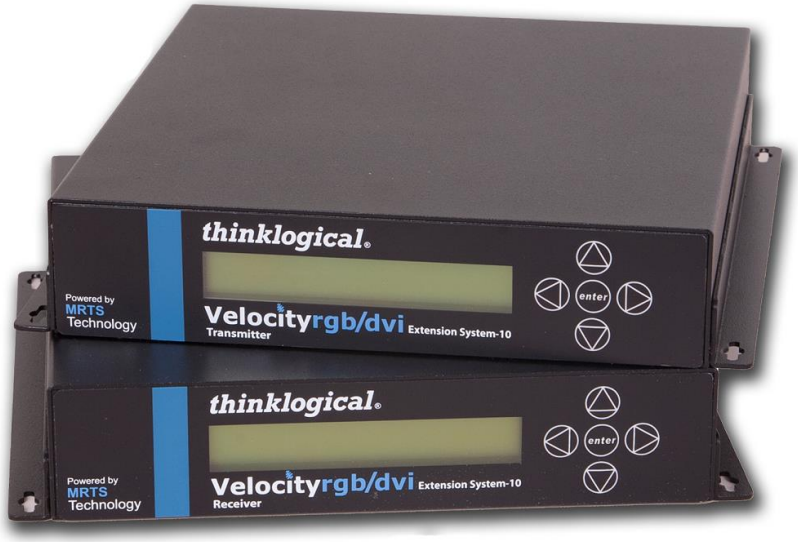
VelocityRGB Extenders

VelocityRGB-9, VelocityRGB/DVI-10 and VelocityRGB-12 Fiber-Optic Extenders

PRODUCT MANUAL

Rev. E, May 2014



Thinklogical, LLC®
100 Washington Street
Milford, Connecticut 06460 U.S.A.
Telephone: 1-203-647-8700
Fax: 1-203-783-9949
www.thinklogical.com

Value Your Content

thinklogical®

Trust Our Proven Ingenuity

Value Your Content

thinklogical®

Trust Our Proven Ingenuity

Copyright Notice

Thinklogical® LLC
100 Washington Street
Milford, Connecticut 06460 U.S.A.
Telephone: 1-203-647-8700

VelocityRGB-9 Extender

VelocityRGB/DVI-10 Extender

VelocityRGB-12 Extender

Subject: VelocityRGB Video Extension System-9, -10 and -12 Product Manual
Revision: E, May 2014

Table of Contents

PREFACE ..... **iv**
About Thinklogical iv
Note and Warning Symbols v
Class 1 Laser Information v

1 Introduction **1**
1.1. Product Overview 1
1.2. Contents 2
1.3. Theory of Operation 2
MRTS Technology 2

2 System Features **3**
2.1. General System Features 3
2.2. Basic Operation 3
2.3. Technical Specifications (**TABLE 1**) 5

3 Connecting to the Velocity Extenders **6**
3.1. Pluggable SFP+ 6
3.2. Fiber Optic Cable 7
3.2.1. Requirements 7
3.2.2. Handling Fiber Optic Cable 7
3.3. VelocityRGB VideoExtenderTransmitter 9
3.3.1. CPU to Transmitter Connections 7
3.3.2. Modifying the Analog RGB Video Parameters 8
3.4. VelocityRGB VideoExtenderReceiver 8
TABLE 2: Supported VGA Resolutions 9
3.5. The AC Power Supply 10

4 Set-Up and Installation **10**
4.1. Order of Installation Events 10
VelocityRGB-9 Quick Start Guide 10
4.2. Firmware Upgrades 12
4.3. Front Panel Usage 12
4.3.1. Saving Changes 16
4.3.2. Restoring Factory Defaults 15
4.3.3. Naming the Transmitter Unit 16
4.3.4. Modifying an Existing Video Modeline to Support the Alternate Timing 17
TABLE 3: Supported and Alternate Timings 17

5 Regulatory & Safety Compliance **19**
5.1. Symbols Found on Our Products 19
5.1.1. Class 1 Laser Labeling 19
5.2. Regulatory Compliance 20
5.2.1. North America 20
5.2.2. Australia & New Zealand 20
5.2.3. European Union 20
5.2.4. Supplementary Information 21
5.2.5. Product Serial Number 21

6 How to Contact Us 22
6.1. Customer Support 22
Website 22
Email 22
Telephone 22
Fax 23
6.2. Product Support 23
Warranty 23
Return Authorization 23
Our Address 24
APPENDIX A: ORDERING INFORMATION 25
APPENDIX B: QUICK START GUIDES 27

PREFACE

About Thinklogical

TOP WORK PLACES 2013
CONNECTICUT POST
GREENWICH TIME
THE NEWS-TIMES
THE ADVOCATE

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 switches and 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.

CERTIFIED ISO 9001:2008 COMPANY

Information Assurance
NATO
Common Criteria
TEMPEST
NATO Information Assurance Product Catalogue
NIAPC

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.

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 two 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.

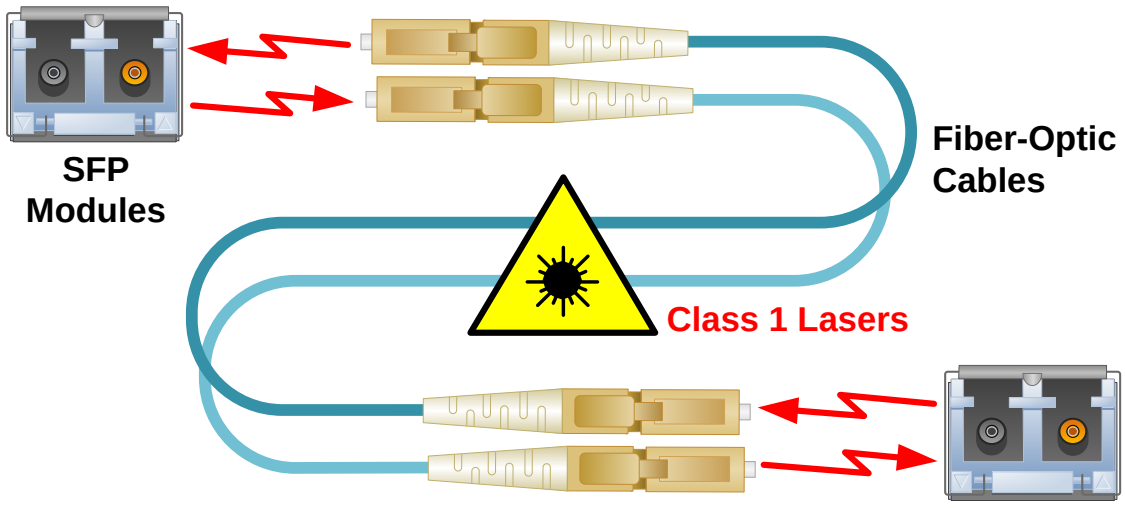
Warning! All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, as shown here.

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

Thinklogical's VelocityRGB-9, VelocityRGB/DVI-10 and VelocityRGB-12 Fiber-Optic Extenders are designed and identified as **Class 1 laser devices**.



CLASS 1 LASERS do not require any special precautions under conditions of normal use.

1 Introduction

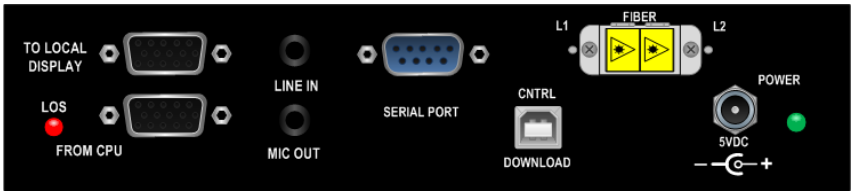
1.1 Product Overview

Thinklogical's VelocityRGB Series Extenders support industry standard RGB video formats up to 165 MHz over multi-mode or single-mode fiber, flawlessly transporting resolutions in the 165 MHZ bandwidth from end to end.

The VelocityRGB Series uses advanced fiber optic technology, so image quality is never compromised with frame dropping, content loss or most other common video transmission problems.

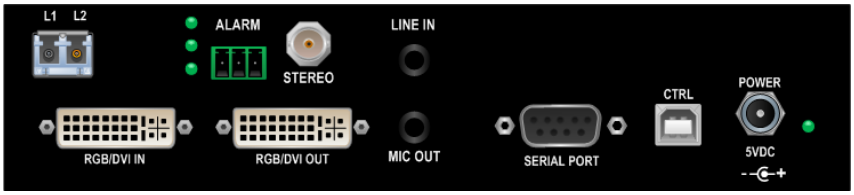
Each system consists of a transmitter and a receiver unit connected by multi-mode or single mode fiber optic cables. The transmitter connects to an analog video source with copper cables and the receiver provides connections to the display and peripheral devices. The transmitter and receiver units are each powered by a +5V DC power supply.

Each of the VelocityRGB models requires two fibers and supports RGB video formats up to 165MHz. In addition, each model has a local RGB video display port on the transmitter and is compatible with all Thinklogical Velocity video receivers, whether RGB or DVI. The receiver converts the video signal from optical to RGB formats. Each receiver offers dual RGB outputs for distributing video to two displays, eliminating the need for an external distribution amp. The **VelocityRGB-10** supports both RGB and DVI video formats while the **VelocityRGB-12** Transmitter supports component video.

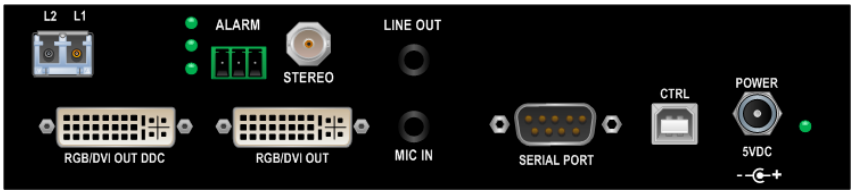


VelocityRGB-9 Transmitter
VEL-AV0M09-LCTX

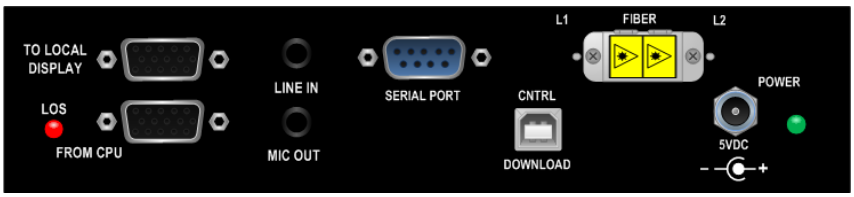
VelocityRGB-9 Receiver
VEL-AV0M09-LCRX



VelocityRGB/DVI-10 Transmitter
VEL-AV0M10-LCTX



VelocityRGB/DVI-10 Receiver
VEL-AV0M10-LCRX



VelocityRGB-12 Component Transmitter
VEL-AV0M12-LCTX

1.2 Contents

Upon receiving your Thinklogical VelocityRGB Video Extender System, you should find the following items:

- RGB Video Extender Transmitter
- RGB Video Extender Receiver (VEL-9 and VEL-10 only)
- Universal AC Power adapter for each unit (PWR-000022-R)
- CD Product Manual

The following cables are included with each model:

VEL-AV0M09-LCTX

- CBL000016-006FR (2) — 3.5mm to 3.5mm plug M/M, 6 ft
- CBL000017-006FR (1) — DB9M to DB9F Cable, 6 ft
- CBL000020-002MR (1) — HD15M to HD15M Cable, 2M

VEL-AV0M10-LCTX

- CBL000013-002MR (1) — DVI-I (M) to DVI-I (M) Cable, 2M
- CBL000016-006FR (2) — 3.5mm to 3.5mm plug M/M, 6 ft
- CBL000017-006FR (1) — DB9M to DB9F Cable, 6 ft
- CBL000022-002MR (1) — DVI (A) Male to VGA Male Cable, 2M

VEL-AV0M12-LCTX

- CBL000016-006FR (2) — 3.5mm to 3.5mm plug M/M, 6 ft
- CBL000017-006FR (1) — DB9M to DB9F Cable, 6 ft
- CBL000020-002MR (1) — HD15M to HD15M Cable, 2M
- CBL-000041-R (1) — SVGA to three RCA Cable, 6 ft

1.3 Theory of Operation

MRTS Technology

VelocityRGB Extenders use Thinklogical's breakthrough, patented Multi Rate Transmission System (MRTS) to provide end-to-end data transmission with unparalleled performance.

This unique optical platform transmits multiple data streams across long distances over single or multiple fibers with **complete reconstruction of the data clock at the destination end point**. The result is perfect synchronization with each transmitted stream.

MRTS is a highly reliable technology and delivers powerful benefits to our customers when combined with our SFP+ optics.

The new MRTS Technology transports every frame of a 1920 x 1200 @ 60Hz (or higher) video stream with no compression, along with all desktop peripherals (audio, serial, etc.) with no latency. Moreover, these signals can be transmitted across distances from several meters to 40 kilometers over multi-mode or single-mode fibers.

MRTS incorporates traditional AV implementations and video routing into the same switch fabric, providing greater value, flexibility, performance and security.

Other unique capabilities include the ability to support a 6.25Gbps bandwidth per stream, which is **50% to 100% higher than our nearest competitors** (typically 1.485Gbps to 3.2Gbps). This is significant because a single DVI stream requires a 5.4Gbps data rate to accommodate the 165MHz of video data. Unlike MRTS Technology, lower bandwidth capability is generally manifested as dropped frames or lower resolution associated with compressing schemes.

2 System Features

2.1 General System Features

Each VelocityRGB Video Extender is designed for high resolution video extension applications. Our RGB Video Extender Systems includes the following features:

VelocityRGB-9 Transmitter Front Panel

- Copper cabling is industry standard
- Units are **stand alone or rack mountable** (brackets included)
- **Local RGB Display** port on transmitters
- RGB supported to **1600 x 1200, 1920x1080**
- **Front panel LCD with navigation buttons** for user adjustable settings
- Flawless image quality, with no frame dropping
- Compact chassis
- Standard VGA (HD15) Copper Connectors
- Supports **Component Video** (VelocityRGB-12)- 1920x1080i, 480P, 720P
- VelocityRGB-12 TX converts YPbPr component video into 4:4:4 RGB colorspace
- **Multi Mode Fiber** extends video up to 1000m (type OM4 fiber)
- **Single Mode Fiber** extends video up to 40km

Powered by
MRTS Technology

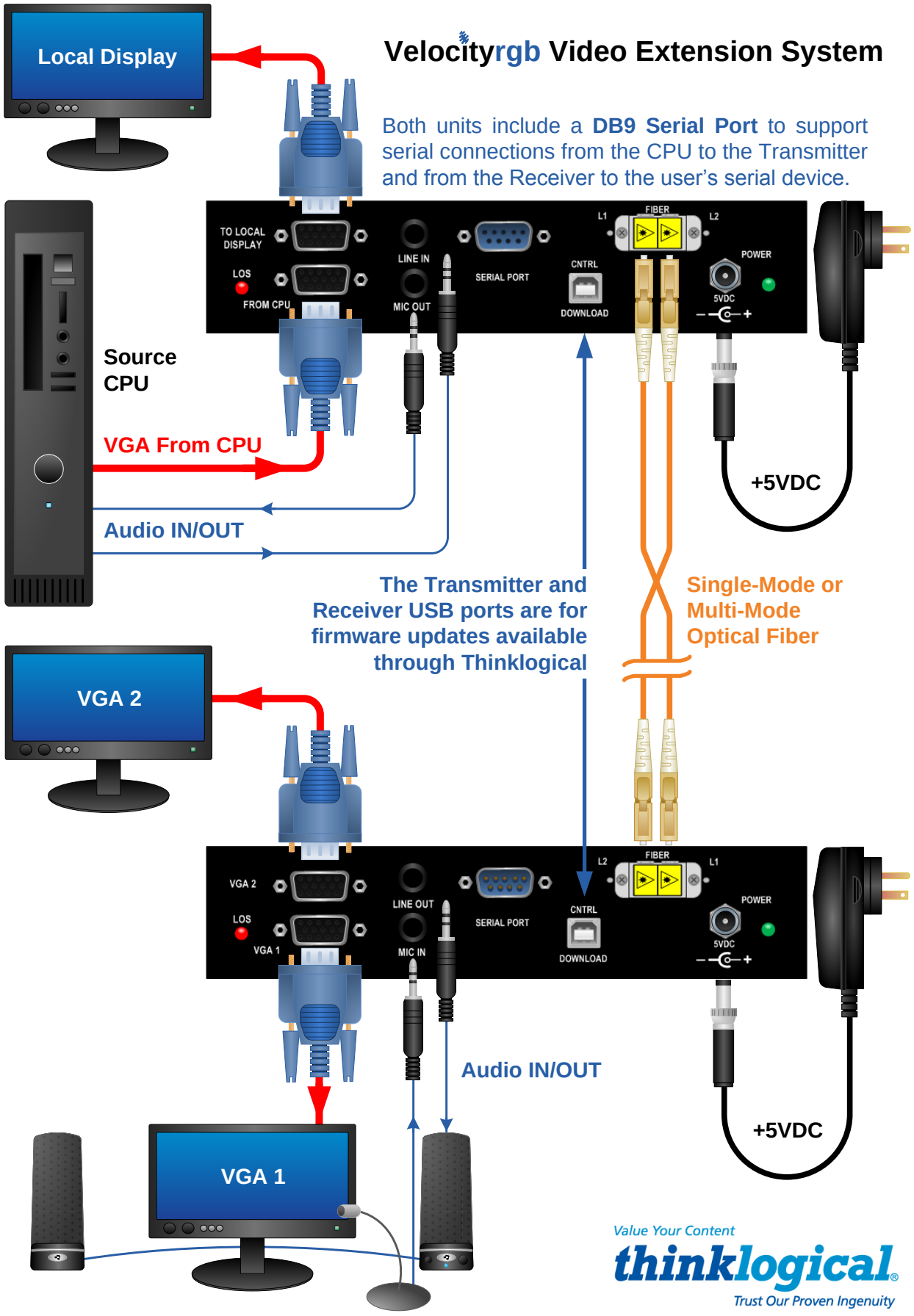
2.2 Basic Operation

Each VelocityRGB Transmitter connects to the Receiver through multi-mode or single-mode fiber optic cables (up to 40 kilometers). The source computer (or other video source) connects to the Transmitter through standard, copper audio, video, USB and serial cables that come with each system. The viewing, audio, USB and other peripheral devices connect to the Receiver with their own standard, copper cables**.**

The diagram on page 4 depicts a typical copper and fiber configuration between a VelocityRGB-9 Transmitter and Receiver.

*Also see the **Quick Start Guides** for the VEL-9 (pgs. 10 and 27), VEL-10 (pg. 28) and VEL-12 (pg. 29).*

Velocityrgb Video Extension System



Value Your Content

thinklogical®

Trust Our Proven Ingenuity

2.3 Technical Specifications

Storage Temperature	-20 to 70 ° C (-4 to 158 ° F), 10 to 90% RH, non-condensing
Power Consumption	Transmitter: <15 Watts, typical Receiver: <15 Watts, typical
Front Panel Display	Transmitter and Receiver: 2 x 24 Liquid Crystal Display
Copper Cables (Supplied with system)	VEL-AV0M09-LCTX CBL000016-006FR (2) 3.5mm to 3.5mm plug M/M, 6FT CBL000017-006FR (1) DB9M to DB9F Cable, 6FT CBL000020-002MR (1) HD15M to HD15M Cable, 2M VEL-AV0M10-LCTX CBL000013-002MR (1) DVI-I (M) to DVI-I (M) Cable, 2M CBL000016-006FR (2) 3.5mm to 3.5mm plug M/M, 6FT CBL000017-006FR (1) DB9M to DB9F Cable, 6FT CBL000022-002MR (1) DVI (A) Male to VGA Male Cable, 2M VEL-AV0M12-LCTX CBL000016-006FR (2) 3.5mm to 3.5mm plug M/M, 6FT CBL000017-006FR (1) DB9M to DB9F Cable, 6FT CBL000020-002MR (1) HD15M to HD15M Cable, 2M CBL-000041-R (1) SVGA to three RCA Cable, 6FT
Optical Cable	Single Mode or Multi Mode, depending upon model
Optical Distance	Up to 65 meters with Type OM1 Up to 350 meters with Type OM2 Up to 650 meters with Type OM3 Up to 1000 meters with Type OM4 Up to 40 kilometers with single-mode
Dimensions	VelocityRGB-9 Height: 1.19” (3.016 cm) Depth: 10” (25.4 cm) Width: 6.49” (16.5 cm) Weight: <1lb (0.45 kg) each Weight: 2 lb (0.91 kg) each Shipping Weight: 12 lbs (5.44 kg) Pair VelocityRGB/DVI-10 Height: 1.19” (3.016 cm) Depth: 10” (25.4 cm) Width: 6.49” (16.5 cm) Weight: <1lb (0.45 kg) each Weight: 2 lb (0.91 kg) each Shipping Weight: 12 lbs (5.44 kg) Pair VelocityRGB-12 Height: 1.19 inches (3.016 cm) Depth: 10 inches (25.4 cm) Width: 6.49 inches (16.5 cm) Weight: 1 lb (0.45 kg) Shipping Weight: 10 lbs (4.54 kg) (1 Transmitter) (Tolerances: ± .039"; .1000 mm)

Operating Temp and Humidity	**0° to 50°C (32° to 122 °F), 5% to 95% RH, non-condensing**
Supply Voltage	**AC/DC Adapters Universal Input 100-240 VAC, 50-60 Hz**
Compliance	**Approvals for US, Canada, and European Union *(pending)***
Warranty	**12 months from date of shipment. Extended warranties available.**

TABLE 1: *Technical Specifications*

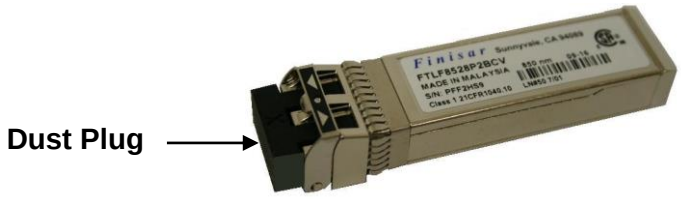
3.0 Connecting to the Thinklogical RGB Extender

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.

3.1 The Pluggable SFP+ Module

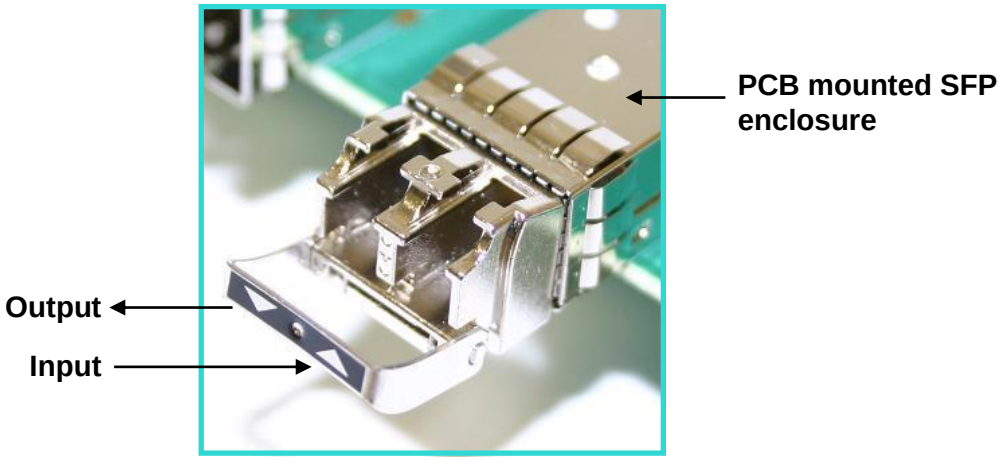
The SFP+ Optical Module is an 8Gbs Short-Wavelength Transceiver designed for use in bi-directional Fiber Optic Channel links. The fiber-optic cables plug into the SFP+ modules. The modules are hot-pluggable and operate with 3.3VDC.

Always use dust caps to protect against dirt or damage when a fiber optic connector is not inserted into the SFP+ module.



SFP+ Module; it is good practice to install dust plugs in unused SFPs

Each SFP+ module is locked into its enclosure on the PCB with a built-in latch handle that can be opened for removal or locked for installation.



SFP+ latch opened for removal

The latch handle spans the two LC ports and arrows printed on the handle indicate which port is an INPUT ( ) and which is an OUTPUT ( ).

3.2 Fiber Optic Cable

3.2.1. Requirements

- Thinklogical recommends **SX+ Laser Enhanced (50µm) fiber** for your Velocity Extension System.
- Multi-mode fiber can extend up to 1000m, where single-mode fiber can extend distances to 40km.
- Fiber optic cable runs between the Transmitter unit (near your CPU) and the Receiver unit (near your desktop devices).
- The standard multi-mode fiber optic cable must be 50 micron, terminated with an SC, ST or LC type fiber optic connector and no longer than 3280 running feet (1000 meters).
- **Be careful not to kink or pinch the fiber optic cable** as it is being installed.
- Keep all bend radii to no less than **3 inches** (76.2mm).
- Always install a **dust cap** on unused or unconnected fibers.

3.2.2. 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 so that it becomes degraded or unusable. **Immediately install a dust cap onto the ferrule tip of any unused or unconnected fibers!**

Dust cap installed on an LC-type fiber's ferrule tip

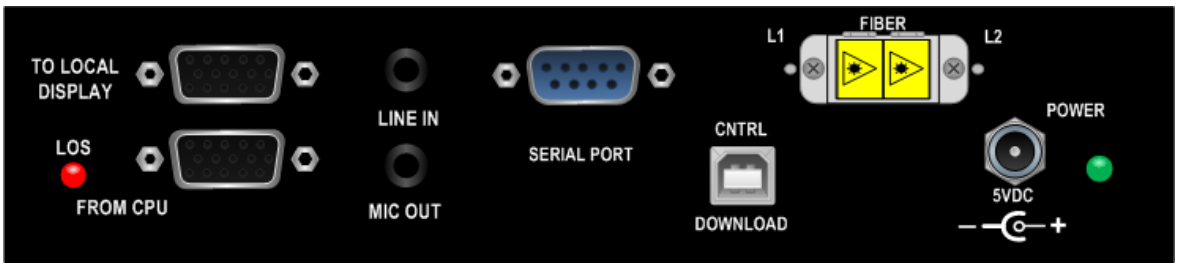
Warning! The ends of the connectors (the ferrule) should never come in contact with any foreign object, including fingertips.

Warning! Minimum bend radius is 3". Be careful not to pinch the fiber if using ties.

3.3 VelocityRGB Video Extender Transmitter

3.3.1. CPU to Transmitter Connections

All connections, including fibers and +5VDC, are made at the rear panel. Video connections are made between the video output card of the CPU and the Tx VGA connector labeled "FROM CPU."



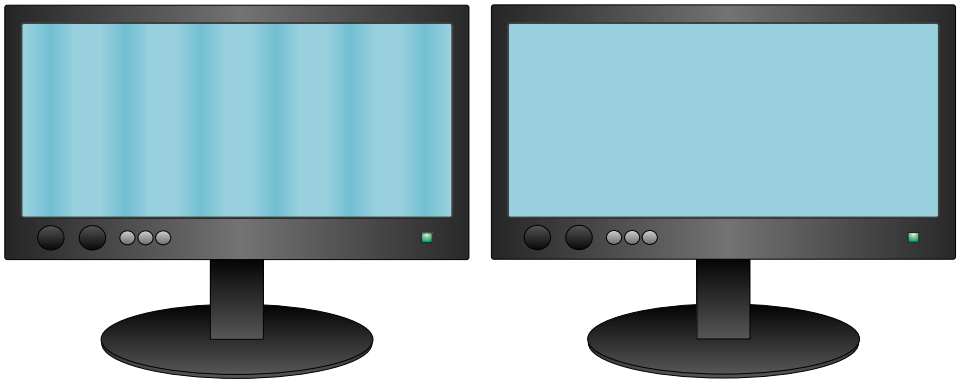
Velocity RGB-9 Transmitter

A second video connector, labeled TO LOCAL DISPLAY, is available for local viewing of the video output at the TX unit. The analog VGA inputs are converted, by the Transmitter, into fiber optic signals and transmitted, via fiber-optic cables, to the RX unit. (If a DVI-A connection from the source is required, standard adapters are available from Thinklogical.)

Other analog input ports on the Transmitter include 3.5mm audio LINE IN and MIC OUT, DB9 Serial and a USB port, CNTRL DOWNLOAD, for firmware updates available from Thinklogical.

3.3.2. Modifying the Analog RGB Video Parameters

It is possible for a video resolution to have different video timings, depending on the format, which could degrade the display at the destination. With 1280x1024x60 Hz, for example, the VESA standard has 1688 pixels in one line, whereas a SGI format has 1680 pixels. The transmitter lookup table is configured for the VESA standard, but can be easily modified to support the SGI format. (Refer to Table 2; *Supported VGA Resolutions*, on page 9.)



A **B**

A: *1280x1024x60 on an SGI computer with the PLLDIV set at 1688 (default value).*

B: *1280x1024x60 on an SGI computer with the PLLDIV modified to 1680.*

3.4. VelocityRGB Video Extender Receiver

All connections, including fibers and +5VDC, are made at the rear panel. The VelocityRGB Receivers support up to two viewing devices with VGA, HD15 video input connectors. Standard adapters are available from Thinklogical for other types of connections.

Other analog output ports on the Receiver include 3.5mm Audio IN and OUT, DB9 Serial and a USB port, CNTRL DOWNLOAD, for firmware updates available from Thinklogical.

VelocityRGB-9 Receiver

The following table lists supported analog (VGA) resolutions:

Thinklogical® Supported VGA Resolutions*

Active Resolution		Total Lines	Vertical Freq (Hz)	Horizontal Freq (kHz)	Pixel Clock Freq (MHz)	Video Standard
Pixels	Lines					
640	448	472	66	31.2	25	Honeywell
640	480	525	60	31.5	25.175	Industry Standard
640	480	520	72	37.9	31.5	VESA
640	480	500	75	37.5	31.5	VESA
640	480	509	85	43.3	36	VESA
720	400	449	70	31.5	28.32	Industry Standard
800	600	625	56	35.1	36	VESA
800	600	628	60	37.9	40	VESA
800	600	666	72	48.1	50	VESA
800	600	625	75	46.9	49.5	VESA
800	600	631	85	53.7	56.25	VESA
1024	768	800	50	40	53.44	Folsom
1024	768	806	60	48.4	65	VESA
1024	768	800	75	60	78.75	VESA
1024	768	808	85	68.7	94.5	VESA
1280	720	750	50	37.5	74.25	Folsom
1280	720	750	60	45	74.25	CEA-861-E
1280	800	828	60	49.7	83.46	VESA GTF
1280	1024	1066	50	52.8	89.55	Folsom
1280	1024	1066	60	64	108	VESA
1280	1024	1082	60	64.8	108.88	Discreet
1280	1024	1066	75	80	135	VESA
1280	1024	1072	85	91.1	157.5	VESA
1280	1024	1063	96	102	163.277	SGI Onyx2
1366	768	795	60	47.7	85.5	VESA GTF
1400	1050	1090	50	54.5	94.61	Folsom
1400	1050	1080	60	64.8	120.78	VESA CVT-RB
1400	1050	1089	60	65.3	121.75	VESA
1400	1050	1099	96	105.4	164.5	SGI Stereo
1440	900	932	60	55.8	106.4	VESA GTF
1440	900	934	60	55.9	106.5	VESA DMT
1600	1200	1250	60	75	162	VESA
1680	1050	1089	60	65.3	146.25	VESA DMT
1920	1080	1125	25	28.12	74.25	Folsom
1920	1080	1125	50	56.25	148.5	Folsom
1920	1080	1125	60	67.5	148.5	CEA-861-E

TABLE 2: *Supported Analog VGA Resolutions*

***With the VelocityRGB-12 Transmitter, 480p, 720p and 1080i resolutions are supported at 60Hz.**

3.5. The AC Power Supply

An AC to +5VDC Adapter (part number PWR-000022-R) is included with each unit.

- **Universal Input: 100–240 VAC 50/60Hz Nominal**
- **Continuous Short Circuit Protection**
- **Over Voltage Protection**
- **Optional AC adaptors to fit various international standards**

AC to +5VDC Adapter (PN: PWR-000022-R) shown with international AC adaptors

4.0 Set-Up and Installation

4.1 Order of Installation Events

Also refer to the **Quick Start Guide** included with your products for detailed instructions. **VelocityRGB-9, -10 and -12** Quick Start Guides are available in **Appendix A**.

The step-by-step instructions below refer to the drawing on the following page. Complete steps 1-6 to connect a VelocityRGB-9 Transmitter to a VelocityRGB-9 Receiver:

STEP 1: Connect **multi-mode** (up to 1000 meters) **or single-mode** (up to 40 kilo-meters) **fiber optic cables** between the Transmitter and Receiver units. Do not kink or pinch the cables and be sure to keep all bend radii to less than 3 inches.

STEP 2: Connect the supplied **AC Power Adapter** (PWR-000022-R) to the Receiver and plug it into a standard AC source.

STEP 3: Install one or two **VGA monitors** by connecting their HD15 cables to the VGA 1 and/or VGA 2 ports on the Receiver. Connect the **audio input/output devices** to the Receiver's 3.5mm audio ports.

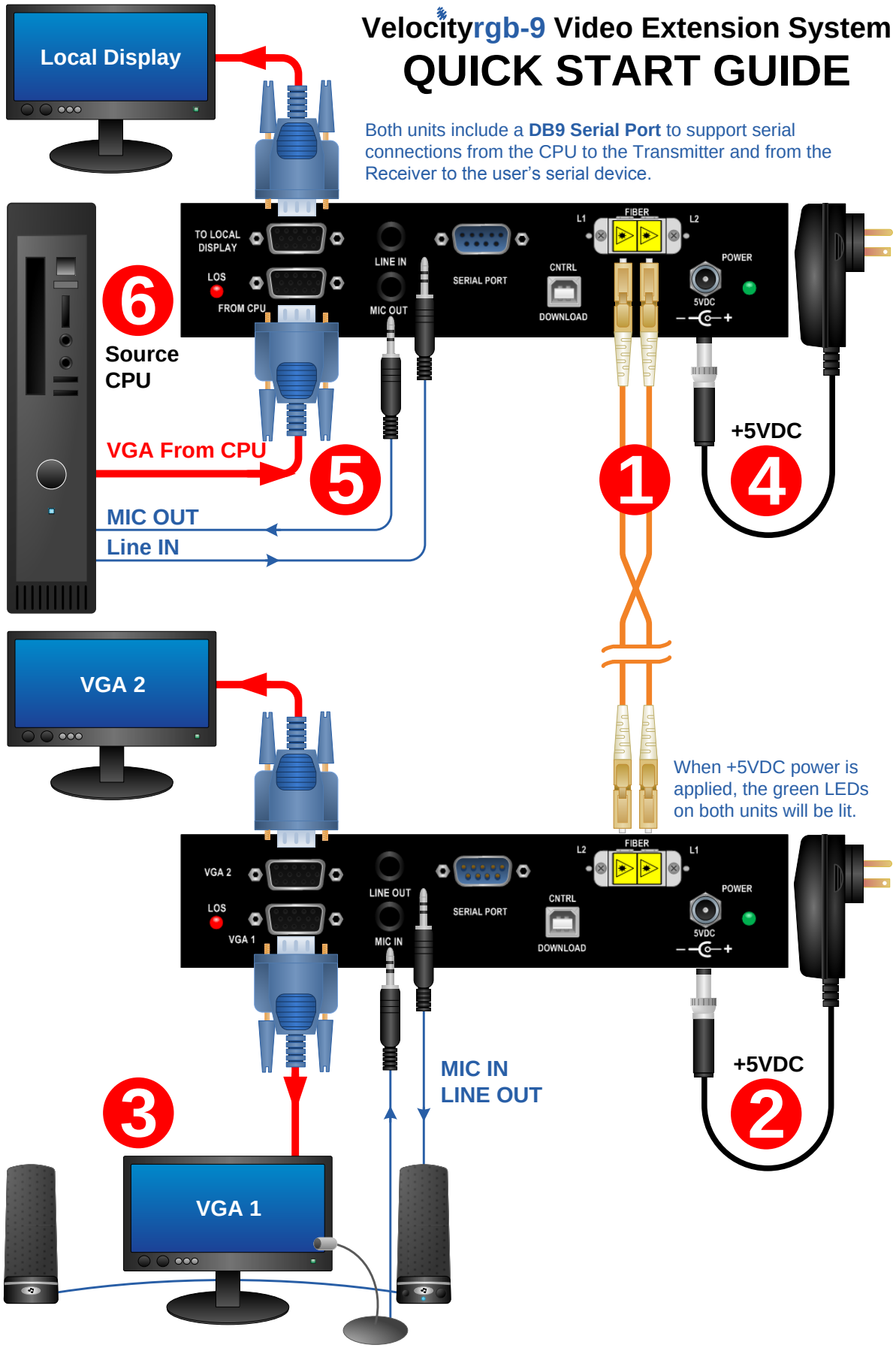
STEP 4: Connect the supplied **AC Power Adapter** (PWR-000022-R) to the Transmitter and plug it into a standard AC source.

STEP 5: Connect the CPU's **RGB OUT** to the Transmitter's **FROM CPU** port with the supplied HD15M to HD15M cable (CBL-000020-002MR) and connect the CPU's **Audio IN and OUT** with the supplied 3.5mm audio cables. Connect an **optional local VGA monitor** to the Transmitter with an HD15M to HD15M cable.

STEP 6: **Ensure the CPU is operating**. *Verify that all system features are functioning properly.*

Velocityrgb-9 Video Extension System
QUICK START GUIDE

Both units include a **DB9 Serial Port** to support serial connections from the CPU to the Transmitter and from the Receiver to the user's serial device.



4.2. Firmware Upgrades

Occasional firmware upgrades are available from Thinklogical. For information and technical assistance, please call us at **203-647-8700**.

4.3. Front Panel Usage

VelocityRGB Front Panel LCD Display and Navigation

Once the unit is powered up, the initial display is shown as follows:

This displays the device type and latest revision of the base unit.

By pressing the down arrow  the RGB Video Extender allows you to enter into the main menu. **All main root menu items are displayed with an *.** They are as follows:

Once an * root menu item is displayed, use the left or right arrows to review settings or make allowable changes. The RGB Video Extender menu functionality is as follows:

Some menu options may not be available on some models

Display	Modifiable	Description
***System**		
LS Connected	No	An indication of the fiber status from the TX to RX.
TX Ctrl Name	TX Only	Name entered on TX unit is displayed on RX unit.
Load Defaults	Yes	Loads factory default video configurations.
Store Values	Yes	Store video configurations.
TX Control	No	Revision of the TX control firmware.
RX Control	No	Revision of the RX control firmware.
FPGA Version	No	Revision of the FPGA code
Serial Number	Yes	The serial number of unit.
Aud Reset En	Yes	Resets the audio sync circuitry
SFP Loss of Signal Value =	No	An indication of fiber status on the extender Receive channel. 0 if signal is received, 1 if signal is missing.
Debug Values	Yes	Factory Use Only.
***DDC**		
DDC PROM Emula. Mode	Yes	**Options are Dynamic, Static and Pass-thru.** In **Dynamic** mode, the DDC of the monitor connected to the RX is read and stored on the TX. The CPU is informed of a change in DDC and the monitor is read. This is useful when the CPU is turned on without a connection to the RX. **Static** mode is used to maintain the current DDC regardless of monitor changes at the RX. **Pass-thru** acts as a wire between the TX and RX and no emulation takes place.
Load Default DDC	Yes	Loads the default EDID table into the TX and changes the mode to Static.
Acquire DDC	Yes	Gets the EDID table from the monitor attached to the RX and stores it in the TX.
Force DDC mode	Yes	Sets the EDID Video Input Signal Type to either analog or digital.

*** Video**		
VGA Connected	No	An indication of whether VGA video is input to the Vis TX
Resolution input	No	Active pixels x active lines vertical rate
Hor. Freq	No	Horizontal frequency
Auto Phase	Yes	Automatically adjust the Sampling Phase to the best setting
PLL Total	Yes	The total pixel count in one line. Consists of Horizontal active pixels + Horizontal blanking pixels
HSOUT Width	Yes	Horizontal sync (Hsync) of video, measured in pixels
DE Start	Yes	Horizontal back porch (Hpb) of video, measured in pixels
DE Width	Yes	Total active pixels in one line
Line Start	Yes	Vertical back porch (Vbp) + Vertical sync (Vsync) of video, measured in lines
Line Width	Yes	The number of visible lines
NativeH	No	Used by Tech support to determine horizontal frequency input. Use the following formula to calculate the frequency: **NativeH * 16**
NativeV	No	Used by Tech support to determine vertical frequency input. Use the following formula to calculate the frequency: **(10,000,000/NativeV)/16**
ISL Sync Status	No	Used by Thinklogical support. Measures sync selection and sync polarity
ISL Sync Activity	No	Used by Thinklogical support. Measures sync activity.
Video 1 cnt	No	Internal use only.
Video 2 cnt	No	Internal use only.
Enable Component Video	Yes	Enables component video resolutions.

4.3.1. Saving Changes

Save video configurations so that the device can recall video settings.

Using the down arrow, scroll down to ***System** as shown below.

Using the right arrow, scroll right until **Store Values** is displayed as shown below, then press **enter**.

Using the up arrow or down arrow, scroll until **Yes** appears as shown below, then press **enter**.

Using the right or left arrows, scroll until you return to the ***System** menu. Using up arrow or down arrow, scroll until you get back to the **Thinklogical** screen.

4.3.2. Restoring Factory Defaults

Load factory default video configurations.

Using the down arrow, scroll down to ***System** as shown below.

Using the right arrow button, scroll until **Load Defaults** is displayed as shown below, then press **enter**.

Using the up arrow or down arrow, scroll until **Yes** appears as shown below, then press **enter**.

Follow the steps in ***Paragraph 4.3.1: Saving Changes*** to save your changes.

4.3.3 Naming the Transmitter Unit

Modify the name of the unit through the Transmitter. The name entered on the Transmitter will display on the Receiver unit.

Using the down arrow, scroll to ***System** as shown below.

Using the right arrow, scroll until **Tx Ctrl** is displayed as shown below, then press **enter**.

Using the right or left arrow, scroll until the blinking cursor is under the letter/number you want to change.

Using the up or down arrow, scroll until you find the appropriate letter/number, then press **enter.**

Using the right or left arrow, scroll to return to the ***System** menu.

Follow the steps below to save your changes.

1. From the ***System** menu, scroll right until **Store Values** is displayed, then press **enter**.
2. Using the up or down arrows, scroll until **Yes** appears, then press **enter**.
3. Using the right or left arrows, scroll to the ***System** menu.
4. Using up or down arrows, scroll to the **Thinklogical** screen.

4.3.4 Modifying an Existing Video Modeline to Support an Alternate Timing

Example of modifying an existing video modeline:

The VESA timing for 1280x1024_60Hz (SXGA) is loaded into the VelocityRGB 9 TX. The modeline can be easily modified to support an alternate timing listed in the table below. Modifiable differences are highlighted.

Parameter	Supported Timing	Alternate Timing
Resolution	1280x1024_60	1280x1024_60 SGI Onyx
Pixel Clock (MHz)	108	107.352
Horizontal Frequency (kHz)	63.98	63.9
Vertical Refresh (Hz)	60	60
Horizontal Total Pixels	1688	1680
Horizontal Active (Pixels)	1280	1280
Horizontal Front Porch(Pixels)	48	40
Horizontal Sync Width(Pixels)	112	120
Horizontal Back Porch (Pixels)	248	240
Vertical Total Lines (Lines)	1066	1065
Vertical active lines (Lines)	1024	1024
Vertical Front Porch (Lines)	1	3
Vertical sync (Lines)	3	3
Vertical Back Porch (Lines)	38	35

TABLE 3: Supported and Alternate Timings

The resolution you wish to modify must be applied to the TX video input connector. Using the down arrow, scroll to ***Video** as shown below.

Using the right arrow, scroll until **VGA Connected** is displayed, then press **enter**.

The Horizontal Pixel must be changed to 1680 to reflect the *Alternate Timing* listed in **Table 3**. Move the cursor under the number you want to change by pressing the right or left arrow. Use the arrow up or down to increment or decrement the number. Once the number is entered correctly, press **enter**.

Using the right arrow, scroll until **DE Start** is displayed as shown below, then press **enter**.

The Horizontal Backporch (Pixels) must be changed to 240 to reflect the Alternate Timing listed in **Table 3**. Move the cursor under the number you want to change by pressing the right or left arrow. Use the arrow up or down to increment or decrement the number. Once number is entered correctly, press **enter**.

Using the right arrow, scroll until **Line Start** is displayed as shown below, then press **enter**.

The Vertical Backporch (Pixels) must be changed to 35 to reflect the Alternate Timing listed in **Table 3, page 17**. Move the cursor under the number you want to change by pressing the right or left arrow. Use the up or down arrow to increment or decrement the number. Once the number is correct, press **enter**.

Using the right or left arrow, scroll to return to ***Video** menu option.

Follow the steps below to save your changes.

1. From the ***System** menu, scroll right until **Store Values** is displayed, then press **enter**.
2. Using the up or down arrows, scroll until **Yes** appears, then press **enter**.
3. Using the right or left arrows, scroll to the ***System** menu.
4. Using up or down arrows, scroll to the **Thinklogical** screen.

5.0. Regulatory and Safety Compliance

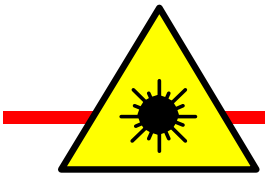
5.1. Symbols Found on Our Products

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

5.1.1. Class 1 Laser Labeling

The VelocityRGB Extension Systems are designed and identified as Class 1 LASER products.

The Class 1 Laser Symbol appears on the covers of the LC-Type fiber ports of the VEL-9 and VEL-12 models.



CLASS 1 LASERS do not require any special precautions under conditions of normal use.

5.2. Regulatory Compliance

Thinklogical extender products are designed and made in the USA. They 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).

5.2.1. North America

These products comply with the following standards:

Safety

- ANSI/UL60950-1: 1st Edition (2003)
- CAN/CSA C22.2 No. 60950-1-03

Laser Safety

- CDRH 21 CFR 1040.10
- Class 1 Laser Product: VEL-3 HDCP
- Accession Number TBD

Electromagnetic Interference

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

5.2.2. 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 measures.

5.2.3. European Union

Declaration of Conformity

Product name:

VelocityRGB Video Extension System

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

Standards Compliance

Safety

- CENELEC EN 60950-1, 1st Edition (2001)

Laser Safety

- IEC60825:2001 Parts 1 and 2
- Class 1 Laser Product

Electromagnetic Emissions

- EN55022: 1994 (IEC/CSPIR22:1993)
- EN61000-3-2/A1 4:2000
- 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

5.2.4. Supplementary Information

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

NOTE: This equipment has been tested and found to comply with the limits for a Class 1 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 uses, generates 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 correct the interference.

NOTE: This Class 1 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.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe A respecte toutes les exigencies du Reglement sur le material brouilleur du Canada.

NOTE: The user may notice degraded audio performance in the presence of electro-magnetic fields.

5.2.5. Product Serial Number

Thinklogical products have a unique serial number printed on an adhesive label that is fixed, typically, to the underside of the unit. The serial number includes a date-code formatted as 2 digits for the week and 2 digits for the year, plus two to four digits for a unique unit number.

Example: Serial number **08**14124 indicates that the unit was built in the **8**th week of the year **20**14 and is unit number 124.

6.0. How to Contact Us

6.1. Customer Support

Thinklogical® is an engineering company and you will receive any assistance you need directly from our most knowledgeable engineers. We believe that the first lines of support are the design engineers that developed each particular product. Therefore, your questions 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 and general information about all of the products we offer, including technical specification sheets and installation guides (for viewing online or for download), product diagrams showing physical connections and other helpful 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 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 one of 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 Merchandise 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.

6.2. Product Support

Thinklogical's support personnel are available Monday through Friday from 8:30am to 5:00pm, 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 Thinklogical® products.

Warranty

Thinklogical® warrants this product against defects in materials and workmanship for a period of one year from the date of delivery. Thinklogical 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, 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 **1-800-291-3211** (USA).

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.

Return Merchandise Authorization must include contact information (phone preferred) in case we need to contact you.

After receiving your RMA number, please ship the unit postpaid, in the original container if possible, with the RMA# prominently displayed on the shipping container. We will contact you about your product once we determine its status.

Products received without Return Merchandise Authorization and/or contact information may delay service or support.

Note: Do not return a product to Thinklogical® without an approved *Return Material Authorization Number.*

Return address for products with Return Material Authorization:

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

PH: 1-800-291-3211 (USA only)
1-203-647-8700

APPENDIX A: ORDERING INFORMATION

Thinklogical's VelocityRGB Extenders	
Part Number	**Description**
	Velocity 9 Part Numbers
VEL-AV0M09-LCRX	Velocity 9 RGB RX, RGB HV, AUX VGA Output, Serial, Audio, MM, LC
VEL-AV0M09-LCTX	Velocity 9 RGB TX, RGB HV, Local Display, Local VGA Port, Serial, Audio, MM, LC
VEL-AV0M09-LCRA	Velocity 9 RGB RX, RGB HV, AUX VGA Output, Serial, Separate Audio, MM, LC
VEL-AV0M09-LCTA	Velocity 9 RGB TX, RGB HV, Local Display, Local VGA Port, Serial, Separate Audio, MM, LC
VEL-AVRM09-LCRX	Velocity 9 RGB RX, RGB HV, AUX VGA Output, Serial, Audio, Redundant Optics, MM, LC
VEL-AVRM09-LCTX	Velocity 9 RGB TX, RGB HV, Local Display, Local VGA Port, Serial, Audio, Redundant Optics, MM, LC
VEL-AV0X09-LCRX	Velocity 9 RGB RX, RGB HV, AUX VGA Output, Serial, Audio, Multipath, MM, LC
VEL-AV0X09-LCTX	Velocity 9 RGB TX, RGB HV, Local Display, Local VGA Port, Serial, Audio, Multipath, MM, LC
	Velocity 10 Part Numbers
VEL-AV0M12-LCTX	Velocity 12 RGB TX, RGB HV, Local Display/VGA Port, Component, Serial, Audio, MM, LC
VEL-AV0M12-LCTA	Velocity 12 RGB TX, RGB HV, Local Display/VGA Port, Component, Serial, Separate Audio, MM, LC
VEL-AVRM12-LCTX	Velocity 12 RGB TX, RGB HV, Local Display/VGA Port, Component, Serial, Audio, Redundant Optics, MM, LC
VEL-AV0X12-LCTX	Velocity 12 RGB TX, RGB HV, Local Display/VGA Port, Component, Serial, Audio, Multipath, MM, LC
	Velocity 9/12 Optics, Multi-Mode
VOP-M04	Velocity 9/12 Optics Option for TX/RX, MM, Dual Fiber, 1000M, LC
VOP-M01	Velocity 9/12 Optics Option for TX/RX, MM, Dual Fiber, 1000M, SC/ST
VOP-M26	Velocity 9/12 Redundant Optics Option for TX/RX, MM, Four Fibers, 1000M, LC
VOP-M22	Velocity 9/12 Redundant Optics Option for TX/RX, MM, Four Fibers, 1000M, SC/ST
VOP-S11	Velocity 9/12 Optics Option for TX/RX, SM, Dual Fiber, 10KM, LC
VOP-S05	Velocity 9/12 Optics Option for TX/RX, SM, Dual Fiber, 10KM, SC/ST
	Velocity 9/12 Optics, Single-Mode
VOP-S41	Velocity 9/12 Redundant Optics Option for TX/RX, SM, Four Fibers, 10KM, LC
VOP-S15	Velocity 9/12 Redundant Optics Option for TX/RX, SM, Four Fibers, 10KM, SC/ST
VOP-S41	Velocity 9/12 with Separate Audio Optics Option for TX/RX, SM, Four Fibers, 10KM, LC
VOP-S15	Velocity 9/12 with Separate Audio Optics Option for TX/RX, SM, Four Fibers, 10KM, SC/ST
VOP-S12	Velocity 9/12 Multipath Optics Option for TX/RX, SM, Three Fibers, 4KM, LC
VOP-S08	Velocity 9/12 Multipath Optics Option for TX/RX, SM, Three Fibers, 4KM, SC/ST
	Velocity 10 Part Numbers
VEL-AV0M10-LCRX	Velocity 10 RGB RX, RGB HV, DVI-I, AUX VGA Output, Serial, Audio, MM, LC
VEL-AV0M10-LCTX	Velocity 10 RGB TX, RGB HV, DVI-I, Local Display, Local VGA Port, Serial, Audio, MM, LC
VEL-AV0M10-LCRA	Velocity 10 RGB RX, RGB HV, DVI-I, AUX VGA Output, Serial, Separate Audio, MM, LC
VEL-AV0M10-LCTA	Velocity 10 RGB TX, RGB HV, DVI-I, Local Display, Local VGA Port, Serial, Separate Audio, MM, LC
VEL-AVRM10-LCRX	Velocity 10 RGB RX, RGB HV, DVI-I, AUX VGA Output, Serial, Audio, Redundant Optics, MM, LC
VEL-AVRM10-LCTX	Velocity 10 RGB TX, RGB HV, DVI-I, Local Display, Local VGA Port, Serial, Audio, Redundant Optics, MM, LC
VEL-AV0X10-LCRX	Velocity 10 RGB RX, RGB HV, DVI-I, AUX VGA Output, Serial, Audio, Multipath, MM, LC
VEL-AV0X10-LCTX	Velocity 10 RGB TX, RGB HV, DVI-I, Local Display, Local VGA Port, Serial, Audio, Multipath, MM, LC

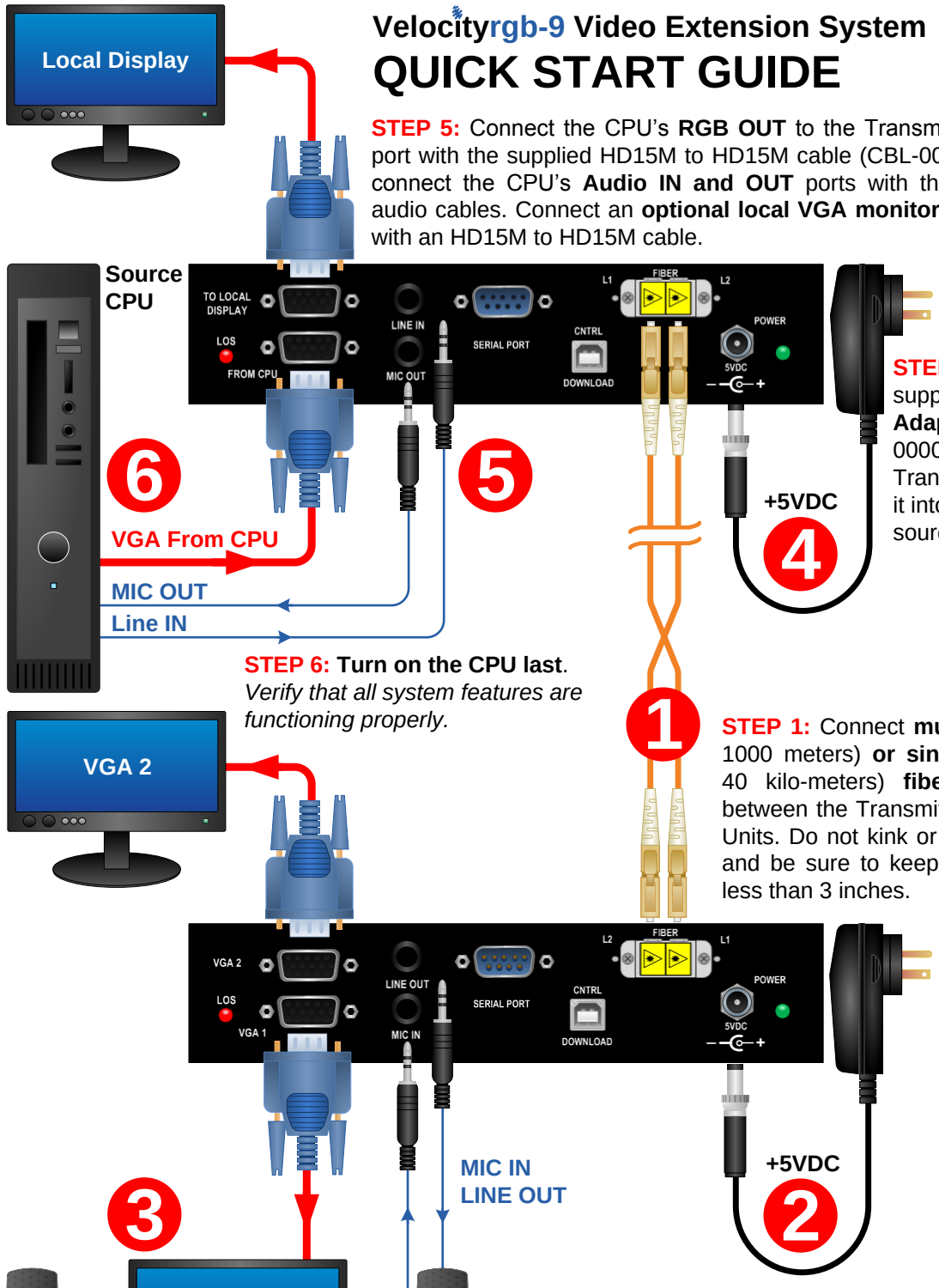
	Velocity 10 Optics, Multi-Mode
VOP-M19	Velocity 10 Optics Option for TX/RX, MM, Dual Fiber, LC, SC or ST, 1000M
VOP-M30	Velocity 10 Redundant Optics Option for TX/RX, MM, Four Fibers, LC, SC or ST, 1000M
VOP-M14	Velocity 10 with Separate Audio Optics Option for TX/RX, MM, Four Fibers, LC, SC or ST, 1000M
VOP-M21	Velocity 10 Multipath Optics Option for TX/RX, MM, Three Fibers, LC, SC or ST, 1000M
	Velocity 10 Optics, Single-Mode
VOP-S04	Velocity 10 Optics Option for TX/RX, SM, Dual Fiber, LC, SC or ST, 10KM
VOP-S06	Velocity 10 Redundant Optics Option for TX/RX, SM, Four Fibers, LC, SC or ST, 10KM
VOP-S89	Velocity 10 Redundant Optics Option for TX/RX, SM, Four Fibers, LC, SC or ST, 40KM
VOP-S06	Velocity 10 with Separate Audio Optics Option for TX/RX, SM, Four Fibers, LC, SC or ST, 10KM
VOP-S06	Velocity 10 Multipath Optics Option for TX/RX, SM, Three Fibers, LC, SC or ST, 4KM
VOP-S58	Velocity 10 Multipath Optics Option for TX/RX, SM, Three Fibers, LC, SC or ST, 40KM

TABLE 4: VelocityRGB Extender Ordering Information

APPENDIX B: QUICK START GUIDES

Velocityrgb-9 Video Extension System

QUICK START GUIDE



STEP 5: Connect the CPU's **RGB OUT** to the Transmitter's **FROM CPU** port with the supplied HD15M to HD15M cable (CBL-000020-002MR) and connect the CPU's **Audio IN and OUT** ports with the supplied 3.5mm audio cables. Connect an **optional local VGA monitor** to the Transmitter with an HD15M to HD15M cable.

STEP 4: Connect the supplied **AC Power Adapter** (PWR-000022-R) to the Transmitter and plug it into a standard AC source.

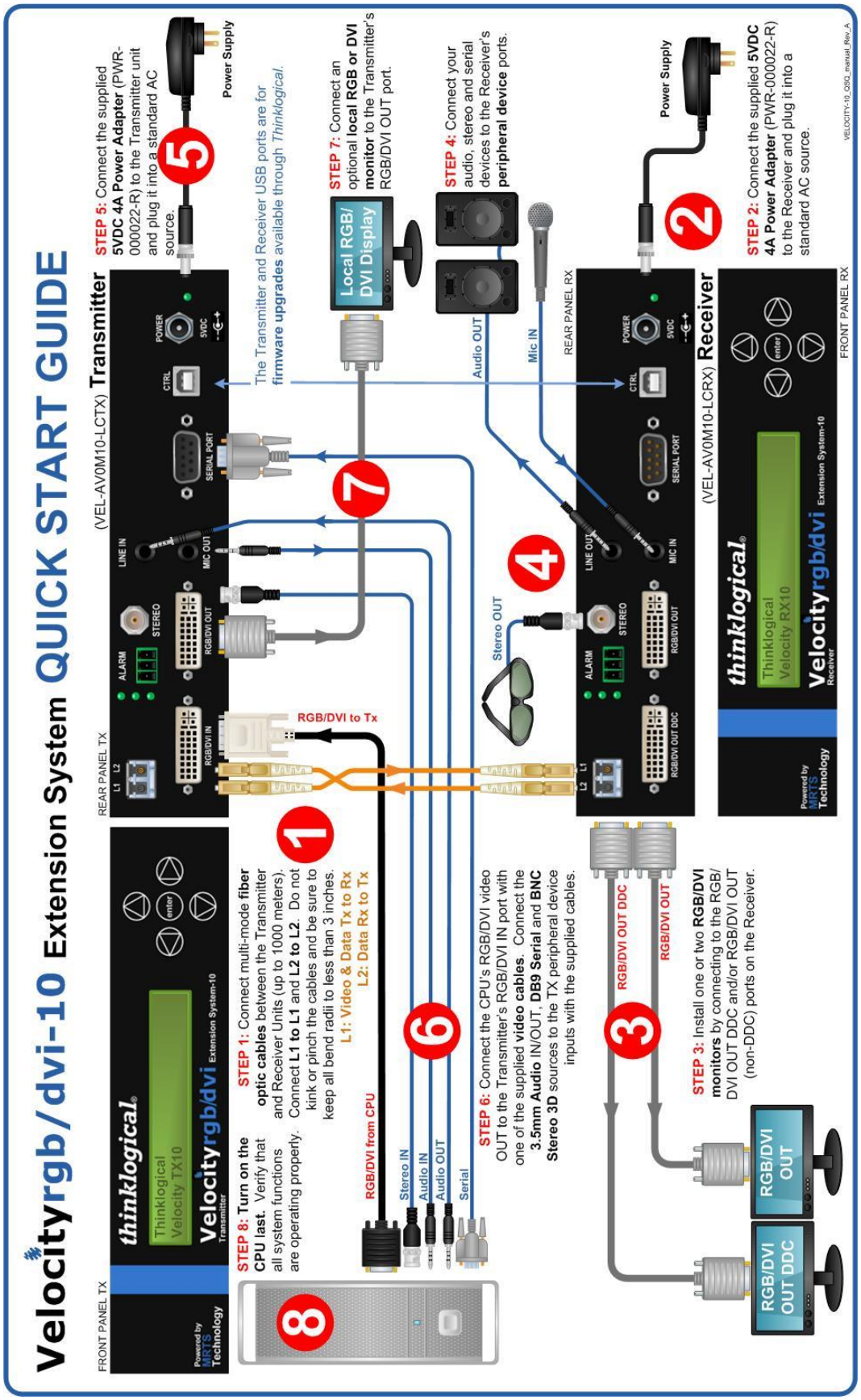
STEP 6: **Turn on the CPU last**. *Verify that all system features are functioning properly.*

STEP 1: Connect **multi-mode** (up to 1000 meters) **or single-mode** (up to 40 kilo-meters) **fiber optic cables** between the Transmitter and Receiver Units. Do not kink or pinch the cables and be sure to keep all bend radii to less than 3 inches.

STEP 2: Connect the supplied **AC Power Adapter** (PWR-000022-R) to the Receiver and plug it into a standard AC source.

STEP 3: Install one or two **VGA monitors** by connecting their HD15 cables to the VGA 1 and/or VGA 2 ports on the Receiver. Connect the **audio input/output devices** to the Receiver's 3.5mm audio ports

VelocityRGB/DVI-10 Quick Start Guide



VelocityRGB-12 Component Extender Quick Start Guide