DVI X-TENDER
Product Manual

Part Number MAN-000003
Rev. D - July 2005

LOGICAL SOLUTIONS

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At Logical Solutions, we do our best to provide comprehensive information with our products. In the event we have an error or oversight in this document, we're sorry, and we will do our best to address the issue in the next revision (if there is one). If you have any issues or questions about the product or this documentation, please contact our Product Support personnel. However, we cannot be held responsible for typos or unintentional omissions from this manual.

Being a technology company, we are constantly looking for innovative ways to make our products work for the advantage of our customers. It is important to use the product manual that came with your system with that product. If you have any comments or suggestions for the product, please send your comments to our Product Support or our Sales personnel. Please see *Section 4, How to Contact Us*, on page 19.

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DVI X-TENDER Product Manual

1 Introduction

Introducing the Logical Solutions DVI X-TENDER Digital Video Extension System

1.1 Transmitter and Receiver Pair

The Logical Solutions Inc. DVI X-TENDER is a Digital Video (DVI) extension system. The DVI X-TENDER system consists of a pair of components that are interconnected using a multimode fiber optic cable, allowing DVI video support up to 1000 meters / 3280 feet from the host computer. Each pair consists of a Transmitter unit and a Receiver unit (both units are similar in appearance, but are labeled differently).

Figure 1.1 *Logical Solutions DVI X-TENDER, Receiver Unit shown*

1.2 LASER Protection

The DVI X-TENDER system is designed and identified as a Class 1 LASER product.

The DVI X-TENDER system design incorporates interactive circuitry to minimize the chance that a user's vision might be affected by the LASER output. The product's optical fiber control circuitry automatically limits the power output of the LASERS to something less than Class 1 levels in the event the fiber optic cable is disconnected or broken. This self-limiting circuitry operates in less than 50 milliseconds to reduce the LASER output.

1.3 System Features

The DVI X-TENDER systems are designed for high-resolution video extension applications, such as remote projection centers, theaters and assembly halls, and for secure computer installations. The ability to remotely locate the CPU away from the monitor allows more control of your computer environment. It is possible to position the monitor or projector in any setting from office to lecture hall to boardroom while keeping the computer secure in a remote, controlled location.

Each DVI X-TENDER system includes the following features:

- Supports video resolutions up to 2048x2560 in a single link
- Support of the DVI-D interface
- Extend digital video signals up to 1000 meters (3280 feet)
- Fully DDC2B compliant
- Transparent operation and functionality - no user interaction required
- Signal transmission via fiber optic cable - no RF interference
- Use single-strand multi-mode fiber, 50 or 62.5 micron, with ST-type connectors
- Safe design provides LASER shut-down (within 50 milliseconds) in the event the fiber is disrupted

1.4 Hardware Features

The DVI X-TENDER systems are self-contained and do not require user modifications. Once installed, the application simply "works" and delivers the video signal clearly and consistently.

- Enclosed metal chassis for each Transmitter and Receiver unit
- One pair of DVI X-TENDER components per video connection
- No user interaction or modification required
- Single ST-type connector for your multimode fiber optic cable
- One DVI-D port for digital video signal connection
- External power jack
- Two universal AC power Adapters provided with each DVI X-TENDER pair (required for Receiver end, Option for Transmitter end)

Most current DVI-D video cards provide suitable power for the DVI X-TENDER Transmitter unit; an AC/DC Adapter is not required for the Transmitter end of the connection.

1.5 Technical Specifications

Each Logical Solutions DVI X-TENDER system is designed to the following specifications:

Electrical Cable to Computer/Display	2M (6.6 feet) DVI-D male-to-male cable (supplied with system)
Connectors	**Receiver:** DVI-D female video input (1) ST-type fiber connector (1) 2.5mm power connector (AC adapter provided and required) **Transmitter:** DVI-D female video output (1) ST-type fiber connector (1) 2.5mm power connector (AC adapter provided, yet is optional)
Protocol	Full DDC2B compliant
Optical Budget	Refer to Table 1
Indicators	Two LEDs on each DVI X-TENDER module: Loss of Signal [LOS] (red, ON when signal is disrupted), near ST connector Power (green, ON when power is supplied), near DVI-D connector
Optical Cable	Single Fiber, multi-mode, 50 micron or 62.5 micron, ST-type connectors (Fiber Cable is customer-supplied or can be ordered from Logical Solutions)
Operating Temperature and Humidity	0 to 50 °C (32 to 122 °F), 5 to 95% RH, non-condensing
Total Extension	Refer to Table 1
Housing Dimensions	1.125 in (H) by 5.38 (W) in by 4.44 in (D) (28.58 mm (H) by 136.65 mm (W) by 112.76 mm (D) Wall-mount keyhole slot spacing: 4.88 in (W) by 3.44 in (D) (123.95 mm (W) by 87.38 mm (D)
Supply Voltage	+5.0 VDC @ 600 mA
AC to DC Adapter	Input: 100-240VAC, 50-60 Hz, 0.4 Amperes Adapter has Universal AC Power Input (100-240 VAC, 50-60 Hz) Output: +5VDC @ 1.6 Amperes, 2.5mm barrel plug Logical Part Number: PWR-000004; two included with each DVI pair

Table 1: Optical Budget

DVI X Tender Distance vs. Resolution

Refresh Rate: 60 Hz (unless noted otherwise)
Color Depth: 32 bits

Fiber Type: 50/125um, 400Mhz-km

Resolution	Timing	Max Dist(m)	Max Dist(ft)
800x600 (SVGA)	GTF	1000	3280
1024x768 (XGA)	GTF	1000	3280
1280x720(HDTV)	GFT	1000	3280
1280x768(WXGA)	GFT	950	3116
1280x1024 (SXGA)	GTF	725	2378
1600x1200 (UXGA)	GTF	475	1558
1920x1080 (HDTV)	LCD	600	1968
2048x2560(50Hz)	LCD	540	1772

Fiber Type: 50/125um, 1000Mhz-km

Resolution	Timing	Max Dist(m)	Max Dist(ft)
800x600 (SVGA)	GTF	1000	3280
1024x768 (XGA)	GTF	1000	3280
1280x720(HDTV)	GFT	1000	3280
1280x768(WXGA)	GFT	1000	3280
1280x1024 (SXGA)	GTF	1000	3280
1600x1200 (UXGA)	GTF	1000	3280
1920x1080 (HDTV)	LCD	1000	3280
2048x2560(50Hz)	LCD	1000	3280

Fiber Type: 62.5/125um, 160Mhz-km

Resolution	Timing	Max Dist(m)	Max Dist(ft)
800x600 (SVGA)	GTF	800	2624
1024x768 (XGA)	GTF	500	1640
1280x720(HDTV)	GFT	400	1312
1280x768(WXGA)	GFT	375	1230
1280x1024 (SXGA)	GTF	275	902
1600x1200 (UXGA)	GTF	200	656
1920x1080 (HDTV)	LCD	225	738
2048x2560(50Hz)	LCD	210	688

NOTE: We support the DVI single-link

2 Installation

Extend digital video (DVI) signals up to 1000 meters over a single fiber!

2.1 Intended Application

The DVI X-TENDER from Logical Solutions permits the placement of a digital monitor or projector up to 1000 meters (3280 feet) away from the controlling computer without loss of resolution. Traditional copper cables are limited to 3 meters (9.84 feet) in DVI applications. Each DVI X-TENDER system consists of a pair of electronic units connected by a single strand multi-mode fiber optic cable. The transmitter unit connects to the computer and the receiver unit connects to the monitor or projector with a 2 meter DVI-D male-to-male cable (supplied). Most DVI-D video cards provide suitable power for the DVI X-TENDER transmitter unit, and an AC/DC power adapter is not required, although one is provided. The receiver module, however, requires an AC/DC power adapter which is supplied with the system.

Caution

The DVI X-TENDER Transmitter emits LASER Radiation in the near infrared region.
The DVI X-TENDER is a Class 1 LASER product.

Note

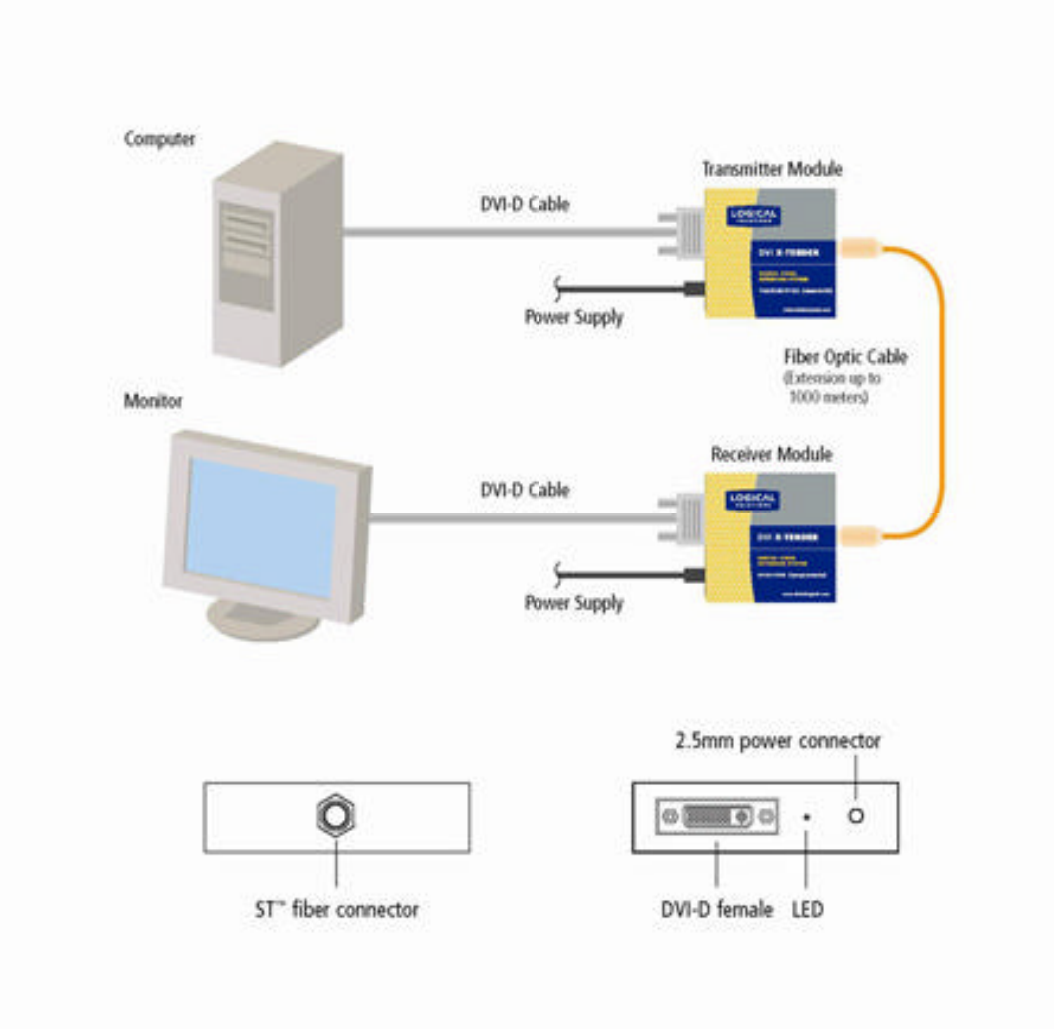
The DVI X-TENDER contains built-in safety circuitry to prevent hazardous LASER energy levels. However, it is good practice NOT to look into the optical connector or fiber cable while power is applied.

2.2 Small Form Factor

Each DVI X-TENDER module is wall-mountable, if desired. Mounting centers are provided with keyhole slots (Fiber cable up, DVI connector and power connector down). A mounting template is provided at the end of this manual for your convenience. Mounting centers are 4.88 in (123.95 mm) by 3.44 in (87.38 mm).

The transmitter and receiver modules of the DVI X-TENDER are compact; measuring only 1.125 in (28.58 mm) by 5.38 in (136.65 mm) by 4.44 in (112.78 mm) allowing for easy connection and placement.

Figure 2.1 *DVI X-TENDER Application diagram*



2.3 Increased Security and Efficiency

The ability to remote the CPU away from the monitor allows more control of the computer environment. Now it is possible to position the monitor or projector in any setting from office to lecture hall to boardroom while keeping the computer secure in a remote, controlled location.

2.4 Order of Installation Events

In order to properly use the DVI X-TENDER system, you must follow this order of events for the initial power-up. By proceeding in this order, your monitor's DDC2B signal (if any) will be sent through the DVI X-TENDER connection upon power-up.

1. Install and connect your Fiber Optic Cable between the DVI X-TENDER Transmitter and DVI X-TENDER Receiver modules.
2. Connect the AC Power Adapter for the DVI X-TENDER Receiver to this unit, and plug it into a suitable power source.
3. Connect your video projector, monitor, or other display device to the DVI X-TENDER Receiver, and turn it on.
4. Finally, connect the AC Power Adapter for the DVI X-TENDER Transmitter, if needed. Connect your Computer to the DVI X-TENDER Transmitter, and turn your computer on last.

Note

If your Display is not turned on as indicated in #3 above, or there is no DDC2B signal received, the default resolution will be 800x600.

2.5 Connecting the DVI System

All physical connections to the product use industry-standard connectors.

2.5.1 Fiber Cable

A single fiber optic cable must be run between the location of the DVI X-TENDER Transmitter (near your CPU or other DVI-D video source) and the DVI X-TENDER Receiver (near the monitor, projector, etc.). The standard multi-mode fiber cable must be 50 or 62.5 micron, terminated with an ST-type twist-lock connector

and no longer than 1000 meters (3280 running feet). Be careful to not kink or pinch the fiber cable as it is being installed, and keep all bend radii to no less than 3 inches.

Note

The DVI X-TENDER has a safety feature that disables the LASER should the fiber cable break or be removed. Therefore, the fiber cable should be connected first, and left in place.

Connect your fiber cable to the ST-type connector on each DVI X-TENDER pair (one Transmitter and one Receiver). Dress the cable so it will not get crushed, pinched or otherwise damaged.

2.5.2 Digital Video (DVI-D) Input

The DVI X-TENDER Transmitter unit connects to your DVI video source (DVI-D video card) using the provided DVI-D male-to-male cable. The Digital Video Input connector on the transmitter will NOT accept other form factors of DVI connectors (DVI-I or DVI-A).

Connect the other end of the DVI-D cable to your video card.

2.5.3 Digital Video (DVI-D) Output

The DVI X-TENDER Receiver unit connects to your DVI video monitor, projector, or other viewing device. Your device must have a DVI-D connector on its cable.

2.5.4 AC Power (Receiver)

Separate wall-pack AC/DC adapters (part number PWR-000004) are included. The power converter is required for the DVI X-TENDER Receiver. A single power jack is provided on the Receiver and accepts the 5VDC input. The green power LED on the DVI X-TENDER Receiver (near the DVI-D connector) will light when the unit is receiving power. The Transmitter may require the AC/DC power converter if the video card does not provide suitable power for the DVI X-TENDER transmitter unit.

The DC power plug has a right-angle connector design.

The AC wall pack has a universal power rating (100-240VAC, 50-60 Hz), and also has slip-on receptacle ‘fingers’ for various AC power receptacles found throughout the world. Use the appropriate AC power ‘fingers’ for your country / location. The others are not needed.

2.5.5 AC Power (Transmitter)

The DVI X-TENDER receives power from your DVI Video Card. The green power LED on the DVI X-TENDER Transmitter (near the DVI-D connector) will light when the unit is receiving power.

A single power jack is provided on the Transmitter and accepts a 5VDC input, if required. In most cases, this connection is NOT required.

Note

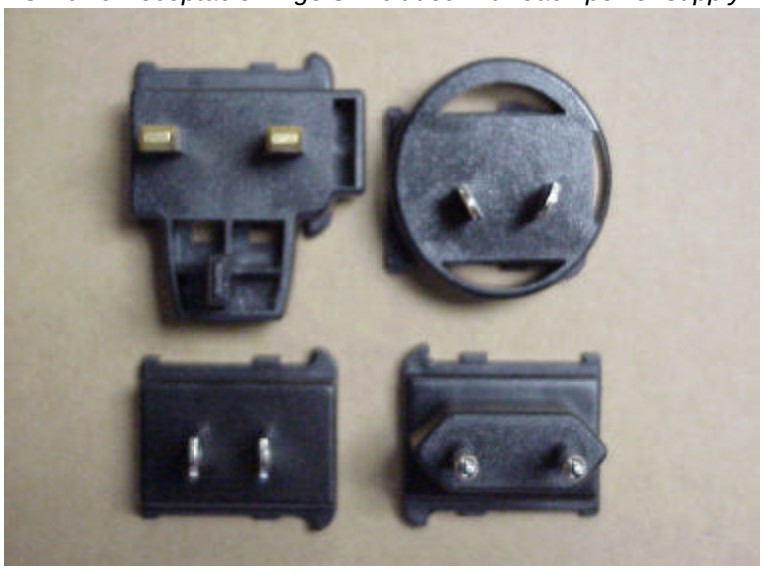
The Transmitter unit receives its DC power via the DVI-D cable connected to your computer, so long as it is sending power. Almost all DVI-D video cards support power output for connected devices.

If your DVI Video Card does not provide adequate power, a separate wall-pack AC/DC adapter (part number PWR-000004) must be used. An AC/DC adapter for the Transmitter unit is supplied with the system.

The DC power plug has a right-angle connector design.

The AC power pack is te same adapter that is used with the Receiver. The AC wall pack has a universal power rating (100-240VAC, 50-60 Hz), and also has slip-on receptacle 'fingers' for various AC power receptacles found throughout the world. Use the appropriate AC power 'fingers' for your country / location. The others 'fingers' are not needed.

Figure 2.2 *AC Power receptacle 'fingers' included with each power supply.*



3 Regulatory & Safety

Regulatory Information and Safety Information

3.1 Safety Requirements

3.1.1 Symbols found on the Product

Markings and labels on the product follow industry-standard conventions. Regulatory markings found on the products comply with requirements.

3.1.1.1 Class 1 LASER Labeling

3.1.2 Product Serial Number

The DVI X-TENDER products have a unique serial number, imprinted on a small silver label that is placed on the bottom of the chassis. The serial number includes a day-code. The format for the day-code is 2-digits each for the month and day, 4-digits for the year, and 2- or 3-digits for a unique unit number. This serial number is also found on the original shipping carton.

3.1.3 Connection to the Product

Connections and installation hardware for the product use industry-standard devices and methods. All wiring connections to the customer equipment is done in a fashion to minimize proprietary or customized connectors or cabling. Power connections are made with regionally appropriate power cords and approved methods.

3.2 Regulatory Compliance

The Logical Solutions Inc. DVI X-TENDER products are designed and made in the U.S.A. The DVI X-TENDER products have been tested by a nationally recognized testing laboratory and found to be compliant with the following standards (both domestic USA and many international locations).

3.3 North America

These products comply with the following standards:

Safety

- UL60950 : 2000
- CAN/CSA C22.2 No. 60950-00

LASER Safety

- CDRH 21CFR 1040.10
- Class 1 LASER Product

Electromagnetic Interference

- FCC CFR47, Part 15, Class A
- Industry Canada ICES-003 Issue 2, Revision 1

3.4 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.

3.5 European Union

3.5.1 Declaration of Conformity

Manufacturer's Name & Address

Logical Solutions Inc.
100 Washington Street
Milford, Connecticut 06460 USA
Telephone (203) 647-8700

Product Name

- Model: DVI X-TENDER Digital Desktop Video Extension System

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

3.5.2 Standards With Which the Products Comply

Safety

- IEC60950:1992+A1, A2, A3, A4, A11

LASER Safety

- IEC60825-1/2
- Class 1 LASER Product

Electromagnetic Emissions

- EN55022: 1994 (IEC/CSPIR22: 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 & Interrupts Test

3.5.3 Supplementary Information

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

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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his 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.

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.

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 adequate measures.

4 How to Contact Us

4.1 Customer Support

Thank You to our Customers for choosing a Logical Solutions product for your application. We appreciate your business and are interested in helping you successfully use our products.

Logical is here to help you. To contact Logical Solutions, use the following telephone numbers and internet-based methods.

4.1.1 Website

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

Our internet website offers product information on all current systems, including technical specification sheets and installation guides (for viewing on-line or for download), product diagrams showing physical connections, and other information you might need. We are constantly updating our website, so be sure to "refresh" your browser when visiting the Logical Solutions website to see the most up-to-date information.

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 for this free download.

4.1.2 E-mail

Logical Solutions is staffed Monday through Friday from 8:30AM to 5:30PM, Eastern Time Zone. We will try to respond to your email inquiries promptly, using the following email addresses for your different needs:

info@thinklogical.com -- Information on Logical Solutions and our products

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

support@thinklogical.com -- Product support, technical issues or questions, product repairs, requests for Return Authorization, any other issue.

4.1.3 Telephone

Telephone Sales: Contact our expert technically-oriented Sales staff via telephone in Milford, Connecticut, at (203) 647-8700 or if in the continental US, you may use our toll-free number (800) 291-3211. We're here Monday through Friday, 8:30AM to 5:30PM, Eastern Time Zone. Ask for their direct dial phone number when you call!

Telephone Product Support: Contact Product Support via telephone in Milford, Connecticut, at (203) 647-8700. The support lines are manned Monday through Friday, 9AM to 5PM, Eastern Time Zone.

International Sales: Please contact our US Sales staff in Milford, Connecticut, at (203) 647-8700. We're here Monday through Friday, 8:30AM to 5:30PM, Eastern Time Zone (same as New York City). If leaving a voice message, please provide a 'best 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. Our Sales Representatives have direct numbers to speed up your next call to us.

4.1.4 Fax

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

4.2 Product Support

Logical Solutions Inc.'s support personnel are available Monday through Friday from 8:30AM to 5:30PM, Eastern Time Zone.

If your application might require 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 Logical Solutions products.

4.2.1 Warranty

Logical Solutions Inc.'s products carry a one year warranty, with longer-term warranties available at time of purchase on most products. Please refer to your product invoice for your product's Warranty Terms and Conditions.

For specific details about the product warranties, please contact Sales.

4.2.2 Return Authorization

If, for some reason, you need to return your Logical Solutions product to us, please get a Return Authorization Number (RA# or RMA#) from Logical's Product Support department before sending the unit in. Return Authorization must include contact information (phone preferred) in the event we have any questions.

After receiving your RA Number, please ship the unit postpaid, with the RA# prominently displayed on the shipping container.

We will contact you about your product once we determine its status.

Products received without Return Authorization and/or Contact information may require additional attention on our part that may delay any desired service or support with your system.

4.2.3 Our Address

If you have any issue with the product, have product questions, or need technical assistance with your DVI X-TENDER system, please call us (203) 647-8700 and let us help.

If shipping something with an RA#, or if you'd like to write us, we are located at:

Logical Solutions Inc.
100 Washington Street
Milford, CT 06460 USA

Appendix A DVI X-TENDER Mounting Template

Use appropriate fasteners and anchors of your choosing to mount each unit.

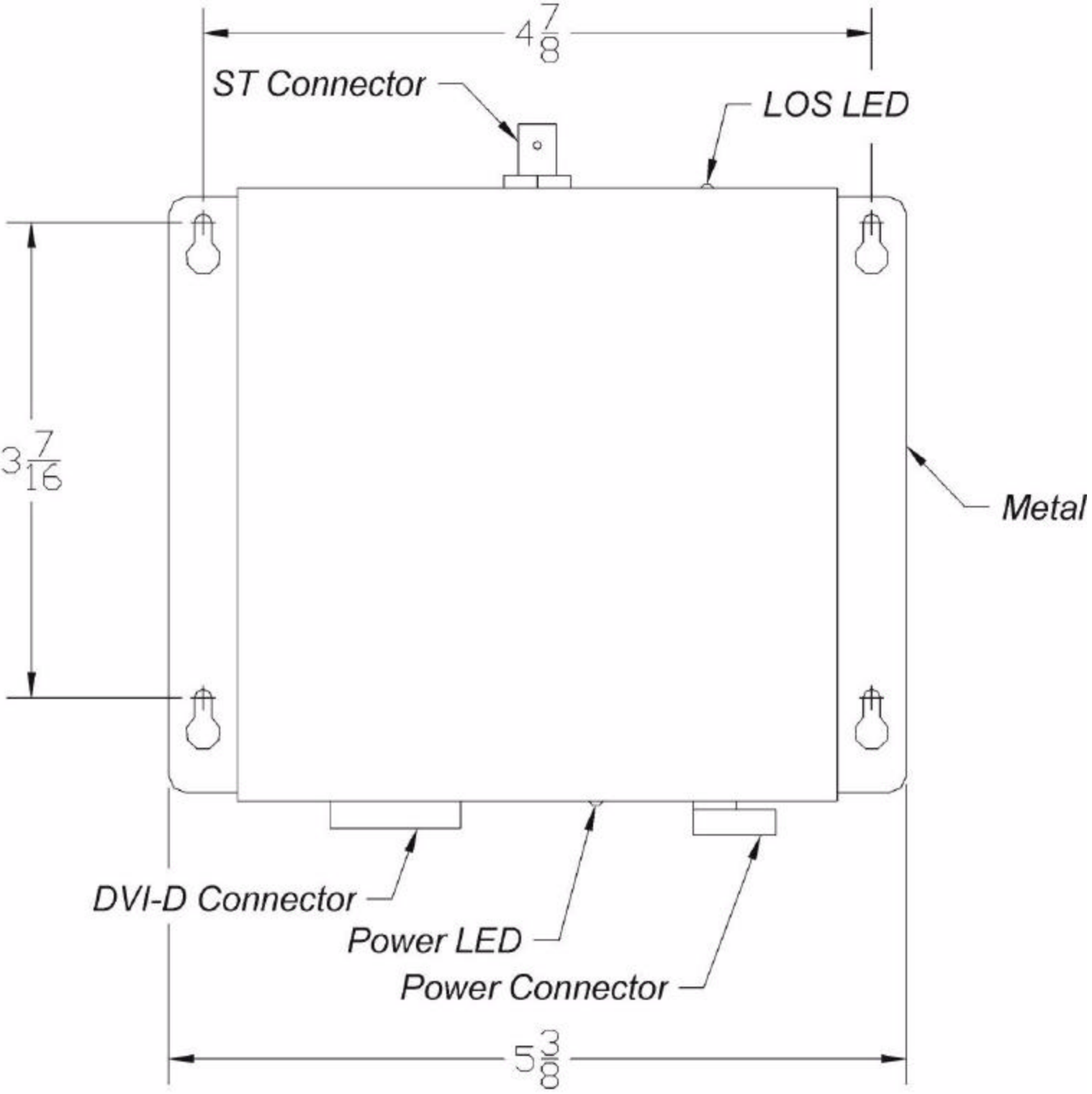
Note

Leave Clearance (3 inch bend radius) for your Fiber Cable at top

Note

Leave Clearance for your DVI-D Cable at bottom

Power connection is only REQUIRED on Receiver (Monitor) end.


4 7/8
ST Connector
LOS LED
3 7/16
Metal
DVI-D Connector
Power LED
Power Connector
5 3/8