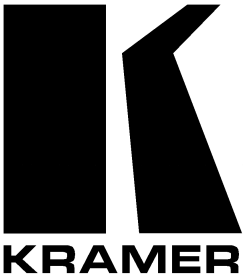
Kramer Electronics, Ltd.



USER MANUAL

Models:

RC-84, ***Transport Control Module***

RC-84E, ***Transport Control Module***

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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 **RC-84 / RC-84E** Transport Control Module, which is designed to let an instructor enter a multimedia classroom and operate an A/V system with ease.

The package includes the following items:

- **RC-84** or **RC-84E**
- One 3.5mm to IR emitter control cable
- One configuration cable
- This user manual[2]
- Configuration software

2 Getting Started

This user manual is written for the end user. Refer to the separate online RC Configuration and Installation Guide for details of how to install and configure the Universal Room Controller[3]

We recommend that you:

- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

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 That provides information about how to set up the system. This online guide may well be updated on a regular basis. For the latest online guide, go to http://www.kramerelectronics.com

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

3 Overview

The unique Kramer **RC-84**[1] **/ RC-84E**[2] combines two control modules—interface and transport—in an all-in-one extended remote control panel. It is designed to control A/V equipment in any room (such as classrooms, boardrooms, or auditoriums), streamlining operations and simplifying control by integrating audio, video, and computer-video sources into a centralized system.

The **RC-84** controller interface module features eight buttons, each of which can be programmed to carry out up to 15 commands[3], in sequence, with one press of a button.

The Transport Control module features PLAY, PAUSE, STOP, PREV/REW and NEXT/FWD buttons, as well as MENU access for up to four selectable sources, thus eliminating the need to use multiple IR remote control transmitters to control them.

The **RC-84** DIGITAL IN connector can be programmed to perform any macro following a defined external trigger[4].

The Kramer Transport Control Module includes:

- An Ethernet port for configuration and control[5]
- Two bidirectional RS-232 wired serial ports, for universal display (for example, projectors) and switcher control, and one RS-485 serial port
- A front panel CONFIG jack connector for RS-232 configuration, control and firmware upgrade
- Two relays for the simplified and centralized control of room functions (such as lighting, closing blinds, screen settings, and so on)
- Up to eight (4x2) IR emitters for IR control
- An IR-learner for the customized control of external sources, receiving the IR commands from different remote transmitters without the need for an external IR remote control unit
- Configurable backlit buttons to set up any supported[6] command

The **RC-84 / RC-84E** is 12V DC fed and can be controlled via the front panel buttons, and remotely, via RS-232, or the ETHERNET.

1 A two-gang wall plate

2 A three-gang wall plate intended for the European market

3 A total of 120 commands

4 For example, if the external trigger would be no spatial movement for 10 minutes, the machine can shut the system down

5 Of up to five machines with unique IP addresses

6 To be configured by the system integrator only

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 Kramer Transport Control Module 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[1].

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

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

4 Your RC-84 / RC-84E

This section defines the:

- **RC-84** (see section 4.1)
- **RC-84E** (see section 4.2)

4.1 Defining the RC-84

Figure 1 and Table 2 define the **RC-84** front panel:

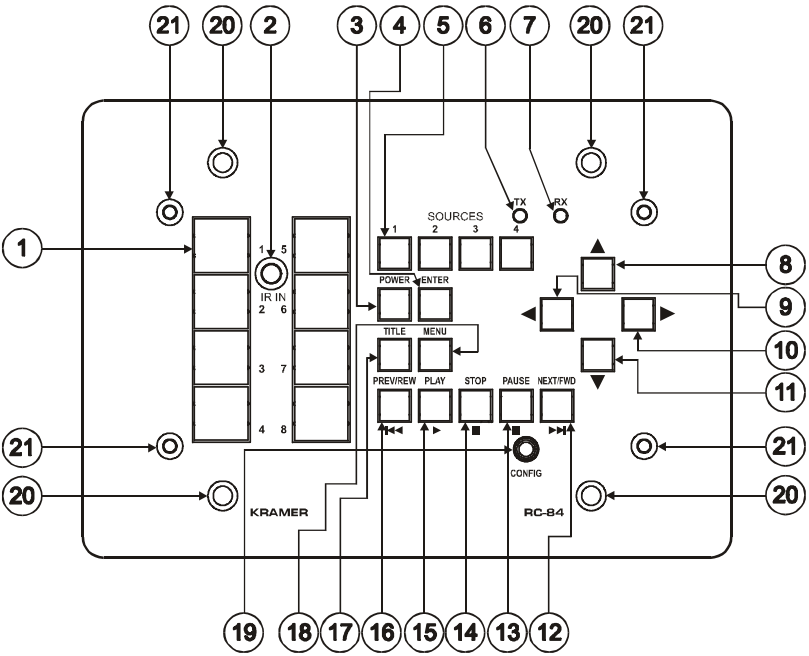

Figure 1: RC-84 Front Panel

Table 1: RC-84 Front Panel Features

#	Feature	Function
1	Interface Control Module Configurable Control Buttons (Macro Buttons)	Control the room and the A/V equipment (from 1 to 8)
2	*IR IN* Receiver	Accepts IR remote commands (for the IR-learner feature)
3	*POWER* Button	Turns ON the power to the display device[1]
4	*ENTER* Button	Press to select an option from the menu
5	*SOURCES* Buttons	Press to select a source (from 1 to 4)
6	*Tx* LED	Lights when transmitting data
7	*Rx* LED	Lights when receiving data
8	▲ Arrow Button	Menu navigation buttons
9	◀ Arrow Button	
10	▶ Arrow Button	
11	▼ Arrow Button	
12	*NEXT/FWD* Button	Move to the next item/scan forward
13	*PAUSE* Button	Pause the video or audio
14	*STOP* Button	Stop the video or audio
15	*PLAY* Button	Play the video or audio
16	*PREV/REW* Button	Move to the previous item or rewind
17	*TITLE* Button	Press to enter the movie's main menu when a DVD movie is inserted in the DVD player
18	*MENU* Button	Enter the audio or video menu (or the DVD player's main menu)
19	*CONFIG* Port[2]	Used for Windows®-based configuration software (driver downloads, firmware updates and so on)
20	Faceplate Attachment Holes	For attaching the faceplate to the controller[3]
21	Mounting holes (4)	For fastening the controller in place

Figure 2 and Table 2 define the **RC-84** right side panel:

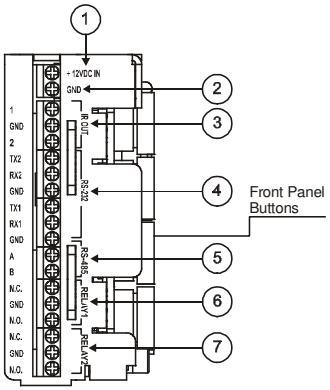

Figure 2: RC-84 Right Side Panel

1 For example, the projector or plasma

2 Via the front panel, without having to remove the RC-84 from its mounting

3 These screws should not be removed during or after mounting

Table 2: RC-84 Right Side Panel Features

#	Feature	Function
1	*+12VDC IN* PIN	Connects (+) to the connector for powering the unit
2	*GND* PIN	Connects (-) to the Ground
3	*IR OUT1* PIN	Control up to 4 machines via IR Emitters[1]
	GND PIN	
	IR OUT2 PIN	
4	*RS-232* Terminal Block Connector (1 and 2)	Connect to the RS-232 connector on the A/V equipment or a PC or other Serial Controller
5	*RS-485* Terminal Block Connector	Connect to the RS-485 detachable terminal block on a switcher or PC, or other device with RS-485 control
6	*RELAY1*	Connect each relay to a room item (such as lighting, screen settings, blinds, and so on)[2]
7	*RELAY2*	

Figure 3 and Table 3 define the **RC-84** underside panel:

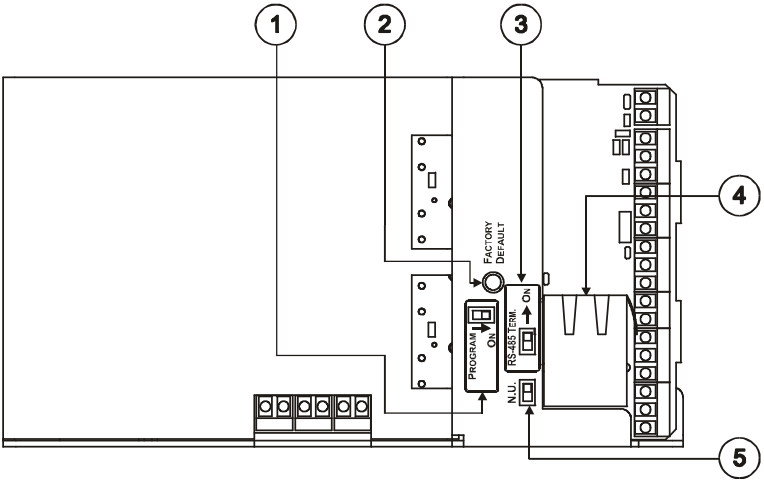

Figure 3: RC-84 Rear Panel

Table 3: RC-84 Rear Panel Features

#	Feature	Function
1	*PROGRAM* Switch	Switch to OFF for normal operation; Switch to ON for firmware upgrade
2	*FACTORY DEFAULT* Button	Press to return to the factory default settings, including all the configured buttons and the network settings[3]
3	*RS-485 TERM.* Switch	Switch to ON for RS-485 line termination
4	Ethernet Port	Connects to a PC or other controller through computer networking
5	*N.U* Switch	Not used

1 Up to two IR emitters per IR OUT PIN

2 See the examples in Figure 8

3 Including the factory default IP number: 192.168.1.39 (an IP number is a device's numerical address as expressed in the format specified in the Internet Protocol)

Figure 4 and Table 4 define the **RC-84** lower underside panel:

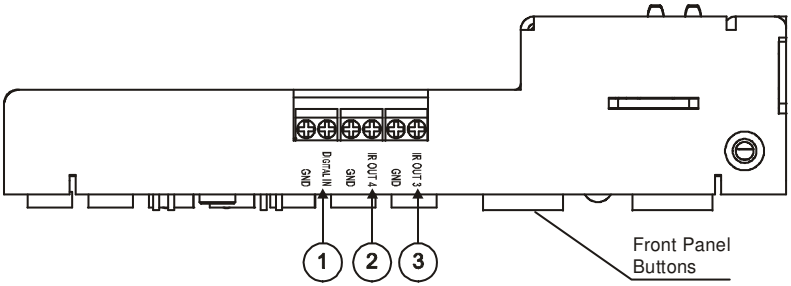

Figure 4: RC-84 Lower Underside Panel

Table 4: RC-84 Lower Underside Panel Features

#	Feature	Function
1	*DIGITAL IN* PIN	Digital input sensor, can be programmed to detect either high or low[1] signals and trigger a macro in response
	GND PIN	
2	*IR OUT4* PIN	Control up to two machines via IR Emitters
	GND PIN	
3	*IR OUT3* PIN	Control up to two machines via IR Emitters
	GND PIN	

4.2 Defining the RC-84E

Figure 5 and Table 5 define the **RC-84E** front panel:

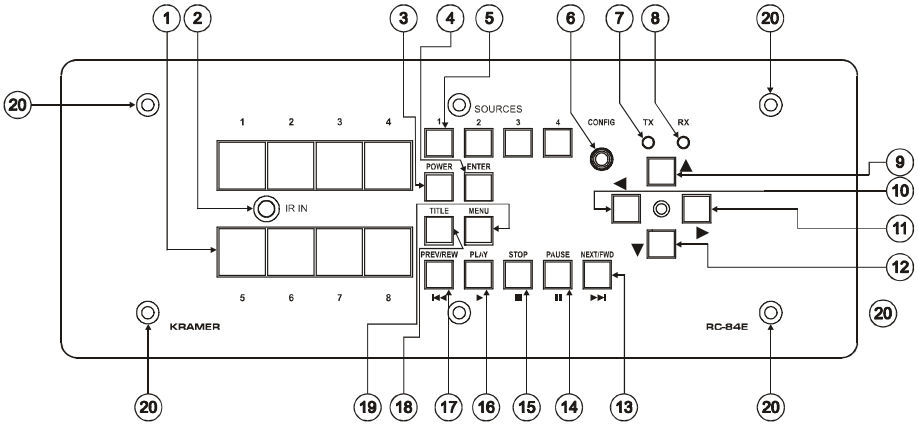

Figure 5: RC-84E Front Panel

1 High signal: 2V – 12 V; low signal <1.5V

Table 5: RC-84E Front Panel Features

#	Feature	Function
1	Interface Control Module Configurable Control Buttons (Macro Buttons)	Control the room and the A/V equipment (from 1 to 8)
2	*IR IN* Receiver	Accepts IR remote commands (for the IR-learner feature)
3	*POWER* Button	Turns ON the power to the display device[1]
4	*ENTER* Button	Press to select an option from the menu
5	*SOURCES* Buttons	Press to select a source (from 1 to 4)
6	*CONFIG* Port[2]	Used for Windows®-based configuration software (driver downloads, firmware updates and so on)
7	*Tx* LED	Lights when transmitting data
8	*Rx* LED	Lights when receiving data
9	▲ Arrow Button	Menu navigation buttons
10	◀ Arrow Button	
11	▶ Arrow Button	
12	▼ Arrow Button	
13	*NEXT/FWD* Button	Move to the next item/scan forward
14	*PAUSE* Button	Pause the video or audio
15	*STOP* Button	Stop the video or audio
16	*PLAY* Button	Play the video or audio
17	*PREV/REW* Button	Move to the previous item or rewind
18	*TITLE* Button	Press to enter the movie's main menu when a DVD movie is inserted in the DVD player,
19	*MENU* Button	Enter the audio or video menu (or the DVD player's main menu)
20	Mounting holes (4)	For fastening the controller in place

Figure 6 and Table 6 define the **RC-84E** lower side panel:

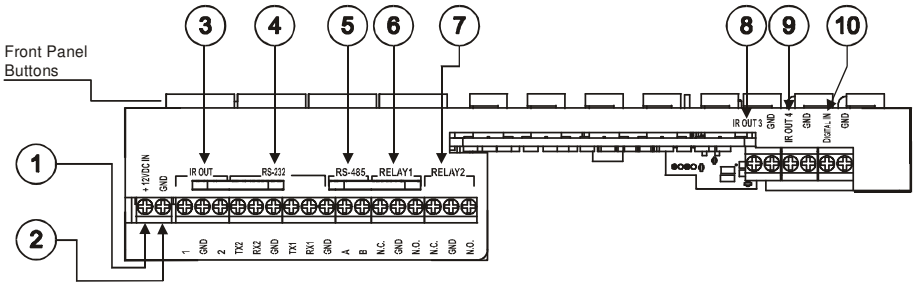

Figure 6: RC-84E Lower Side Panel

1 For example, the projector or plasma

2 Via the front panel, without having to remove the RC-84E from its mounting

Table 6: RC-84E Lower Side Panel Features

#	Feature	Function
1	*+12VDC IN* PIN	Connects (+) to the connector for powering the unit
2	*GND* PIN	Connects (-) to the Ground
3	*IR OUT1* PIN	Control up to 4 machines via IR Emitters[1]
	GND PIN	
	IR OUT2 PIN	
4	*RS-232* Terminal Block Connector (1 and 2)	Connect to the RS-232 connector on the A/V equipment or a PC or other Serial Controller
5	*RS-485* Terminal Block Connector	Connect to the RS-485 detachable terminal block on a switcher or PC, or other device with RS-485 control
6	*RELAY1*	Connect each relay to a room item (such as lighting, screen settings, blinds, and so on)[2]
7	*RELAY2*	
8	*IR OUT3 PIN*	Control up to two machines via IR Emitters
	GND PIN	
9	*IR OUT4 PIN*	Control up to two machines via IR Emitters
	GND PIN	
10	*DIGITAL IN PIN*	Digital input sensor, can be programmed to detect either high or low[3] signals and trigger a macro in response
	GND PIN	

Figure 7 and Table 7 define the **RC-84E** rear panel:

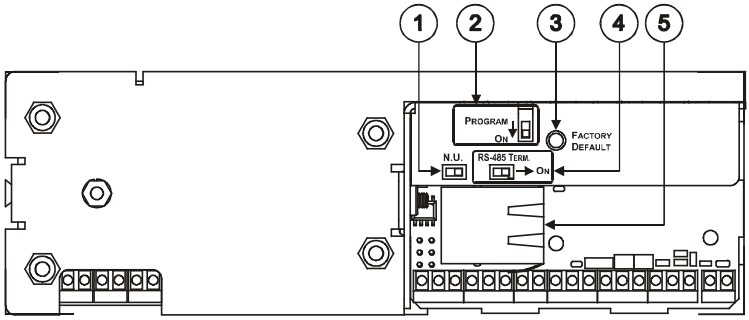

Figure 7: RC-84E Rear Panel

Table 7: RC-84E Rear Panel Features

#	Feature	Function
1	*N.U* Switch	Not used
2	*PROGRAM* Switch	Switch to OFF for normal operation; Switch to ON for firmware upgrade
3	*FACTORY DEFAULT* Button	Press to return to the factory default settings, including all the configured buttons and the network settings[4]
4	*RS-485 TERM.* Switch	Switch to ON for RS-485 line termination
5	Ethernet Port	Connects to a PC or other controller through computer networking

1 Up to two IR emitters per IR OUT PIN

2 See the examples in Figure 8

3 High signal: 2V – 12 V; low signal <1.5V

4 Including the factory default IP number: 192.168.1.39 (an IP number is a device's numerical address as expressed in the format specified in the Internet Protocol)

5 Using Your Transport Control Module[1]

This user manual is applicable once the unit is installed and configured[2]. The installation process is not detailed in this user manual[3], and includes:

- Setting up the labels on the buttons, according to your specific requirements[4]
- Hardware installation
- Connecting the inputs and the display
- Configuration via the Windows®-based configuration software and/or the IR learner

The universal room controller is very easy to use, as the example in Figure 8 and Table 8 defines[5]:

1 From this section on, all the information is relevant to the RC-84 and RC-84E machines, unless noted otherwise

2 By authorized Kramer technical personnel or by an external system integrator

3 Refer to the separate online "RC Configuration and Installation Guide" at http://www.kramerelectronics.com

4 It is recommended to place labels on the buttons prior to installing the unit, as this involves removing the face plate

5 Your RC-84 was installed and configured to suit your specific requirements. This example describes how to setup one of an unlimited number of available setups for the system

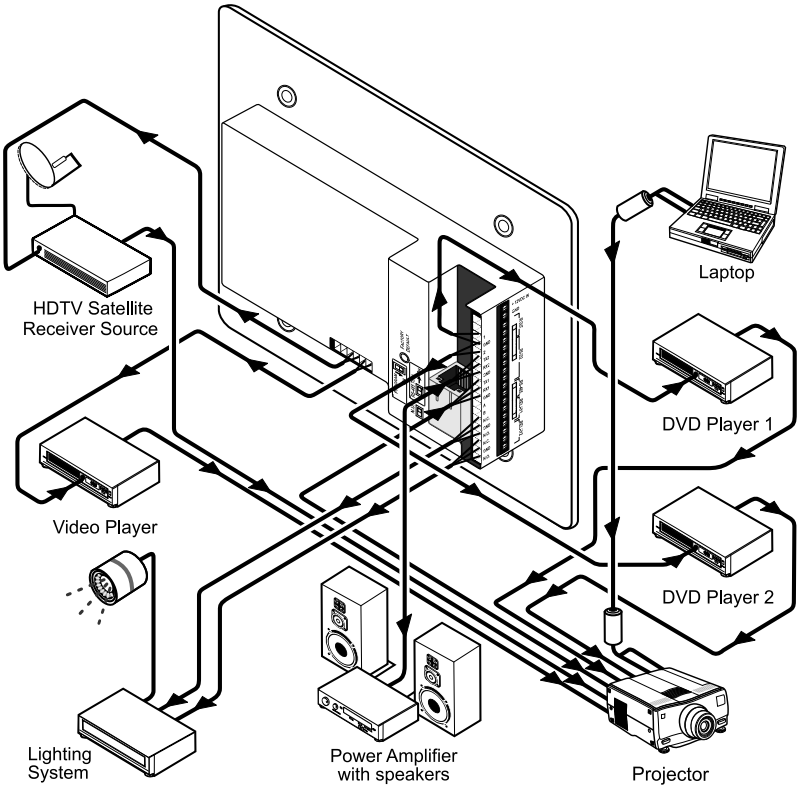

Figure 8: Example of a Typical RC-84 Configuration

Table 8: Connection Scheme (for the example in Figure 8)

This connector:	Controls:
IR OUT1 PIN[1]	A DVD[2] player
IR OUT3 PIN[1]	A video player[2]
IR OUT4 PIN[1]	An HDTV satellite receiver source
RS-232 1 (*TX1*, *RX1*) Terminal Block Connector	A projector
RS-232 2 (TX2, RX2) Terminal Block Connector	A power amplifier with speakers
RS-485 Terminal Block Connector	Not connected
RELAY1	The lights – ON
RELAY2	The lights – OFF
Ethernet	Not shown in this illustration
A laptop is connected directly to the projector	

1 Connected via the IR emitter cable. IR OUT1, IR OUT3 and IR OUT4 can each be connected to identical machines and still be controlled separately

2 Each IR connector can control two different machines via a dual emitter cable. For example, a DVD player and a document camera could be connected to the same IR connector (not shown in Figure 8)

For complex systems, with multiple sources, it is recommended to use a presentation switcher/scaler (for example, the Kramer **VP-23N** or the **VP-724xl**). The sources can then be connected to the switcher inputs and the switcher outputs connected to the projector as illustrated in Figure 9. The **RC-84** controls the switcher via RS-232.

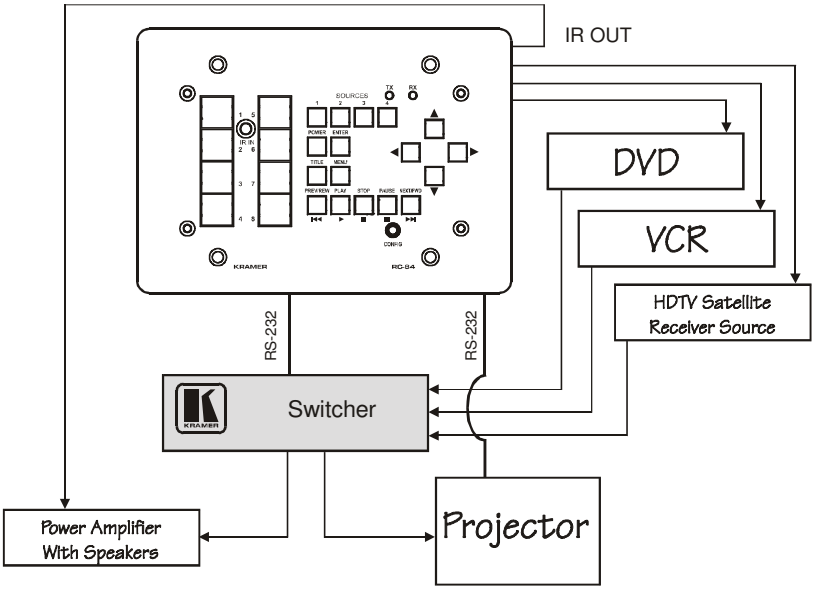

Figure 9: RC-84 Configuration Block Diagram with Switcher/Scaler

Figure 10 shows the **RC-84** built into a podium that is located in a lecture auditorium. An overhead projector and screen, speakers, lights; and a cabinet with a VCR, two DVDs, an HDTV Satellite receiver source and an amplifier inside, are all controlled via the **RC-84**. The presenter's laptop is located on the podium, next to where the **RC-84** is mounted. It is also controlled by the **RC-84** and is used for presentations, slide shows and so on. Each device can be operated via the transport control module remote features: PLAY, PAUSE, STOP, PREV/REW and NEXT/FWD buttons, as well as MENU access, by selecting the appropriate source (one of four).

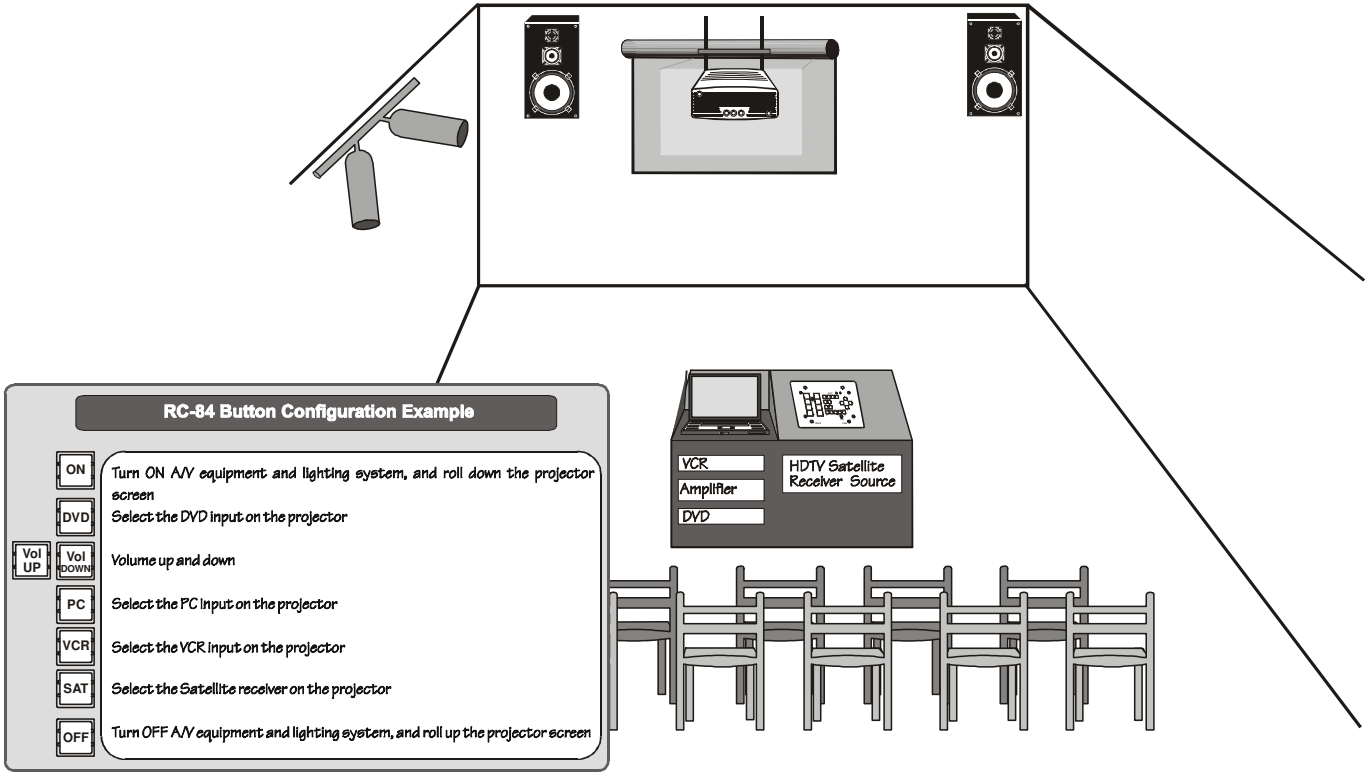

Figure 10: Example of a Typical RC-84 Setup in the Lecture Auditorium

5.1 Operating the RC-84

In the following example[1], illustrated in Figure 11, the **RC-84** is labeled with specific functions and each button is programmed[2] to perform several tasks[3] as defined in Table 9.

Each button may be assigned with up to 15 commands.

Table 9: The Commands Configuration

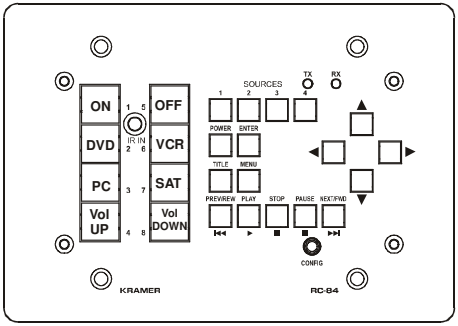

Figure 11: RC-84 Labels Setup

The Label	The Macro Sequence
ON	• Power up the projector • Power up the power amplifier • Power up the DVD player • Power up the video player • Power up the satellite receiver source • Roll down the projector screen • 1 minute delay (for the projector to heat up) • Turn the lights off • The projector selects the PC input
OFF	• Turn the lights on • Power down the projector • Power down the power amplifier • Power down the DVD player • Power down the satellite receiver source • Power down the video player • Roll up the projector screen • Turn off the speakers
DVD	• The projector selects the DVD input
VCR	• The projector selects the VCR input
PC	• The projector selects a PC input
SAT	• The projector selects the HDTV satellite receiver source
Vol UP	• Power amplifier volume up
Vol DOWN	• Power amplifier volume down

1 This is only one example of a typical application where each button can be configured as required

2 By the technical installer

3 A macro sequence, including up to 15 commands per button, carried out one after the other

5.2 Using the Macro Buttons

Pressing any of the Controller Interface module buttons initiates a macro sequence[1], during which the button blinks (as programmed by the system integrator).

If during the macro sequence the button blinks faster than usual[2], this indicates that a malfunction has been detected[3] and the **RC-84** exits the macro sequence.

To solve the problem, summon technical help

If you want to stop a macro sequence, press and hold that button for 5 seconds. The sequence will come to an end. You can resume operation by pressing any of the buttons[4]. The unit will carry out the macro sequence commands from the beginning.

5.3 Locking the Front Panel

The front panel can be locked to avoid unintended tampering with the buttons.

To lock the panel buttons, press and hold buttons 4 and 8 simultaneously for about 2 seconds.
All the buttons blink momentarily and the panel is locked.

When pressing a button at this stage, all the buttons blink twice.

To unlock the panel buttons, press these buttons once again.
All the buttons blink momentarily and unlock. You can now use the buttons as usual.

5.4 Turning the Light of the Backlit Buttons On and Off

When the room is darkened, the buttons can be illuminated for convenience.

- To **turn on** the backlight, press buttons 3 and 7 simultaneously
- To **turn off** the backlight, press the respective buttons once again.

1 The macro sequence can be carried out instantly or can take a while, depending on the delay times included in the sequence

2 Six times per second, as compared with twice per second during normal operation

3 For example, a faulty DVD player

4 Including the button you kept pressed to stop the macro sequence

5.5 Using the Internal Web Page

The internal Web page can be used to remotely operate the **RC-84** via the Ethernet.

To control your **RC-84** via the internal Web page, do the following:

1. Type the unit's IP number[1] in the Address bar of your browser (or type any link defined by the system integrator).
   The **RC-84** front panel is displayed on your screen.
2. Press the on-screen buttons to control the unit.

6 Technical Specifications

Table 10 defines the technical specifications:

Table 10: Technical Specifications[2] of the RC-84 / RC-84E Transport Control Module

PORTS:	2 RS-232 on terminal block connectors; 1 RS-485 on terminal block connectors; 1 ETHERNET RJ-45 port; 1 IR Learner port
OUTPUTS:	2 relays on terminal block connectors (36V AC or DC, 2A, 60VAC maximum on non-inductive load); 4 IR emitters on terminal block connectors
BUTTONS:	8 programmable buttons, 4 selector buttons, 13 video/DVD control buttons
POWER SOURCE:	12V DC, 155mA
DIMENSIONS:	RC-84: 16.2cm x 3.1cm x 11.4cm (6.38" x 1.23" x 4.5", W, D, H) RC-84E: 23cm x 3.1cm x 8.6cm (9.06" x 1.23" x 3.39", W, D, H)
WEIGHT:	0.3kg (0.67lbs.) approx.
ACCESSORIES:	Kramer 3.5mm to IR Emitter Control Cable (C-A35/IRE-10), power supply, two extra M3x5 screws, Java based control software (internal), Windows®-based Kramer control software
OPTIONS:	Kramer 3.5mm to IR Emitter Control Cable (C-A35/IRE-10), Kramer 3.5mm to Dual IR Emitter Control Cable (C-A35/2IRE-10), 15 meter and 20 meter IR emitter extension cables

1 The default IP number is 192.168.1.39, and may be changed by the system integrator

2 Specifications are subject to change without notice

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.

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

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000251 REV 1