



KRAMER ELECTRONICS LTD.

USER MANUAL

MODELS:

631T

HDMI Optical Transmitter

631R

HDMI Optical Receiver

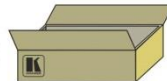


631T, 631R Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to <http://bit.ly/k-prod-downloads> to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ✓ 631T, 631R HDMI Optical Transmitter/Receiver
- ✓ 4 Rubber feet (each)
- ✓ 1 Power supply (each) (12V DC)
- ✓ 1 Quick Start sheet



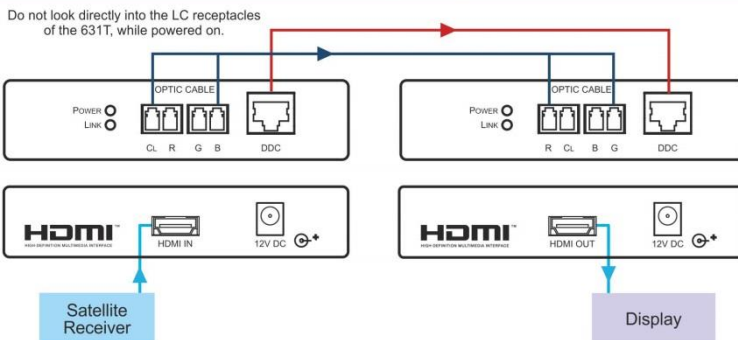
Save the original box and packaging materials in case you need to return your **631T, 631R** for service.

Step 2: Install the 631T, 631R

Attach the rubber feet and place on a table or mount the **631T, 631R** in a rack (using an optional **RK-1** rack adapter).

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **631T, 631R**.



Always use Kramer high-performance cables for connecting AV equipment to the **631T, 631R**.

Step 4: Connect the power

Connect the 12V DC power adapter to the **631T, 631R** and plug the adapter into the mains electricity.



Contents

1	Introduction	1
2	Getting Started	2
2.1	Achieving the Best Performance	2
2.2	Safety Instructions	3
2.3	Recycling Kramer Products	3
3	Overview	4
3.1	About the Power Connect™ Feature	4
3.2	Defining the 631T/R HDMI Optical Transmitter and Receiver	5
4	Using the 631T/631R HDMI Optical Transmitter/Receiver	6
4.1	Connecting the 631T/631R HDMI Optical Transmitter/Receiver	6
4.2	Operating the 631T/631R HDMI Optical Transmitter/Receiver	7
4.3	Wiring the TP LINE IN / LINE OUT RJ-45 Connectors	8
4.4	Avoiding Pitfalls Using the 631T/631R	9
5	Technical Specifications	10

Figures

Figure 1: 631T HDMI Optical Transmitter	5
Figure 2: 631T HDMI Optical Receiver	5
Figure 3: Connecting the 631T/631R	7
Figure 4: TP PINOUT	8

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 video, audio, presentation, and broadcasting professionals 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 14 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; 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 Video Products; GROUP 12: Digital Signage; GROUP 13: Audio; and GROUP 14: Collaboration.

Congratulations on purchasing your Kramer **631T/R** *HDMI Optical Transmitter and 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

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/support/product_downloads.asp 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 **631T/R** 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.

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



Warning: Class 1 Laser Product

- Invisible laser radiation present
- Avoid long-term viewing of laser
- Avoid the use of magnifying viewing aids or instruments (such as binoculars, telescopes, microscopes and magnifying lenses, but not spectacles or contact lenses)
- Avoid placing optical devices in the emitted beam that could cause the concentration of the laser radiation to be increased

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 Kramer DigiTOOLS® **631T HDMI Optical Transmitter** and the **631R HDMI Optical Receiver** are an optical transmitter and receiver pair for transmitting HDMI signals up to 1600x1200 at 60Hz. The **631T** converts an HDMI signal into an optical signal and the **631R** converts the optical signal back to HDMI.

The **631T/631R** features:

- A maximum data rate of 6.75Gbps (2.25Gbps per graphic channel)
- HDTV compatibility and HDCP compliance
- A system range of up to 100m (320ft)
- The Power Connect™ System - Only one unit in a system, the transmitter or the receiver, needs to be connected to a power source when the devices are within 50m (150ft) of each other
- Use of UTP (unshielded twisted pair) or STP (shielded twisted pair) cables such as CAT 5 and fiber optic with 4 simplex or 2 duplex LC fiber connectors
- A compact DigiTOOLS® structure - 3 units can be rack mounted side-by-side in a 1U rack space with the optional RK-3T rack adapter

3.1 About the Power Connect™ Feature

The Power Connect™ feature here means that only one unit in a system, the transmitter or receiver, needs to be connected to a power source when the devices are within 60m (197ft) of each other. The Power Connect™ feature applies as long as the cable can carry power and the distance does not exceed 60m on standard TP cable. (Heavier gauge cable may be used to extend the Power Connect™ range).

3.2 Defining the 631T/R HDMI Optical Transmitter and Receiver

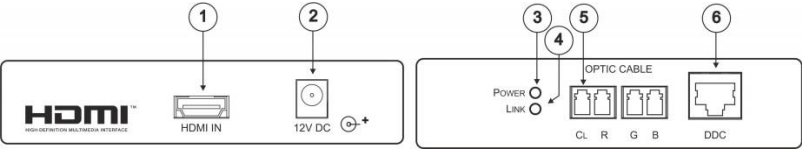


Figure 1: 631T HDMI Optical Transmitter

#	Feature	Function
1	<i>HDMI IN</i>	Connects to the HDMI source
2	<i>12V DC</i>	+12V DC connector for powering the unit
3	<i>POWER LED</i>	Illuminates when receiving power
4	<i>LINK LED</i>	Illuminates when receiving a valid input signal
5	<i>OPTIC CABLE</i> Connector	Connect to the connector on the 631R
6	<i>DDC RJ-45</i> Connector	Connects to the Display Data Channel <i>DDC</i> RJ-45 connector on the 631R

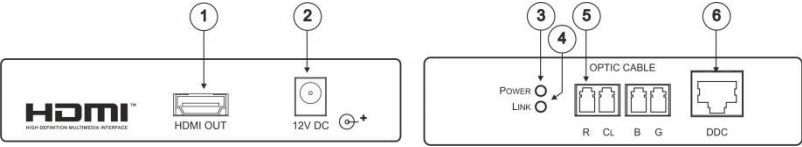


Figure 2: 631T HDMI Optical Receiver

#	Feature	Function
1	<i>HDMI OUT</i>	Connects to the HDMI acceptor
2	<i>12V DC</i>	+12V DC connector for powering the unit
3	<i>POWER LED</i>	Illuminates when receiving power
4	<i>LINK LED</i>	Illuminates when receiving a valid input signal
5	<i>OPTIC CABLE</i> Connector	Connect to the connector on the 631T
6	<i>DDC RJ-45</i> Connector	Connects to the Display Data Channel <i>DDC</i> RJ-45 connector on the 631T

4 Using the 631T/631R HDMI Optical Transmitter/Receiver



Always switch off the power to each device before connecting it to your **631T/R**. After connecting your **631T/R**, connect its power and then switch on the power to each device.

You can use the **631T** and **631R** to configure an HDMI optical transmitter and receiver system. This section describes how to:

- Connect the **631T/631R** transmitter and receiver system (see [Section 4.1](#))
- Operate the **631T/631R** transmitter and receiver system (see [Section 4.2](#))
- Wire the DDC (CAT 5) RJ-45 connectors (see [Section 4.3](#))
- Avoid pitfalls (see [Section 4.4](#))

4.1 Connecting the 631T/631R HDMI Optical Transmitter/Receiver

To connect the **631T** with the **631R**, as the example in [Figure 3](#) illustrates, do the following:

1. On the **631T**, connect the HDMI source (for example, a set top box) to the HDMI IN connector, using the Kramer HDMI copper cable.
Note: Do not look directly into the LC receptacles of the **631T**, while powered on, although this product is regulated strictly enough to operate under the Laser Class 1, classified by CDRH/FDA for eye safety.
2. On the **631R**, connect the HDMI OUT connector to the HDMI acceptor (for example, a display), using Kramer HDMI copper cable.
3. Remove the module dust covers and connect each duplex LC fiber cable one-by-one to each of the four LC receptacles of the **631T** and **631R**. The 4 LC patch cord fiber bundled cable lets you transmit 4 channels (R, G, B, and CL (CLOCK)) of graphic data and multi-channel audio data over it.
Note: Carefully recheck the polarities and ensure that the duplex connectors are fully engaged.
4. Connect the DDC RJ-45C connector on the **631T** to the DDC RJ-45C connector on the **631R**, via UTP cabling, see [Section 4.3](#).

5. Connect the 12V DC, 2.1A power adapter to the power socket of either the **631T** or **631R**, and connect the adapter to the mains electricity.

The signal from the HDMI source is transmitted via CAT5 and fiber optic cables, decoded and converted at the HDMI OUT connector to the HDMI acceptor.

The power connect feature lets you connect just one power adapter to either the transmitter or receiver. Alternatively, connect the separate power supplies to the transmitter and to the receiver simultaneously

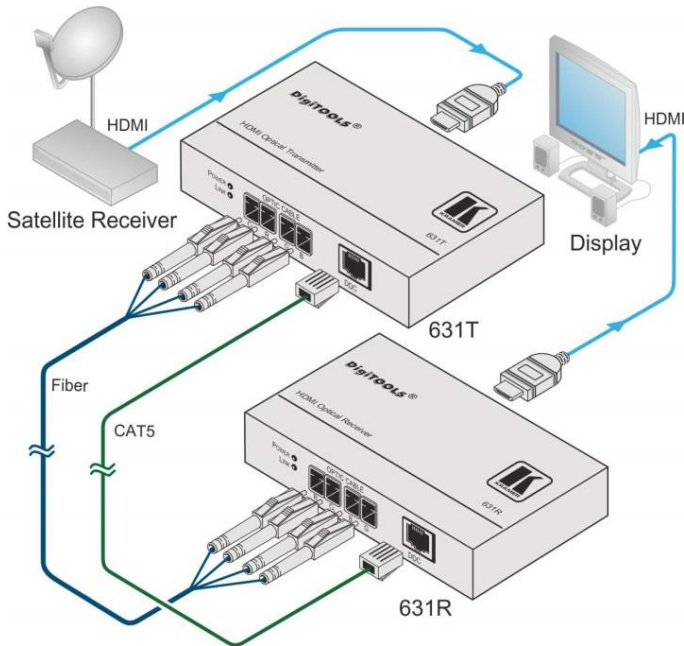


Figure 3: Connecting the 631T/631R

4.2 Operating the 631T/631R HDMI Optical Transmitter/Receiver

To operate the **631T/631R** HDMI Optical Transmitter/Receiver system:

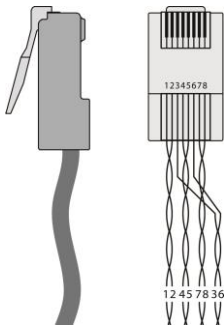
- Turn ON the power on the set-top box and the display
Note: Avoid “hot plugging” the **631T** or **631R**. This is not a recommended practice with live digital voltages (but it can be done)

4.3 Wiring the TP LINE IN / LINE OUT RJ-45 Connectors

This section defines the TP pinout, using a **straight** pin-to-pin cable with RJ-45 connectors.

EIA /TIA 568B	
PIN	Wire Color
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown

Figure 4: TP PINOUT



Pin	Symbol	Description
1	DDC Data GND	DDC Data line return ground
2	DDC Data	DDC Data line for (HDMI Digital Display Channel) DDC2B communication
3	DDC Clock GND	DDC Clock line return ground
4	Power GND	Main power return ground
5	Power	Main power for Kramer module
6	DDC Clock	DDC Clock line for (HDMI Digital Display Channel) DDC2B communication
7	5V_IN	DVI 5V (DVI No. 14 pin for Display)
8	HPD	Signal is driven by monitor to enable the system to identify the presence of a Display

4.4 Avoiding Pitfalls Using the 631T/631R

Be aware of the following:

- **If the display device shows only a black screen** – Be sure that the AC plugs and the DC jacks used by external power supplies are firmly connected; that the power bars are live; and that the **631T/631R** are connected correctly to the media receiver or computer and display, respectively. Also, check if the media receiver or computer and display are powered on and properly booted. In addition, reboot the system after reconnecting the optical system cable
- **If the screen is distorted or displays noise** - Check if the graphics resolution is properly set. Go to the Display Properties of Windows and click on the Settings. Be sure that the resolution is set at equal to or less than UXGA (1600x1200) at 60Hz refresh ratio. In addition, reset the system. Power down, disconnect and reconnect the optical system cable and/or the DC power adapter(s), and power up
- **Maintenance** - These cables contain sensitive fiber optic materials that can be damaged through rough handling. Use caution during the installation and use of these cables to ensure that you do not damage them. Avoid installing the cables in an environment where it could be stepped on, run over, pinched or crushed

5 Technical Specifications

INPUTS:	1 HDMI connector (631T); 1 RJ-45 DDC (CAT 5 connector) (631R)
OUTPUTS:	1 RJ-45 DDC (CAT 5 connector) (631T); 1 HDMI connector (631R)
BANDWIDTH:	6.75Gbps (2.25Gbps per graphics channel)
RESOLUTION:	Up to QUXGA (1900x1200 narrow blanking) including 1080p @60Hz, deep color up to 36 bit
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI, using fiber optic communication links and DDC2B
RANGE:	100m (>320ft) for UXGA (1900x1200) at 60Hz
FIBER-OPTIC CONNECTION:	Each has 2 duplex LC receptacles connected to four 62.5/125µm or 50/125µm multimode fiber optic cables
INDICATOR LEDs:	POWER and LINK LEDs
POWER CONSUMPTION:	12V DC 140mA
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:	12cm x 7.95cm x 2.76cm (4.7" x 3.1" x 1.08") W, D, H
WEIGHT:	0.3kg (0.67lbs) approx.
INCLUDED ACCESSORIES:	Power supply, bracket installation kit, 1 HDMI/HDMI male-to-male cable
OPTIONAL ACCESSORIES:	RK-3T 19" 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 APPLICABLE 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 APPLICABLE 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

CE



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing



P/N: 2900-000105



Rev: 4