Kramer Electronics, Ltd.

USER MANUAL

Model:

TP-310A

UXGA Line Receiver/DA

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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[1] that are clearly defined by function.

Thank you for purchasing the Kramer **TP-310A** *UXGA Line Receiver/DA*, which is ideal for:

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

The package includes the following items:

- **TP-310A** *UXGA Line Receiver/DA*
- Power cord[2]
- This user manual[3]

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[4]

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

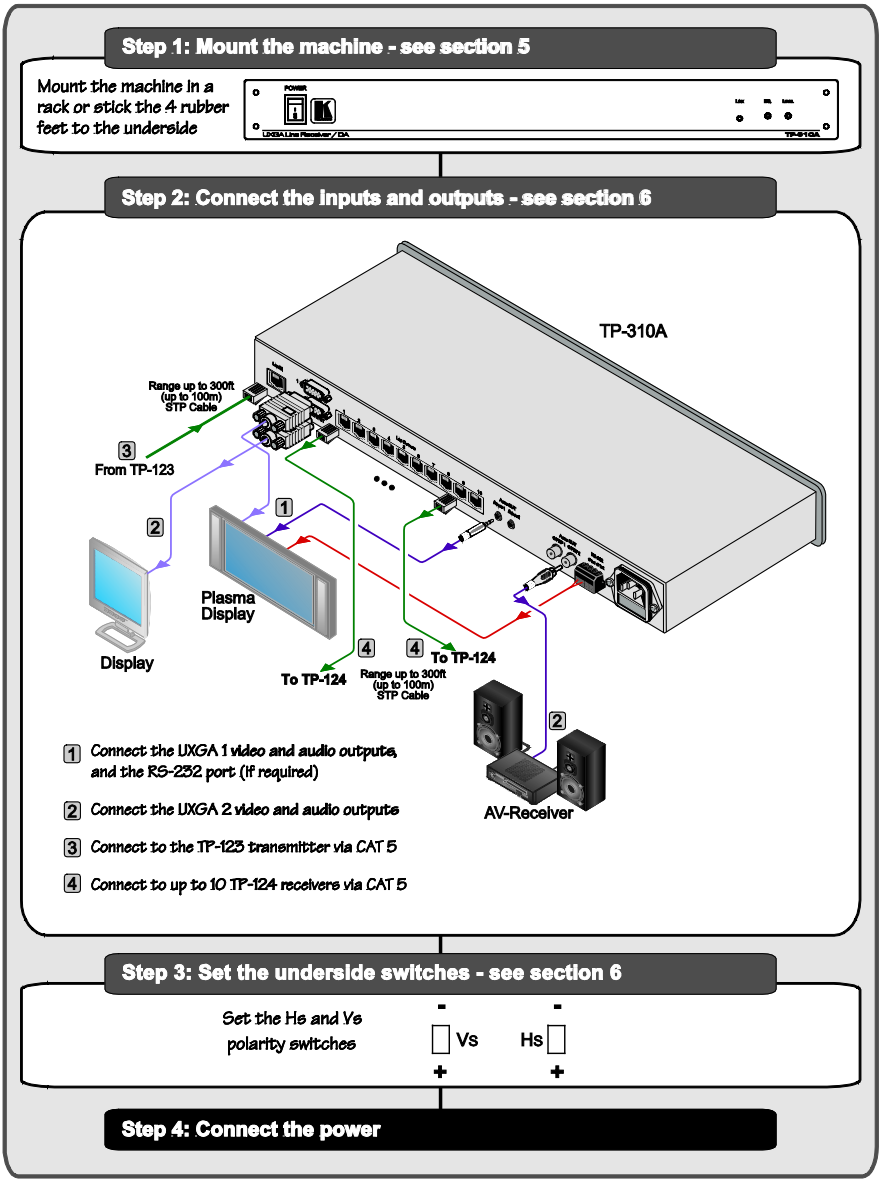
2 We recommend that you use only the power cord supplied with this device

3 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

4 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 **TP-310A** *UXGA Line Receiver/DA* receives a CAT 5 signal from a transmitter[1] and distributes it to up to 10 other receivers (via CAT 5 cables). The **TP-310A** also decodes the CAT 5 signal and simultaneously distributes it to two UXGA outputs, two analog audio outputs, two digital audio outputs and two RS-232 outputs.

The **TP-310A** serves as a power center that can distribute power to both the transmitter and the connected receivers (see section 3.1).

In particular, the **TP-310A**:

- Has a resolution of up to UXGA
- Has two UXGA outputs on 15-pin HD computer graphics video connectors
- Includes two digital audio outputs (S/PDIF) on RCA connectors and two analog audio outputs on 3.5mm mini jacks
- Has a transmission range of up to 300ft (up to 100 meters) over STP cabling
- Can change the polarity of decoding H and V Sync for video (UXGA)
- Includes EQ. and LEVEL controls for the video (UXGA) output

The **TP-310A** is housed in a 19" 1U rack mountable enclosure, with rack "ears" included, and is fed from a 100-240V AC universal switching power supply.

3.1 About the Power Connect Feature

The Power Connect feature applies as long as the cable can carry power. This feature is available when using STP cable and the distance does not exceed 50m on standard CAT 5 cable. For longer distances, heavy gauge cable should be used[2]. For units which are connected via RJ-45 connectors, make sure that the shield of the STP cable is connected to the metal casing of the connectors on both ends of the cable. For units which are connected via terminal block connectors, the shield of the STP cable must be connected to a ground terminal on the units at both ends (use the ground terminal of the power supply connection if necessary).

For a CAT 5 cable exceeding a distance of 50m, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

1 For example, the Kramer TP-121, TP-123 or TP-45

2 CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

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

We recommend that you use Shielded Twisted Pair (STP) cable. There are different levels of STP cable available, and we advise you to use the best quality STP cable that you can afford. Our non-skew-free cable, Kramer **BC-STP** is intended for analog signals where skewing is not an issue. For cases where there is skewing, our UTP skew-free cable, Kramer **BC-XTP**, may be used. Bear in mind, though, that we advise using STP cables where possible, since the compliance to electromagnetic interference was tested using those cables.

Although Unshielded Twisted Pair (UTP) cable might be preferred for long range applications, the UTP cable should be installed far away from electric cables, motors and so on, which are prone to create electrical interference. However, since the use of UTP cable might cause inconformity to electromagnetic standards, Kramer does not commit to meeting the standard with UTP cable.

3.3 Recommendations for Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables[1] to avoid 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 that may adversely influence signal quality and position your Kramer **TP-310A** away from moisture, excessive sunlight and dust

4 Your TP-310A UXGA Line Receiver/DA

Figure 1 and Table 1 define the **TP-310A**:

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

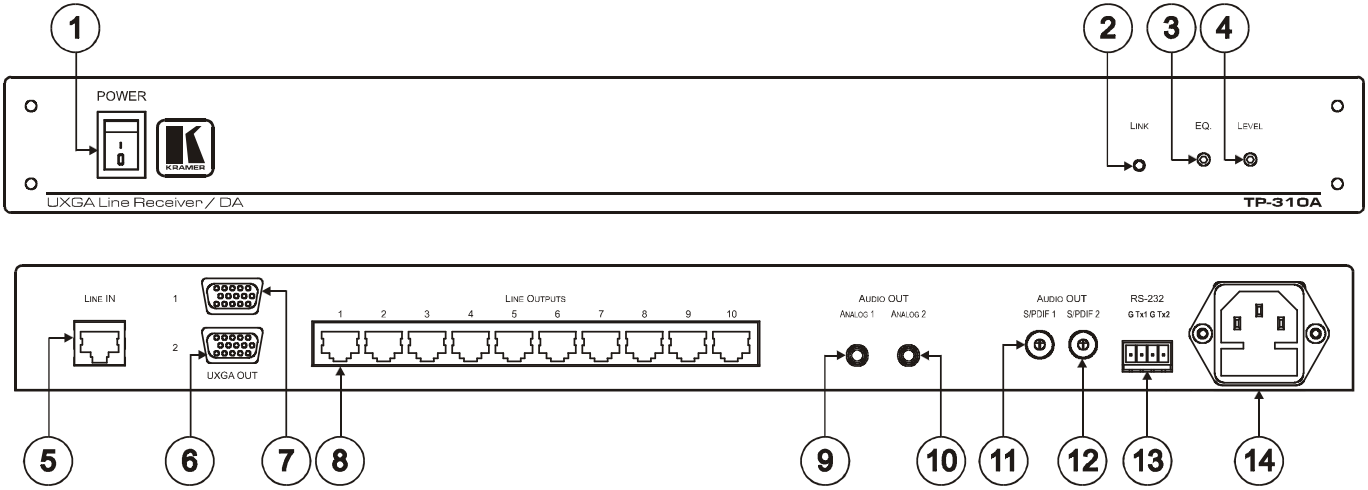


Figure 1: TP-310A UXGA Line Receiver/DA

Table 1: TP-310A UXGA Line Receiver/DA Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the unit ON or OFF
2	*LINK* LED		Lights when receiving a valid input signal
3	*EQ.*[1] Trimmer		Adjusts[2] the cable compensation (equalization) level for the UXGA outputs
4	*LEVEL* Trimmer		Adjusts[2] the output signal level for the UXGA outputs
5	*LINE IN* RJ-45 Connector		Connect to the *LINE OUT* connector of a transmitter[3]
6	*UXGA OUT 2* HD15F Connector		Connect to the video acceptor 2
7	*UXGA OUT 1* HD15F Connector		Connect to the video acceptor 1
8	*LINE OUTPUT* RJ-45 Connectors		Connect to[4] the LINE IN RJ-45 connector on a receiver[5] (from 1 to 10)
9	*Audio OUT* 3.5mm Mini Jacks	*ANALOG 1*	Connect to the stereo analog audio acceptor 1
10		*ANALOG 2*	Connect to the stereo analog audio acceptor 2
11	*Audio OUT* RCA Connectors	S/PDIF 1	Connect to the digital audio acceptor 1
12		S/PDIF 2	Connect to the digital audio acceptor 2
13	*RS-232* Terminal Block Connector	*G, Tx1*	Connect the two connectors (G and Tx1) to control a device (see section 6.3)
		G, Tx2	Connect the two connectors (G and Tx2) to control a device (see section 6.3)
14	Power Connector with *Fuse*		AC connector enabling power supply to the unit

4.1 The TP-310A UXGA Line Receiver/DA Underside

Figure 2 and Table 2 define the underside of the **TP-310A**

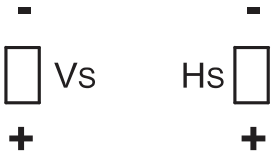


Figure 2: TP-310A Underside

Table 2: Features of the TP-310A Underside

Feature	Function
VS Switch[6]	Slide the switch down, to set the V SYNC to positive polarity (POSITIVE) Slide the switch up, to set the V SYNC to negative polarity (NEGATIVE)
HS Switch[6]	Slide the switch down, to set the H SYNC to positive polarity (POSITIVE) Slide the switch up, to set the H SYNC to negative polarity (NEGATIVE)

1 Degradation and VGA/XGA signal loss can result from using long cables (due to the effects of stray capacitance, for example), sometimes leading to a loss of sharpness in high-resolution signals

2 Use a screwdriver to carefully rotate the trimmer, adjusting the appropriate level

3 The PINOUT is defined in Table 3 and Figure 5

4 Using a Kramer's skew-free CAT 5 cable BC-SXTP, for example, with RJ-45 connectors at both ends (the PINOUT is defined in Table 3 and Figure 5)

5 For example, the Kramer TP-124 or TP-46

6 By default, both switches are set to POSITIVE

5 Installing in a Rack

This section provides instructions for rack mounting the 1U unit.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

Operating temperature range	+5° to +45° C (41° to 113° F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20° to +70° C (-4° to 158° F)
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!

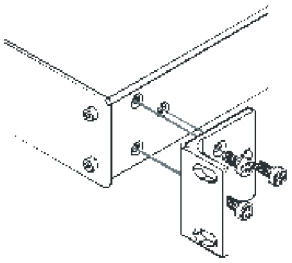
When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from: http://www.kramerelectronics.com

6 Configuring the TP-310A UXGA Line Receiver/DA

This section describes how to:

- Connect the **TP-310A** (see section 6.1)
- Connect additional **TP-310A** units (see section 6.2)
- Wire the CAT 5 LINE IN/LINE OUT RJ-45 Connectors (see section 6.3)
- Wire the RS-232 connector (see section 6.4)

6.1 Connecting a single TP-310A UXGA Line Receiver/DA

You can use the **TP-310A** with a UXGA/audio/data line transmitter such as the Kramer **TP-123**[1]. You can connect a single **TP-310A** to up to 10 receivers, and up to five **TP-310A** units can be connected to increase the number of outputs to 46.

To configure a **TP-123**/**TP-310A** *UXGA/Line Receiver – DA system*[2] as illustrated in the example in Figure 3, do the following[3]:

1. On the **TP-123**, connect:
   - A UXGA source (for example, a laptop's graphics card) to the XGA IN 15-pin HD computer graphics video connector and an audio source to the Audio IN 3.5mm mini jack, for example, using a Kramer C-GMA/GMA cable (VGA 15-pin HD + audio jack to VGA 15-pin HD + audio jack)[4]
   - An RS-232 cable with a 9-pin D-sub connector at one end to the laptop, and a 2-PIN terminal block connector at the other end to the **TP-123** RS-232 port
2. On the **TP-310A**, connect the:
   - UXGA OUT 1 15-pin HD computer graphics video connector to the UXGA acceptor 1 (for example, a plasma display), and the Audio OUT ANALOG 1 3.5mm mini jack connector to the analog audio connector on the acceptor. If required, connect the RS-232 G and TX1 terminal block connector to the RS-232 port on the acceptor
   - UXGA OUT 2 15-pin HD computer graphics video connector to the UXGA acceptor 2 (for example, a display), and the Audio OUT S/PDIF 2 RCA connector to the digital audio acceptor (for example, an AV Receiver)

1 Refer to the separate user manual, which can be downloaded at: http://www.kramerelectronics.com

2 Using up to 300ft (100m) of UTP cabling

3 Switch OFF the power on each device before connecting it to your TP-310A. After connecting your TP-310A, switch on its power and then switch on the power on each device

4 Not supplied. The full list of Kramer cables is on our Web site at http://www.kramerelectronics.com. Alternatively, you can connect an XGA source to the XGA IN 15-pin HD connector, and a separate audio source to the AUDIO IN 3.5mm mini jack

3. Connect the LINE OUTPUT CAT 5 connectors as follows[1]:
   - The LINE OUT 1 RJ-45 connector on the **TP-310A** to the LINE IN RJ-45 connector on the **TP-124**[2] via STP cabling[3] (with a range of up to 300ft (up to 100m))[4]
   - The LINE OUT 10 RJ-45 connector on the **TP-310A** to the LINE IN RJ-45 connector on the **TP-124**[2], via STP cabling[3] (with a range of up to 300ft (up to 100m))
4. Connect the LINE OUTPUT RJ-45 connector on the **TP-123** to the LINE IN RJ-45 connector on the **TP-310A**, via STP cabling (with a range of up to 300ft (up to100m)), see section 3.2.
5. Connect the power cord[5].
6. If necessary, set the HS and VS switches on the underside.

1 You do not have to connect all the outputs

2 Refer to the separate user manual, which can be downloaded at http://www.kramerelectronics.com

3 For details of how to wire a CAT 5 LINE IN/LINE OUT RJ-45 connector, see section 6.3

4 The TP-46 is connected to an additional TP-46 unit for transmitting the signal further

5 We recommend that you use only the power cord that is supplied with this machine

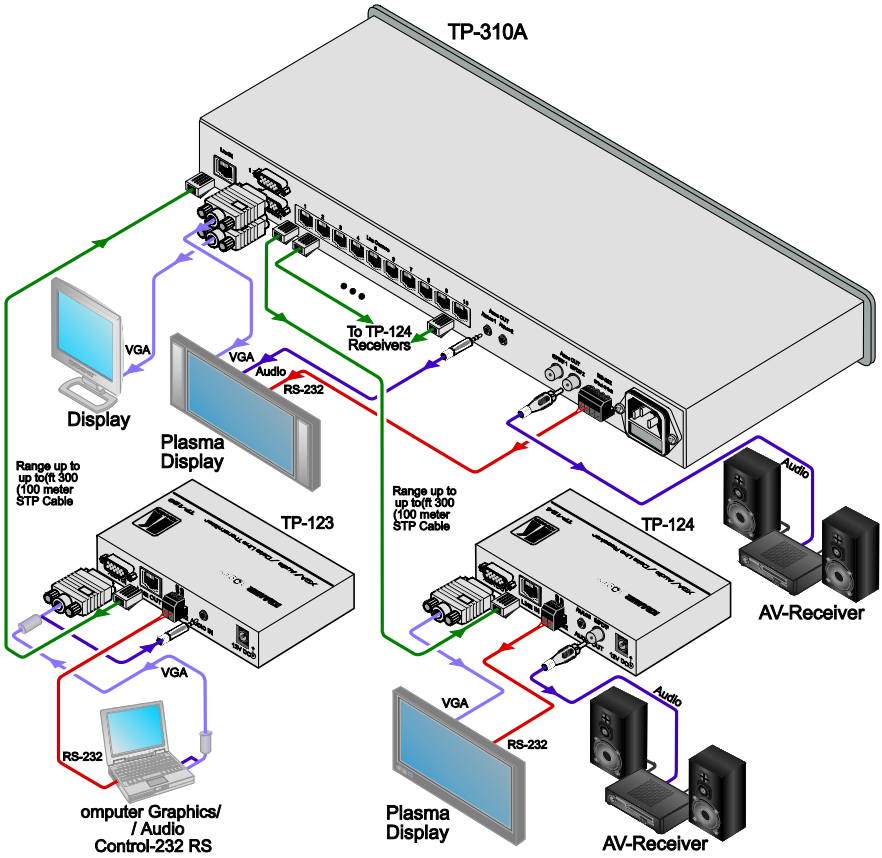


Figure 3: Connecting the TP-310A UXGA/Line Receiver – DA system

6.2 Connecting Additional TP-310A UXGA Line Receiver/DA Units

You can connect several **TP-310A** units via the LINE OUTPUT RJ-45 connectors on the first unit. The number of **TP-310A** units that can be connected depends upon the quality of the input signal that you require and the distance between the machines. We do not recommend cascading more than five **TP-310A** units.

In the example illustrated in Figure 4, a **TP-310A** unit is connected to three additional **TP-310A** units via the LINE OUTPUT RJ-45 connectors. Each of the three connected **TP-310A** units can distribute the signal to 10 receivers. The system, in total, distributes the signal to 37 receivers.

To connect an expanded UXGA Line Receiver/DA system, do the following:

1. Connect a transmitter to the LINE IN RJ-45 connector of the first **TP-310A**.
2. Connect the LINE OUTPUT 1 RJ-45 connector of the first **TP-310A** to the LINE IN RJ-45 connector of the second **TP-310A**.
3. Connect the LINE OUTPUT 2 RJ-45 connector of the first **TP-310A** to the LINE IN RJ-45 connector of the third **TP-310A**.
4. Connect the LINE OUTPUT 3 RJ-45 connector of the first **TP-310A** to the LINE IN RJ-45 connector of the fourth **TP-310A**.
5. Connect the LINE OUTPUT RJ-45 connectors of each **TP-310A** unit, to the LINE IN RJ-45 connectors of the appropriate receivers, as illustrated in Figure 4.
6. On each **TP-310A** unit, connect the power.

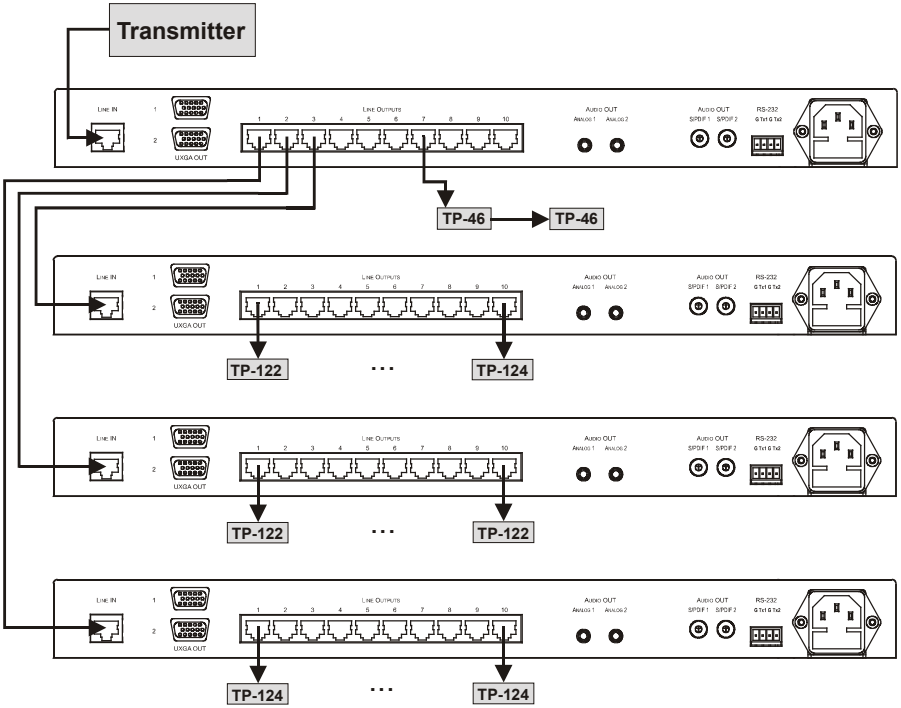


Figure 4: Distributing the Signal to 37 Receivers

6.3 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

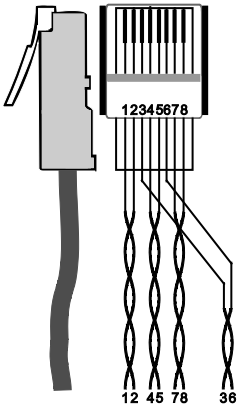
Table 3 and Figure 5 define the UTP CAT 5 PINOUT, using a straight pin to pin cable with RJ-45 connectors:

Table 3: CAT 5 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

Figure 5: CAT 5 PINOUT



6.4 Wiring the RS-232 Connector

Prepare an RS-232 cable with a 9-pin D-sub connector at one end, and a 2-pin terminal block connector at the other end, as defined in Table 4 and Figure 6:

Table 4: RS-232 PINOUT Connection

Attach the 9-pin D-sub Connector	To the Terminal Block Connector PIN:
PIN 3	TX (1 and 2)
PIN 5	G

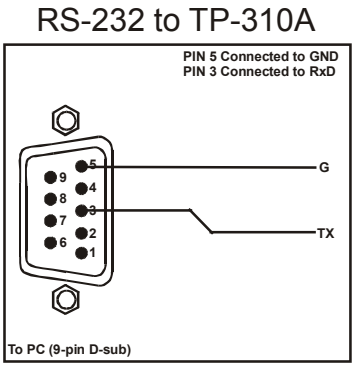


Figure 6: RS-232 PINOUT Connection

7 Technical Specifications

Table 5 includes the technical specifications of the **TP-310A**:

Table 5: Technical Specifications[1] of the TP-310A UXGA Line Receiver/DA

INPUT:	1 RJ-45 TP LINE IN connector	
OUTPUTS:	10 RJ-45 TP LINE OUT connectors 2 UXGA Video out connectors 2 3.5mm mini jack audio out connectors 2 RCA S/PDIF out connectors 1 4-pin terminal block for 2 RS-232 TxD out lines	
MAX. OUTPUT LEVEL:	VIDEO: 1.3Vpp/75Vpp	Audio: 2.3V/10kΩ
POWER OUTPUTS:	12V DC 0.5A max via each RJ-45 output (PINs 4, 5)	
RESOLUTION:	Up to UXGA	
BANDWIDTH (-3dB):	Audio: 20Hz to 20kHz@1dB	
SAMPLING RATE FOR S/PDIF:	48kHz	
S/N RATIO:	Audio: >75dB	
TOTAL GAIN:	Audio: Analog/analog: 0dB Analog/SPDIF: -12dBFS	
TND+N:	Audio: <0.02%	
POWER SOURCE:	100-240 V AC, 50/60 Hz, 50VA	
DIMENSIONS:	19" x 9.3" x 1U (W, D, H) rack mountable	
WEIGHT:	3kg (6.6lbs) approx.	
ACCESSORIES:	Power cord[2]	

1 Specifications are subject to change without notice

2 We recommend that you use only the power cord that is supplied with this machine

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, 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)

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.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
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P/N: 2900-000366 REV 3