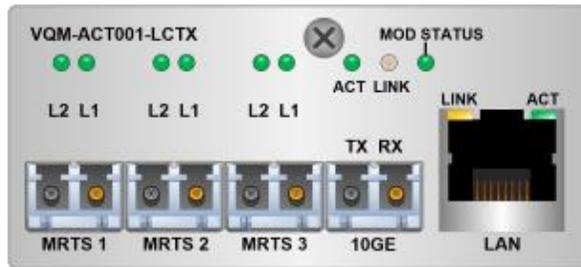


*thinklogical*®

# Q-Series ACT-10

**Advanced Concentrator Transport 10G**

*Extend Video & Data Across Service Provider Networks*



## PRODUCT MANUAL

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***thinklogical***®

*Trust Our Proven Ingenuity*

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**Subject:** Q-Series ACT-10 Product Manual  
**Release:** Initial Release, December, 2014



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## PREFACE

### About Thinklogical



Thinklogical, LLC®  
100 Washington St.  
Milford, CT 06460

We, the Thinklogical team, are committed to understanding and exceeding our customers' requirements, the first time and every time.

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

Thinklogical offers the only fiber optic KVM matrix routers in the world that are accredited to The Common Criteria, EAL4 and TEMPEST.

Governments, entertainment, scientific and industrial customers worldwide rely on Thinklogical's products and solutions for security, high performance, continuous operation and ease of integration. Thinklogical products are designed and manufactured in the USA and are certified to the ISO 9001-2008 standard.



Thinklogical is headquartered in Milford, Connecticut and is privately held by Riverside Partners, LLC, Boston, MA (<http://www.riversidepartners.com>). For more information about Thinklogical products and services, please visit [www.thinklogical.com](http://www.thinklogical.com).

Follow Thinklogical on LinkedIn at <http://www.linkedin.com/company/thinklogical> and on Facebook at <http://www.facebook.com/ThinklogicalUSA>



## 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** information at a point in the text that is relevant to the subject being discussed.



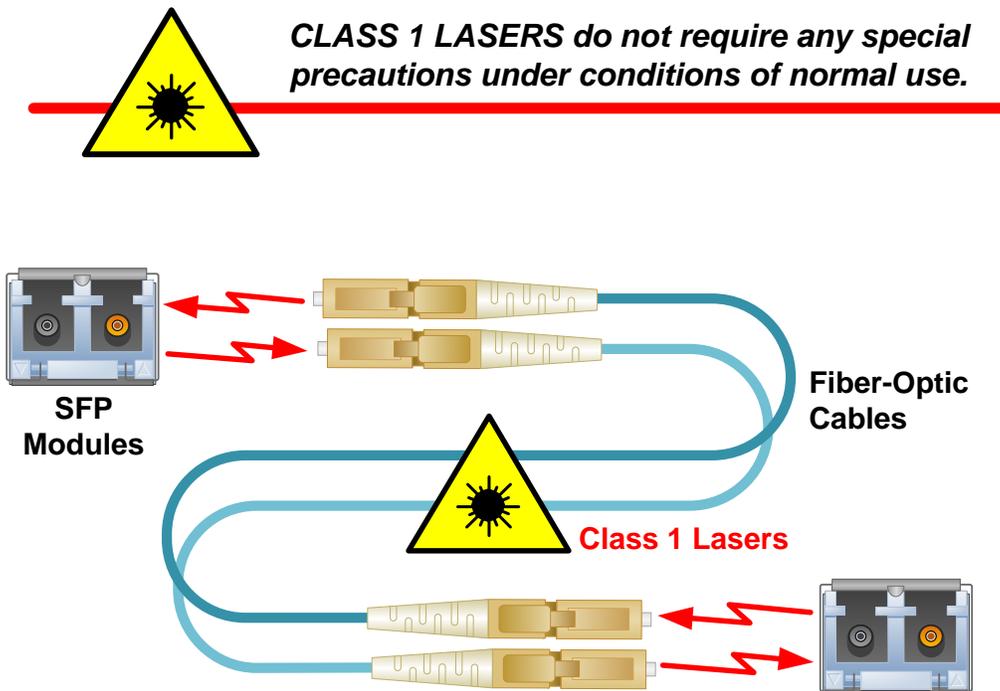
**Warning!** All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, as shown here.

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.

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

## Class 1 Laser Information

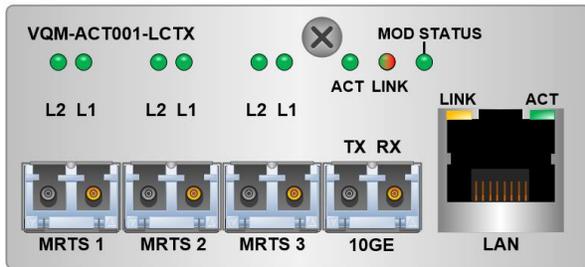
All Q-Series modules are designed and identified as **Class 1 LASER** products.



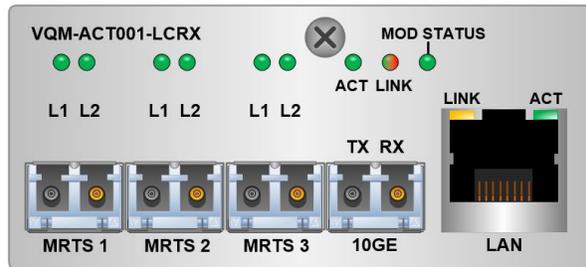
# 1. Introduction

## 1.1. Product Overview: The Advanced Concentrator Transport 10G

Thinklogical has developed the **Advanced Concentrator Transport 10G (ACT-10)**, a 10G Ethernet solution to allow extension across service provider networks. This advanced technology allows for extension well beyond Thinklogical's current 80km fiber-extension products, so users can interface with sources spanning wide geographical regions covered by the service provider network. Paired with Thinklogical's VelocityKVM and VelocityDVI Extension Systems and powered by Thinklogical's patented **Multi-Rate Transmission System (MRTS) Technology**, the **ACT-10 allows users to transmit two MRTS streams** (two video sources, a single USB 2.0 interface, keyboard, mouse, audio, serial and stereo) **over a single 10G data stream for transport over a Wide Area Network.**



ACT-10 Transmitter Module



ACT-10 Receiver Module

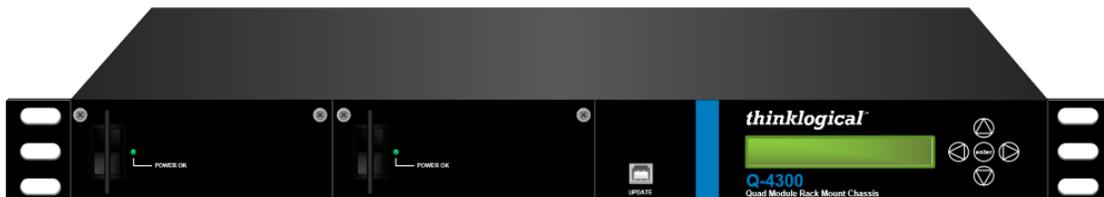
### THE SYSTEM

**MRTS Technology 6.25 Gbps. allows for Full Frame Rate Transmission of uncompressed DVI or RGB video.** Our Velocity line of video extenders transport every frame of a DVI or RGB video stream seamlessly with no compression or dropped frames. In addition, all high speed peripherals function with no latency.

*The ACT-10 is compatible with Thinklogical's Velocity extenders for single-link and dual-link DVI.* The system includes a Thinklogical Velocity Transmitter, which connects to the source. The Transmitter converts the DVI signal from the source into 6G MRTS data for fiber optic transmission. This signal is transmitted to the ACT-10 Transmitter which converts the MRTS data into 10G Ethernet **Media Access Control (MAC)** encapsulated packets with **Virtual Local Area Network (VLAN)** tags, enabling the data to be received by the service provider **Local Area Network (LAN)** network interface.

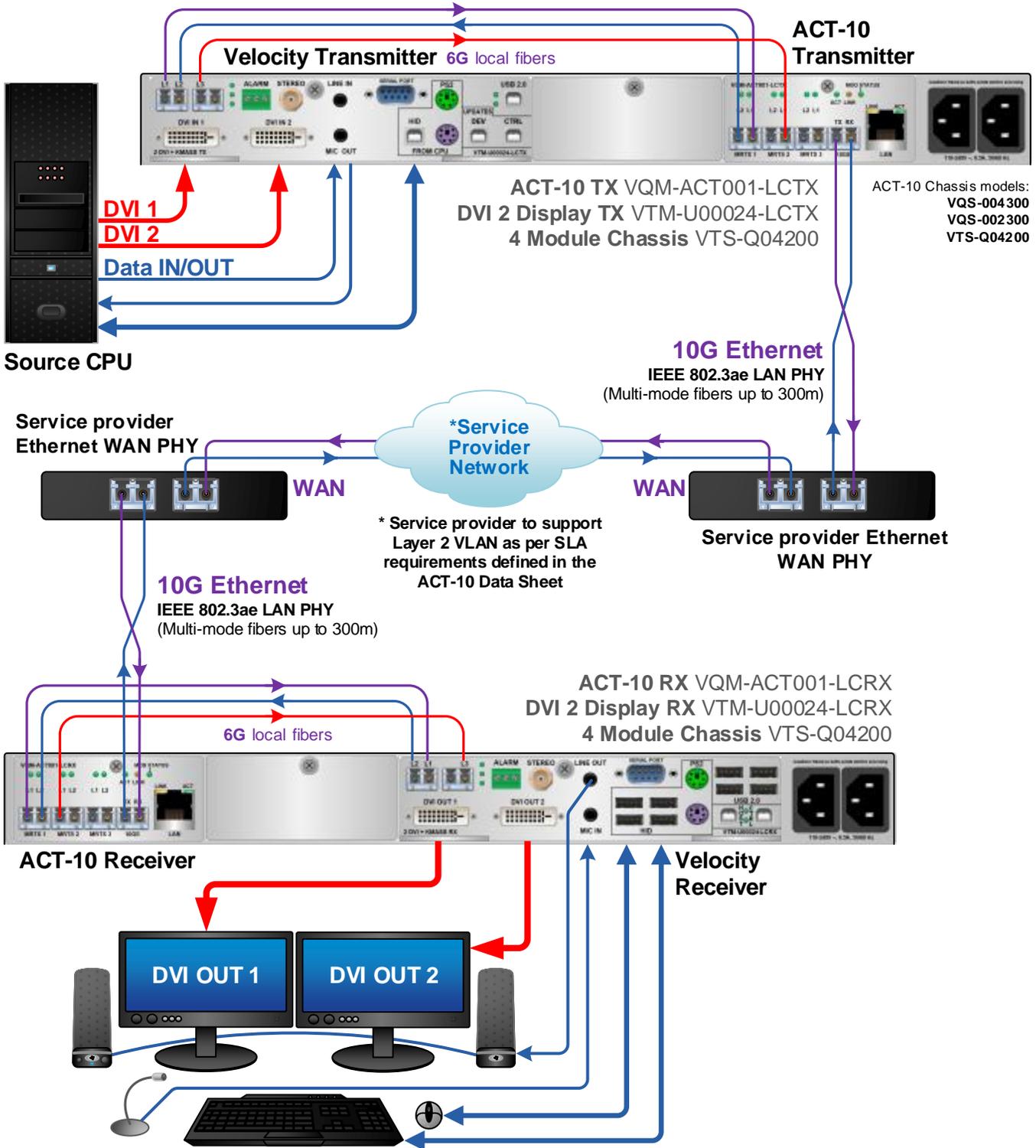
The service provider is required to supply the required **Network Interface Device (NID)** with a 10GE LAN interface on the user side and a **Wide Area Network (WAN) Physical Layer (PHY)** interface, SONET OC-192, CET, OTN-ODU2 or PON on the service provider side. The service provider WAN must also include a **Service Level Agreement (SLA)**, indicating no packet re-ordering, a maximum latency of 50ms and a **packet delay variation (PDV)** no greater than 1us.

After data is transmitted through the service provider network via VLAN switching, data is received by an ACT-10 Receiver at the opposite side of the system. The data is converted from 10G Ethernet MAC encapsulation back to MRTS. The ACT-10 then transmits the data to a Velocity Receiver, which displays the content.



Q-4300 Rack-Mount Chassis

For enhanced reliability, the ACT-10 has a hot-swappable modular design for use with Thinklogical's flexible and resilient Q-Series Chassis. A Q-4300 Chassis, offering redundant and hot-swappable power supplies, supports up to four ACT-10 modules in only a single RU. Additional chassis are available, such as the VTS-Q04200 T-Series chassis, designed to support one T-Series and up to two Q-Series modules, as shown below.



*A typical ACT-10 application using a VTS-Q04200 T-Series/Q-Series Chassis*

## 1.2. Fiber-Optics

All Q-Series Extenders are available with either Multi-mode or Single-mode optics which allows users to securely locate a display device and peripherals up to 80 kilometers away from the controlling computer without loss of resolution. (See Technical Specifications on page 10.)

In addition, all high speed peripherals function with minimal latency, making it ideally suited for a wide range of applications in the broadcast and post-production field, command and control centers, universities, air traffic control, energy production and exploration, and most other commercial KVM applications.

## 2.0. System Features

*ACT-10 is compatible with Thinklogical's single- and dual-link Velocity DVI & KVM extenders.*

### The Transmit Side

- The system includes a Thinklogical Velocity Transmitter, which connects to the source.
- The Transmitter converts KVM from the source into 6G MRTS data for fiber optic transmission.
- This signal is transmitted to the ACT-10 Transmitter, which converts the MRTS data into 10G Ethernet MAC encapsulated packets with VLAN tags, enabling the data to be received by the service provider LAN network interface.



### The Service Provider

- The service provider is required to supply the required Network Interface Device (NID) with a 10GE LAN interface on the user side and a WAN interface, SONET OC-192, CET, OTN-ODU2 or PON on the service provider side.
- The service provider WAN must also include a service level agreement, indicating no packet re-ordering, a maximum latency of 50ms and a PDV no greater than 1us.



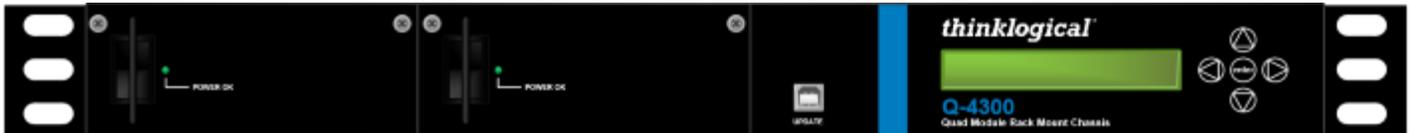
### The Receiver Side

- After data is transmitted through the service provider network via VLAN switching, data is received by an ACT-10 Receiver at the opposite side of the system.
- The data is converted from 10G Ethernet MAC encapsulation back to MRTS.
- The ACT-10 then transmits the data to a Velocity Receiver, which displays the content.



## 2.1. Chassis Options and Features

- The ACT-10 fits into Thinklogical's VQS-004300, VQS-002300 or VTS-Q04200 Chassis.
- Sturdy housing allows desktop stacking of units. (Allow min. 2" between stacks.)
- Front panel LCD for system configuration and status (See para. 2.4, pg. 11).
- Internal cooling fans.



**Q-4300 Chassis:** (VQS-004300) Supports any combination of up to four Q-Series modules. Dual interface and current sharing power supplies. Desktop or 19" rack-mount.



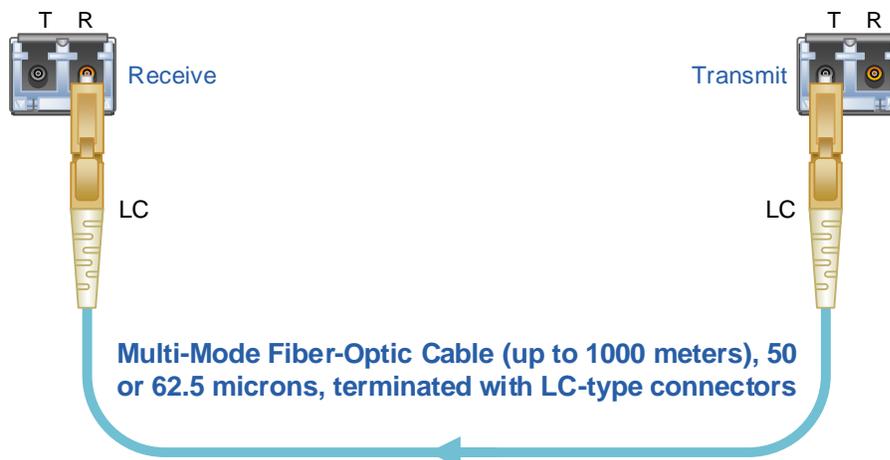
**Q-2300 Chassis:** (VQS-002300) Supports up to two Q-Series modules. Desktop only.



**T-4200 Chassis:** (VTS-Q04300) Supports any combination of up to one T-Series and two Q-Series modules. Dual interface and current sharing power supplies. Desktop or 19" rack-mount.

## 2.2. Fiber Optic Cable

Fiber-optic cables connect the ACT-10 Tx to the Transmitters, the Transmitters to the Routers, the Routers to the Receivers and the Receivers to the ACT-10 Rx. Standard multi-mode fiber optic cables must be 50 or 62.5 microns, terminated with LC type fiber optic connectors. **Be careful not to kink or pinch the fiber optic cable as it is being installed and keep all bend radii to no less than 3 inches (76.2mm).**



## 2.3. Advanced Concentrator Transport 10G Technical Specifications

<b>ACT-10 Advanced Concentrator Transport 10G</b>	
<b>Video Resolution</b>	DVI-D, all single-link and dual-link resolutions (Two video sources up to a maximum video bandwidth of 1920x1280)
<b>Copper Connectors</b>	1 LAN Connector: RJ-45 (Cable: CAT 5e UTP or better) 4 Fiber Ports (SFPs): LC Type
<b>Optical Cable</b>	Fiber Type: 50 or 62.5 micron, Multi-mode Required (per module): Up to 8, depending upon application. (Not supplied)
<b>Optical Distance</b>	Multi-Mode: Up to 50 meters with Type OM1 Up to 350 meters with Type OM2 Up to 750 meters with Type OM3 Up to 1000 meters with Type OM4 Single-Mode: Up to 80km – All Distances: OS2 (9/125)
<b>Operating Temp and Humidity</b>	0° to 50°C (32° to 122 °F), 5% to 95% RH, non-condensing
<b>Module Dimensions</b>	Height: 1.592" (40.43 mm) ± .039"; .1 mm Depth: 6.366" (161.69 mm)* ± .039"; .1 mm Width: 3.693" (93.80 mm) ± .039"; .1 mm
<b>Weight Shipping Weight</b>	1.5 lbs. (0.68kg) 9 lbs. (4.08kg)
<b>Supply Voltage</b>	100-240 VAC, 50-60 Hz, Universal AC power supply
<b>Power Consumption</b>	16 Watts per module
<b>Compliance</b>	Approvals for US, Canada, and European Union Standards Compliance: IEEE 802.3ae; IEEE 802.1Q
<b>Warranty</b>	Twelve months from date of shipment. Extended warranties available.

## 2.4. Chassis and Module LCD Menus

The Chassis and Module menus can be accessed from the chassis front panel LCD.

### 2.4.1. Accessing the ACT-10 Parameters Menu



Upon turn-on, the chassis LCD will display **Chassis configuration and version** information as shown, left.



Press the **up or down arrow** buttons to get to the **\*Card #** root menu. (The ACT-10 can be in any one of four card slots.)



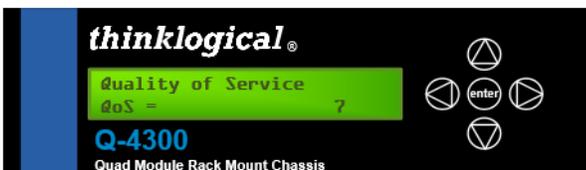
Press the **left or right arrow** buttons to get to the individual **Card Status Menus**. The menu will indicate which card slot holds the ACT-10 Module. (Follow the on-screen instructions to navigate the menus.)



Press the **up or down arrow** buttons to get to the **ACT-10 Parameters** menu.



Press the **left or right arrow** buttons to scroll through the **ACT-10 Parameters** sub-menus.



## 2.4.2. System Parameters Menus



ACT-10 root menus include **\*System Parameters**, **\*SFPs 1 through 4 Parameters** and **\*LAN Parameters**. Use the **up and down arrow** buttons to scroll through the root menus.



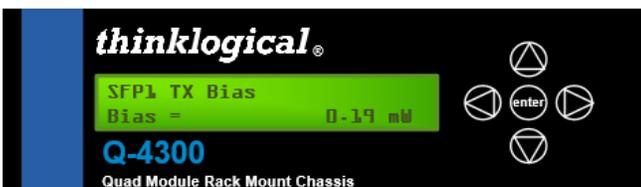
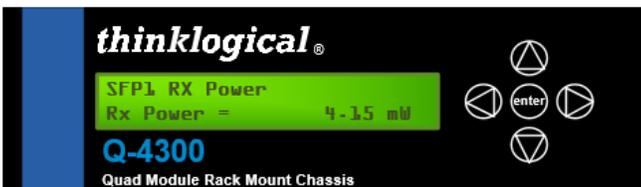
Use the **left or right arrow** buttons to scroll through the **\*System Parameters** sub-menus.



### 2.4.3. SFP 1-4 Parameters Menus



Under the ACT-10 root menus, use the **left or right arrow** buttons to scroll through the **\*SFP1-4 Parameters** sub-menus.



## 2.4.4. LAN Parameters Menus



Under the ACT-10 root menu, use the **left or right arrow** buttons to scroll through the **\*LAN Parameters** sub-menus.



## 3.0. Regulatory & Safety Compliance

### 3.1. Safety Requirements

#### Symbols found on the product

Markings and labels on the product follow industry-standard conventions. Regulatory markings found on the products comply with 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 to be compliant with the following standards (both domestic USA and many international locations):

**North America****Safety**ANSI/UL60950-1: 1<sup>st</sup> Edition (2003)

CAN/CSA C22.2 No. 60950-1-03

**Electromagnetic Interference**

FCC CFR47, Part 15, Class A

Industry Canada ICES-003 Issue 2, Revision 1

**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 adequate measures.

**European Union****Declaration of Conformity**Manufacturer's Name & Address: **Thinklogical, LLC®****100 Washington Street****Milford, Connecticut 06460 USA**

These products comply with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

**Standards with Which Our Products Comply****Safety**CENELEC EN 60950-1, 1<sup>st</sup> Edition (2001)**Electromagnetic Emissions**

EN55022: 1994 (IEC/CSP1R22: 1993)

EN61000-3-2/A14: 2000

EN61000-3-3: 1994

**Electromagnetic Immunity**

EN55024: 1998 Information Technology Equipment-Immunity Characteristics

EN61000-4-2: 1995 Electro-Static Discharge Test

EN61000-4-3: 1996 Radiated Immunity Field Test

EN61000-4-4: 1995 Electrical Fast Transient Test

EN61000-4-5: 1995 Power Supply Surge Test

EN61000-4-6: 1996 Conducted Immunity Test

EN61000-4-8: 1993 Magnetic Field Test

EN61000-4-11: 1994 Voltage Dips &amp; Interrupts Test

**3.2. 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 exigences du Règlement sur le matériel brouilleur du Canada.*



**Warning!** 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 measures.



**Note:** This equipment has been tested and found to comply 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 take adequate corrective measures at their own expense.



**Note:** This Class A digital apparatus complies with Canadian ICES-003 and has been verified as being 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.



**Note:** The user may notice degraded audio performance in the presence of electromagnetic fields.

## 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, **05-140125** indicates the unit was built in the 5<sup>th</sup> month of 2014, 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.

## 4.0. How to Contact Us

### 4.1. Customer Support

Thinklogical® is an engineering company and you will receive the information you require directly from our most knowledgeable engineers.

*We believe that the first line of support comes from the design engineers that developed each particular product.*

Therefore, your questions or issues will be handled promptly by our in-house engineers who are most familiar with your products.

**Thank you for choosing Thinklogical® products for your application.**

*We appreciate your business and are dedicated to helping you successfully use our products.*

**thinklogical® is always here to help you.**

*To contact us, please use the following telephone numbers and internet-based methods:*

## Website

Check out our website for current product offerings, support information and general information about all of the products we offer.

Our internet website offers product information on all current systems, including technical specification sheets and installation guides (for viewing online or for download), product diagrams showing physical connections and other information you might need.

Internet: **www.thinklogical.com**



**Note: Most online documents are stored as Adobe Acrobat “PDF” files. If you do not have the Adobe Acrobat reader needed to view PDF files, visit [www.adobe.com](http://www.adobe.com) for a download.**

## Email

Thinklogical® is staffed **Monday through Friday from 8:30am to 5:00pm**, Eastern Time Zone. We will do our best to respond to your email inquiries promptly. Please use the following email addresses:

**info@thinklogical.com** – Information on Thinklogical® and our products.

**sales@thinklogical.com** – Sales Department - orders, questions or issues.

**support@thinklogical.com** – Product support, technical issues or questions, product repairs and request for Return Authorization.

## Telephone

**Product & Customer Support:** **1-203-647-8700**

**US Commercial & Canada Sales:** **1-203-647-8769**

**US Federal Government Sales:** **1-203-647-8716**

**Toll Free in the Continental US:** **1-800-291-3211**

**International Sales (Europe, Middle East, Africa):** **1-203-647-8704**

**International Sales (Asia Pacific, Central & Latin America):** **1-203-647-8734**

**Fax:** **1-203-783-9949**

Please contact our expert sales staff in Milford, CT. We are here Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. We'll provide a representative's direct dial phone number when you call.

If leaving a voice message, please provide a preferred time to call back so we may reach you at your convenience.

Our switchboard attendant will direct your call during regular business hours. We have an automated attendant answering our main telephone switchboard after regular business hours and holidays. You can leave voice messages for individuals at any time.

**Fax**  
Our company facsimile number is **1-203-783-9949**. Please indicate the nature of the fax on your cover sheet and provide return contact information.

## **4.2. Product Support**

Thinklogical's® support personnel are available **Monday through Friday from 8:30am to 5:00pm**, Eastern Time Zone. If your application requires assistance at some time outside of our normal business hours, please contact us beforehand and we will do our best to make arrangements to help you with your Thinklogical® products.

### **4.2.1. Warranty**

Thinklogical, LLC® warrants this product against defects in materials and workmanship for a period of one year from the date of delivery. Thinklogical, LLC® and its suppliers disclaim any and all other warranties.



**Note:** Thinklogical, LLC® products carry a one year warranty, with longer term available at time of purchase on most products. Please refer to your product invoice for your products 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, LLC® authorized dealer where you purchased the device, or if you purchased directly, call Thinklogical at **1-800-291-3211 (USA)**.

### **4.2.2. Return Authorization**

If you need to return your Thinklogical® product to us for any reason, please get a **Return Merchandise Authorization Number (RMA#)** from Thinklogical's **Product Support Department (1-203-647-8700)** before sending the unit in.

In the event you must return a product to Thinklogical directly, please contact **Customer Support** at **1-800-291-3211** or **1-203-647-8700**. Customer Support will ask you to describe the problem and will issue you a **Return Merchandise Authorization** number (RMA#). Pack the device in its original box, if possible, and return it with the RMA# printed on the outside of the box.



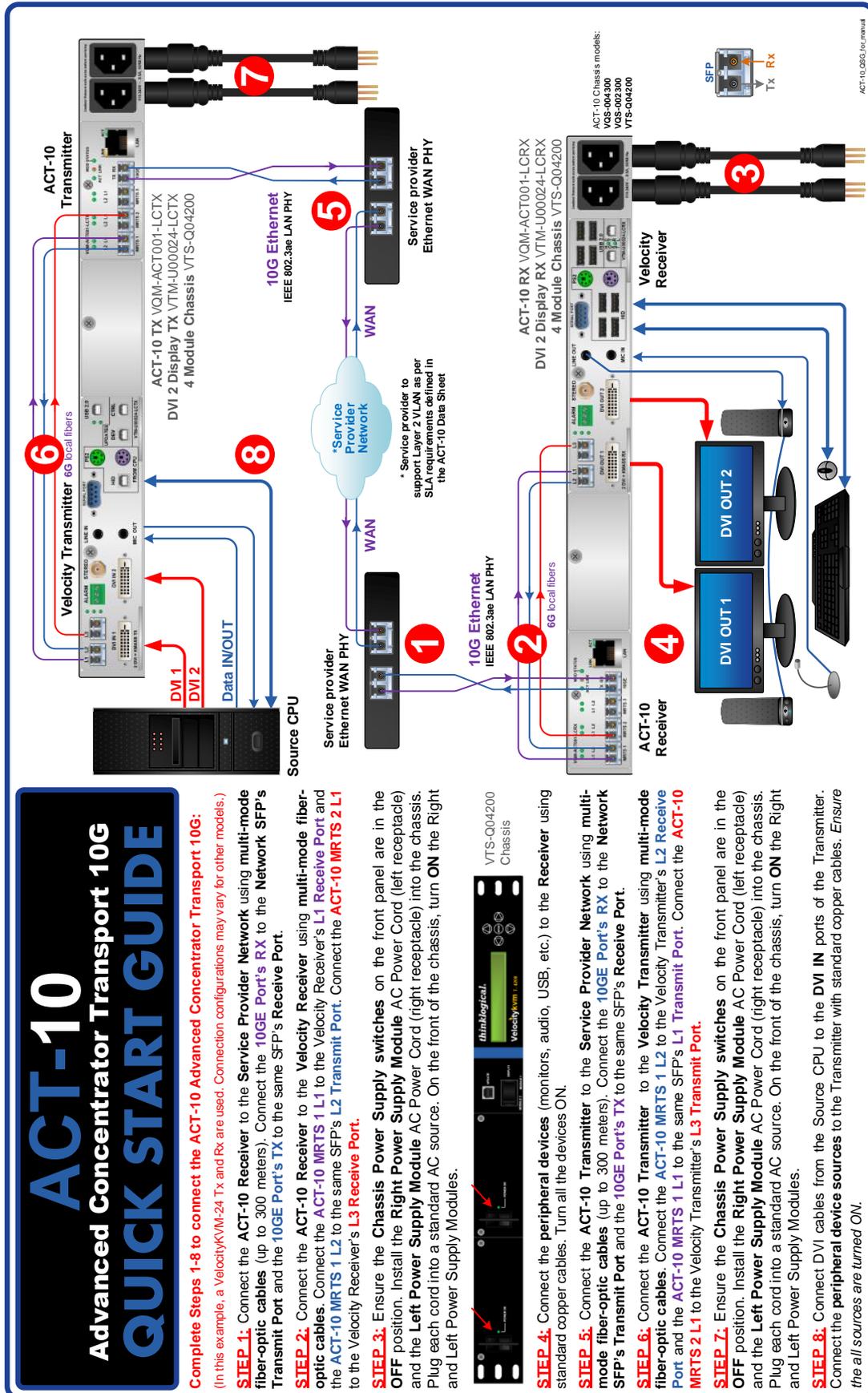
**Note:** **DO NOT** return a product to Thinklogical® without a **Return Material Authorization**.

### **Our Address**

If you have any product issues or questions or need technical assistance with your Thinklogical® system, please call us at **1-800-291-3211 (USA only)** or **1-203-647-8700** and let us help. If you need to write us or return a product, please use the following address: Return address for products with Return Material Authorization:

**Thinklogical, LLC®**  
**Attn: RMA#**  
**100 Washington Street**  
**Milford, CT 06460 USA**

# Appendix: ACT-10 Quick Start Guide



## ACT-10 Advanced Concentrator Transponder 10G QUICK START GUIDE

**Complete Steps 1-8 to connect the ACT-10 Advanced Concentrator Transponder 10G:**  
(In this example, a VelocityVM-24 Tx and Rx are used. Connection configurations may vary for other models.)

**STEP 1:** Connect the ACT-10 Receiver to the Service Provider Network using multi-mode fiber-optic cables (up to 300 meters). Connect the 10GE Port's RX to the Network SFP's Transmit Port and the 10GE Port's TX to the same SFP's Receive Port.

**STEP 2:** Connect the ACT-10 Receiver to the Velocity Receiver using multi-mode fiber-optic cables. Connect the ACT-10 MRTS 1 L1 to the Velocity Receiver's L1 Receive Port and the ACT-10 MRTS 1 L2 to the same SFP's L2 Transmit Port. Connect the ACT-10 MRTS 2 L1 to the Velocity Receiver's L3 Receive Port.

**STEP 3:** Ensure the Chassis Power Supply switches on the front panel are in the OFF position. Install the Right Power Supply Module AC Power Cord (left receptacle) and the Left Power Supply Module AC Power Cord (right receptacle) into the chassis. Plug each cord into a standard AC source. On the front of the chassis, turn ON the Right and Left Power Supply Modules.



**STEP 4:** Connect the peripheral devices (monitors, audio, USB, etc.) to the Receiver using standard copper cables. Turn all the devices ON.

**STEP 5:** Connect the ACT-10 Transmitter to the Service Provider Network using multi-mode fiber-optic cables (up to 300 meters). Connect the 10GE Port's RX to the Network SFP's Transmit Port and the 10GE Port's TX to the same SFP's Receive Port.

**STEP 6:** Connect the ACT-10 Transmitter to the Velocity Transmitter using multi-mode fiber-optic cables. Connect the ACT-10 MRTS 1 L2 to the Velocity Transmitter's L2 Receive Port and the ACT-10 MRTS 1 L1 to the same SFP's L1 Transmit Port. Connect the ACT-10 MRTS 2 L1 to the Velocity Transmitter's L3 Transmit Port.

**STEP 7:** Ensure the Chassis Power Supply switches on the front panel are in the OFF position. Install the Right Power Supply Module AC Power Cord (left receptacle) and the Left Power Supply Module AC Power Cord (right receptacle) into the chassis. Plug each cord into a standard AC source. On the front of the chassis, turn ON the Right and Left Power Supply Modules.

**STEP 8:** Connect DVI cables from the Source CPU to the DVI IN ports of the Transmitter. Connect the peripheral device sources to the Transmitter with standard copper cables. Ensure the all sources are turned ON.