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 video, audio, presentation, and broadcasting professionals 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 **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:

- One **FC-50** *RS-232 Range Extender* unit
- Power supply (12V DC)
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high-resolution cables[3]

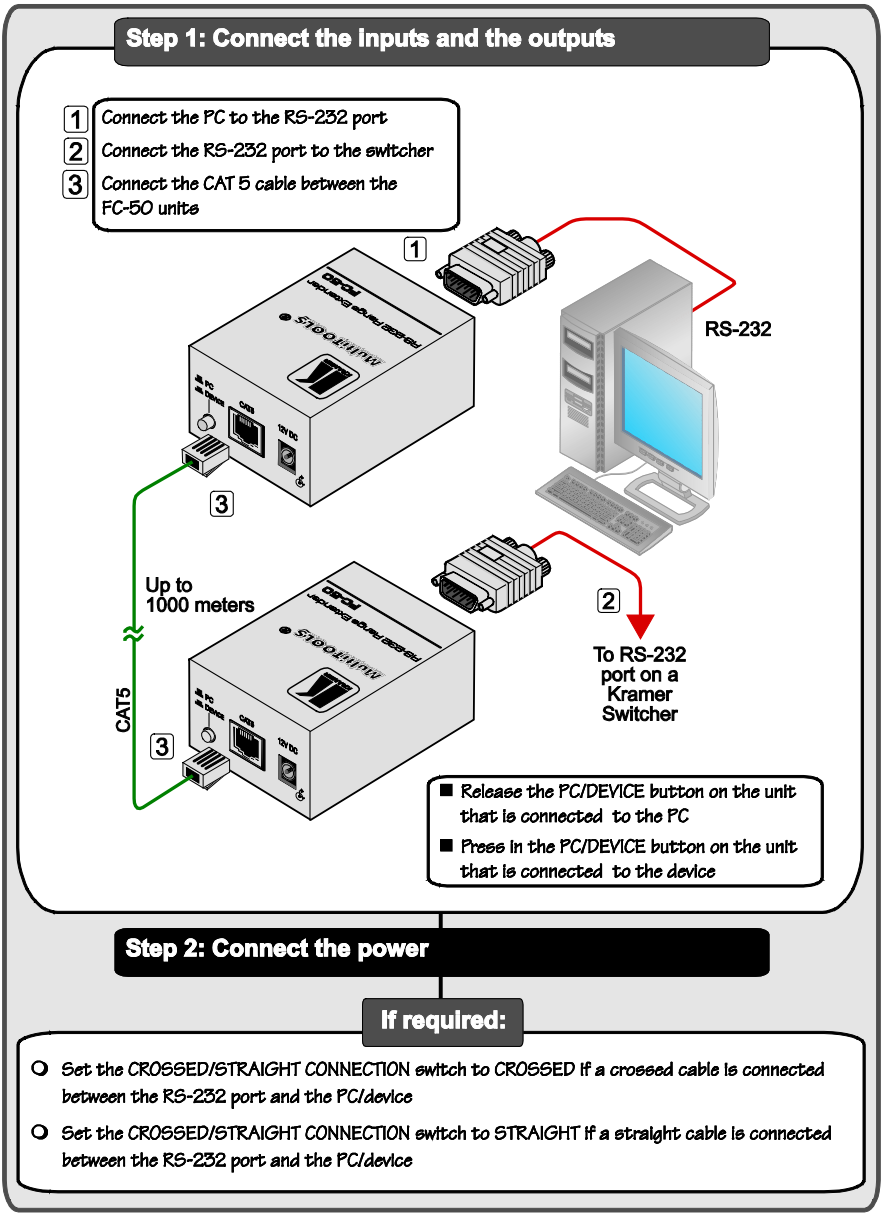
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity;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

2 Download up-to-date Kramer user manuals from our Web site at 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 (purchased separately) via a CAT 5 cable, the PC can control the switcher over a range of up to 1000 meters (3300 feet).

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 applies as long as the cable can carry power. This feature is available when using STP cable and the distance does not exceed 50m (164ft) on standard CAT 5 cable. For longer distances, heavier gauge cable should be used (TP cable is still suitable for the video/audio transmission, but not for feeding the power at these distances). 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 TP cable exceeding a distance of 50m, 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, and stress that the compliance to electromagnetic interference was tested using 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.

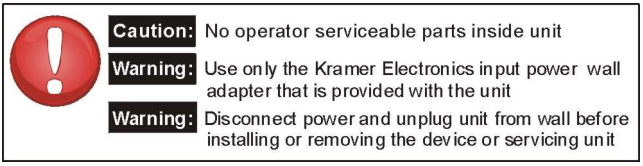
In cases where there is skewing, our Unshielded Twisted Pair (UTP) skew-free cable, Kramer **BC-XTP**, may be advantageous, and UTP cable might

also be preferable for long range applications. In any event when using UTP cable, it is advisable to ensure that the cable is installed far away from electric cables, motors and so on, which are prone to create electrical interference.

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).
- Do not secure the cables in tight bundles or roll the slack into tight coils
- 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*:

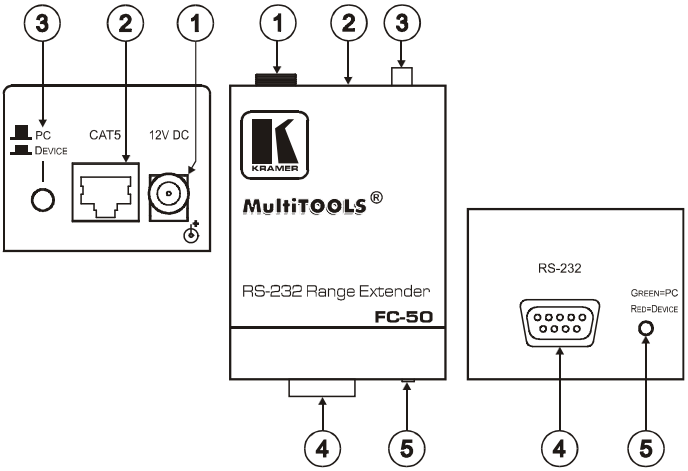


Figure 1: FC-50 RS-232 Range Extender

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

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

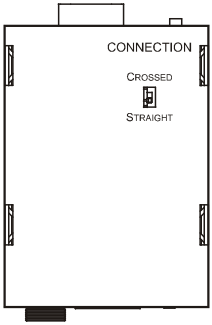


Figure 2: FC-50 RS-232 Range Extender Underside

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 connection[1] between the RS-232 port and the PC/device
   - CROSSED for a crossed wire connection[2] 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).

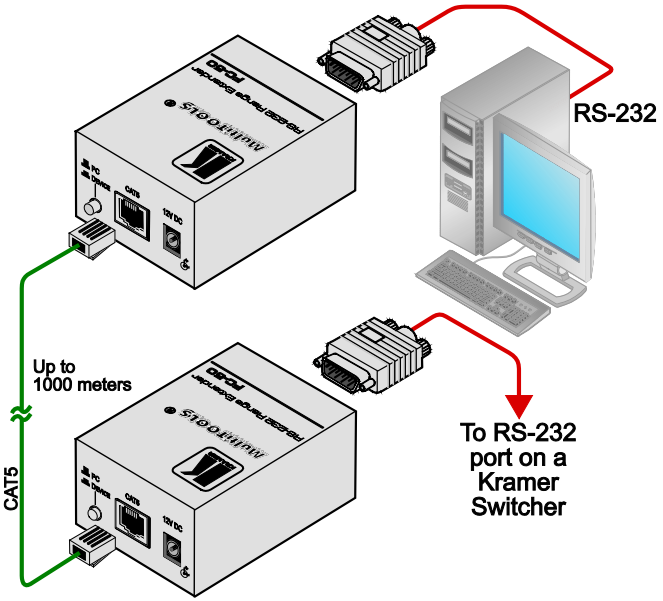


Figure 3: Connecting the FC-50 RS-232 Range Extender

1 For example, flat cable

2 Null modem

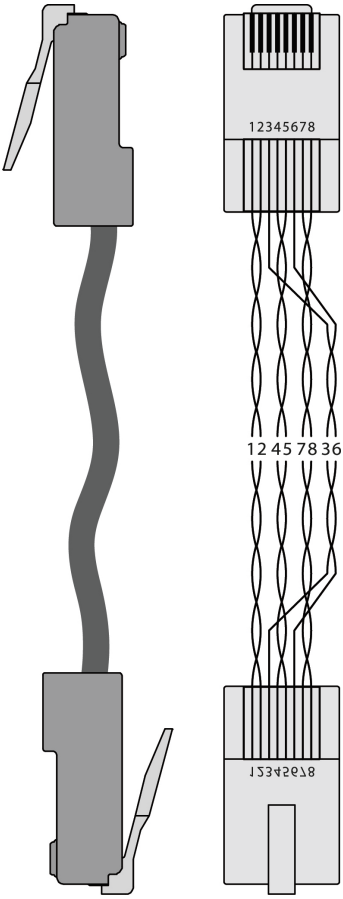
5.1 Wiring the CAT 5 LINE IN / LINE OUT RJ-45 Connectors

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 568B	
PIN	**Wire Color**
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown

Figure 4: CAT 5 PINOUT



6 Technical Specifications

The **FC-50** technical specifications are shown in Table 4:

Table 4: Technical Specifications[1] 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
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
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

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

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Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

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What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

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If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

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To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

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If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

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Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

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.

P/N: 2900-000333 Rev: 6

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000333 REV 6