USER MANUAL

MODELS:

690T
SDI Fiber Optic Transmitter
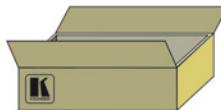**690R**
SDI Fiber Optic Receiver

690T, 690R Quick Start Guide

This guide helps you install and use your products for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

☑ The **690T** SDI Fiber Optic Transmitter or the **690R** SDI Fiber Optic Receiver

☑ 1 power adapter (5V DC input)

☑ 4 Rubber feet

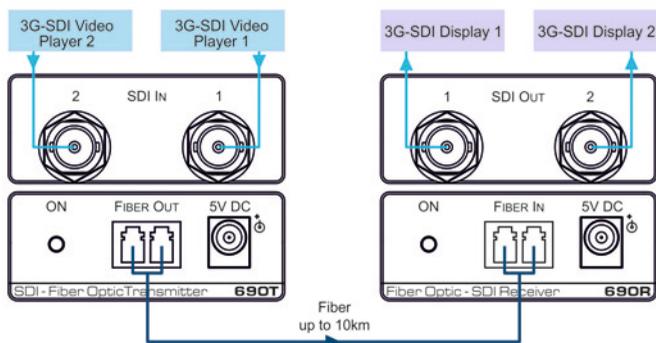☑ Mounting brackets

☑ 1 Quick Start Guide

Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

Step 2: Install the 690T/690R

Mount the units in a rack (**RK-4PT**) or place them on a table.

Step 3: Connect inputs and outputs

Always switch OFF the power on each device before connecting it to your **690T/690R**.

The SDI 1 IN source signal on the **690T** is always routed to the SDI 1 OUT acceptor on the **690R** and the SDI 2 IN source signal on the **690T** is always passed to the SDI 2 OUT acceptor on the **690R**

On the 690T:
▶ Connect two 3G-SDI video players

On the 690R:
▶ Connect two 3G-SDI displays

Connect 690T to 690R:
▶ Connect the fiber optic cable from the optic connector on the **690T** to the optic connector on the **690R**

Connect a power adapter to the 5V DC socket and to the mains electricity on both the **690T** and the **690R**.

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer Pico TOOLS™ **690T** *SDI Fiber Optic Transmitter* or **690R** *SDI Fiber Optic Receiver* which are ideal for the following typical applications:

- Home theater, presentation and multimedia applications
- Long range multimedia distribution for cinemas, stores, and entertainment centers
- Video production and broadcast facilities
- Retail stores and other point-of-sale systems
- Digital signage

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment

- Review the contents of this user manual

> Go to http://www.kramerelectronics.com to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)

- Do not secure the cables in tight bundles or roll the slack into tight coils

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality

- Position your Kramer product away from moisture, excessive sunlight and dust

> This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

> The customer can replace any SFP module with a standard SFP module but Kramer guarantees correct operation only with Kramer supplied modules.

> SFP modules must be of the same type: either MSA or non-MSA.

> Only modules Laser Class I acc. 21 CFR 1040 and Class 1 per IEC 60825-1 are allowed in this product.

2.2   Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3   Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

3   Overview

The **690T** is a high-performance fiber optic transmitter for SD-SDI, HD-SDI and 3G-SDI signals. The unit converts up to two channels of serial digital signals to light pulses that are transmitted over a dual single mode cable to a **690R** receiver that converts them back to serial digital signals. The **690T** and the **690R** pair have a transmission range of 10km (more than 6.2 miles) for 3G-SDI.

The **690T** and the **690R** feature:

- A maximum data rate of up to 3Gbps, enabling it to be used for standard definition, high definition and the new 3G high definition serial digital video signals (3G-SDI)

- Two SDI gold-plated BNC connectors each for the transmitter and the receiver

- SD-SDI, HD-SDI and 3G-SDI support of video pathological patterns for SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 297-2006
  Standard Definition (SD-SDI) means an NTSC or PAL compatible video format, consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video
  High Definition (HD-SDI) means a video format, consisting of 720 active lines of progressive video or 1080 lines of progressive or interlaced video
  3G-SDI means a video format, consisting of 1080 lines of progressive video

- Support of data rates of 270Mbps, 1483.5Mbps, 1485Mbps and 2970Mbps

- SMPTE 297-2006 compatible electrical-to-optical interfaces

- HDTV compatibility

- Reclocking and equalization on each channel

- Cable equalization up to 200m for 1.5GHz HD signals, and 100m for 3GHz HD signals

- Only modules Laser Class I acc. 21 CFR 1040 and Class 1 per IEC 60825-1 are allowed in this product.

- 5V DC power adapters and housing in Kramer Pico TOOLS™ enclosures. Four units can be rack mounted side−by−side in a 1U rack space with the optional **RK-4PT** rack adapter

3.1 Defining the 690T and the 690R SDI Fiber Optic Transmitter and Receiver

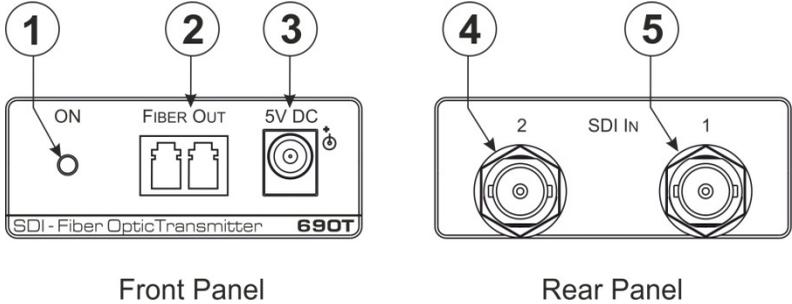Figure 1 and Figure 2 define the **690T** and **690R**, respectively.

Figure 1: 690T SDI Fiber Optic Transmitter Front and Rear Panels

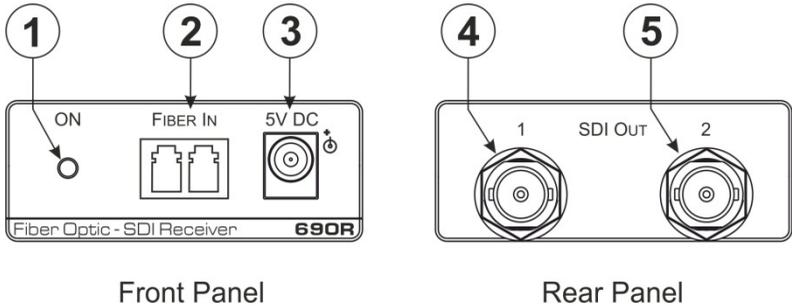| #	Feature	Function
1	*ON* LED	Illuminates when receiving power
2	*FIBER OUT* Dual SFP Connector	Connects to the dual optical connector on the **690R** via dual single mode cable
3	*5V DC* Connector	Connect to the power adapter
4	SDI IN 2 BNC Connector	Connect to the SDI source 2
5	SDI IN 1 BNC Connector	Connect to the SDI source 1

Figure 2: 690R SDI Fiber Optic Receiver Front and Rear Panels

#	Feature	Function
1	*ON LED*	Illuminates when receiving power
2	*FIBER IN* Dual SFP Connector	Connects to the dual optical connector on the **690T** via dual single mode cable
3	*5V DC Connector*	Connect to the power adapter
4	*SDI OUT 1* BNC Connector	Connect to the SDI acceptor 1
5	*SDI OUT 2* BNC Connector	Connect to the SDI acceptor 2

4   Connecting the 690T and the 690R

Always switch off the power to any device before connecting it to your **690T** and/or **690R**. After connecting your **690T** and/or **690R** connect the power and then switch on the power to the device.

To connect the 690T and the 690R as illustrated in the example in Figure 3:

1. Connect up to two SDI sources (for example, 3G-SDI video players) to the two SDI IN connectors.

2. Connect the two SDI OUT connectors to up to two SDI acceptors (for example, 3G-SDI displays).

The SDI 1 IN source signal on the **690T** is always routed to the SDI 1 OUT acceptor on the **690R** and the SDI 2 IN source signal on the **690T** is always passed to the SDI 2 OUT acceptor on the **690R**

3. Remove the dust caps and connect the OPTIC CABLE connector of the **690T** to the OPTIC CABLE connector of the **690R**, via dual single mode cable (9/12) over LC connectors (a maximum range of 10km (more than 6.2 miles)).

4. Connect the power adapter to the 5V DC socket and to the mains electricity for both the **690T** and the **690R** (not shown in Figure 3).

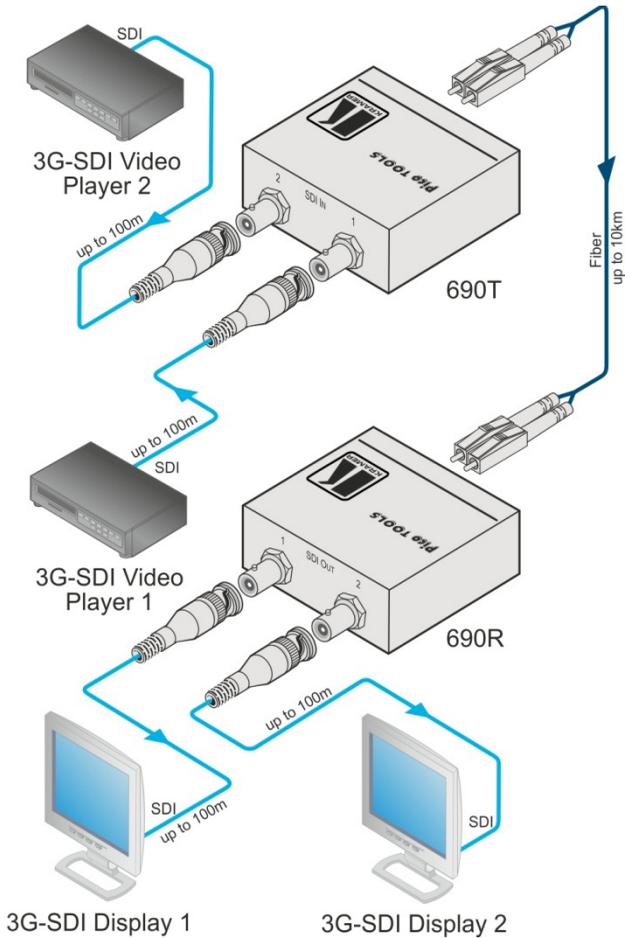Figure 3: Connecting the 690T and/or 690R

5   Technical Specifications

	690T	690R
INPUTS:	2 SDI/HD−SDI/3G-SDI on BNC connectors	2 LC optical connectors
OUTPUTS:	2 LC optical connectors	2 SDI/HD−SDI/3G-SDI on BNC connectors
BANDWIDTH:	Supports up to 3Gbps bandwidth for each input	
FIBER OPTIC EXTENSION:	Up to 10km (>6.2 miles) for 3G-SDI	
INPUT CABLE EQUALIZATION	200m for SDI, 100m for 3G-SDI	
FIBER-OPTIC CONNECTION:	Dual single mode fiber (9/125) over LC connectors	
POWER SOURCE:	5V DC, 480mA	5V DC, 350mA
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)	
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)	
HUMIDITY:	10% to 90%, RHL non-condensing	
DIMENSIONS:	6.2cm x 5.2cm x 2.4cm (2.4" x 2.0" x 0.9") W, D, H	
WEIGHT:	0.14kg (0.31lbs) approx each	
ACCESSORIES:	1 Power supply	
OPTIONS:	RK-4PT rack adapter	
Specifications are subject to change without notice at http://www.kramerelectronics.com		

LIMITED WARRANTY

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.

2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.

3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics will not do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com

SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

Laser Compliance	
LASER PRODUCT	Laser Class I acc. 21 CFR 1040 and Class 1 per IEC 60825-1.

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