

Kramer Electronics, Ltd.



USER MANUAL

Model:

FC-50

RS-232 Range Extender

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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 groups¹ that are clearly defined by function.

Thank you for purchasing the **FC-50 RS-232 Range Extender**, which is ideal for controlling a single matrix switcher or other controllable device from long distance.

The package includes the following items:

- Two **FC-50 RS-232 Range Extender** units
- One Power adapter (12V DC Input)
- This user manual²

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 cables³

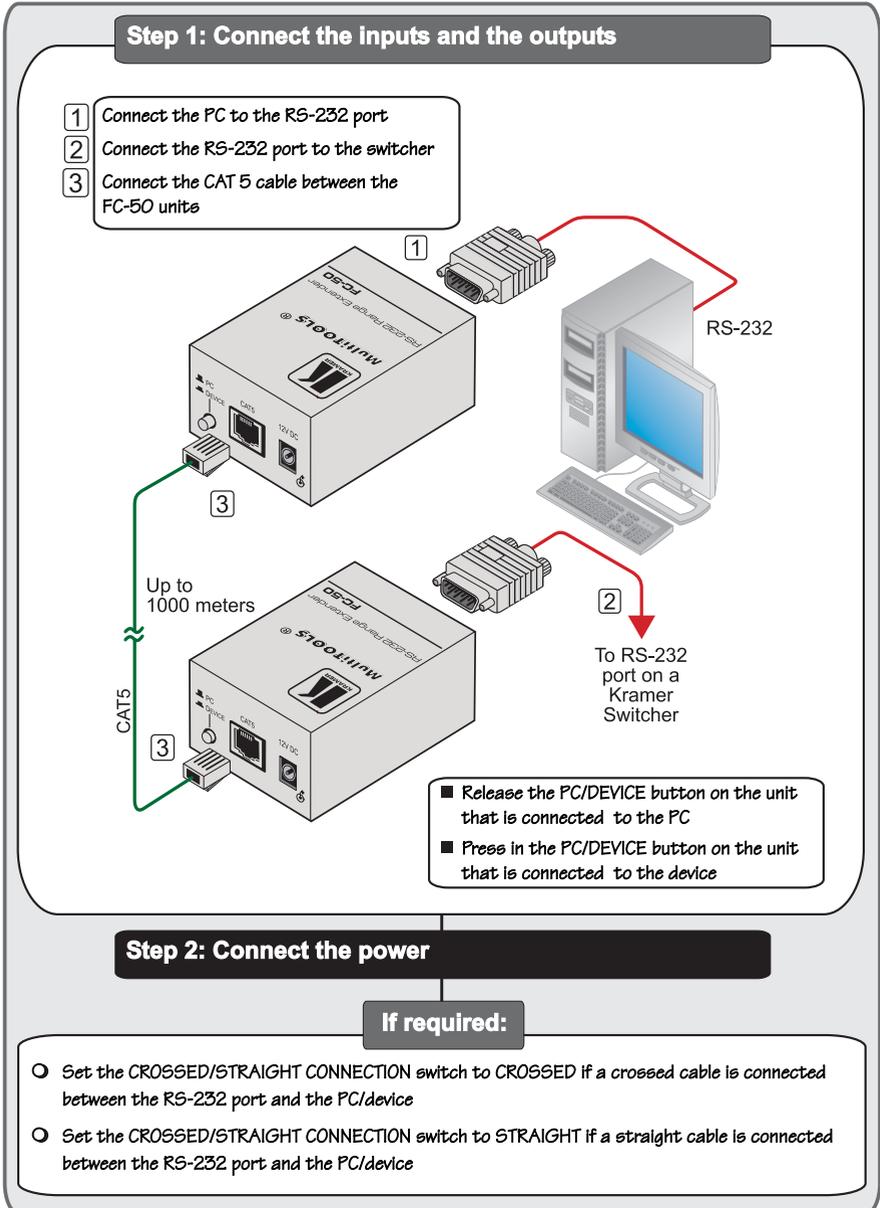
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from our Web site: <http://www.kramerelectronics.com>

3 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 high-quality Kramer MultiTOOLS **FC-50 RS-232 Range Extender** can connect either to a PC or to a device (for example, a switcher). By connecting two units via a CAT 5 cable, the PC can control the switcher over a range of up to 1000 meters.

In particular, the **FC-50** features:

- Bidirectional RS-232 operation
- The Power Connect feature
- A CONNECTION switch to select between a crossed and a straight connection
- A PC/DEVICE pushbutton that is pressed or released if a device or a PC, respectively, are connected to the RS-232 port
- 12V DC power

3.1 About the Power Connect Feature

The Power Connect feature means that only one unit in a system, the transmitter or the receiver, needs to be connected to a power source when the devices are within 150 feet (50 meters) of each other.

The Power Connect feature applies as long as the cable can carry power. The distance does not exceed 50 meters on standard CAT 5 cable. For longer distances, heavy-gauge cable should be used¹.

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

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

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 digital signals and 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.

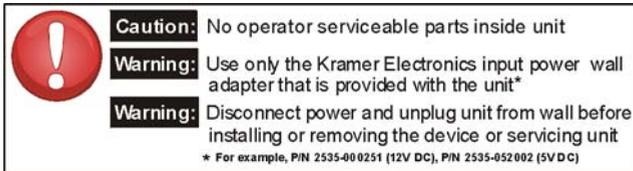
¹ CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

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 cables¹ 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 **FC-50** away from moisture, excessive sunlight and dust



4 Your FC-50 RS-232 Range Extender

[Figure 1](#) and [Table 1](#) define the **FC-50 RS-232 Range Extender**:

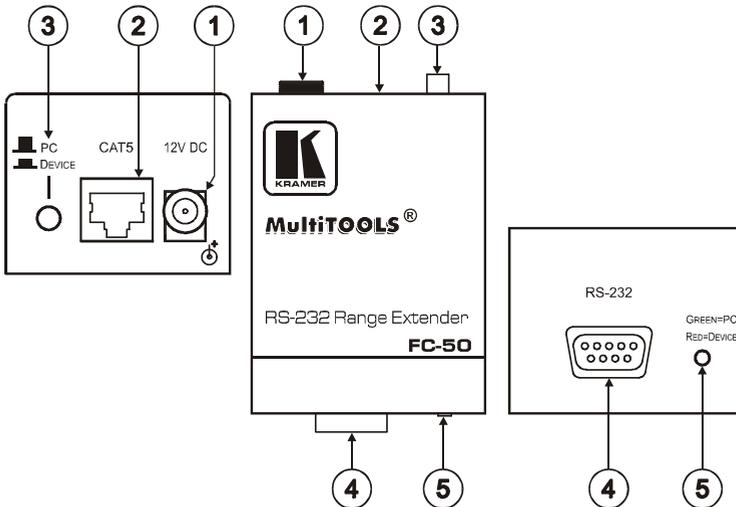


Figure 1: FC-50 RS-232 Range Extender

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

Your FC-50 RS-232 Range Extender

Table 1: FC-50 RS-232 Range Extender Features

#	Feature	Function
1	12V DC	+12V DC connector for powering the unit
2	CAT 5 RJ-45 Connector	Connect to ¹ the CAT 5 RJ-45 connector on the other FC-50 unit
3	PC / DEVICE Button	Press when a device is connected to the RS-232 port Release when a PC is connected to the RS-232 port
4	RS-232 9-pin D-sub Connector	Connects to either a PC or a device PINs 2, 3 and 5 are passed through the device
5	GREEN=PC RED=DEVICE	LED
		Lights in green when the PC/DEVICE button is released and in red when the PC/DEVICE button is pressed

[Figure 2](#) and [Table 2](#) define the **FC-50** underside:

Table 2: FC-50 RS-232 Range Extender Underside Features

Feature	Function
CROSSED / STRAIGHT CONNECTION Switch	Set to CROSSED for a crossed wire connection ² between the RS-232 port and the PC/device Set to STRAGHT for a straight wire connection between the RS-232 port and the PC/device

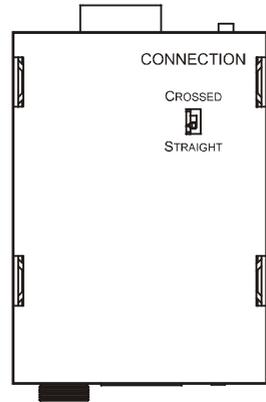


Figure 2: FC-50 RS-232 Range Extender Underside

¹ Using a UTP CAT 5 cable with RJ-45 connectors at both ends (the PINOUT is defined in [Table 3](#) and [Figure 4](#))

² PINs 2 and 3 (Rx and Tx) are crossed in the wiring between the 9-pin D-sub connectors

5 Connecting the FC-50 RS-232 Range Extender

To connect two **FC-50** units, as illustrated in the example in [Figure 3](#), do the following:

1. Connect a PC to the RS-232 port of the first **FC-50** unit and release the PC/DEVICE button.
2. Connect the RS-232 port of the second **FC-50** unit to a device (for example, a switcher) and push in the PC/DEVICE button.
3. Connect the CAT 5 RJ-45 connector of the first unit to the CAT 5 RJ-45 connector of the second **FC-50** unit via UTP cabling.
4. Set the CONNECTION switch independently on both units as follows:
 - STRAIGHT for a straight wire connection¹ between the RS-232 port and the PC/device
 - CROSSED for a crossed wire connection² between the RS-232 port and the PC/device
5. Connect the 12V DC power adapter to the power socket on the **FC-50** and connect the adapter to the mains electricity (not illustrated in [Figure 3](#)).

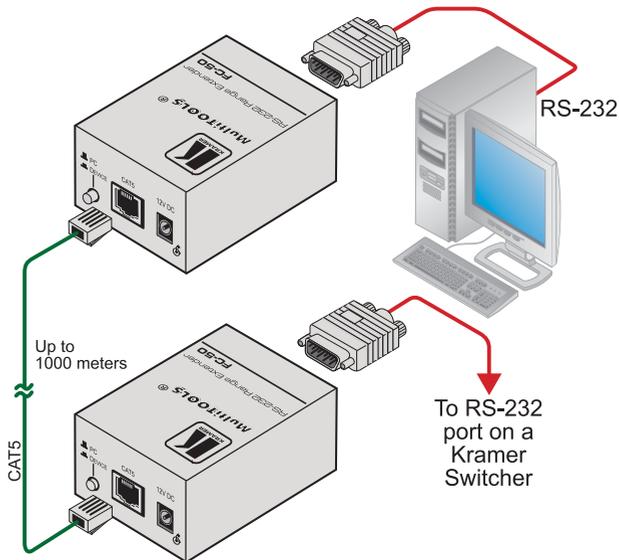


Figure 3: Connecting the FC-50 RS-232 Range Extender

¹ For example, flat cable

² Null modem

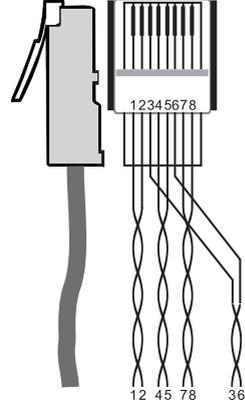
5.1 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

[Table 3](#) and [Figure 4](#) 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		EIA /TIA 568B	
PIN	Wire Color	PIN	Wire Color
1	Green / White	1	Orange / White
2	Green	2	Orange
3	Orange / White	3	Green / White
4	Blue	4	Blue
5	Blue / White	5	Blue / White
6	Orange	6	Green
7	Brown / White	7	Brown / White
8	Brown	8	Brown
Pair 1	4 and 5	Pair 1	4 and 5
Pair 2	3 and 6	Pair 2	1 and 2
Pair 3	1 and 2	Pair 3	3 and 6
Pair 4	7 and 8	Pair 4	7 and 8

Figure 4: CAT 5 PINOUT



6 Technical Specifications

The **FC-50** technical specifications are shown in [Table 4](#):

Table 4: Technical Specifications¹ of the FC-50

PORTS:	RS-232 on a 9-pin D-sub connector ² , 1 CAT 5 RJ-45 connector
BAUD RATES:	Up to 115.2kbaud
DISPLAY:	GREEN=PC/RED=DEVICE LED
DIMENSIONS:	5.32cm x 7.25cm x 4.2cm (2.09" x 2.85" x 1.65"), W, D, H
POWER SOURCE:	12V DC, 42mA
WEIGHT:	0.3kg (0.67lbs) approx.

¹ Specifications are subject to change without notice

² Only PINs 2, 3, 5 on the RS-232 cable are valid

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.



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



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