Kramer Electronics, Ltd.

USER MANUAL

Models:

TP-107AVR, *XGA / Audio Line Transmitter*

RC-108, *Presentation Controller*

RC-116, *Presentation Controller*

BoardView™ Kits:

Kit 2AVR: TP-107AVR (2 units) and TP-122

Kit 4AVR: TP-107AVR (4 units) and TP-122

Kit 8AVR: TP-107AVR (8 units) and TP-122

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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.

Congratulations on purchasing your Kramer **TP-107AVR** *XGA / Audio Line Transmitter*, and/or the **RC-108** and/or **RC-116** *Presentation Controllers* and/or the *BoardView*™ kits (specified in Table 2), which are ideal for presentation and multimedia applications.

This user manual[2] is supplied with each machine (see Table 1) and kit (see Table 2). The power supply is purchased separately[3].

You can purchase single **TP-107AVR** machines to work as standalone units or for adding them to a *BoardView*™ kit, as defined in Table 1:

Table 1: Single Units

The unit	Recommended Cables
TP-107AVR	One K-NET[4] and one CAT 5 cable
RC-108	One K-NET cable
RC-116	One K-NET cable

Table 2: BoardView™ Kit Options

BoardView Kit Name	Machines Included	Recommended Cables		Recommended[5] Power Adapter (12V DC)[6]	Recommended Controller
		STP CAT 5	K-NET[7]		
2AVR	Two **TP-107AVR** One **TP-122**	2	1	1.25A	N/A
4AVR	Four **TP-107AVR** One **TP-122**	4	3	2.1A	**RC-108**
8AVR	Eight **TP-107AVR** One **TP-122**	8	7	5A	**RC-108/RC-116**

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 For single machines as well as for the BoardView™ kits

4 Kramer model BC-2T

5 The power supply is not provided with the kit, it can be purchased separately, see Table 3

6 Adding additional single units to a kit will probably change the power requirements, see Table 3

7 K-NET is a proprietary Kramer protocol for interconnecting Kramer units

Table 3: Connecting a Power Adapter to a System

The quantity of machines in a system	Recommended Power Adapter (12V DC)	Part Number
Up to two **TP-107AVR** units	1.25A	Eu/US: 2535-000005 UK: 2535-000006 Japan: 2535-700005
Three to four **TP-107AVR** units	2.1A	Eu/US: Eu/US: 2535-000251 UK: UK: 2535-025121 Japan: Japan: 2535-700251
Five to eight **TP-107AVR** units[1]	5A	Eu/US/UK[2]: 2535-000635 Japan: 2535-700635

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 If more than eight units are used, it is recommended to connect two 5A power adapters to the system

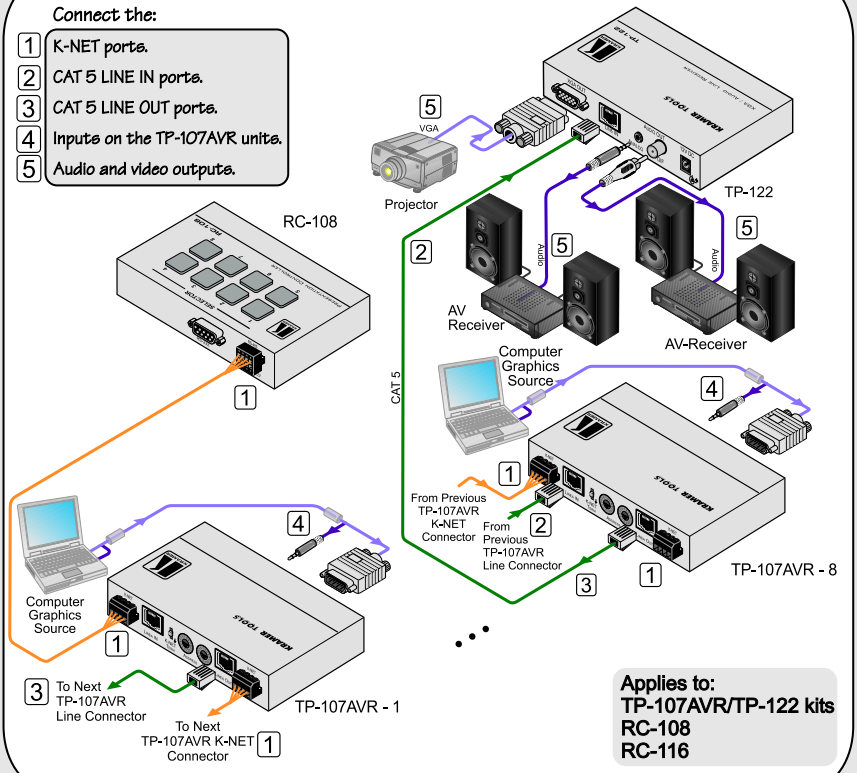
2 A desktop power supply with a DC plug. This power supply requires an AC power cord; use the power cables with a US plug for the US, an EU plug for Europe, and a UK plug for the UK

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

Step 1: Connect the system - see section 5

Connect the:

1. K-NET ports.
2. CAT 5 LINE IN ports.
3. CAT 5 LINE OUT ports.
4. Inputs on the TP-107AVR units.
5. Audio and video outputs.



Applies to:
TP-107AVR/TP-122 kits
RC-108
RC-116

Step 2: Set the Dipswitches on the TP-107AVR

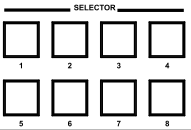
ADDRESS

Set the address of each unit. You can set it to up to 256 via the two potentiometers (with Hex numbers from 00 to FF), see section 5.6

Step 3: Connect the power

Step 4: Operation

Press a SELECTOR button on the RC-108 (16 SELECTOR buttons for RC-116) Presentation Controller to grant priority to a TP-107AVR unit



3 Overview

This section describes:

- The **TP-107AVR / TP-122** *BoardView*™ kits, see section 3.1
- The **RC-108** and the **RC-116**, presentation controllers, see section 3.2
- Using shielded twisted pair (STP) / unshielded twisted pair (UTP), see section 3.3
- Recommendations for achieving the best performance, see section 3.4

3.1 About the TP-107AVR / TP-122 Kits

The **TP-107AVR** is an *XGA / Audio Line Transmitter* that accepts a computer graphics[1] video signal and an analog audio signal and transmits them over a CAT 5 cable.

The **TP-122** is an *XGA / Audio Line Receiver*[2] that receives the coded CAT 5 signal transmitted by a **TP-107AVR**, decodes it and converts it to XGA, stereo analog and S/PDIF digital audio outputs.

You can use a single **TP-107AVR** unit together with the **TP-122** to configure an XGA/Audio Line-to-Twisted Pair Transmitter and Receiver system.

The *BoardView*™ kits include two, four or eight[3] **TP-107AVR** machines that can be interconnected (via CAT 5 and K-NET cables) and each assigned an Address number[4] . Pressing an ONLINE button on any of the interconnected machines transmits the signal from that machine to the **TP-122** receiver, which is also connected to the system (see Figure 1). The signal is then decoded on the **TP-122** and converted to an XGA output and audio outputs. If the ONLINE button is pressed simultaneously on several machines, the machine with the highest Address number will transmit the signal to the receiver (for example, Address number 5 has priority over Address number 1).

If a Controller (for example, the **RC-108/RC-116** *Presentation Controller*, see section 3.2) is connected to the *BoardView*™ kit, it can be used to determine which machine in the chain will have access to the **TP-122**.

1 The terminology XGA is used throughout this manual, where this implies any RGBHV signal on a 15-pin HD computer graphics video connector having a resolution from VGA up to UXGA

2 You can download the Kramer TP-122 user manual at: http://www.kramerelectronics.com

3 Single TP-107AVR units can be added to a kit (up 16 units in a chain)

4 A priority number

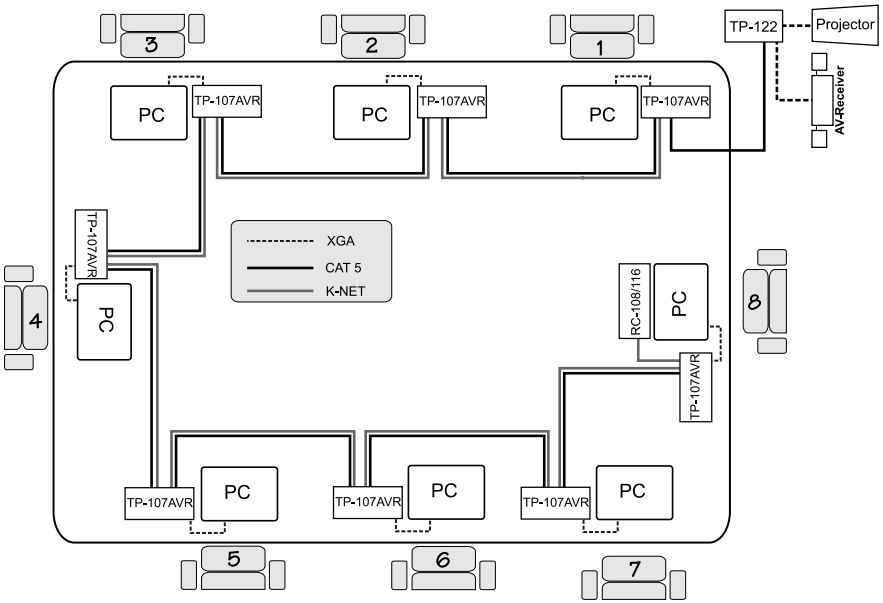


Figure 1: TP-107AVR / TP-122 Configuration

The **TP-107AVR** includes:

- A LINE IN CAT 5 connector, that connects to the LINE OUT CAT 5 connector on the previous *Line Transmitter*
- A LINE OUT CAT 5 connector, that connects to a receiver (for example, the **TP-122**) or to the next *Line Transmitter* in the chain
- A pair of rotary selector switches for setting the ADDRESS (see section 5.6)

In addition, the **TP-107AVR**:

- Must be controlled via KNET
- Has a resolution of up to UXGA
- Is 12V DC fed

The **TP-122**:

- Can power—or be powered by—the transmitter over the same CAT 5 cable
- Can change the polarity of decoding H and V Sync for video
- Includes EQ. and level controls
- Allows an operation range of more than 300ft. (more than 100 meters) over standard CAT 5 cable
- Is 12V DC fed

3.2 Controlling via the RC-108 and RC-116 Presentation Controllers

The **RC-108** and **RC-116** are presentation controller units designed specifically to control a *BoardView*™ system[1]. Each presentation controller has the appropriate number of input selector buttons[2], an RS-485 and 12V port and an RS-232 9-pin D-sub port for firmware upgrade.

3.3 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[3].

The compliance to electromagnetic interference was tested using STP cables, therefore we recommend 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.

3.4 Recommendations for Achieving the Best Performance

Achieving the best performance means:

- Connecting 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)
- Avoiding interference from neighboring electrical appliances that may adversely influence signal quality, and positioning your Kramer machine 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[4].

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

1 Up to eight and up to 16 units, respectively

2 Eight and 16 buttons, respectively

3 The Kramer BC-STP cable is recommended

4 For example: model number AD2512C, part number 2535-000251

4 Your Line Transmitter, Receiver and Presentation Controllers

This section defines the:

- **TP-107AVR** *XGA / Audio Line Transmitter* (see section 4.1)
- **TP-122** *XGA / Audio Line Receiver* (see section 4.2)
- **RC-108** and **RC-116** *Presentation Controllers* (see section 4.3)

4.1 Your TP-107AVR XGA / Audio Line Transmitter

Figure 2 and Table 4 define the **TP-107AVR**:

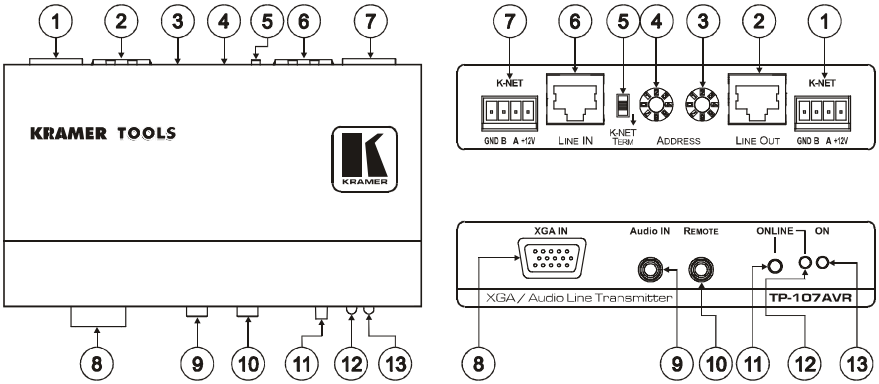


Figure 2: TP-107AVR XGA / Audio Line Transmitter

Table 4: TP-107AVR XGA / Audio Line Transmitter Features

#	Feature	Function
1	*K-NET* Terminal Block Connector	Connect to the previous or next Line Transmitter or to a control device. PIN GND is for the Ground connection; PIN B (-) and PIN A (+) are for RS-485, and PIN +12V is for powering the unit[1]
2	*LINE OUT* RJ-45 Connector	Connects to[4] the LINE IN RJ-45 connector on the receiver[2] or the next line transmitter
3	*ADDRESS* Selectors	Rotate to select the Address number[3]
4		
5	*K-NET TERM* Switch	Set the switch to ON for K-NET Line Termination with 120Ω
6	*LINE IN* RJ-45 Connector	Connects to[4] the LINE OUT RJ-45 connector on the previous line transmitter
7	*K-NET* Terminal Block Connector	Connect to the previous or next Line Transmitter or to a control device. PIN GND is for the Ground connection; PIN B (-) and PIN A (+) are for RS-485, and PIN +12V is for powering the unit[5]
8	*XGA IN* 15-pin HD Connector	Connects to the XGA source
9	*Audio IN* 3.5mm Mini Jack	Connects to the audio source
10	*Remote* 3.5mm Mini Jack	Connect to an external button for easy on-line connection (for example, when the unit is installed under the table). For the pinout, see section 7
11	*ONLINE* Button	Press to access priority
12	*ONLINE* LED	Lights when gaining priority
13	ON LED	Lights when receiving power

1 The 12V DC power supply (not provided) is used to power the system (see Table 2)

2 For example, the Kramer TP-122. You can download this user manual at: http://www.kramerelectronics.com

3 From 1 to 256 (see section 5.6)

4 Using CAT 5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 9 and Figure 12)

5 The 12V DC power supply (provided) is used to power the system (see Table 2)

4.2 Your TP-122 XGA / Audio Line Receiver

Figure 3 and Table 5 define the **TP-122** *XGA / Audio Line Receiver*:

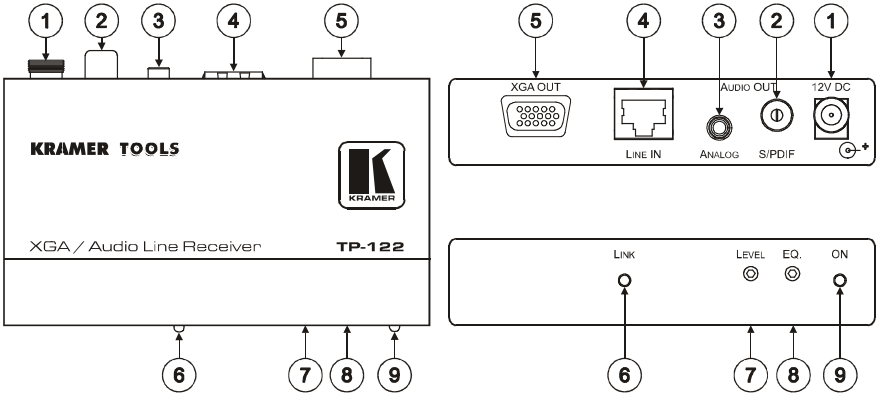


Figure 3: TP-122 XGA / Audio Line Receiver

Table 5: TP-122 XGA / Audio Line Receiver Features

#	Feature		Function
1	*12V DC*		+12V DC connector for powering the unit
2	*AUDIO OUT*	*S/PDIF* RCA connector	Connects to the digital audio acceptor
3	*AUDIO OUT*	*ANALOG* 3.5mm Mini Jack	Connects to the analog audio acceptor
4	*LINE IN* RJ-45 Connector		Connects to[1] LINE OUT RJ-45 connector on the **TP-107AVR**
5	*XGA OUT* 15-pin HD Connector		Connects to the XGA acceptor
6	*LINK* LED		Illuminates when receiving the correct input signal
7	*LEVEL* Trimmer		Adjusts[3] the output signal level
8	*EQ.*[2] Trimmer		Adjusts[3] the cable compensation equalization level
9	*ON* LED		Illuminates when receiving power

1 Using an STP CAT 5 cable with RJ-45 connectors at both ends (the PINOUT is defined in Table 9 and Figure 12)

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

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

Figure 4 and Table 6 define the underside of the **TP-122** *XGA / Audio Line Receiver*:

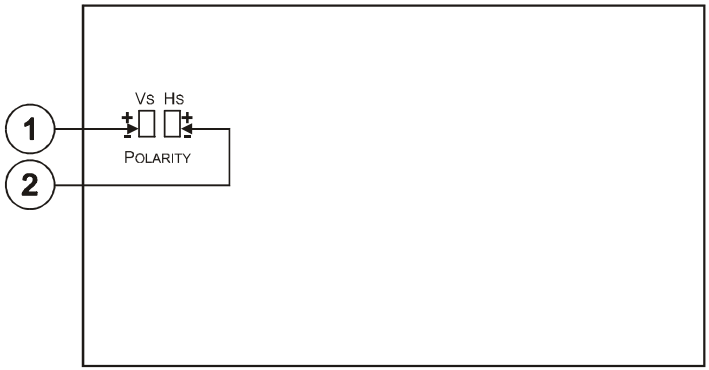


Figure 4: TP-122 XGA / Audio Line Receiver (Underside)

Table 6: TP-122 XGA / Audio Line Receiver (Underside) Features

#	Feature	Function
1	*VS* Switch	Slide the switch down, to set the V SYNC to negative polarity; slide the switch up[1], to set the V SYNC to positive polarity
2	*HS* Switch	Slide the switch down, to set the H SYNC to negative polarity; slide the switch up[1], to set the H SYNC to positive polarity

1 By default, both switches are set down (for a negative V SYNC and H SYNC polarity)

4.3 Your RC-108 / RC-116 Presentation Controller

Figure 5 and Table 7 define the **RC-108**:

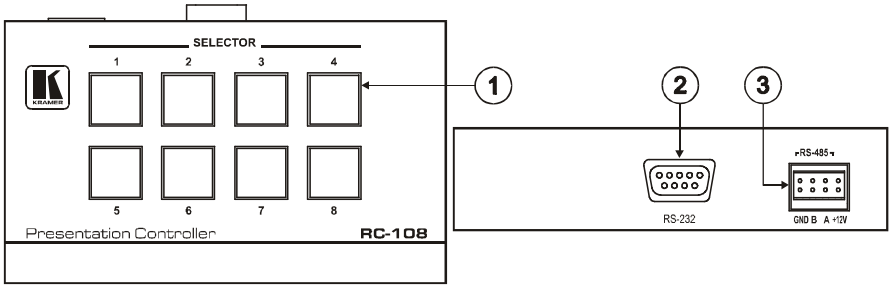


Figure 5: RC-108 Presentation Controller

Figure 6 and Table 7 define the **RC-116**:

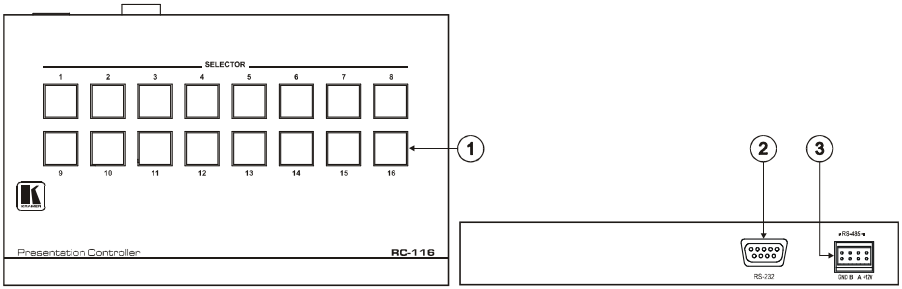


Figure 6: RC-116 Presentation Controller

Table 7: RC-108/RC-116 Presentation Controller Features

#	Feature	Function
1	*SELECTOR* Buttons[1]	Press to give priority to a **TP-107AVR** unit, according to its Address number Press and hold[2] to toggle between releasing control[3] over the **TP-107AVR** and regaining control
2	*RS-232* 9-pin D-sub Connector	Connects to a PC for upgrading the firmware
3	*RS-485* and *12V DC* PINs	PIN GND is for the Ground connection; PIN B (-) and PIN A (+) are for RS-485, and PIN +12V is for powering the unit

Figure 7 and Figure 8 illustrate the underside of the **RC-108** and the **RC-116**, respectively, as defined in Table 8:

1 From 1 to 8 for the RC-108, and from 1 to 16 for the RC-116

2 For about 2 seconds

3 For example, to let unit 6 gain control, press the selector button 6 (button 6 illuminates). To let unit 7 gain control, press the selector button 7 (button 7 illuminates and button 6 no longer illuminates). To release control over the units, press and hold the selected button (button 7 in this example) until it no longer illuminates

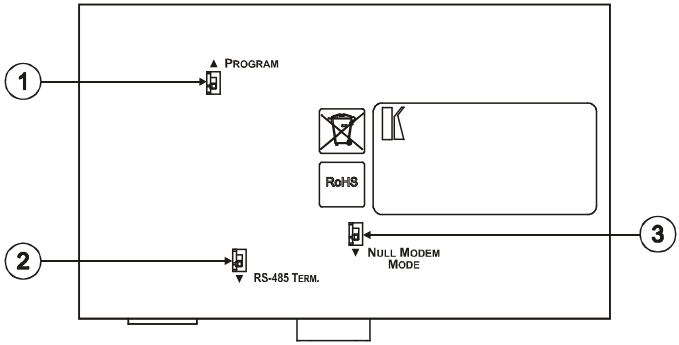


Figure 7: RC-108 Underside Panel

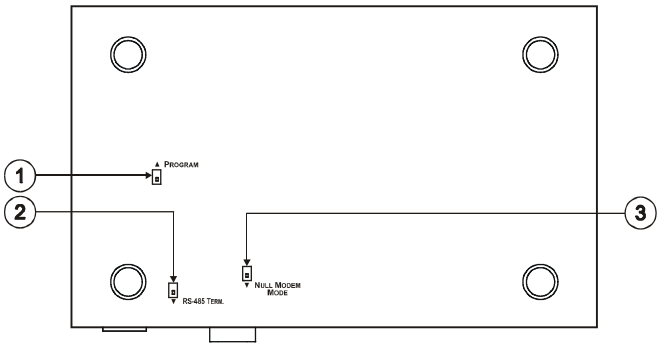


Figure 8: RC-116 Underside Panel

Table 8: RC-108 / RC-116 (Underside Panel) Features

#	Feature	Function
1	PROGRAM Switch	Slide downwards for normal operation, slide upwards to PROGRAM to upgrade to the latest Kramer firmware (see section 8),
2	RS-485 TERM. Switch	Set the switch to the left to ON for RS-485 Line Termination with 120Ω
3	NULL MODEM MODE Switch	Set to NULL MODEM MODE to connect a PC to the unit, using the Null-modem adapter; otherwise connect without a Null-modem adapter

5 Configuring a TP-107AVR System

This section describes how to:

- Connect the **TP-107AVR** (see section 5.1)
- Configure a **TP-107AVR / TP-122** *BoardView*™ kit (see section 5.2)
- Connect the **RC-108 / RC-116** Presentation Controller to the *BoardView*™ kit (see section 5.3)
- Wire the CAT 5 LINE IN / LINE OUT RJ-45 connectors (see section 5.4)
- Connect via the K-NET terminal block connector (see section 5.5)
- Set the Address number (see section 5.6)

5.1 Connecting an XGA / Audio Line Transmitter / Receiver System

To connect the **TP-107AVR** *XGA / Audio Line Transmitter* with the **TP-122** *XGA / Audio Line Receiver*, as the example in Figure 9 illustrates, do the following:

1. On the **TP-107AVR**, connect an XGA source (for example, a computer graphics source) to the XGA IN 15-pin HD computer graphics connector and an audio source to the Audio IN 3.5mm mini jack, for example, using a Kramer C-GMA/GMA cable (VGA HD15M +Audio jack to VGA HD15M +Audio jack)[1].
2. On the **TP-122**, connect the XGA OUT 15-pin HD (F) connector to the XGA acceptor (for example, a display), and connect the AUDIO OUT S/PDIF RCA connector to the digital audio acceptor (for example, an AV Receiver), and the ANALOG 3.5mm mini jack to the analog audio acceptor (for example, a stereo audio recorder).
3. Connect the LINE OUTPUT RJ-45 connector on the **TP-107AVR** to the LINE IN RJ-45 connector on the **TP-122**, via STP cabling[2] (with a range of up to 300ft (100m)), see section 5.4.
4. Connect a 12V DC power adapter to each power socket on the **TP-107AVR** and the **TP-122**, and connect the adapters to the mains electricity.
   The signal from the XGA source is transmitted via CAT 5 cable, decoded and converted at the XGA OUT 15-pin HD (F) connector to the XGA acceptor.
5. On the **TP-122**:
   - Adjust[3] the video output signal level and/or cable compensation equalization level, if required
   - If necessary, set the H SYNC and V SYNC switches[4] on the underside

1 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 computer graphics connector, and a separate audio source to the AUDIO IN 3.5mm mini jack

2 The Kramer BC-STP cable is recommended

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

4 By default, both switches are set down (for negative V SYNC and H SYNC polarity)

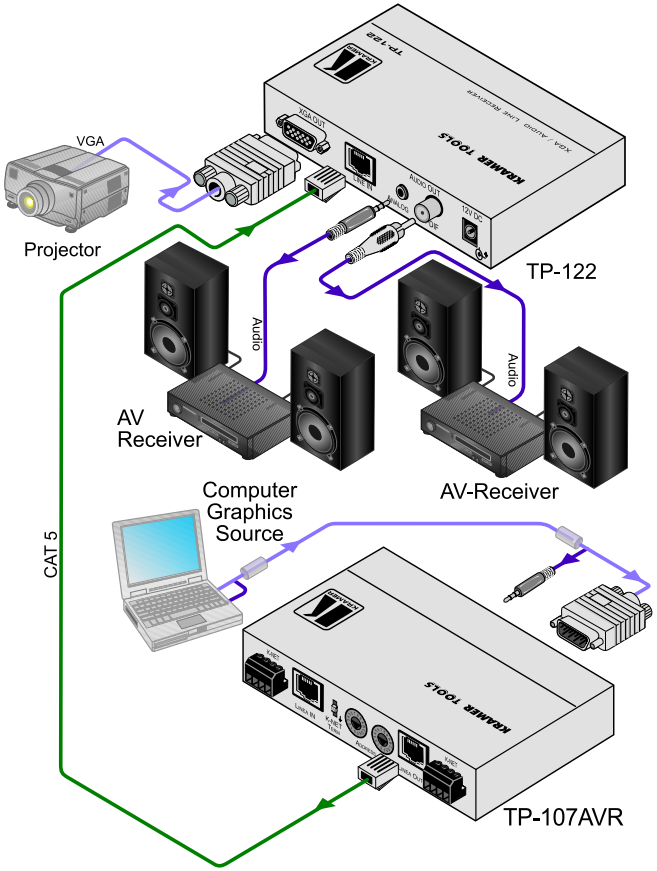


Figure 9: Connecting the XGA / Audio Line Transmitter / Receiver System

5.2 Connecting the TP-107AVR/TP-122 BoardView™ Kit

To connect the **TP-107AVR/TP-122** *BoardView*™ kit as illustrated in the example in Figure 10, do the following:

1. Connect an XGA source (for example, a computer graphics source) to the XGA IN 15-pin HD computer graphics connector and an audio source to the Audio IN 3.5mm mini jack, for example, using a Kramer C-GMA/GMA cable (VGA HD15M +Audio jack to VGA HD15M +Audio jack)[1].
2. Connect the LINE OUT RJ-45[2] connector to the LINE IN RJ-45 connector on the next **TP-107AVR** in the chain or to the LINE IN RJ-45 connector of a receiver (for example, the Kramer **TP-122**), via STP cabling[3]
   The total range of the connected units should be up to 300ft (100m).
3. Connect the LINE OUT RJ-45 connector of the previous **TP-107AVR** unit to the LINE IN RJ-45 connector on the **TP-107AVR**.
4. Connect the K-NET[4] port to the previous and the next **TP-107AVR** unit or to the **RC-108** Presentation Controller[5].
5. Set an Address number for each **TP-107AVR** unit via the two potentiometers (see section 5.6).
6. Connect the 12V DC power adapter (see Table 3) to the power socket and connect the adapter to the mains electricity.

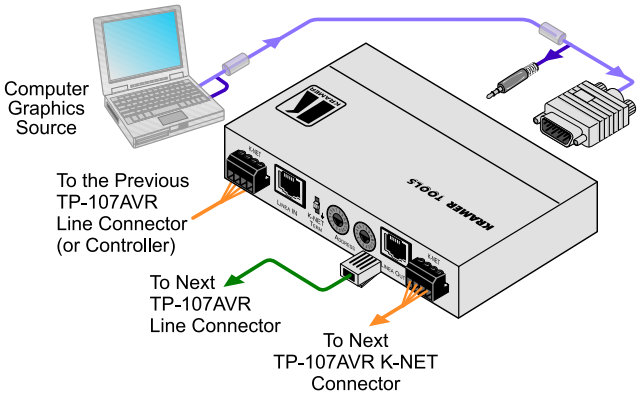


Figure 10: Connecting the TP-107AVR

1 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 computer graphics connector, and a separate audio source to the AUDIO IN 3.5mm mini jack

2 For details of how to wire a CAT 5 LINE IN / LINE OUT RJ-45 connector, see section 5.4

3 The Kramer BC-STP cable is recommended

4 The 12V DC power supply (provided) is used to power the system (see Table 2)

5 Or alternatively to the RC-116 (see section 3.2)

5.3 Configuring the TP-107AVR / TP-122 Kit with the RC-108[1]

To configure a presentation system as illustrated in the example in Figure 11, do the following:

1. Connect the computer graphics source on each **TP-107AVR** machine in the chain (see section 5.2).
2. Interconnect the **TP-107AVR** machines via the CAT 5 and KNET cables.
3. Connect the **RC-108** *Presentation Controller* to the chain via the K-NET port[2].
4. Connect the last **TP-107AVR** unit to a receiver (for example, the Kramer **TP-122**[3]), which is connected to an acceptor (for example, a projector and an AV receiver with speakers).
5. Set the RS-485 TERM switch on the first and the last unit to ON.
6. Set an Address number for each **TP-107AVR** unit via the two potentiometers (see section 5.6).

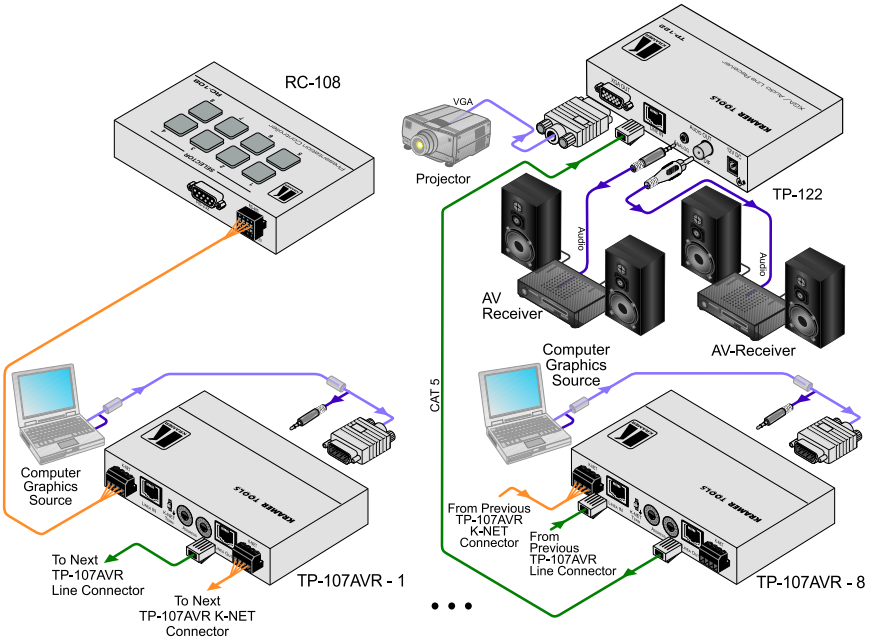


Figure 11: Configuring the TP-107AVR / TP-122 / RC-108 System

1 From this section on, the RC-108 applies also to the RC-116, unless stated otherwise

2 RS-485 on RC-108

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

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

Table 9 and Figure 12 define the STP CAT 5 PINOUT, using a straight pin-to-pin cable with RJ-45 connectors:

Figure 12: CAT 5 PINOUT

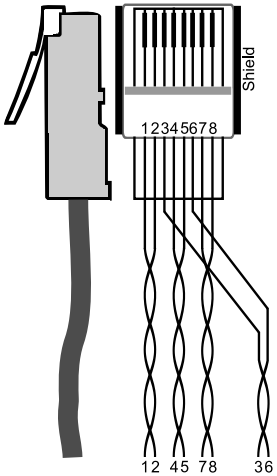


Table 9: CAT 5 PINOUT

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

5.5 Connecting via the K-NET

The **TP-107AVR** units connect to the **RC-108/RC-116** controller via the K-NET ports, as illustrated in Figure 13.

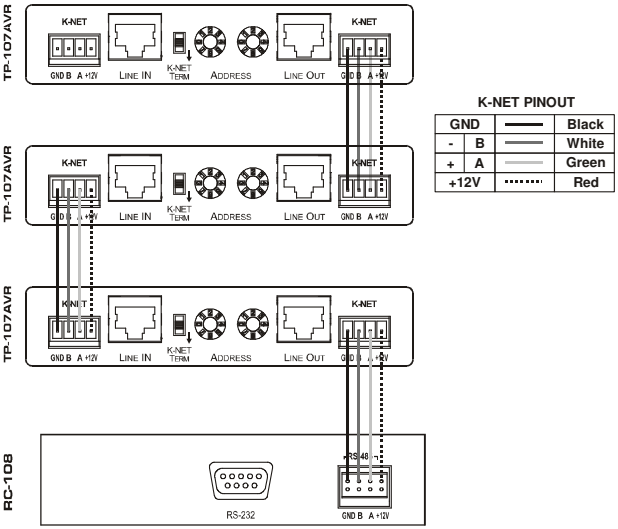


Figure 13: Wiring the RS-485 Connector

5.6 Setting the Address Number of the TP-107AVR

The Address number can be set to up to 256 via the two rotary selector switches[1] (with Hex numbers ranging from 0 to F each). When using the Kramer **RC-108** or **RC-116** controller, the Address numbers should be set from 1 to 8 or from 1 to 16 respectively[2] (in accordance with the SELECTOR button numbers on the controller), as illustrated in Figure 14 and defined in Table 10.

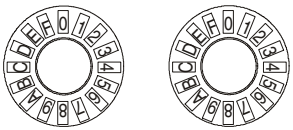


Figure 14: Rotary Switch Settings

1 Using more than 16 units in a system is not recommended so it maintains high quality video transmission

2 For higher address numbers refer to a decimal to Hex converter. For example, address number 125 is 7D

Table 10: Rotary Switch Setting Features

Address #	Left 	Right 	Address #	Left 	Right 
1	0	0	9	0	8
2	0	1	10	0	9
3	0	2	11	0	A
4	0	3	12	0	B
5	0	4	13	0	C
6	0	5	14	0	D
7	0	6	15	0	E
8	0	7	16	0	F

The option to set the Address numbers to up to 256 is useful when preparing meetings, for example, in hotels or conference centers. When one conference center stores many **TP-107AVR** units (for example, 32 units), each set to a different Address number (any number from 1 to 256). The fact that the Address number is set on each unit makes it easy to setup a *BoardView*™ system. For example, to setup a 16-unit system, you have to pick any of the available machines and connect them (as described in section 5.2) in any order without having to worry about a duplicate address number. Such a system can be used without connecting the **RC-108/RC-116** *Presentation Controller*[1], letting each participant in the meeting gain access by pressing the ONLINE button.

6 Controlling the TP-107AVR

The **TP-107AVR** can be used in a transmitter and receiver system as described in section 3.1, or set up as a system without any controller (see example in section 5.6).

You can use the **RC-108/RC-116** (see section 6.1) or any other RS-485 based controller[2] to control the *BoardView*™ system (see section 6.2).

6.1 Controlling the TP-107AVR / TP-122 Kit via the RC-108

The **RC-108** unit, when connected to a chain of **TP-107AVR** units, controls the system by granting access to the projector and overriding the individual ONLINE buttons on the **TP-107AVR** units.

If a SELECTOR button on the **RC-108** is pressed and held for about two seconds, the **RC-108** loses control over the **TP-107AVR** units in the chain. To regain control, press and hold once again.

1 To use the RC-108/RC-116, the address numbers on the TP-107AVR units must be set from 1 to 8/1 to 16, respectively

2 For example, the Kramer RC-8IR Room Controller

6.2 Controlling the TP-107AVR / TP-122 Kit via an RS-485 Controller

To control a *BoardView*™ via an RS-485 Controller (see to section 6.2.1 for the RS-485 communication Protocol), for example, the Kramer **RC-8IR**[1] *Room Controller*, connect the chain of **TP-107AVR** units to the RS-485 terminal blocks (see Figure 15).

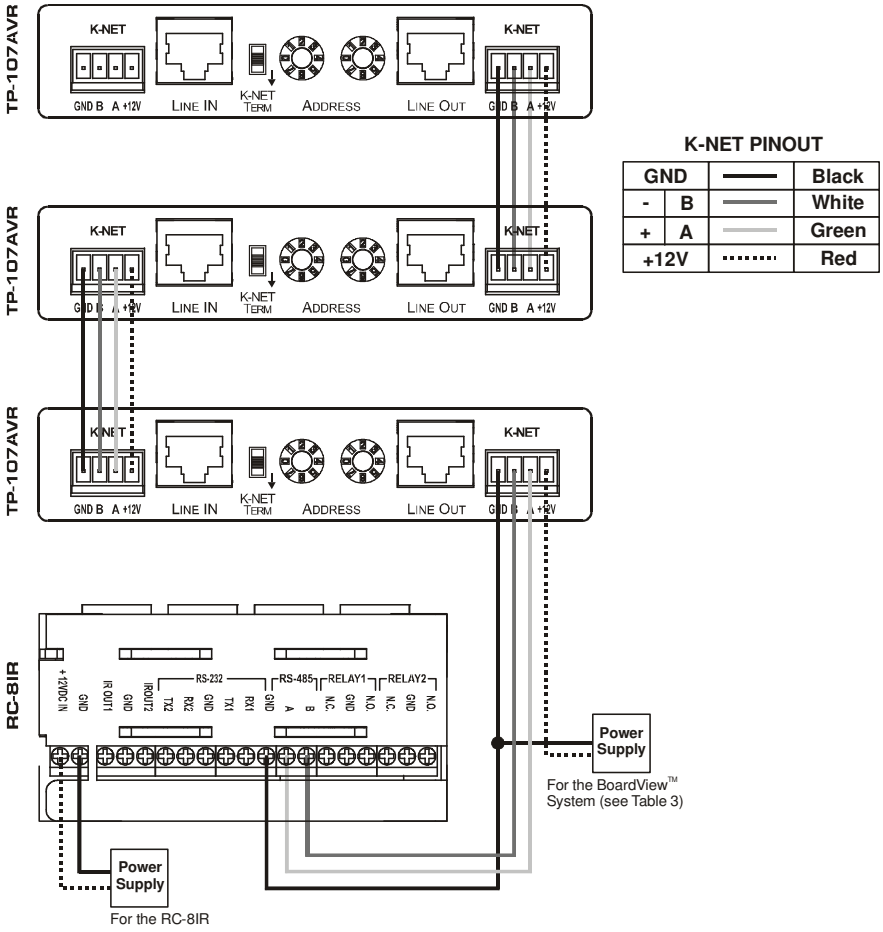


Figure 15: Wiring to an RS-485 Controller

You can also connect the same power supply to the BoardView™ System and the **RC-8IR** (see Table 3)

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

6.2.1 RS-485 Communication Protocol

Use the communication protocol to control the **TP-107AVR** units via an RS-485 controller. The communication settings are: 9600 bps; Data bits: 8; Parity: None; Stop bits: 1; and Flow Control: None. Table 11 defines the Communication protocol for Address numbers 0 to 127.

Table 11: RS-485 Communication Protocol (Address Number 0 – 127)

Command:	Command 1	Command 2	Command 3	Command 4	Description:
Select a **TP-107AVR** Machine according to its Address number	H02	H81	H80 + Address1	H81	The VGA input of the selected **TP-107AVR** device is activated. VGA inputs of other **TP-107AVR** units in the chain are blocked
Free Speech	H02	H82	H80 + Address1	H81	Following this command, any **TP-107AVR** in the chain can be activated by pressing the ONLINE button. This state is cancelled after the "Set **TP-107AVR** Machine" command is sent to any **TP-107AVR** in the chain
Turn Off **TP-107AVR**	H02	H83	H80 + Address1	H81	The VGA input of the selected **TP-107AVR** device is blocked

Table 12 defines the Communication protocol for address numbers 0 to 127

Table 12: RS-485 Communication Protocol (Address Number 128 – 256)

Command:	Command 1	Command 2	Command 3	Command 4	Description:
Select a **TP-107AVR** Machine according to its Address number	H02	H81	Address[1]	HC1	The VGA input of the selected **TP-107AVR** device is activated. VGA inputs of other **TP-107AVR** units in the chain are blocked
Free Speech	H02	H82	Address[1]	HC1	Following this command, any **TP-107AVR** in the chain can be activated by pressing the ONLINE button. This state is cancelled after the "Set **TP-107AVR** Machine" command is sent to any **TP-107AVR** in the chain
Turn Off **TP-107AVR**	H02	H83	Address[1]	HC1	The VGA input of the selected **TP-107AVR** device is blocked

For example:

- Select **TP-107AVR** machine 5:
  Hx02,Hx81,Hx85,Hx81
- Select **T-P-107AVR** machine 200 (HxC8):
  Hx02,Hx81,HxC8,HxC1
- Select **TP-107AVR** machine 100 (Hx64):
  Hx02,Hx81,HxE4,Hx81
  Calculation – Hx80+Hx64 = HxE4

1 The Address number of the selected TP-107AVR as set by the ADDRESS potentiometers (see section 5.6)

7 Installing a Remote Button

You can connect the Remote 3.5mm mini jack to an external button for easy on line connection when the unit is installed, say, under the table. Table 13 defines the Remote pinout:

Table 13: Remote PINOUT

PIN	Function
Left	LED
Right	Key switch
Gnd	Ground

8 Flash Memory Upgrade

The **RC-108**[1] firmware is located in FLASH memory, which lets you upgrade[2] to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 8.1)
- Connecting the PC to the RS-232 port (see section 8.2)
- Upgrading firmware (see section 8.3)

8.1 Downloading from the Internet

You can download the up-to-date file[3] from the Internet. To do so:

1. Go to our Web site at www.kramerelectronics.com and download the file: "*FLIP_RC108.zip*" from the Technical Support section.
2. Extract the file: "*FLIP_ RC108.zip*" to a folder (for example, C:\Program Files\Kramer Flash).
3. Create a shortcut on your desktop to the file: "*FLIP.EXE*".

8.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **RC-108** unit, do the following:

1. Connect the RS-232 9-pin D-sub side panel port (see section 8.2.1).
2. Slide the underside PROGRAM switch to ON.
3. Connect the power.

1 This section applies also to the RC-116

2 Upgrade should be carried out by skilled technical personnel. Failure to upgrade correctly will result in the malfunction of the machine

3 The files indicated in this section are given as an example only. File names are liable to change from time to time

8.2.1 Connecting the RC-108 to a PC via RS-232

To connect a PC to the **RC-108/RC-116** unit, using the null-modem adapter provided *with* the machine (recommended):

- Connect the null-modem adapter to the RS-232 9-pin D-sub port on the rear panel of the Master **RC-108/RC-116**. Connect the null-modem adapter to the RS-232 9-pin D-sub port on your PC with a 9-wire flat cable

To connect a PC to the **RC-108/RC-116** unit, *without* using a null-modem adapter:

- Connect the RS-232 9-pin D-sub port on your PC to the RS-232 9-pin D-sub rear panel port on the Master **RC-108/RC-116** unit, as Figure 16 illustrates

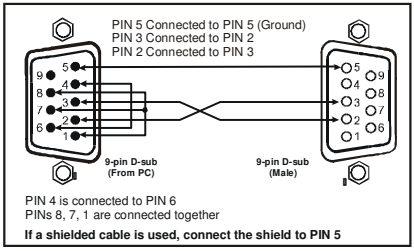


Figure 16: Connecting a PC without using a Null-modem Adapter

8.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the desktop icon: "*Shortcut to FLIP.EXE*".
   The Splash screen appears as follows:

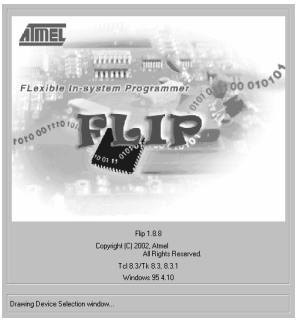


Figure 17: Splash Screen

2. After a few seconds, the Splash screen is replaced by the "*Atmel – Flip*" window:

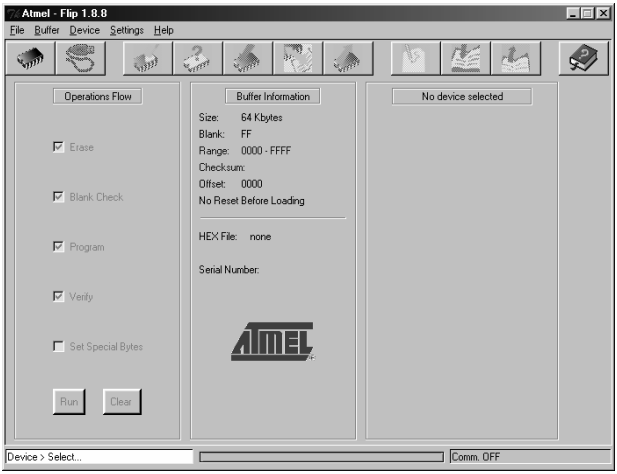


Figure 18: Atmel – Flip Window

3. Press the keyboard shortcut key *F2* (or select the "*Select*" command from the *Device* menu, or press the integrated circuit icon in the upper right corner of the window).
   The "*Device Selection*" window appears:

Figure 19: Device Selection Window

4. Click the button next to the name of the device and select from the list: AT89C51RD2:

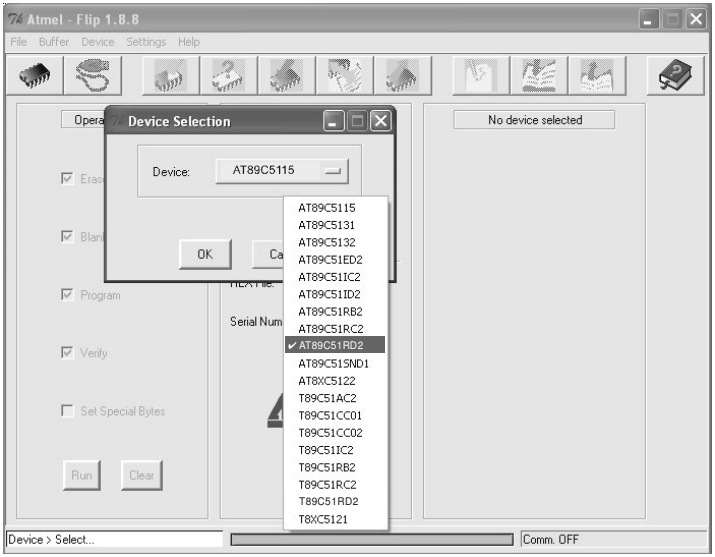


Figure 20: Device Selection Window

5. Click OK and select "*Load Hex*" from the *File* menu.

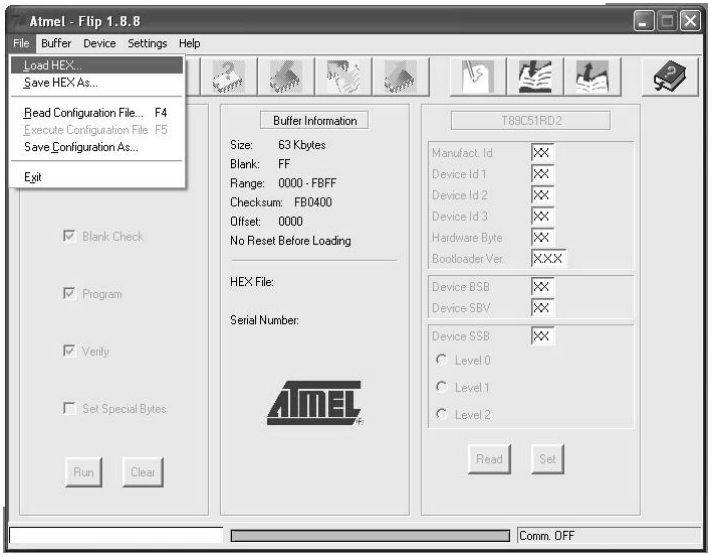


Figure 21: Loading the Hex

6. The Open File window opens. Select the correct HEX file that contains the updated version of the firmware for **RC-108** (for example ***44M_V1p2.hex***) and click Open.

7. Press the keyboard shortcut key *F3* (or select the "*Communication / RS232*" command from the *Settings* menu, or press the keys: *Alt SCR*). The "*RS232*" window appears. Change the COM port according to the configuration of your computer and select the 9600 baud rate:

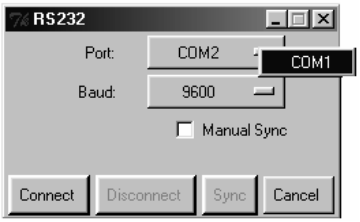


Figure 22: RS-232 Window

8. Click Connect.
   In the "*Atmel – Flip*" window, in the *Operations Flow* column, the *Run* button is active, and the name of the chip appears as the name of the third column: *AT89C51RD2*.
   Verify that in the *Buffer Information* column, the "*HEX File: RC108.hex*" appears.

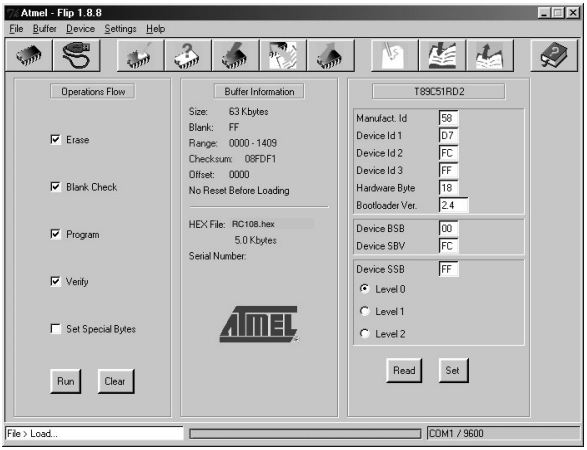


Figure 23: Atmel – Flip Window (Connected)

9. Click *Run*.
   After each stage of the operation is completed, the check-box for that stage becomes colored green[1].
   When the operation is completed, all 4 check-boxes will be colored green and the status bar message: *Memory Verify Pass* appears[2]:

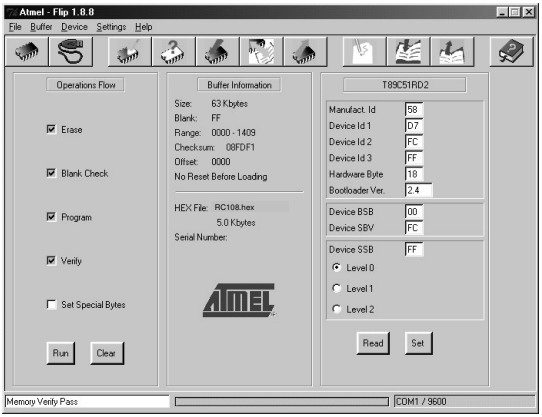


Figure 24: Atmel – Flip Window (Operation Completed)

10. Close the "*Atmel – Flip*" window.
11. Disconnect the power on the **RC-108**.
12. If required, disconnect the *RS-232* rear panel port on the **RC-108** unit from the Null-modem adapter.
13. Slide the underside PROGRAM switch to the normal position.
14. Connect the power to the **RC-108**.

1 See also the blue progress indicator on the status bar

2 If an error message: "Not Finished" shows, click Run again

9 Technical Specifications[1]

Table 14 and Table 15 define the **TP-107AVR / RC-108 / RC-116** technical specifications.

Table 14: Technical Specifications of the TP-107AVR

INPUTS:	1 XGA on a 15-pin HD connector, 1 CAT 5 on an RJ-45 connector (LINE IN) 1 stereo on 3.5mm phones	
OUTPUTS:	1 CAT 5 on an RJ-45 connector (LINE OUT)	
MAX. OUTPUT LEVEL:	VIDEO: 1.3Vpp	AUDIO: 3Vpp
BANDWIDTH (-3dB):	150MHz	AUDIO: 20kHz
DIFF. GAIN:	2.5%	
DIFF PHASE:	0.5 Deg.	
K-FACTOR:	0.2%	
S/N RATIO[2]:	VIDEO: 61dB @5MHz	AUDIO: 77dB @1MHz
CROSSTALK (all hostile):	VIDEO: -43dB @6MHz, video into audio	
CONTROLS:	KNET (RS-485), RS-485 TERM slide switch, remote button	
COUPLING:	AC	
AUDIO THD + NOISE:	0.152% @1MHz	
AUDIO 2nd HARMONIC:	0.009%	
POWER SOURCE:	12V DC, 180mA (for *BoardView*™ kits, see Table 3)	
DIMENSIONS:	12cm x 6.95cm x 2.44cm (4.7" x 2.74" x 0.96"), W, D, H	
WEIGHT:	0.3kg (0.66lbs) approx.	
ACCESSORIES:	mounting bracket, 19" rack adapters	
OPTIONS	Power supply, K-NET and CAT 5 cables (see Table 2)	

Table 15: Technical Specifications of the RC-108 / RC-116

CONTROLS:	RS-485, RS-232
DIMENSIONS:	**RC-108**: 12cm x 6.95cm x 2.44cm (4.7" x 2.74" x 0.96"), W, D, H **RC-116**: 18.4cm x 11.4cm x 2.65cm (7.24" x 4.5" x 1.05"), W, D, H
WEIGHT:	**RC-108**: 0.3kg (0.66lbs) approx. **RC-116**: 0.6kg (1.32lbs) approx.

1 Specifications are subject to change without notice

2 Local video input into the chain when in the offline mode

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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E-mail: info@kramerel.com
P/N: 2900-000534 REV 1