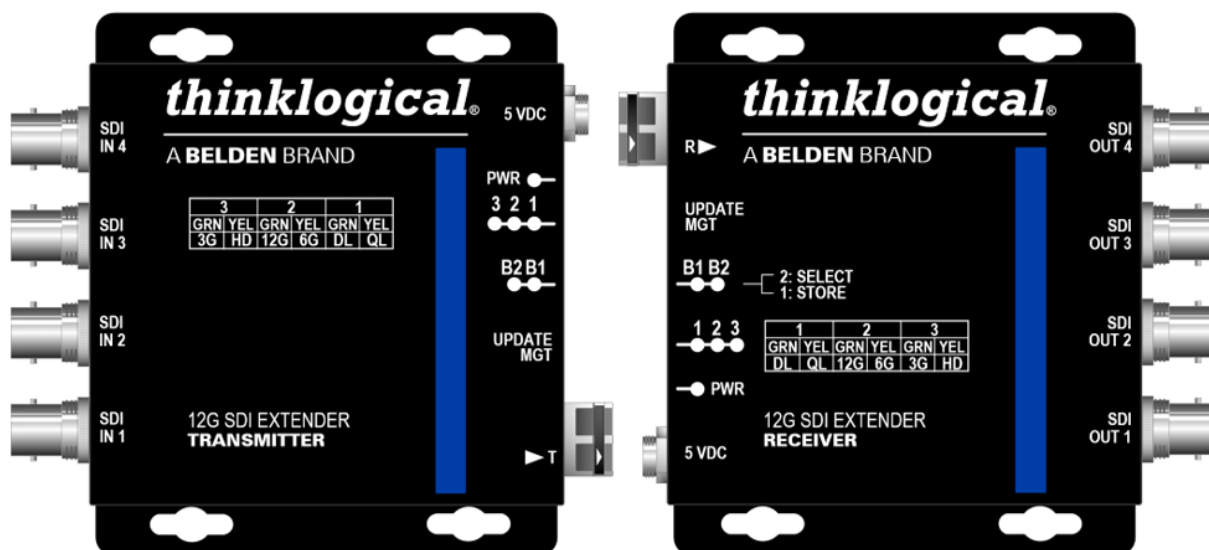




A **BELDEN** BRAND

12G SDI Extenders

PRODUCT MANUAL



Revision B, October 2020

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Subject: 12G SDI Extenders Product Manual
Revision: B, October 2020



thinklogical

A **BELDEN** BRAND



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YouTube: www.youtube.com/user/thinklogicalNA
Twitter: [@thinklogical](https://twitter.com/thinklogical)

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PREFACE

About Thinklogical A BELDEN BRAND



thinklogical®
A BELDEN BRAND
100 Washington St.
Milford, CT 06460 USA



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>.

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. 6. Thinklogical® strongly recommends that you read this section prior to starting the hardware assembly.

Section 2 – Product Features: Pg. 8. Details the features and functions of your equipment.

Section 3 – Set-Up and Installation: Pg. 15. Contains all the requirements and procedures necessary to connect and install your equipment, including FPGA updates.

Section 4 – Thinklogical Support: Pg. 18. 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, **09-200127** indicates the unit was built in the **9th** month of **2020** and is unit number **127**.

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: FPGA Download and Installation Procedure**, pg. 20.

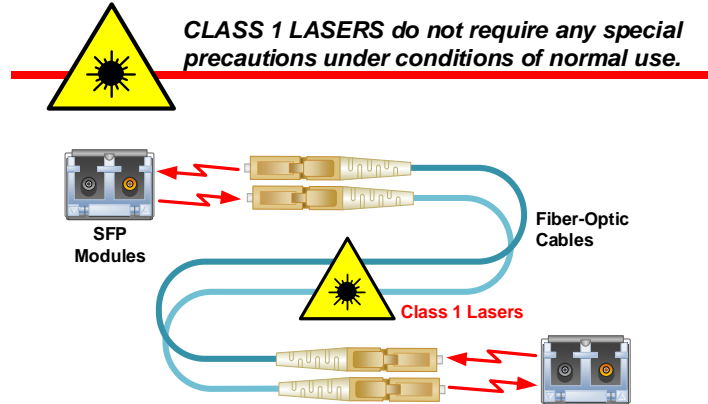
See **APPENDIX C: 12G SDI Extenders FPGA Program Code Update Procedure**, pg. 21.

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. magnifying glass, etc.).



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:

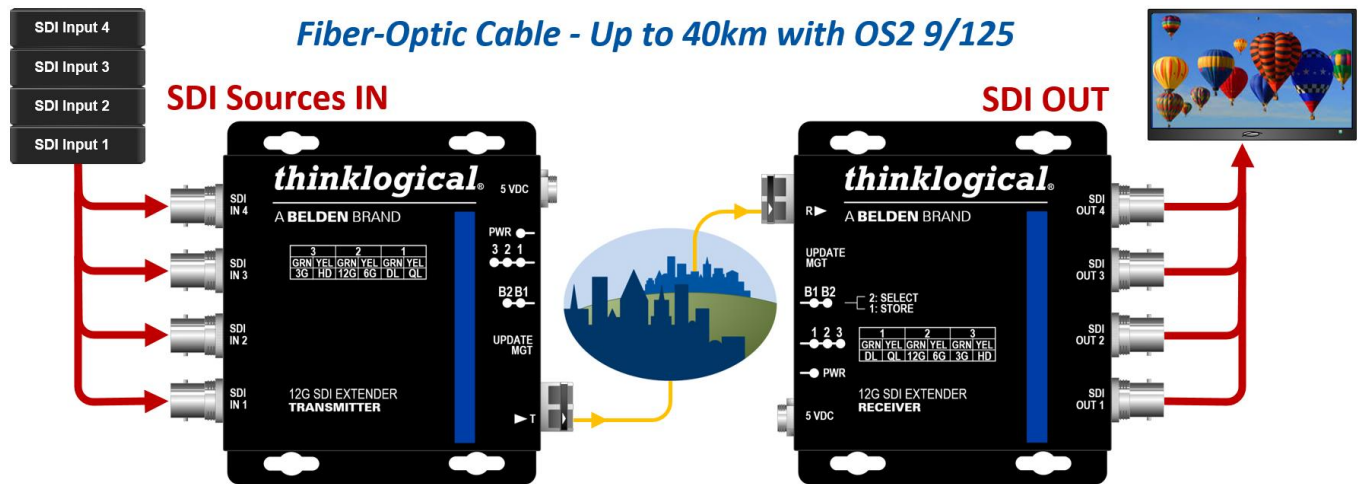
- This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. *Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.*
- This is a Class A product. In a domestic environment, this product 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

Designed to be compatible with the **12G SDI Input/Output Card for the TLX160 Matrix Switch®**, the **12G SDI Extension System** accepts one video signal over one to four standard BNC connectors.

DL and QL video signals are multiplexed into a single data stream where an SDI pathological TX SFP module, which supports data rates between HD-SDI (1.5G) and 12G SDI, is used to transport the serial stream over a single fiber-optic cable. An SDI pathological RX SFP module then receives the data. Operating in either pass-through mode or demultiplex mode generates the output video signal and allows cross-conversion between the input signal and the output signal. For instance, a Quad-Link 3G input can be displayed at 12G Single-Link, and vice versa.

This product is a stand-alone design and is not compatible with TLX or SDI Extreme 3G+ Extender product lines. It is only compatible with the 12G SDI I/O Card of the TLX 160 Matrix Switch.



Operating Requirements

- 12G SDI Extenders support the following signal formats:
 - 1 x HD-SDI (1.485/1.4835 Gbps), per SMPTE ST 292
 - 2 x HD-SDI (1.485/1.4835 Gbps), per SMPTE ST 372
 - 4 x HD-SDI (1.485/1.4835 Gbps), per SMPTE ST 425-3
 - 1 x 3G-SDI (2.97/2.967 Gbps), per SMPTE ST 425-1
 - 2 x 3G-SDI (2.97/2.967 Gbps), per SMPTE ST 425-3
 - 4 x 3G-SDI (2.97/2.967 Gbps), per SMPTE ST 425-5
 - 1 x 6G-SDI (5.94/5.934Gbps), per SMPTE ST 2081-10 MODE 1 and MODE 2
 - 2 x 6G-SDI (5.94/5.934Gbps), per SMPTE ST 2081-11 MODE 1
 - 1 x 12G-SDI (11.88/11.868 Gbps), per SMPTE ST 2082-10 MODE 1
- The transport scheme is compatible with the 12G SDI I/O Card for the TLX160 Matrix Switch.
- Transmit distances from up to 10km or 40km, depending upon the SFP module.
- Requires use of non-MSA compliant, single-mode TX and RX SFP modules. (Not interoperable with all other MSA compliant devices.)
- All signals are transported via one single-mode fiber.
- The Transmitter accepts a single, dual, or quad copper inputs (from a single video source). The Transmitter multiplexes Dual-Link and Quad-Link inputs or passes through a single input to the pathological SFP.
- The Receiver converts the received fiber-optic signal back to its equivalent SDI signal or can convert specific formats for cross conversion (See tables on pg. 13 for more information).
- Thinklogical recommends Belden 6G (1694A) coaxial cable or better to extend 12G SDI signals.

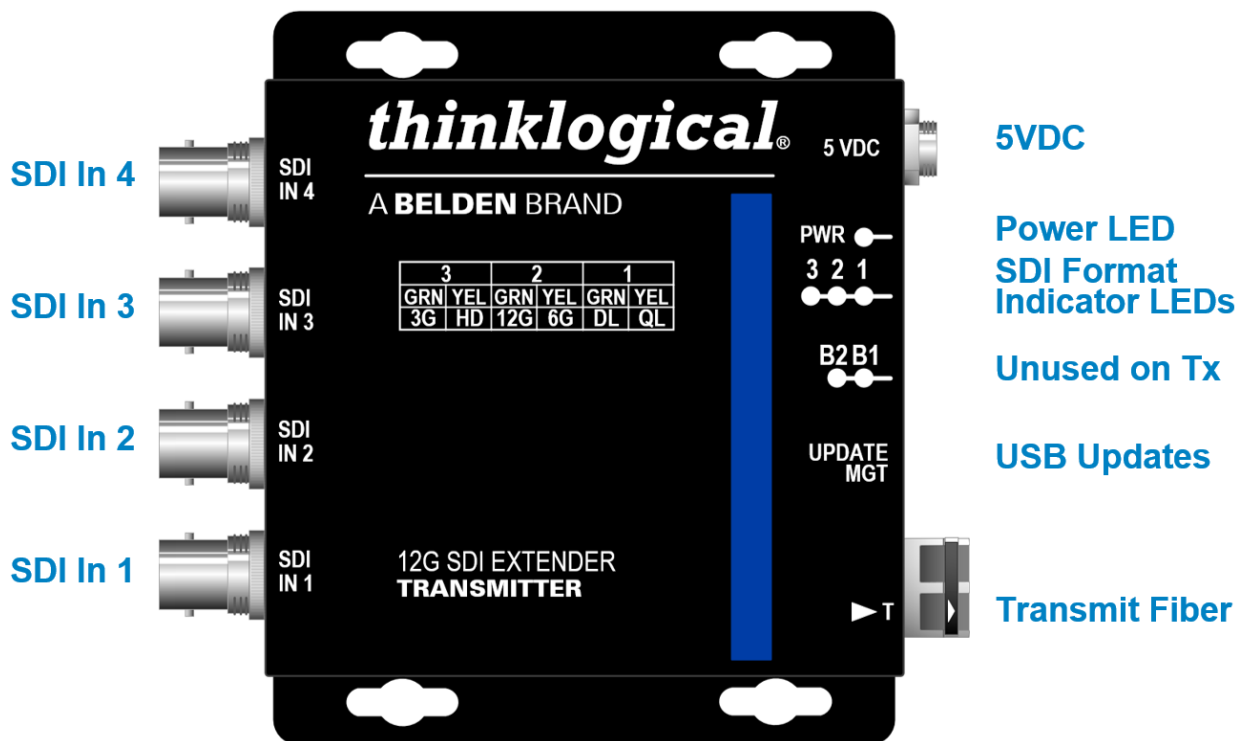
12G SDI Extenders

- Part numbers: **SDI-S00012-LCTX** (10km Tx), **SDI-400012-LCTX** (40km Tx)
SDI-S00012-LCRX (10km Rx), **SDI-400012-LCRX** (40km Rx)
- Uses up to four BNC connectors to extend one video source.
- Single-Mode Fiber-Optic Cable transports HD, 3G, 6G or 12G video with ancillary data.

Transmitter Design Features

Each module features a mounting bracket on each side.

- **Dual-purpose USB mini-B Update Port:**
 - *Firmware Updates* via FPGA Download Utility (see Appendix C, pg. 21).
 - Diagnostic and configuration information is available via a terminal program such as PuTTY or Tera Term. The serial port is configured as:
Baud Rate: 38.4K, **Data Bits:** 8, **Parity:** None, **Stop Bits:** 1, **Flow Control:** None
 - 1 USB Mini-B cable supplied, per chassis
- The transmitter automatically detects the incoming video data rate(s) on SDI inputs 1-4 and performs the required operation without involving the user.
- If a single video signal is connected (HD, 3G, 6G, or 12G), it must be connected to SDI IN 1.
- Input SDI signals must conform to the list of supported configurations to be operational.



Transmitter Part Numbers

- SDI-S00012-LCTX** *Single-Mode 10km Optics*
SDI-400012-LCTX *Single-Mode 40km Optics*

Receiver Design Features

Each module features a mounting bracket on each side.

- **Dual-purpose USB mini-B Update Port:**

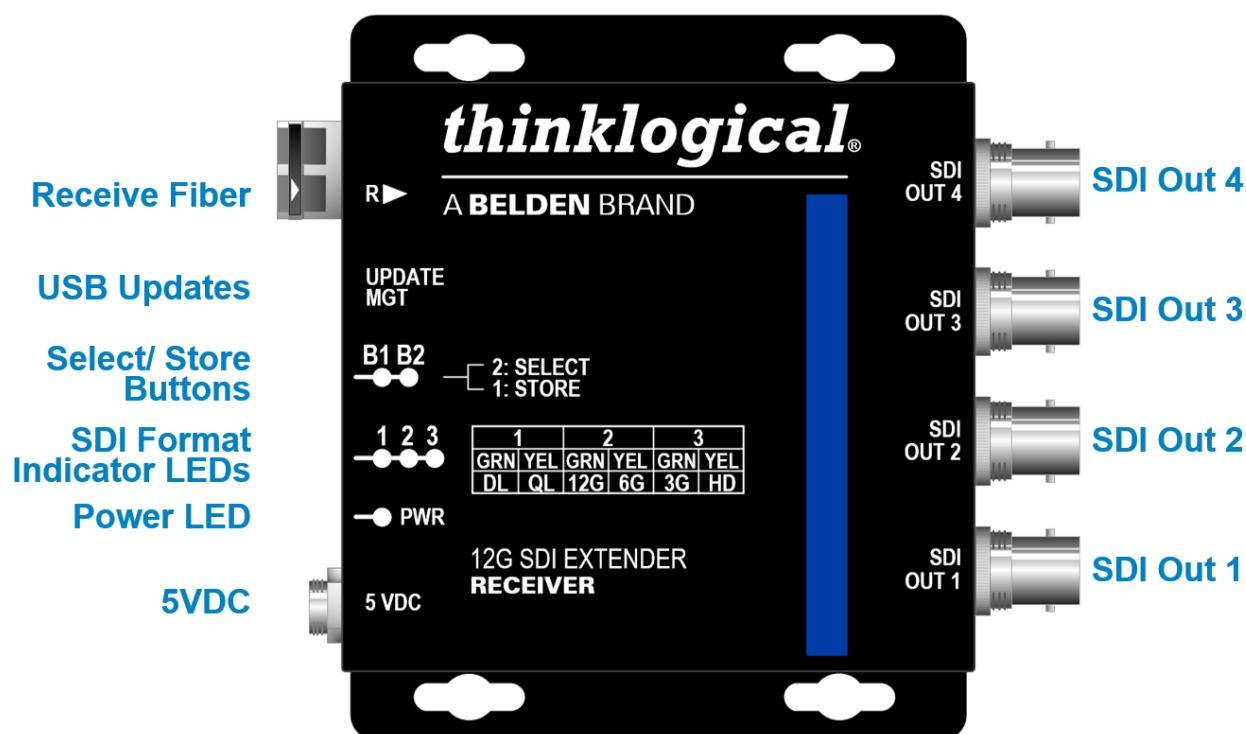
- *Firmware Updates* via FPGA Download Utility (see pg. 21).
- Diagnostic and configuration information is available via a terminal program such as PuTTY or Teraterm. The serial port is configured as:

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

- 1 USB Mini-B cable supplied, per chassis

- **Select and Store Buttons:**

For video formats that allow conversion, use the **Select Button (B2)** to cycle through the available video formats. The Video Format LEDs will change to reflect each format, which becomes active immediately (see *Signal Formats Table 1* on pg. 12). Pressing the **Store Button (B1)** saves the current format to non-volatile memory. After a power reset, the saved format will return. If Button 1 is not pressed, the previously saved format will return.

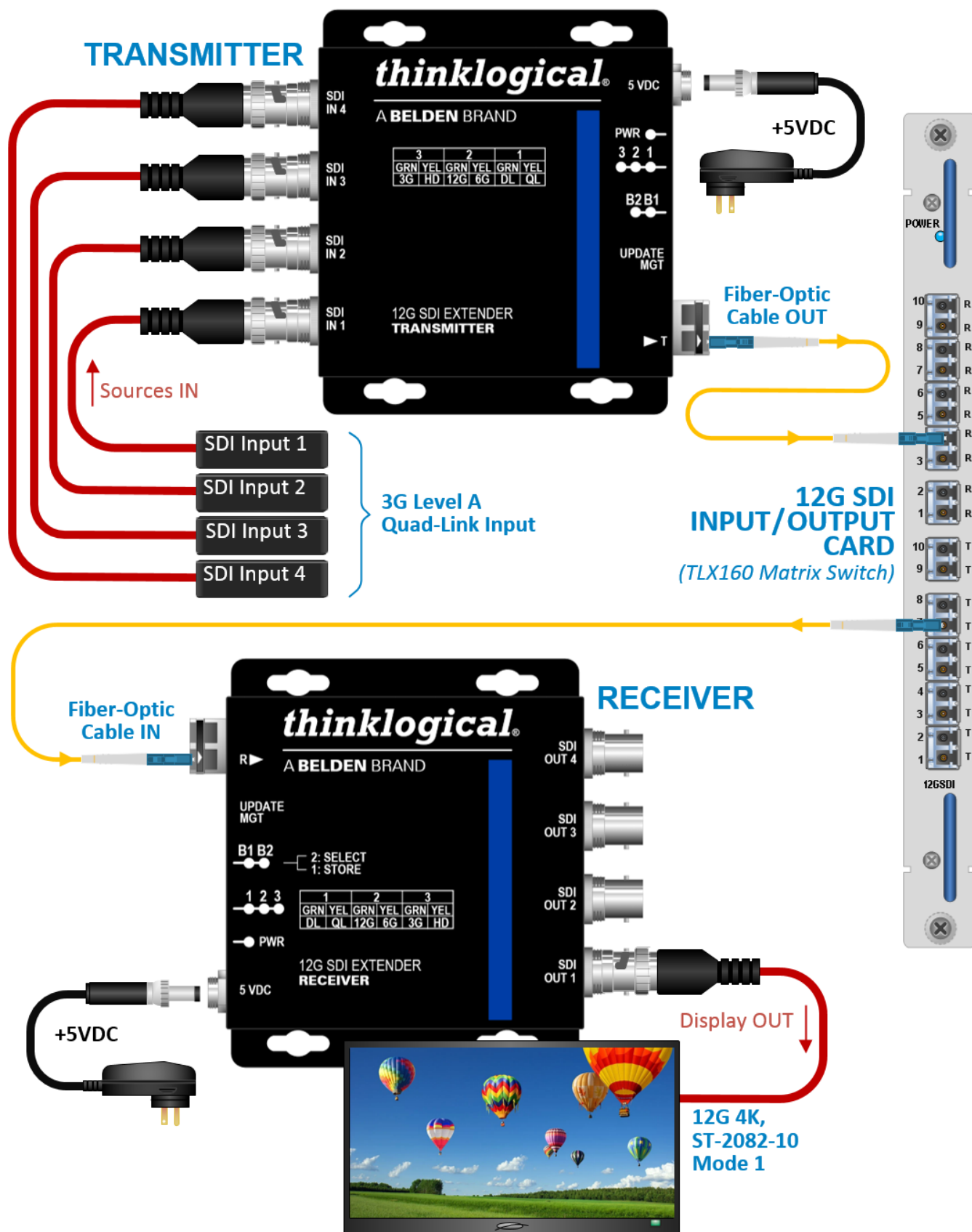


Receiver Part Numbers:

SDI-S00012-LCRX Single-Mode 10km Optics

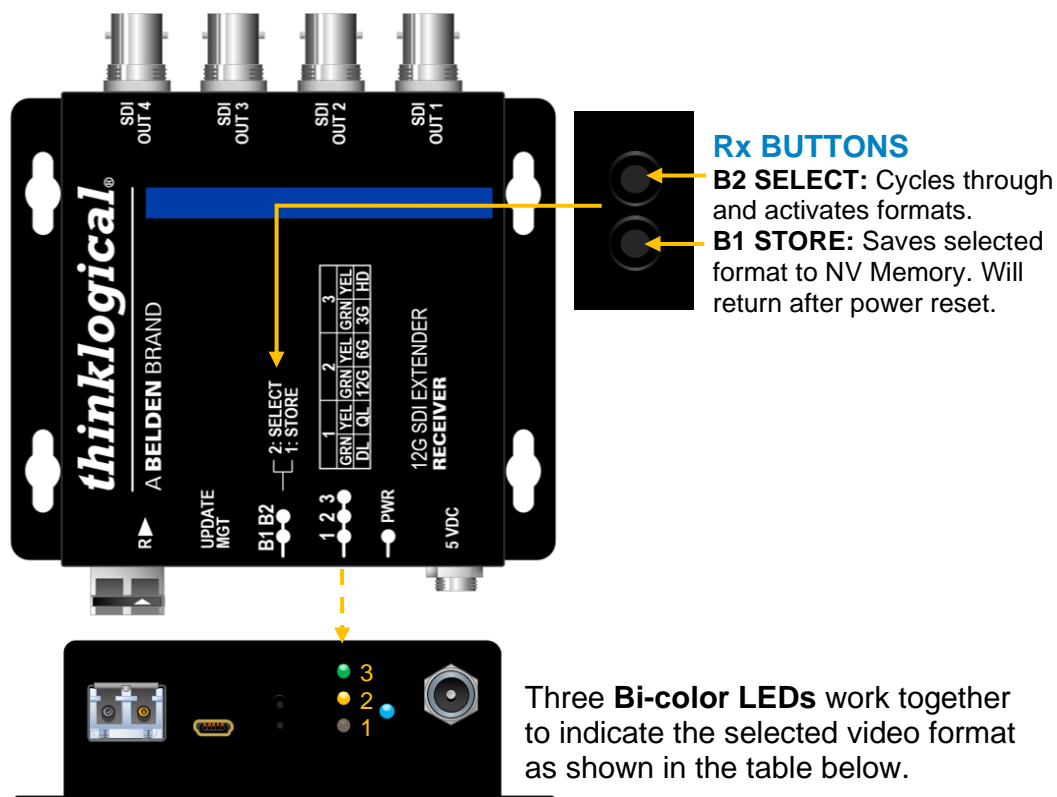
SDI-400012-LCRX Single-Mode 40km Optics

12G SDI Transmitter to Receiver Connection Diagram



See APPENDIX A: 12G SDI Extender Quick Start Guide, pg. 19.

Video Format Tables



Video Format Table 1

	LED 1	LED 2	LED 3
3			
2			
1			
Signal Format	DL/QL	12G/6G	3G/HD
12G	OFF	GREEN	OFF
6G	OFF	YELLOW	OFF
3G	OFF	OFF	GREEN
HD	OFF	OFF	YELLOW
DL6G	GREEN	YELLOW	OFF
DL3G	GREEN	OFF	GREEN
DLHD	GREEN	OFF	YELLOW
QL3G	YELLOW	OFF	GREEN
QLHD	YELLOW	OFF	YELLOW
No Signal	OFF	OFF	OFF

VIDEO FORMATS THAT CAN BE CROSS-CONVERTED:

VIDEO IN STANDARD	VIDEO OUT STANDARD
12G 4K, ST-2082-10 MODE 1	QL-3G A 4K 2SI, ST425-5 DL-6G 4K, ST-2081-11 MODE 1 12G 4K, ST-2082-10 MODE 1
DL-6G 4K, ST-2081-11 MODE 1	QL-3G A 4K 2SI, ST425-5 DL-6G 4K, ST-2081-11 MODE 1 12G 4K, ST-2082-10 MODE 1
QL-3G A 4K 2SI, ST425-5	QL-3G A 4K 2SI, ST425-5 DL-6G 4K, ST-2081-11 MODE 1 12G 4K, ST-2082-10 MODE 1

Video Format Table 2

VIDEO FORMATS THAT CAN BE EXTENDED, BUT NOT CROSS- CONVERTED:

Video Format Table 3

SMPTE Format

QL-3G B 4K 2SI, ST425-5
 QL-3G A 4K SQ, ST 425-5
 QL-3G B 4K SQ, ST 425-5
 6G 4K, ST-2081-10 MODE 1
 DL-3G B 4K 2SI, ST 425-3
 DL-3G 4K SQ B.1, ST 425-3*
 DL-3G 4K SQ B.2, ST 425-3
 QL-HD 4K B.1 SQ, ST 425-3*
 6G, ST-2081-10 MODE 2
 DL-3G A, ST 425-3
 DL-3G B, ST 425-3
 3G A, ST 425-1
 3G B-DL, ST 425-1
 DUAL LINK, ST 372
 3G B-DS, ST 425-1
 HD, ST 292

*DL-3G 4K SQ B.1, ST425-3 and QL-HD 4K B.1 SQ, ST425-3 transports are indistinguishable from each other. Therefore, when extending either format, users may need to utilize the Select/Save buttons to obtain the required format output. Cross conversion is not allowed.

Technical Specifications

PHYSICAL	
Dimensions (Tx and Rx)	Height: 1.26" (32.0 mm) Depth: 3.69" (93.7 mm) Width: 3.41" (86.6 mm) Width (with mounting brackets): 4.40" (111.8 mm) Weight (per module): 0.6 lb. (0.27 kg) Shipping Weight: 1 lb. (0.45 kg)
Interfaces	5VDC Input; Power Status LED; Video Format LEDs 1,2,3; Select & Store Buttons (Rx); USB-mini-B Update Port (cable included); Fiber SFP; Four BNC IN/OUT Ports
OPTICS LENGTHS	
Fiber-Optic Cable	This product requires single-mode fiber-optic cable . Distances of 10km and 40km are available, depending upon the SFP selection. Thinklogical recommends type OS2 9/125um fiber.
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. de-rates by 3% for every 330m > 1000m Storage: Unlimited
ELECTRICAL	
Supply Voltage	+5.0 VDC (AC/DC adapter, universal input 100-240VAC)
Max. DC Power Consumption	6.25W
THERMAL	Heat load (BTU/HR): <i>Equal to DC Power consumption x 3.412</i> 21.3 BTU/HR
RELIABILITY	MTBF (calculated): TX: 170,814 hrs. RX: 127,240 hrs.
REGULATORY	US/Canada EN 90650, FCC 47 CFR Part 15, ICES, CE
WARRANTY	1 Year from date of shipment. Extended warranties available.

Included: USB Mini-B (CBL00105-002MR)



Section 3: Set-Up & Installation

Contents

When you receive your Thinklogical® 12G SDI Extenders, you should find the following items in the quantities specified in your order:

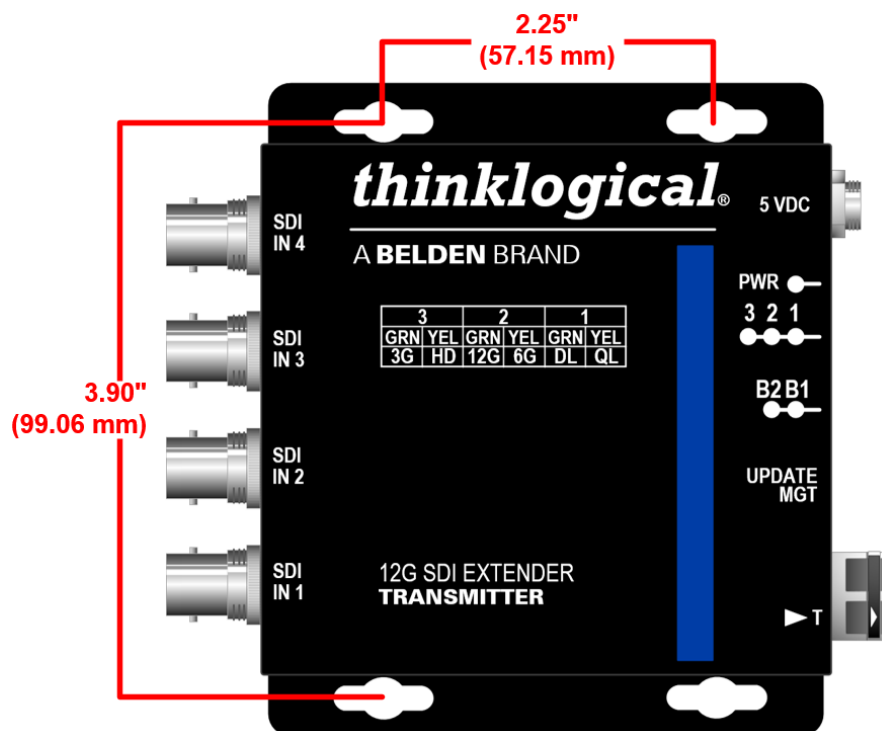
- 12G SDI Transmitters and Receivers (in customer-specified quantities)
- 5VDC Power Adapter, one per device – (International AC adapters are provided)
- USB-A to USB mini-B cable
- Product Manual CD

Unpacking the 12G SDI Extenders

Each Extender is fitted with a pair of mounting brackets, allowing it to be fix-mounted to a desktop (see below). All physical connections to the product use industry-standard connectors. Non-supplied cables that may be needed are commercially available. Thinklogical requires 75Ω BNC cables. All connections are found on the left and right sides of the unit.

**READ THE INSTRUCTIONS THOROUGHLY
BEFORE STARTING ANY PROCEDURE!**

- Carefully remove each module from its shipping package and inspect it to make certain that it is in good condition.
- Verify the quantities of each device and included materials received.
- Ensure that all the SFP modules are sealed with a removable dust plug.
- When the device has been inspected and found to be in suitable condition, the installation process can begin.



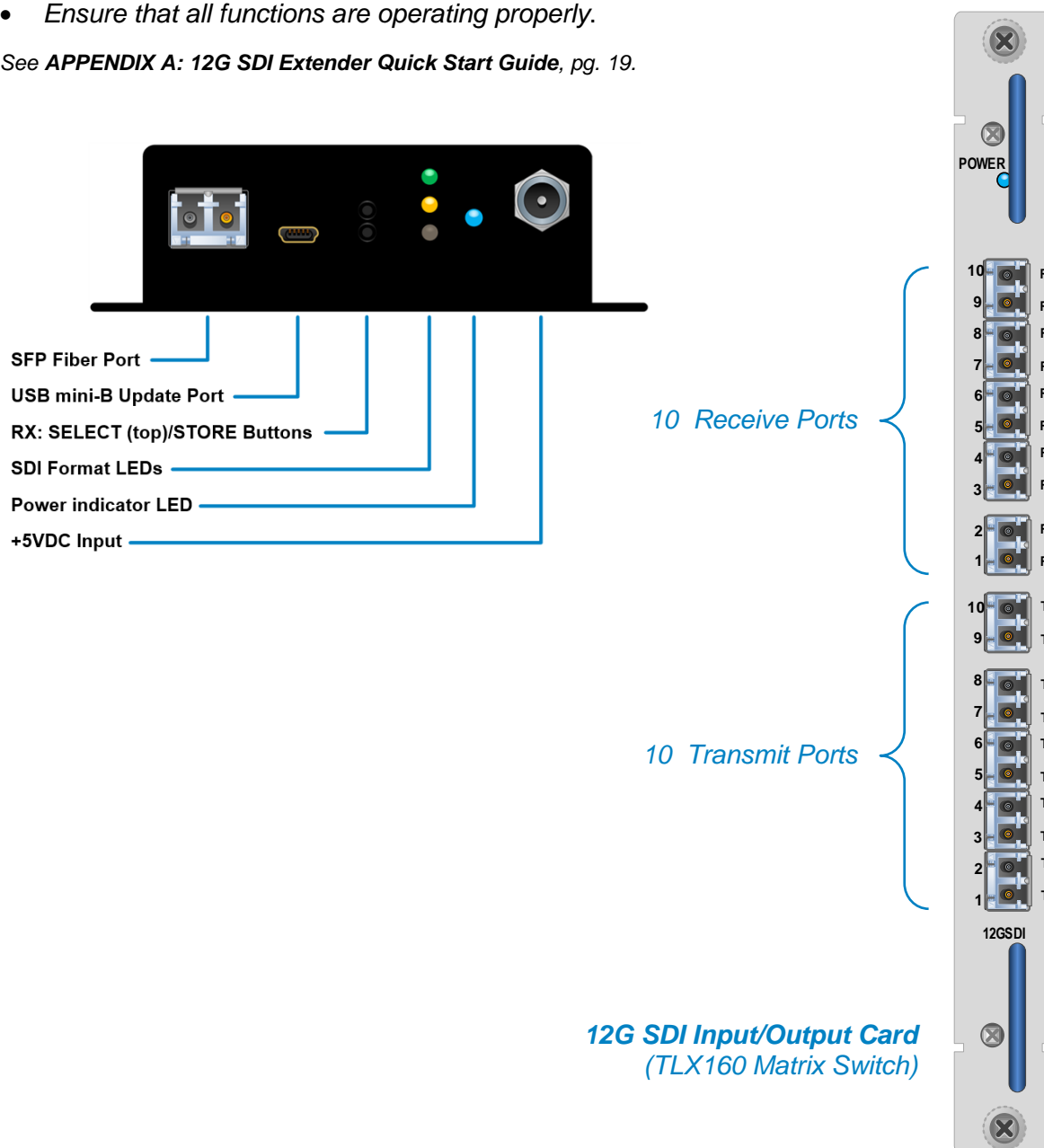
Mounting Hole dimensions (both Tx and Rx)

DRAWING NOT TO SCALE

Order of Installation Events

- **Mount** each device in its desired location.
- Connect the sources' **copper cables** to the transmitter.
- Connect the **fiber-optic cables** from the Transmitters to the Receivers, or to the *12G SDI Input/Output Card* of the *TLX160 Matrix Switch*® if applicable. Be sure to follow all fiber-optic cable installation procedures.
- Connect the display's **copper cables** to the Receiver and turn display power ON.
- Connect the **5VDC Adapter** (PWR-22) into the Receiver's 5VDC input and plug it into a standard AC source.
- Ensure all **sources** on the Transmitter side are properly connected and powered ON.
- Connect the **5VDC Adapter** (PWR-22) into the Transmitter's 5VDC input and plug it into a standard AC source.
- Select the desired **video format** using the Receiver's Select and Store buttons. (pg. 12)
- *Ensure that all functions are operating properly.*

See **APPENDIX A: 12G SDI Extender Quick Start Guide**, pg. 19.



Pluggable SFP+ Modules

Each 12G SDI module includes one, non-MSA compliant, SFP module. The module must be used with single-mode fiber-optic cable.

The SFP+ Optical Module is a 12Gbps module specifically designed to support SMPTE standard video formats (HD-SDI, 3G-SDI, 6G-SDI, and 12G-SDI). The modules are hot-pluggable and operate on 3.3VDC. A latch handle, used to remove and install the SFP, has arrows indicating an input or an output.

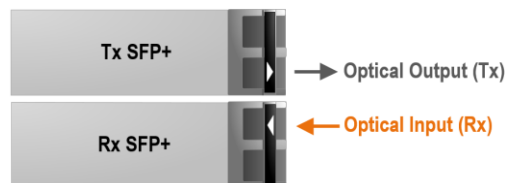
Always use dust caps to protect against dust and damage when a fiber optic connector or port is not attached to a device. All Thinklogical SFPs are fully populated with dust plugs upon shipment



Note: The 12G SFP modules are specific to the 12G SDI Transmitter and Receiver and will not operate inside Thinklogical's Velocity or TLX product lines.

Fiber-Optic Cables

Fiber-optic cables connect a Transmit SFP's output port to any Receive SFP's input port. An arrow on the handle indicates an Output or an Input.



Requirements: Thinklogical recommends connecting 12G SDI Extenders and Matrix Switches up to 40km (25 miles) with Type OS2 9/125 Single-mode fiber terminated with LC type connectors.



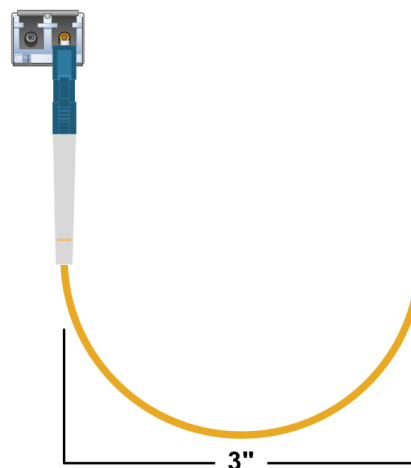
Handling Fiber-Optic Cable: Unlike copper cabling, fiber optic cable requires special handling. A small speck of dust or a scratch to the ferrule tip (the end of the connector) can attenuate the optical signal, rendering the cable inoperable. Also, do not pinch, kink or sharply bend the fibers.



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



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



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:support@thinklogical.com>

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

Telephone: [1-203-647-8700](tel: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](tel: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 **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. **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: 12G SDI Extender Quick Start Guide

thinklogical's® 12G SDI Extenders

SDI Extension System

Thinklogical recommends connecting 12G SDI Extenders up to 40km (25 miles) with Type OS2 9/125 Single-mode fiber terminated with LC type connectors.

SDI Sources IN

SDI OUT

SDI BNC Ports

VIDEO FORMATS - LEDs 1-23

RX BUTTONS

B2 SELECT: Cycles through available video formats (QL-3G-A..., DL-6G 4K..., SL-12G 4K...). Format is instantly active.

B1 STORE: Saves the current video format. Saved format returns after power reset. If Button 1 is not pressed, previously saved format returns after power reset.

Complete Steps 1-7 to connect 12G SDI Transmitters to 12G SDI Receivers:

STEP 1: Connect the 12G SDI Transmitter Modules to the 12G SDI Receiver Modules using fiber-optic cables (up to 40km with Single-Mode Fiber). See above.

STEP 2: On the Receiver, install the +5VDC adapter PWR-22 and plug it into a standard AC Source.

STEP 3: Connect the SDI OUT ports to the SDI display device(s) with 75Ω BNC Cable(s). Turn the device(s) ON.

STEP 4: On the Transmitter, install the +5VDC adapter PWR-22 and plug it into a standard AC Source.

STEP 5: Connect the 3G Level A Quad-Link Input to the Transmitter with 75Ω BNC Cables. Ensure the sources are ON.

STEP 6: Set the desired video format using the Select (B2) and Store (B1) buttons on the Receiver. (See RX BUTTONS, right and on pg. 12 of the Product Manual.)

STEP 7: Ensure all system functions are operating properly.

Signal Format	LED 1	LED 2	LED 3
12G	OFF	GREEN	3G/HD
6G	OFF	YELLOW	OFF
3G	OFF	OFF	OFF
HD	OFF	OFF	OFF
DL6G	GREEN	OFF	GREEN
DL3G	GREEN	OFF	GREEN
DLHD	GREEN	OFF	GREEN
QL3G	YELLOW	OFF	YELLOW
QLHD	YELLOW	OFF	YELLOW
No Signal	OFF	OFF	OFF

Appendix B: FPGA Download Installation Procedure

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:

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.

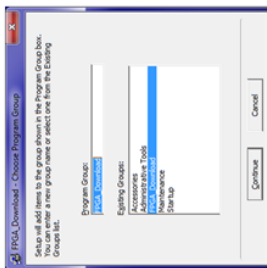


2



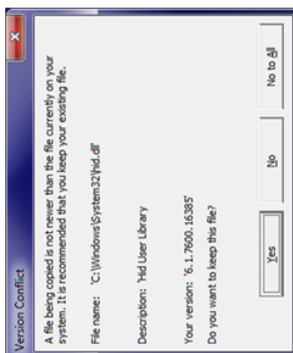
STEP 2: Begin the installation by clicking the displayed button.

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.

Appendix C: 12G SDI Extender Flash Program Code Update Procedure

thinklogical® 12G SDI Extender Modules Flash Program Code Update Procedure

A BELDEN BRAND

STEP 1: Flash Update Preparation: Please contact your **thinklogical** Sales Representative or Customer Service (1-203-647-8700) for access to the Tx and Rx flash program code: **12GSDi_Tx*.mnhf** or **12GSDi_Rx*.mnhf** (*version).

FPGA Update Preparation: If you do not have the **FPGA_Download** exe application, please contact **Tech Support** for assistance (203-647-8700). Open the **FPGA_upgrade.zip** file and run the **Setup.exe** file. Accept all the default installation options. A Start menu program group named **"FPGA_Download"** will be created.

STEP 2: Install the provided flash program code on the system's CPU.

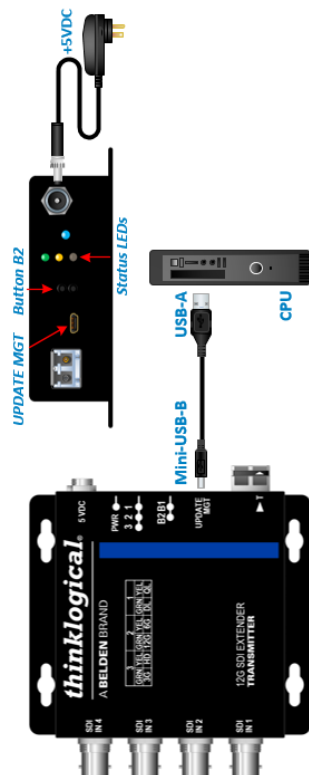
STEP 3: Connect the provided USB cable between the PC and the 12G SDI Extender's UPDATE MGT port.

STEP 4: Press and hold the top button **B2** on the 12G SDI Extender. Apply power to the unit (+5VDC adapter). Continue holding the button for approximately two seconds, then release. The middle LED will flash orange, indicating that it is ready to accept a new firmware download. (If not, repeat the procedure). *Note that users may exit the update procedure at this point by cycling the unit's power.*

STEP 5: Open the **FPGA_download** application and click on "Identify Product." The unit will identify your extender as either a 12GSDi_RX or 12GSDi_TX. Click on the "Open File" button.

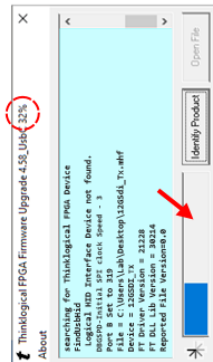
STEP 6: A dialog box will appear with the model selected, either 12GSDi_RX or 12GSDi_TX. Click "OK."

STEP 7: Select the directory where the update files are stored. Click on a file (**12GSDi_Tx.mnhf** in this example), then click "Open."



STEP 8: The progress bar will show the flash activity. Once this portion of the procedure is started, the current firmware is fully erased, which means the firmware update procedure must be completed in its entirety for the extender to resume operation. The progress bar will be fully extended (100%) when the operation is complete.

Note: During programming, the TOP LED (3) flashes rapidly, while the middle LED (2) flashes irregularly during the update. **DO NOT** interrupt the application or PC once the download has started. **FPGA_Download** erases the application flash in its entirety.



STEP 9: When the operation is complete, the following message is displayed:

Power-cycle the chassis to make the new firmware active. (Confirm the firmware version installed by using a terminal program such as Tera Term.) If a programming error occurs, the bottom LED will be steadily lit. If so, shut down the FPGA_Download application, re-power the extender and start the process over.



STEP 10: Perform steps 3-9 to program another extender. If you have any problems, please call **thinklogical** for help: 203-647-8700

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12G_SDI_Extender_Flash_Program_Code_Update_Procedure_Rev_A