

**Kramer Electronics, Ltd.**



# **USER MANUAL**

**Models:**

***670T, HDMI Optical Transmitter***

***670R, HDMI Optical Receiver***

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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<sup>1</sup> that are clearly defined by function.

Congratulations on purchasing your Kramer DigiTOOLS® **670T HDMI Optical Transmitter** and/or **670R HDMI Optical Receiver** which are ideal for:

- 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

The package includes the following:

- **670T** and/or **670R**
- Power adapter (5V DC Input)
- This user manual<sup>2</sup>

The multimode (OM3) fiber cable with SC connectors is not supplied with the unit

## 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
- Use Kramer high performance high resolution cables<sup>3</sup>

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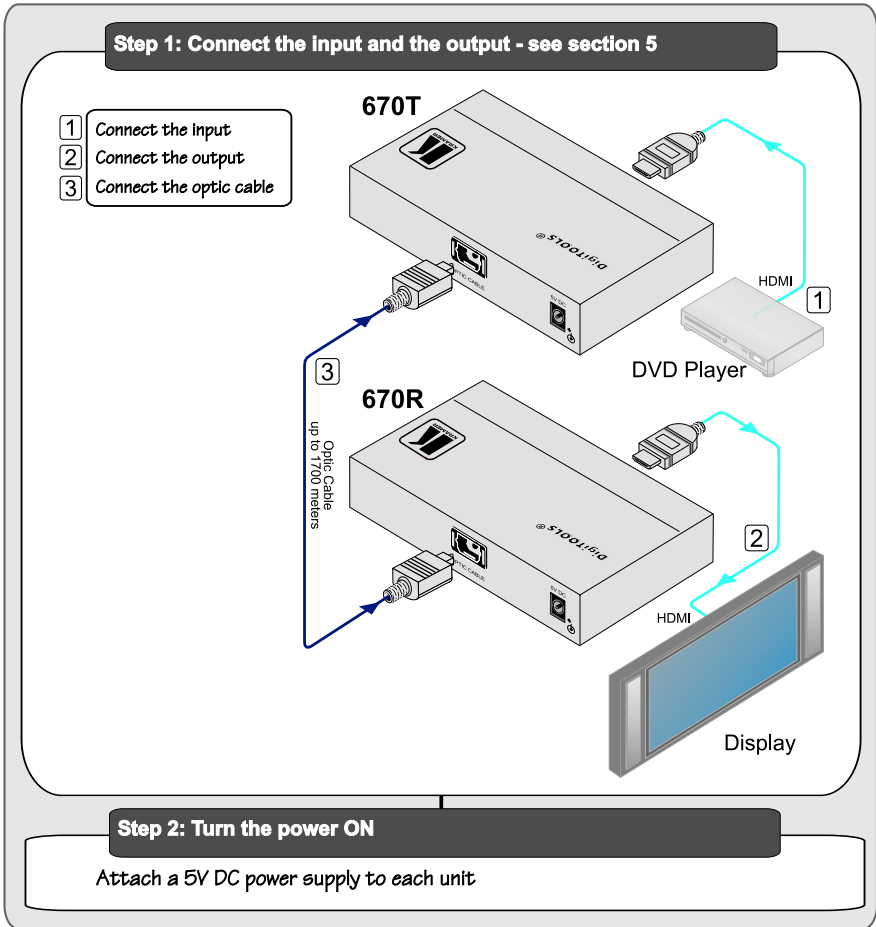
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from the Internet at this URL: <http://www.kramerelectronics.com>

3 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

## 2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.



### 3 Overview

The **670T** converts the HDMI signal to an optical signal, and the **670R** converts the optical signal back into an HDMI signal. Together, the **670T** and **670R** form an HDMI transmitter/receiver over multimode fiber system.

The **670T** and **670R** pair:

- Features a transmission range of 1700 meters (more than 5570ft) over an optical cable
- Is strictly regulated in accordance with Class 3R Laser Eye Safety in compliance with ANSI Z136 and IEC 60825-1:2007
- Includes HDMI connectors
- Transmits four TMDS video channels as well as one low-speed channel for passing HDCP, EDID, 5V source and a Hot Plug Detect (HPD) signal over one multimode fiber
- Supports up to 2.25Gbps bandwidth per graphic channel<sup>1</sup>
- Is HDCP compliant
- Has 5V DC power adapters and is housed in Kramer DigiTOOLS<sup>®</sup> enclosures

#### 3.1 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital<sup>2</sup> audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality.

In particular, HDMI<sup>3</sup>:

- Provides a simple<sup>4</sup> interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy<sup>5</sup> cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio<sup>6</sup> on a single cable

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1 Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions

2 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

3 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

4 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

5 HDMI technology has been designed to use standard copper cable construction at up to 15m

6 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable<sup>1</sup>, and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

HDMI has the capacity to support:

- Existing high-definition video formats (720p, 1080i, and 1080p/60), as well as standard definition formats such as NTSC or PAL

### 3.2 Recommendations for Achieving the Best Performance

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise-levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **670T** and **670R** away from moisture, excessive sunlight and dust



**Caution** – No operator-serviceable parts inside unit.

**Warning** – Use only the Kramer Electronics input power wall adapter that is provided with this unit<sup>2</sup>.

**Warning** – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

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<sup>1</sup> HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

<sup>2</sup> For example, part number 2535-052002

## 4 Your HDMI Optical Transmitter and Receiver

This section describes the:

- **670T HDMI Optical Transmitter**, see section 4.1
- **670R HDMI Optical Receiver**, see section 4.2

### 4.1 Your 670T HDMI Optical Transmitter

Figure 1 and Table 1 define the **670T HDMI Optical Transmitter**:

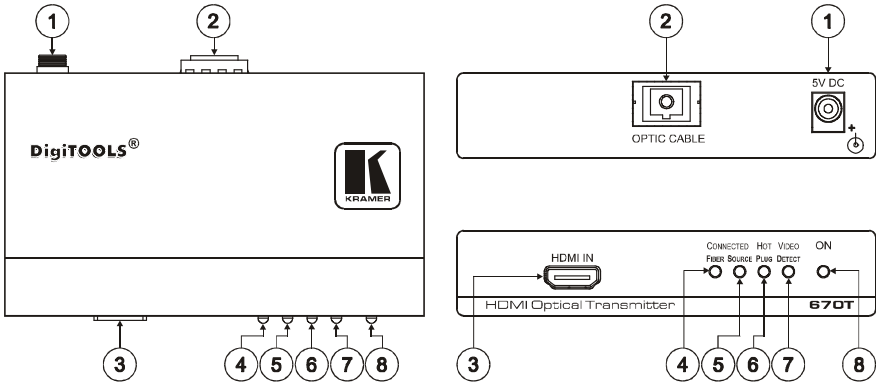


Figure 1: 670T HDMI Optical Transmitter

Table 1: 670T HDMI Optical Transmitter Features

#	Feature	Function
1	5V DC	+5V DC connector for powering the unit
2	OPTIC CABLE Connector <sup>1</sup>	Connect to the optical connector on the <b>670R</b>
3	HDMI IN Connector	Connects to the HDMI source
4	CONNECTED LEDs	FIBER Illuminates when the fiber optic cable is connected
5		SOURCE Illuminates when a source is connected
6	HOT PLUG LED	Indicates a connected display on the receiver side
7	VIDEO DETECT LED	Indicates a valid video signal on the transmitter side
8	ON LED	Illuminates when receiving power

<sup>1</sup> With a dust cap cover

## 4.2 Your 670R HDMI Optical Receiver

Figure 2 and Table 2 define the **670R HDMI Optical Receiver**:

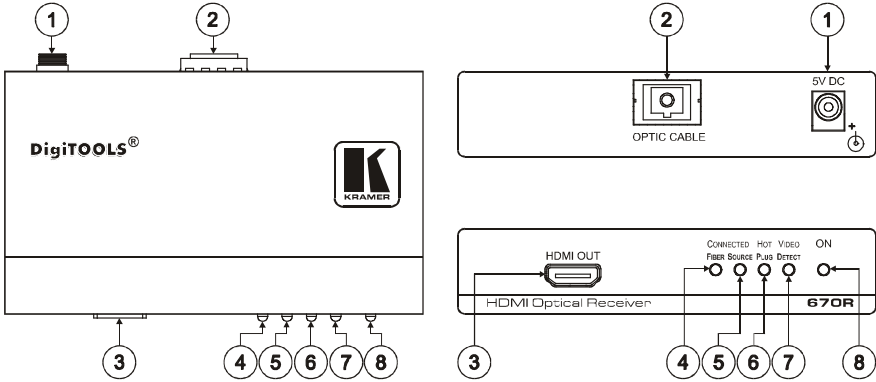


Figure 2: 670R HDMI Optical Receiver

Table 2: 670R HDMI Optical Receiver Features

#	Feature	Function	
1	5V DC	+5V DC connector for powering the unit	
2	OPTIC CABLE Connector <sup>1</sup>	Connect to the optical connector on the <b>670T</b>	
3	HDMI OUT Connector	Connects to the HDMI acceptor	
4	CONNECTED LEDs	FIBER	Lights when the fiber optic cable is connected
5		SOURCE	Lights when a source is connected
6	HOT PLUG LED	Indicates a connected display on the receiver side	
7	VIDEO DETECT LED	Indicates a valid video signal on the transmitter side	
8	ON LED	Illuminates when receiving power	

## 5 Connecting the 670T and 670R Transmitter/Receiver System

To connect the **670T** and **670R**, as illustrated in the example in Figure 3, do the following:

1. Connect an HDMI source (for example a DVD player) to the HDMI IN connector.
2. Connect the HDMI OUT connector to an HDMI acceptor (for example, an LCD display).
3. Remove the dust caps and connect the OPTIC CABLE connector of the **670T** to the OPTIC CABLE connector of the **670R**, via optic OM3 cabling<sup>2</sup> (maximum range of 1700 meters (over 5570ft)).

<sup>1</sup> Covered with a dust cap

<sup>2</sup> With SC connectors



4. Connect the 5V DC power adapter to the power socket on each unit and connect the adapter to the mains electricity (not shown in Figure 3).

Avoid direct eye exposure into the optic connectors when powered, although this product is regulated strictly enough to operate under the Laser Class 3R for eye safety

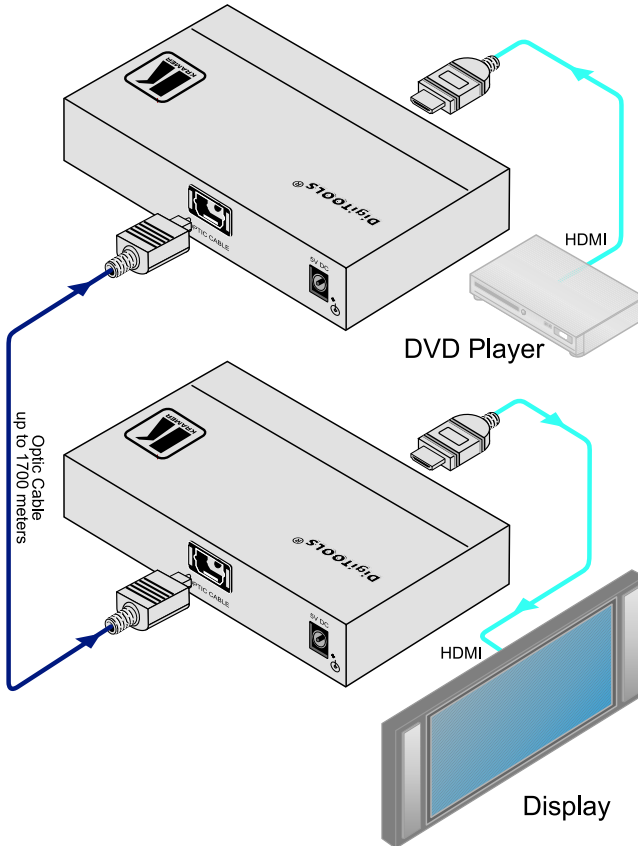


Figure 3: Connecting the 670T/670R Transmitter/Receiver System

## 6 Technical Specifications

Table 3 includes the technical specifications<sup>1</sup>.

*Table 3: Technical Specifications of the 670T and the 670R*

	<b>670T</b>	<b>670R</b>
INPUTS:	HDMI Connector	1 optical connector
OUTPUTS:	1 optical connector	HDMI Connector
BANDWIDTH:	Supports up to 2.25Gbps bandwidth per graphic channel	
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI 1.3, using fiber optic communication links and DDC2B	
EXTENSION LIMIT:	1700m (>5570 feet) for 1080p/60Hz	
FIBER-OPTIC CONNECTION:	SC connectors for multimode (OM3) fiber cable (not supplied with the unit)	
INDICATOR LEDs:	Video, source, acceptor fiber and on LEDs	
POWER SOURCE:	5V DC, 250mA	5V DC, 230mA
DIMENSIONS:	12cm x 7.95cm x 2.76cm (4.7" x 3.1" x 1.08", W, D, H)	
WEIGHT:	0.3kg (0.67lbs) approx. each	
ACCESSORIES:	2 power supplies (5V/2A), 2 bracket installation kits	
OPTIONS:	HDMI/HDMI male-to-male cable <sup>2</sup>	

<sup>1</sup> Specifications are subject to change without notice

<sup>2</sup> The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

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## LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

### HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

### WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

### WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site [www.kramerelectronics.com](http://www.kramerelectronics.com).
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
  - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
  - ii) Product modification, or failure to follow instructions supplied with the product
  - iii) Repair or attempted repair by anyone not authorized by Kramer
  - iv) Any shipment of the product (claims must be presented to the carrier)
  - v) Removal or installation of the product
  - vi) Any other cause, which does not relate to a product defect
  - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

### WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

### HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

### LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

### EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

**NOTE:** All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);  
generic emission standard.  
Part 1: Residential, commercial and light industry"  
EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.  
Part 1: Residential, commercial and light industry environment".  
CFR-47: FCC® Rules and Regulations:  
Part 15: "Radio frequency devices  
Subpart B Unintentional radiators"

### CAUTION!

- ☒ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ☒ Use the supplied DC power supply to feed power to the machine.
- ☒ Please use recommended interconnection cables to connect the machine to other components.  
\* FCC and CE approved using STP cable (for twisted pair products)



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**For the latest information on our products and a list of Kramer distributors, visit our Web site: [www.kramerelectronics.com](http://www.kramerelectronics.com), where updates to this user manual may be found. We welcome your questions, comments and feedback.**



**Caution**

**Safety Warning:**

Disconnect the unit from the power supply before opening/servicing.

**Class 3R Laser Compliance**



**CLASS 3R LASER PRODUCT**

This product complies with “ANSI Z136” and “IEC 60825-1:2007”.



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**Kramer Electronics, Ltd.**

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