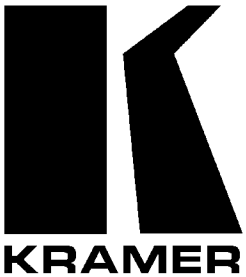
Kramer Electronics, Ltd.



USER MANUAL

Models:

TP-219HD, ***XGA / HD Line Transmitter / Switcher***

TP-220HD, ***XGA / HD Line Receiver / DA***

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1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups[1], which are clearly defined by function.

Congratulations on purchasing your Kramer TOOLS **TP-219HD** *XGA / HD Line Transmitter / Switcher* and Kramer TOOLS **TP-220HD** *XGA / HD Line Receiver / DA* which are ideal for:

- Presentation and multimedia applications
- Long range graphics distribution for schools, hospitals, security, and stores

The package includes the following:

- **TP-219HD** and/or **TP-220HD**
- Power adapter (12V DC Input)
- This user manual[2]

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[3]

2.1 Quick Start

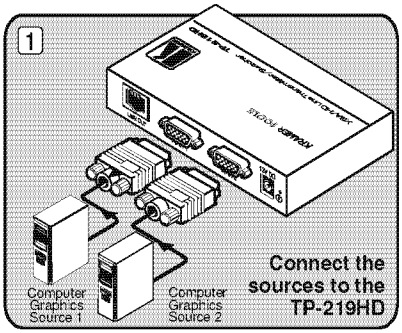
This quick start chart summarizes the basic setup and operation steps.

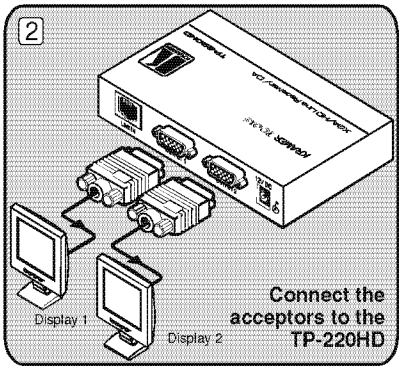
1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

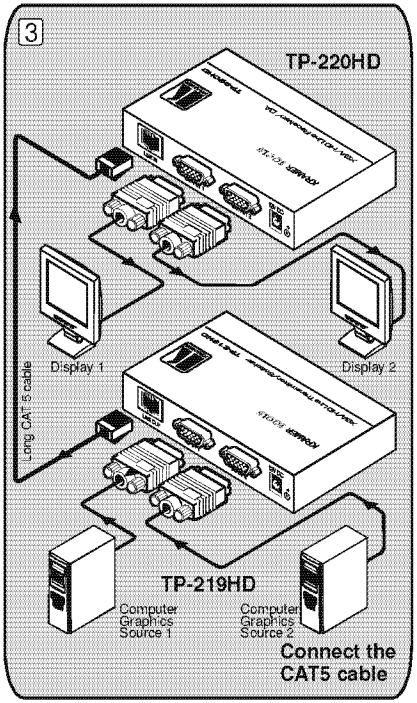
2 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

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

Step 1: Connect the inputs and the outputs







If necessary, set the polarity of both machines using the underside switches

Step 2: Connect the power

If required:

- Adjust the EQ. and LEVEL on the TP-220HD

3 Overview

This section describes:

- The power connect feature, see section 3.1
- Using shielded twisted pair (STP) / unshielded twisted pair (UTP), see section 3.2
- A summary of the **TP-219HD / TP-220HD**, see section 3.3
- Recommendations for achieving the best performance, see section 3.4

3.1 About the Power Connect Feature

The Power Connect feature lets you power a transmitter / receiver system by connecting just one power adapter— to either the transmitter or the receiver. The other unit is fed via the cable connecting between the transmitter/receiver. The Power Connect feature applies as long as the cable can carry power. The distance does not exceed 50 meters on standard CAT5 cable, for longer distances, heavy gauge cable should be used[1].

For a CAT5 cable exceeding a distance of 50 meters, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

3.2 Shielded Twisted Pair (STP) / Unshielded Twisted Pair (UTP)

The decision whether to use shielded twisted pair (STP) cable or unshielded twisted pair (UTP) cable depends on the nature of the application.

It is recommended that in applications with high interference, shielded twisted pair (STP) cable is used. However, the shield itself does create a capacitance that degrades the frequency response of the machines. For shorter distances, of 50m or so, shielded twisted pair (STP) cable is preferred because it provides protection from interference (degradation is not apparent).

For long range applications, unshielded twisted pair (UTP) cable is preferred. However, the unshielded twisted pair (UTP) cable should be installed far away from electric cables, motors and so on, which are prone to create electrical interference.

1 CAT5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

3.3 About the TP-219HD / TP-220HD

The Kramer TOOLS **TP-219HD** can receive two computer graphics/HD[1] signals of which one is selected via an INPUT SELECTOR button. The selected input is transmitted via CAT5 cabling to the **TP-220HD** which distributes it to two outputs simultaneously.

The **TP-219HD** *XGA / HD Line Transmitter / Switcher*:

- Has a transmission range of more than 300 ft. (more than 100 meters)
- Includes two XGA[2]/YUV[3] inputs on HD15F connectors
- Features an INPUT SELECTOR button to select between INPUT 1 and INPUT 2
- Can change the polarity of encoding H and V Sync for XGA graphics
- Can power or be powered by the receiver over the same CAT5 cable (see section 3.1)
- Is 12VDC fed

The **TP-220HD** *XGA / HD Line Receiver / DA*:

- Has two XGA/YUV[3] outputs on HD15F connectors
- Can change the polarity of decoding H and V Sync for XGA graphics
- Includes EQ. and LEVEL controls
- Can power or be powered by the transmitter over the same CAT5 cable (see section 3.1)
- Is 12VDC fed

3.4 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 **TP-219HD/TP-220HD** away from moisture, excessive sunlight and dust

1 The TP-219HD and TP-220HD accept high definition resolutions: 480p, 576p, 720p, 1080i, and 1080p

2 The terminology XGA is used throughout this manual, where this implies any RGBHV signal on an HD15 connector having a resolution from VGA up to UXGA

3 Also known as Y, Cb, Cr, or Y, B-Y, R-Y, or Y, Pb, Pr

4 Your XGA / HD Line Transmitter / Switcher and Receiver / DA

This section describes the:

- **TP-219HD** *XGA / HD – Line Transmitter / Switcher*, see section 4.1
- **TP-220HD** *XGA / HD – Line Receiver / DA*, see section 4.2

4.1 Your TP-219HD

Figure 1, Figure 2, and Table 1 define the **TP-219HD**:

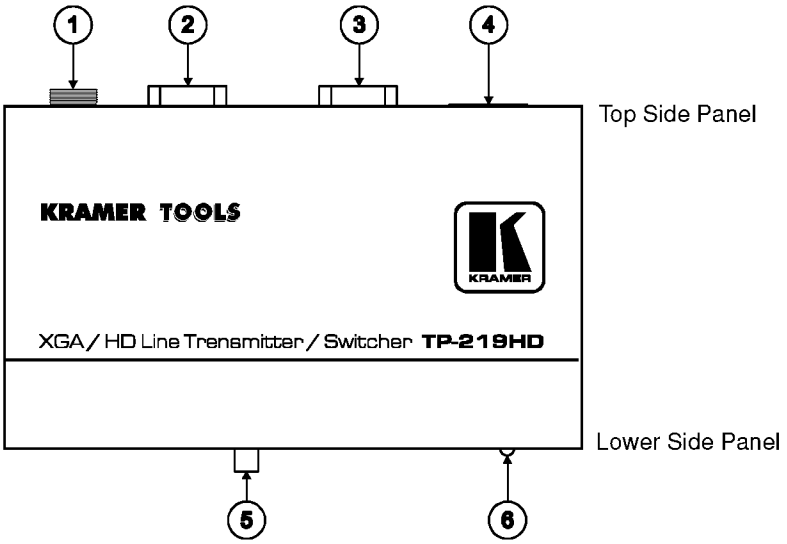


Figure 1: TP-219HD XGA / HD Line Transmitter / Switcher

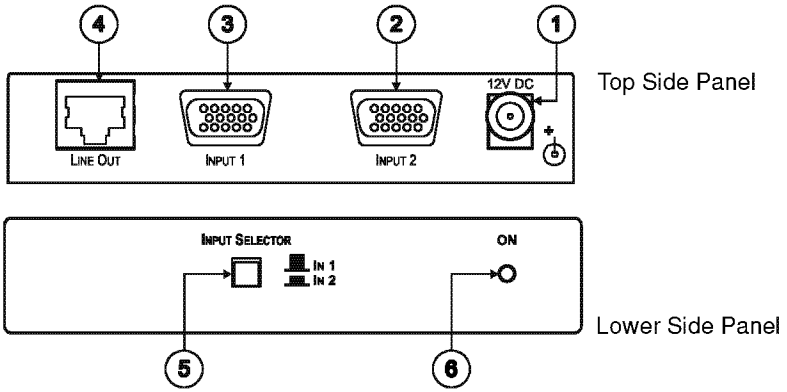


Figure 2: TP-219HD (Top Side and Lower Side Panels)

Table 1: TP-219HD XGA / HD Line Transmitter / Switcher Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*INPUT 2* HD15F Connector	Connect to the second XGA/HD source
3	*INPUT 1* HD15F Connector	Connect to the first XGA/HD source
4	*LINE OUT* RJ-45 Connector	Connect[1] to the LINE IN RJ-45 connector on the **TP-220HD**
5	*INPUT SELECTOR* button	Press to select IN 2; release to select IN 1
6	*ON* LED	Illuminates when receiving power

Figure 3 and Table 2 define the **TP-219HD** underside panel:

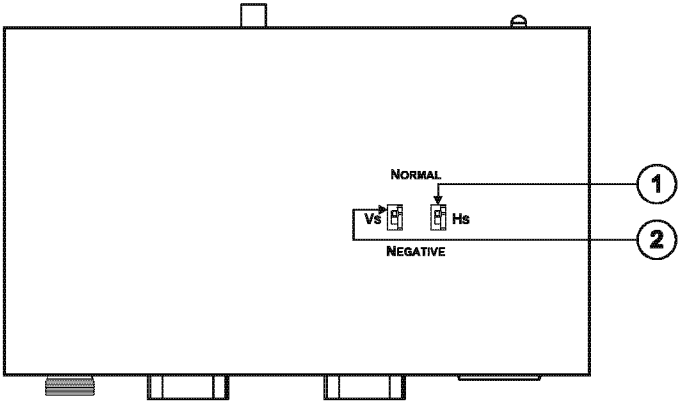


Figure 3: TP-219HD (Underside Panel)

Table 2: TP-219HD (Underside Panel) Features

#	Feature	Function
1	*HS* Switch	Slide the switch up (to NORMAL) to retain the polarity Slide the switch down[2] to change the HS polarity to NEGATIVE polarity[3]
2	*VS* Switch	Slide the switch up (to NORMAL) to retain the polarity Slide the switch down[2] to change the VS polarity to NEGATIVE polarity[3]

1 Using a UTP CAT5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 5 and Figure 9)

2 By default, both switches are set to NORMAL

3 Downgoing syncs

4.2 Your TP-220HD

Figure 4, Figure 5, and Table 3 define the **TP-220HD**:

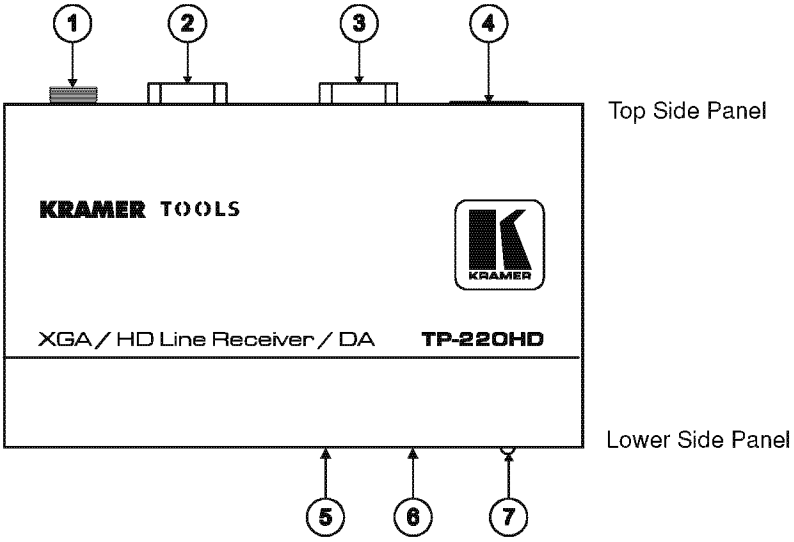


Figure 4: TP-220HD XGA / HD Line Receiver / DA

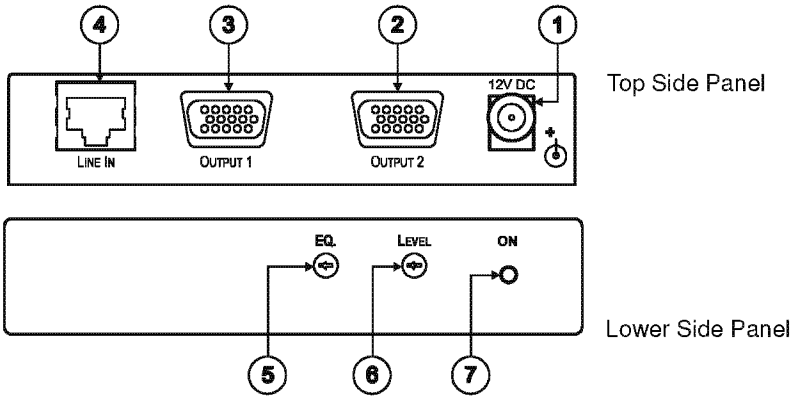


Figure 5: TP-220HD (Top Side and Lower Side Panels)

Table 3: TP-220HD XGA / HD Line Receiver / DA Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*OUTPUT 2* HD15F Connector	Connect to the second XGA/HD acceptor
3	*OUTPUT 1* HD15F Connector	Connect to the first XGA/HD acceptor
4	*LINE IN* RJ-45 Connector	Connect[1] to the LINE OUT RJ-45 connector on the **TP-219HD**
5	*EQ.* Trimmer	Adjust[2] the cable compensation equalization level
6	*LEVEL* Trimmer	Adjust[2] the output signal level
7	*ON* LED	Illuminates when receiving power

Figure 6 and Table 4 define the **TP-220HD** underside panel:

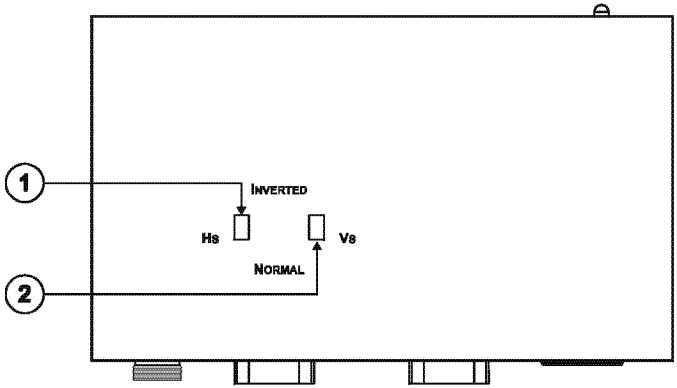


Figure 6: TP-220HD (Underside Panel)

Table 4: TP-220HD (Underside Panel) Features

#	Feature	Function
1	*HS* Switch	Slide the switch up[3] (to INVERTED) to invert the HS polarity Slide the switch down (to NORMAL) to retain the polarity
2	*VS* Switch	Slide the switch up[3] (to INVERTED) to invert the VS polarity Slide the switch down (to NORMAL) to retain the polarity

1 Using a UTP CAT5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 5 and Figure 9)

2 Insert a screwdriver into the small hole and carefully rotate it, to trim the appropriate level

3 By default, both switches are set to NORMAL

5 Connecting the TP-219HD and TP-220HD

You can use the **TP-219HD** *XGA / HD – Line Transmitter / Switcher* with the **TP-220HD** *XGA / HD – Line Receiver / DA* to configure an XGA/HD DA system. This will let you transmit one selected computer graphics/HD signal to two displays via long line CAT5 UTP cabling.

To connect the **TP-219HD** to the **TP-220HD**, as the example in Figure 7 illustrates, do the following:

1. On the **TP-219HD**, connect[1]:
   - An XGA[2] source (for example, Computer Graphics Source 1) to the INPUT 1 HD15F connector
   - An XGA[2] source (for example, Computer Graphics Source 2) to the INPUT 2 HD15F connector
2. If necessary, set the HS and VS switches on the **TP-219HD** underside[3].
3. On the **TP-220HD**, connect[4] the:
   - OUTPUT 1 HD15F connector to an XGA[5] acceptor (for example, Display 1)
   - OUTPUT 2 HD15F connector to an XGA[5] acceptor (for example, Display 2)
4. If necessary, set the HS and VS switches on the **TP-220HD** underside[6].
5. Connect the LINE OUT RJ-45 connector on the **TP-219HD** to the LINE IN RJ-45 connector on the **TP-220HD**, via CAT5 cabling, see section 5.2.
6. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity on both[7] the **TP-219HD** and the **TP-220HD** (not shown in Figure 7).
   The selected signal from the XGA/HD source is transmitted via CAT5 cable, decoded and converted at the OUTPUT 1 and OUTPUT 2 HD15F connectors to the XGA acceptors simultaneously.

1 You do not have to connect both inputs

2 Alternatively, you can connect an HD source, see section 5.1

3 By default, both switches are set to normal (see Figure 3 and Table 2)

4 You do not have to connect both outputs

5 Alternatively, you can connect an HD acceptor, see section 5.1

6 By default, both switches are set to normal (see Figure 6 and Table 4)

7 If you cannot connect the power to both the TP-219HD and TP-220HD, you can just connect the power to one of them

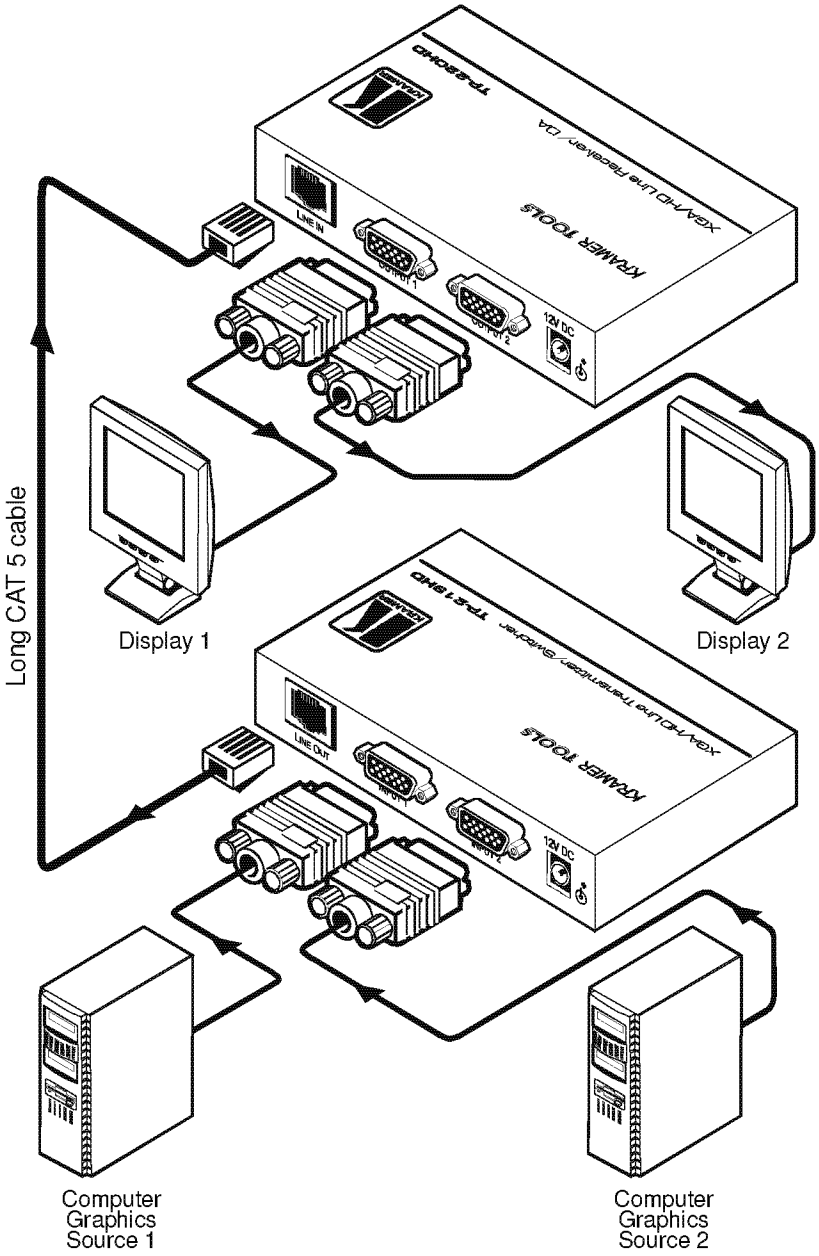


Figure 7: Connecting the TP-219HD / TP-220HD XGA System

5.1 Connecting an HD System

When connecting a high definition source, as illustrated in Figure 8, use a breakout cable such as the Kramer C-GM/3RVF. If you have a VGA to a 5BNC cable, use the RGB wires only.

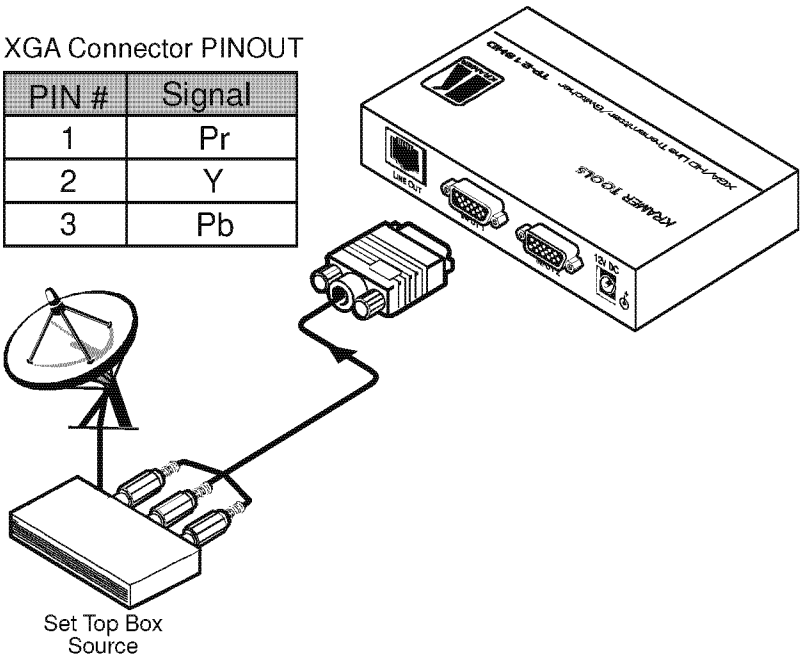


Figure 8: Connecting an HD Source

You can also connect an HD acceptor (for example, a plasma display) using the same PINOUT.

5.2 Wiring the CAT5 LINE IN / LINE OUT RJ-45 Connectors

Table 5 and Figure 9 define the UTP CAT5 PINOUT, using a straight pin-to-pin cable with RJ-45 connectors:

Figure 9: CAT5 PINOUT

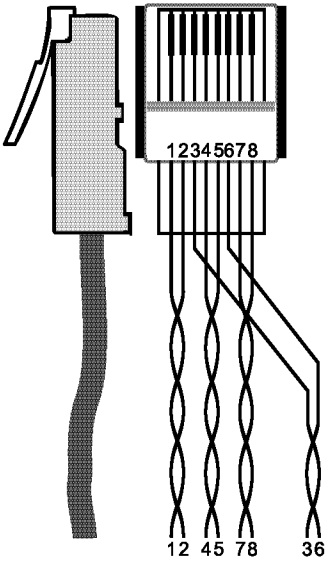


Table 5: CAT5 PINOUT

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

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
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6
Pair 4	7 and 8

6 Technical Specifications

Table 6 includes the technical specifications[1].

Table 6: Technical Specifications of the TP-219HD and TP-220HD Setup

	TP-219HD	TP-220HD
INPUTS:	2 XGA / HD on HD15F connectors	1 CAT5 IN on an RJ-45 connector
OUTPUTS:	1 CAT5 OUT on an RJ-45 connector	2 XGA / HD on HD15F connectors
MAX. OUTPUT LEVEL:	1.5Vpp	
RESOLUTION:	Up to UXGA, up to 1080P	
DIFF. GAIN:	2.3%	
DIFF. PHASE:	0.2°	
K-FACTOR:	0.1%	
S/N RATIO:	70dB @5MHz	
CROSSTALK (all hostile):	-45dB	
CONTROLS:	Input selector button	Level: -9.2dB to +2.1dB EQ.: 0 to +29.5dB @50MHz
COUPLING:	AC	DC[2]
POWER SOURCE:	12V, 300mA, when feeding **TP-220HD**	12V, 300mA, when feeding **TP-219HD**
DIMENSIONS:	12.1cm x 7.18cm x 2.42cm (4.76" x 2.83" x 0.95"), W, D, H	
WEIGHT:	0.3 kg. (0.67 lbs.) approx. each	
ACCESSORIES:	Power supply	

1 Specifications are subject to change without notice

2 The TP-219HD causes the setup to be AC

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.
2. Any product, on which the serial number has been defaced, modified or removed.
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.

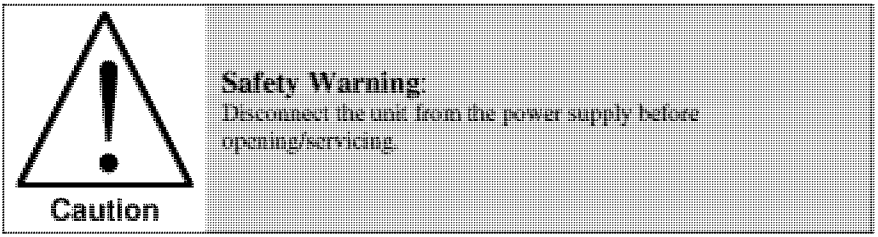
This equipment has been tested to determine compliance with the requirements of:

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.

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



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