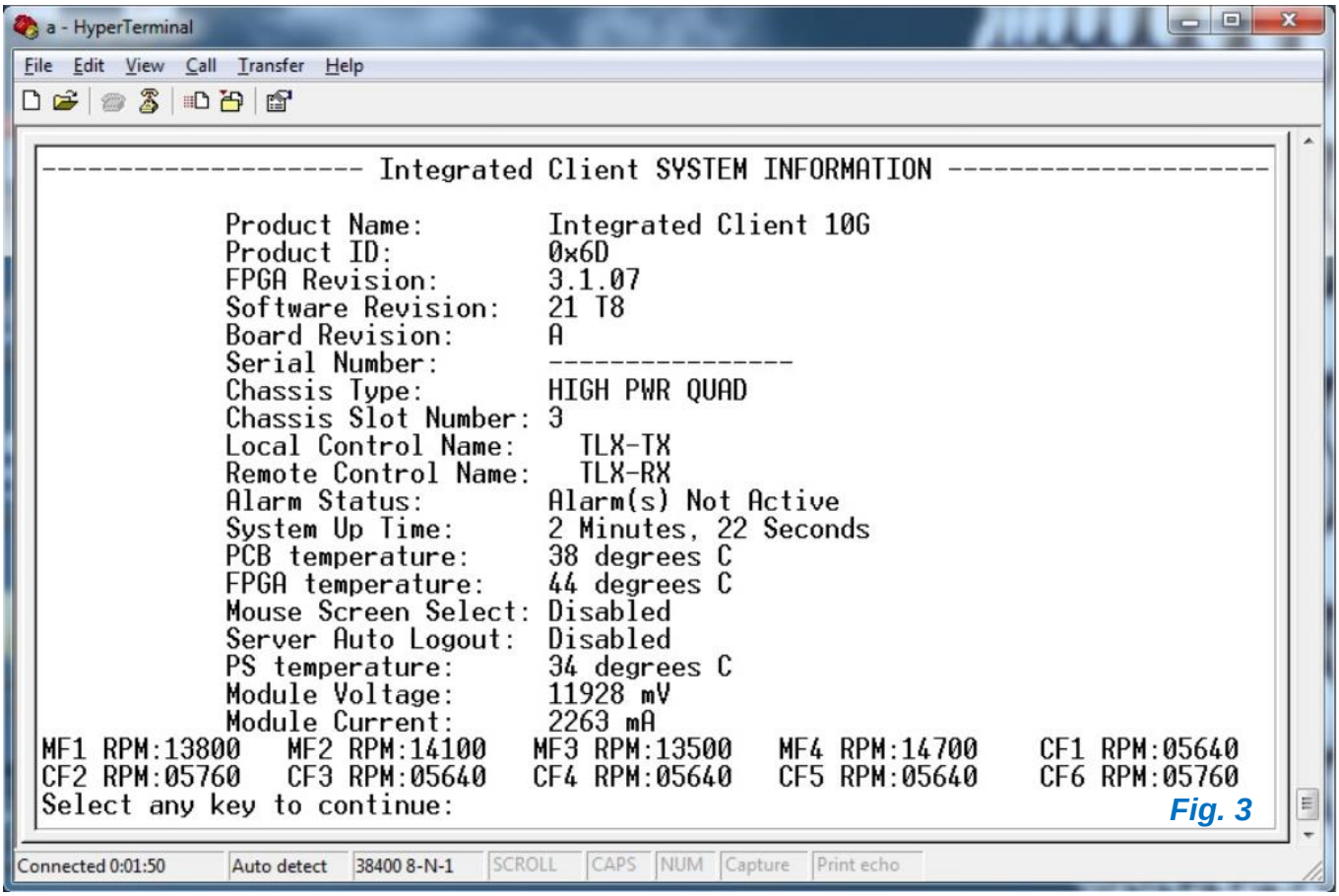


Fig. 3

Type 1 to select **1: System Information.** The resulting window displays relevant settings and conditions for that module, such as software revisions, temperatures and power usage. (Fig. 3)

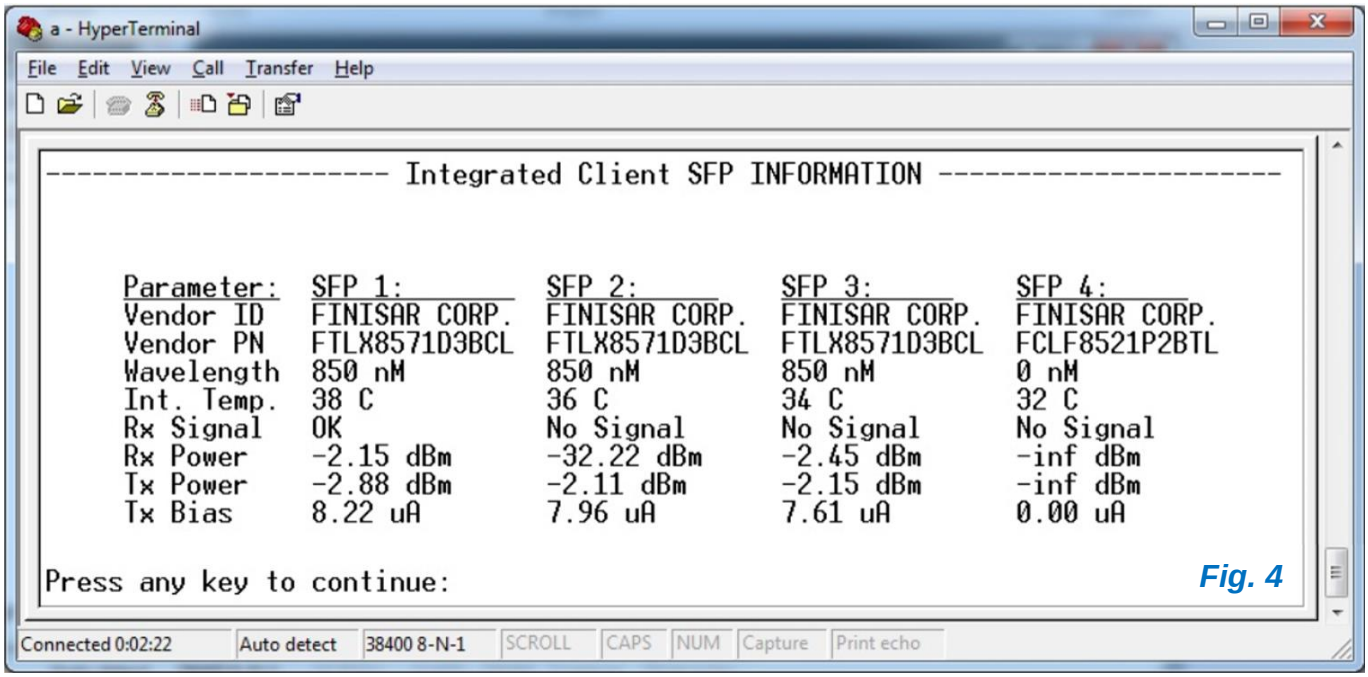


Fig. 4

Selecting **6: SFP Parameters** displays relevant SFP information for that module.

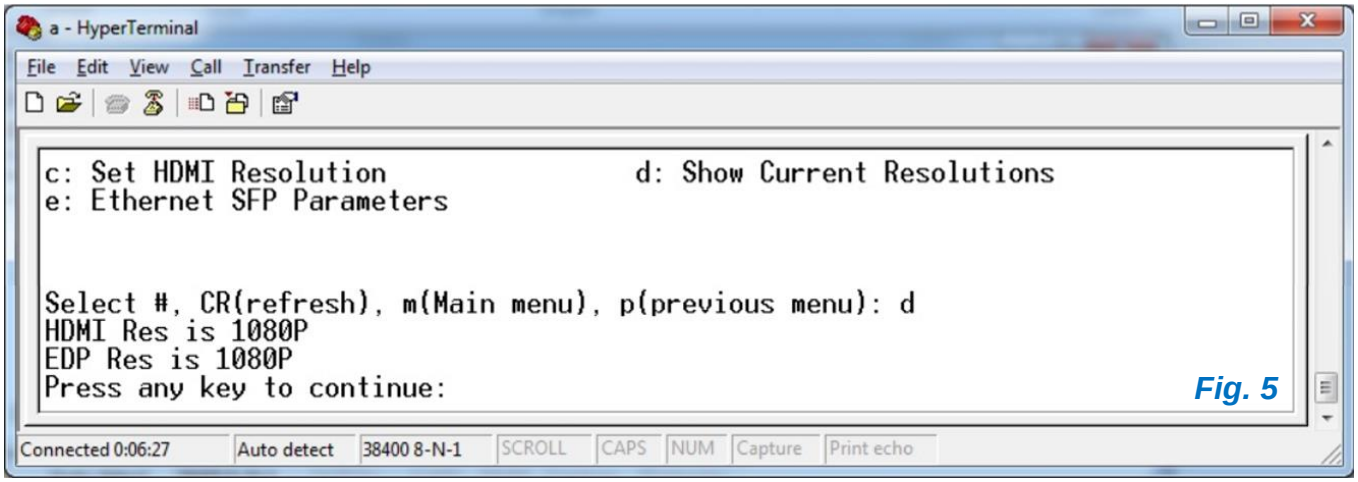


Fig. 5

Selecting **c: HDMI Resolution** shows current resolution settings and allows changes.

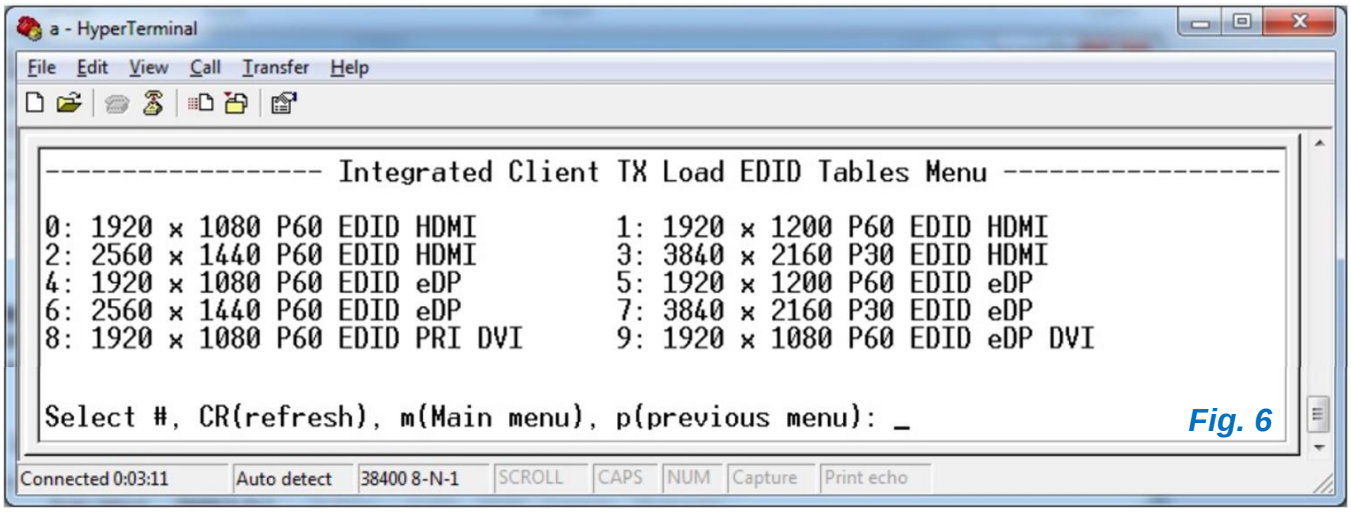


Fig. 6

Selecting **d: Show Current Resolutions** allows users to select EDID Modes. (May require machine power-cycle to load new tables.)

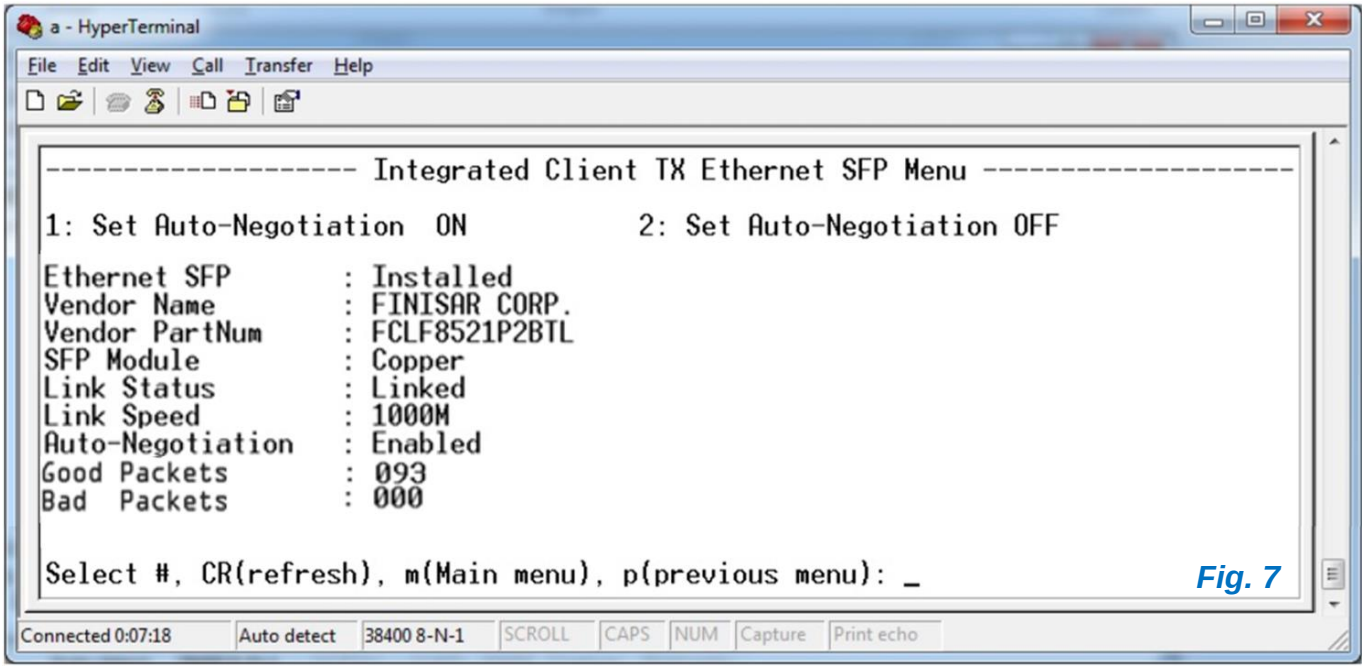
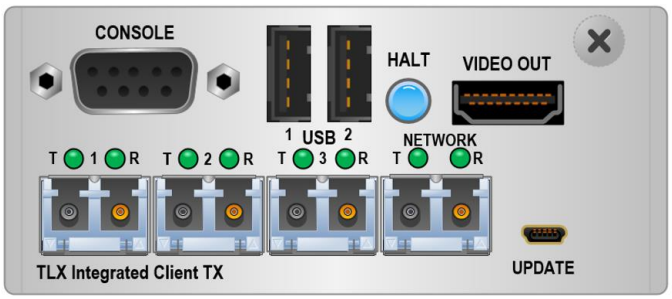


Fig. 7

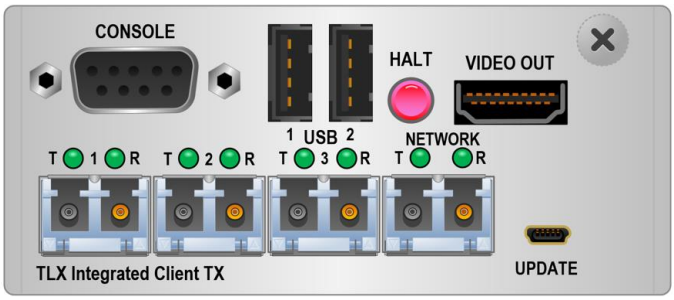
Selecting **e: Ethernet SFP Parameters** displays SFP status and sets *Auto-Negotiation* ON or OFF.

The HALT Button

The HALT button provides visual status of the CPU's current state. During normal operation, the HALT button is continuously lit blue. When halted, it will blink red.



CPU Active (HALT is lit BLUE)



CPU Halted (HALT is blinking RED)

How to Power-Down a Module

To remove an operating ICT Module, perform a standard, orderly shut-down at the Windows or Linux desktop or command prompt. When the Module's CPU has halted, the HALT button will blink red. The module can now be removed from the chassis.

If necessary, a System Administrator or other user may press the HALT button to suspend operation of the CPU if the operating system does not respond to the normal power-down procedure.

How to Remove and Replace a Power Supply

BEFORE STARTING ANY PROCEDURE, IT IS RECOMMENDED THAT YOU READ THE INSTRUCTIONS THOROUGHLY!

Each Power Supply Module is universal input 100-240VAC, 1.5A, 50-60Hz. Use the proper power cords for your region (PWR-000006-R, domestic-single, 2 each supplied with the unit).

Step 1 Switch the Power Supply to **OFF** (O).

Warning! Do not proceed to Step 2 until the power is OFF on the supply to be removed.

Step 2 **Loosen the captive mounting screws** in the upper corners of the module.

Step 3 **Pull the Power Supply straight out** of the chassis by the handle.

Step 4 **Insert the new Power Supply** into the chassis and slide it straight in until it reaches the backplane connectors. *At this point, use just enough force to firmly engage the module with the mating connector.*

Step 5 **Tighten the captive mounting screws** in the upper corners of the module.

Step 6 Turn the switch on the front of the power supply to **ON** (I).

Section 4: Thinklogical Support

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:supprt@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*.**

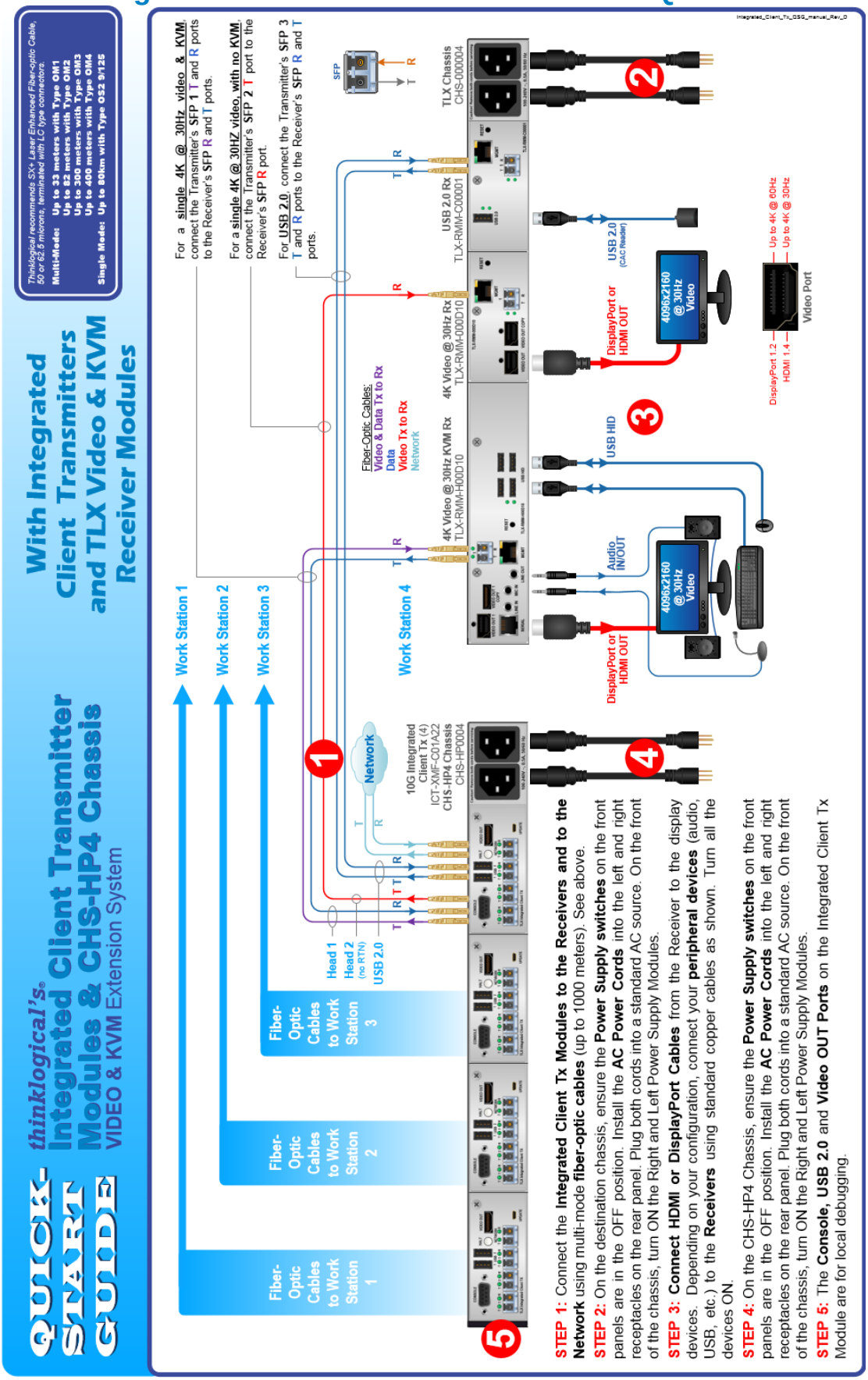
Our Address

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: Integrated Client Transmitter & CHS-HP4 Quick Start Guide



thinklogical® Procedure for the FPGA Download Installation

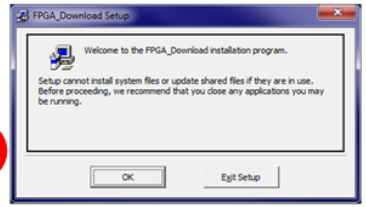
FPGA Update Preparation:

- The *FPGA_Download.exe* application is stored in: **http://ftp.thinklogical.com/ftp/visualization/updates/FPGA_upgradeVxxx.zip** (where 'Vxxx' is the version number).
- Open the **FPGA_upgradeVxxx.zip** file and extract the contents to a temporary directory.

The following procedure documents the steps necessary to install the FPGA Download Application using a Windows-based computer.

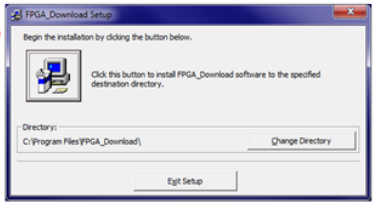
Perform steps 1-5 as described:

1



STEP 1: To install the application, double click on **setup.exe (Contained in FPGA_upgradeVxxx.zip).** If asked for permission to make changes, select *Yes*. At the above *Welcome* screen, select *OK*.

2

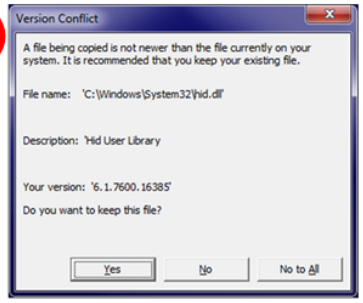


STEP 2: Begin the installation by clicking the displayed button.

3

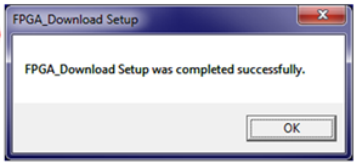
STEP 3: Choose program group: Select *Continue* when the default selections are displayed.

4



STEP 4: The files will now attempt to download. If a **Version Conflict** is displayed, select *Yes (keep this file)*.

5



STEP 5: The **Thinklogical FPGA Download Setup** is now complete. Press *OK*. **You are now ready to download to a Thinklogical device.**

NOTE: When upgrading for the first time, the user may encounter a **Found New Hardware Wizard** box if the current drivers are not installed **(A)** or if not connected to the internet **(B)**. Follow the instructions below, then proceed to steps **(C)** and **(D)**.

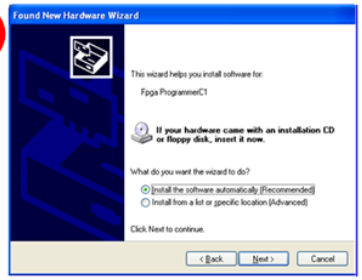
A

STEP A: The **Found New Hardware Wizard** may open if the Thinklogical product is being connected to the PC for the first time.

B

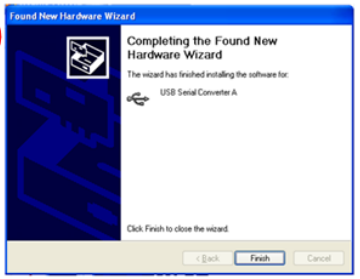
STEP B: If not connected to the Internet, select *No, not this time* and navigate to where the FPGA Update application is installed. The driver is in the Install Directory. Proceed to **Step 3**. **If using an internet connection**, select: *Yes, this time only*. Click on *Next*. Proceed to **Step C**.

C



STEP C: Select *Install the software automatically (Recommended)*. Click on *Next*

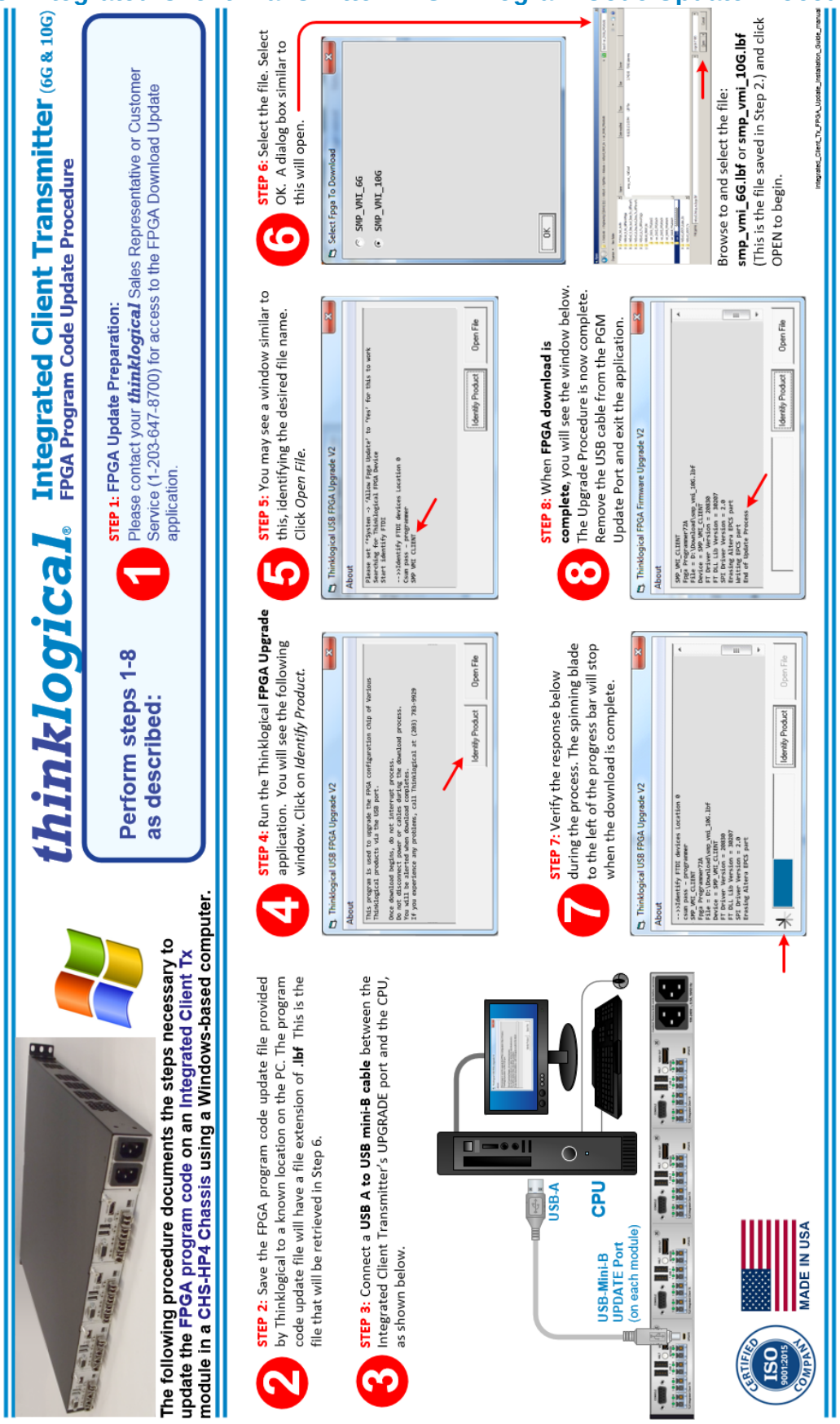
D



STEP D: Follow the instructions for the **Completing the Found New Hardware Wizard** Box. Click on *Finish*.

FPGA_Download_Instructions_Rev_A.vsd

Appendix C: Integrated Client Transmitter FPGA Program Code Update Procedure



Appendix D: Installing an OS on the ICT

NOTE: The ICT is shipped with an SSD loaded with unactivated Windows10

ICT BIOS Boot Settings

To get to the **ICT BIOS Settings** press the <*Delete*> key as soon as the Thinklogical logo appears on the screen during the ICT boot. An **ICT BIOS Configuration** screen will appear. Go to the **Boot Tab** to configure the system boot options.

BIOS settings to install OS from the external USB media:

Connect the external bootable USB media containing the OS installation software to the ICT's USB port. Start ICT and press the <*Delete*> key to get to the BIOS setup. Go to the **Boot Tab**.

For UEFI-based Boot select the following options:

- BIOS MODE: [UEFI and Legacy]
- Boot Option #1 [UEFI: USB Flash Disk]

Go to **Save** & **Exit** tab, select **Save Changes** and **Reset**, then hit <**Enter**> key.

For BIOS (legacy) based Boot select the following options:

- BIOS MODE: [UEFI and Legacy]
- Boot Option #1 [USB Flash Disk]

Go to **Save** & **Exit** tab, select **Save Changes** and **Reset**, then hit <**Enter**> key.

For BIOS settings for network Boot and OS install for UEFI based network boot, select the following options:

- Launch PXE ROM [UEFI]
- Network Stack [Enabled}
- Ipv4 PXE Support [Enabled] or Ipv4 PXE Support [Disabled] for Ipv6 support only
- Ipv6 PXE Support [Enabled] or Ipv6 PXE Support [Disabled] for Ipv4 support only
- BIOS MODE: [UEFI only]
  Go to **Save** & **Exit** tab, select **Save Changes** and **Reset**, then hit <**Enter**> key.
- Press <Delete> during the boot, select:
- Boot Option #1 [UEFI: PXE IP4 Intel® Ethernet Connection I219-LM] for Ipv4
  or
- Boot Option #1 [UEFI: PXE IP6 Intel® Ethernet Connection I219-LM] for Ipv6
  Go to **Save** & **Exit** tab, select **Save Changes** and **Reset**, then hit <**Enter**> key.

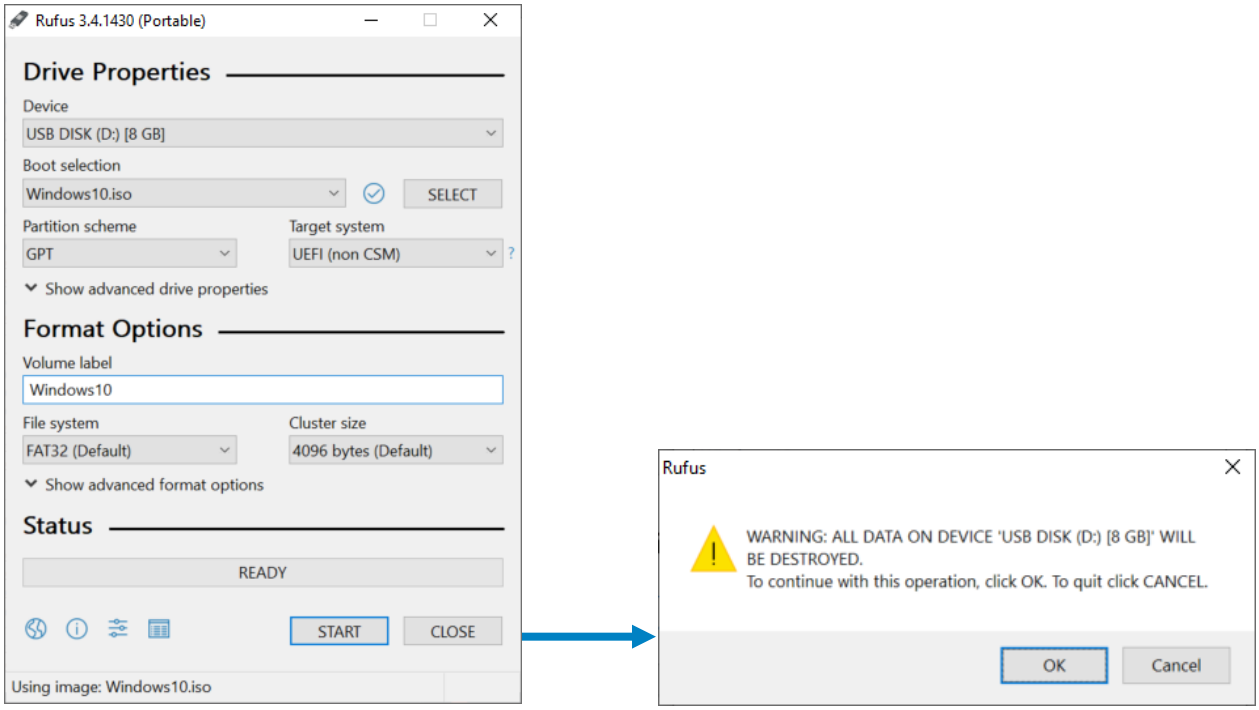
For BIOS (legacy) based Boot select the following options:

- Launch PXE ROM [Legacy]
- BIOS MODE: [UEFI and Legacy]
  Go to **Save** & **Exit** tab, select **Save Changes** and **Reset**, then hit <**Enter**> key.
- Press Del during the boot, select:
- Boot Option #1 [IBA CL Slot 00FE v0110]
  Go to **Save** & **Exit** tab, select **Save Changes** and **Reset** and hit <**Enter**> key.

Prepare Bootable USB media from a Windows machine:

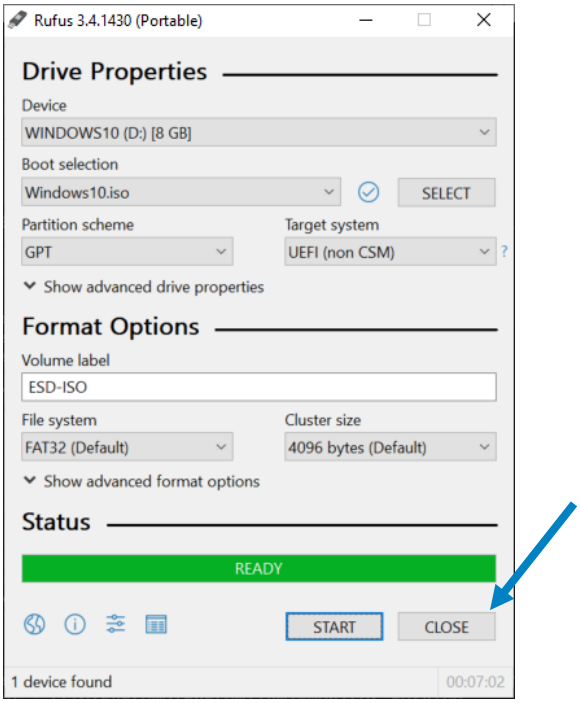
Download a portable version of Rufus (https://rufus.ie/) or use a similar software to create a bootable USB drive. Make an ISO image of the OS installation and USB drive (minimum size of 8 GB for Windows) available.

Launch Rufus. Select USB Disk, ISO image and (optional) specify Volume label, e.g.:



Press the **START** button, then click **OK** on the WARNING that appears next.

Press the **CLOSE** button when the green status bar reads READY.



Safely Remove Hardware and Eject Media.

Prepare Bootable USB media from a Linux machine:

Go to the directory containing the Linux OS installation ISO files, e.g.:

```
root@ubuntu#  ls -l *.iso
-rw-r--r-- 1 root     root    4588568576 Nov 25 18:55 CentOS-7-x86_64-DVD-1810.iso
-rw-r--r-- 1 root     root    3623878656 Feb 16 07:53 debian-9.8.0-amd64-DVD-1.iso
-rw-r--r-- 1 root     root    1996488704 Feb  9 19:27 ubuntu-18.04.2-desktop-amd64.iso
-rw-r--r-- 1 root     root    1999503360 Oct 17 18:44 ubuntu-18.10-desktop-amd64.iso
```

Connect a USB drive to the Linux system and use the "parted -l" command to locate the device to which the USB drive is connected, e.g.:

```
root@ubuntu# parted -l
Model: USB Flash Disk (scsi)
Disk /dev/sdb: 8054MB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:
Number  Start   End     Size    File system  Name    Flags
 1      1049kB  8054MB  8053MB               Microsoft Basic Data  msftdata
```

Use the dd command to copy the OS ISO installation image to the USB drive.
For example, to create a CentOS 7 USB bootable disk, run:

```
root@ubuntu#  dd bs=4M if= CentOS-7-x86_64-DVD-1810.iso of=/dev/sdb conv=fdatasync status=progress
4366270464 bytes (4.4 GB, 4.1 GiB) copied, 11 s, 76.2 MB/s
1094+0 records in
1094+0 records out
4588568576 bytes (4.6 GB, 4.3 GiB) copied, 1314.2857 s, 3.5 MB/s
```

To create Ubuntu 18.04.2 USB bootable disk run:

```
root@ubuntu# dd bs=4M if=ubuntu-18.04.2-desktop-amd64.iso of=/dev/sdb conv=fdatasync status=progress
1983905792 bytes (2.0 GB, 1.8 GiB) copied, 26 s, 76.2 MB/s
476+0 records in
476+0 records out
1996488704 bytes (2.0 GB, 1.9 GiB) copied, 576.694 s, 3.5 MB/s
```

To create Ubuntu 18.10 USB bootable disk, run:

```
root@ubuntu# dd bs=4M if=ubuntu-18.10-desktop-amd64.iso of=/dev/sdb conv=fdatasync status=progress
1988100096 bytes (2.0 GB, 1.9 GiB) copied, 27 s, 73.4 MB/s
476+1 records in
476+1 records out
1999503360 bytes (2.0 GB, 1.9 GiB) copied, 657.932 s, 3.0 MB/s
```

To create Debian 9.8 USB bootable disk, run:

```
root@ubuntu#  dd bs=4M if=debian-9.8.0-amd64-DVD-1.iso of=/dev/sdb conv=fdatasync status=progress
3623878656 bytes (3.6 GB, 3.4 GiB) copied, 120 s, 30.1 MB/s
864+0 records in
864+0 records out
3623878656 bytes (3.6 GB, 3.4 GiB) copied, 600.658 s, 6.0 MB/s
```

Eject the drive and connect it to the ICT's USB port for OS installation. Make sure that the ICT's BIOS is configured for USB drive boot (see above) and the appropriate size SSD card for OS installation is present.

Network Boot Installation

Make sure that ICT's BIOS is configured for network (PXE) boot (see above) and the appropriate size SSD card for OS installation is present. On system boot, ICT will start to search for a DHCP server to get the IP settings and network boot information.