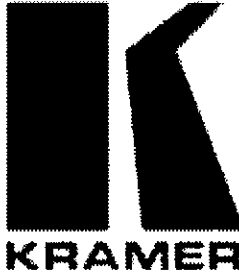


Kramer Electronics, Ltd.



USER MANUAL

Models:

VS-4FW, *FireWire Repeater / HUB (4 Ports)*

VS-6FW, *FireWire Repeater / HUB (6 Ports)*

VS-8FW, *FireWire Repeater / HUB (8 Ports)*

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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 Groups¹, which are clearly defined by function.

Congratulations on purchasing your Kramer TOOLS **VS-4FW**, **VS-6FW** or **VS-8FW**, which are ideal for:

- Digital video production, editing studios, and digital video live broadcasting
- PC FireWire port extensions and long cable drivers

The package includes the following items:

- *FireWire Repeater / HUB (VS-4FW, VS-6FW or VS-8FW)*
- One 6 pin to 6 pin Connector Cable²
Power adapter (12V DC Input) and this user manual³

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 cables⁴

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

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

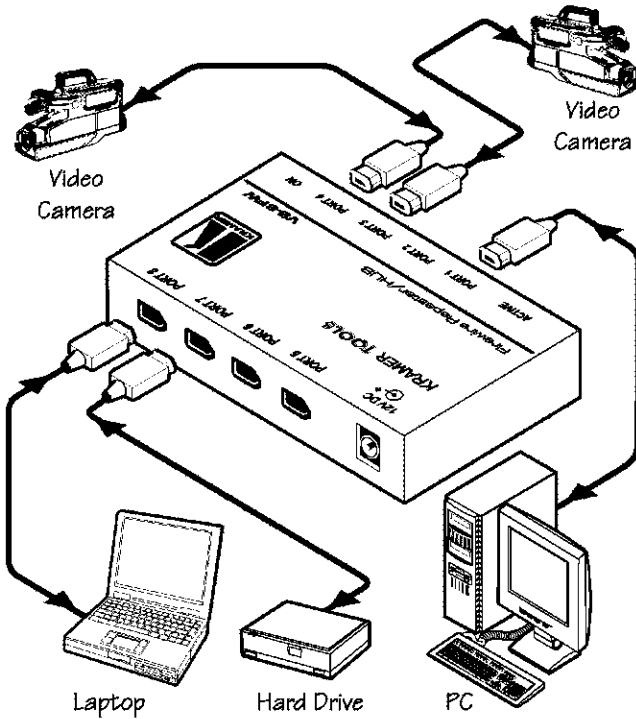
2 The original FireWire standard defines a cable with identical 6 pin connectors at both ends that can be plugged in either direction, between nodes, and carries the signal and the power. In the IEEE 1394a supplement, two kinds of FireWire 4 pin connector cable became available without the power pins: a 6 pin connector at one end and a 4 pin connector at the other end, and 4 pin connectors at both ends

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

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

Step 1: Connect the FireWire devices - see section 5

The VS-BFW (shown below) is an 8 port FireWire Repeater / HUB.
Also available in 4 port (the VS-4FW) and 6 port (the VS-6FW) versions.



Step 2: Connect the power

3 Overview

Each Kramer TOOLS *FireWire Repeater / HUB*—the **VS-4FW**, the **VS-6FW**, and the **VS-8FW**—are based on FireWire which:

- Is a serial bus standard¹ that enables quick universal interfacing between video and computer hardware items²
- Is simple to use and operates independently of the host system, letting you connect more items than you otherwise could (as a computer only has limited ports available), and for extended distances. Several can be cascaded to create up to a 63 port FireWire Repeater / HUB
- Supports Plug and Play³, hot swapping⁴ and isochronous⁵ and asynchronous applications

3.1 About the FireWire Repeater / HUB

Many computers today come with one or more FireWire ports on the rear panel. These ports let you attach many devices to your computer quickly and easily. The operating system also supports FireWire, so the installation of the device drivers is also quick and easy. Compared to other ways of connecting devices to your computer (including parallel ports, serial ports and special cards that you install inside the computer's case), FireWire devices are simple. Many peripheral devices (including: DV Camcorders, Digital still cameras, Webcams, Storage devices such as External Hard Drives and Arrays, and Network connections) now come in a FireWire version.

Connecting a FireWire device to a computer is easy – you just plug it into the port. If it is an uninstalled FireWire device, the operating system auto-detects it and installs software support for it automatically. If the device has already been installed, the computer activates it and starts talking to it.

With so many FireWire devices on the market today, you easily run out of ports very quickly. The simple solution to the problem is an inexpensive FireWire hub. The FireWire standard supports up to 63 devices, and FireWire hubs are a part of the standard. A hub typically has four/six/eight new ports, but may have many more. You plug the hub into your computer, and then plug your devices (or other hubs) into the hub. By chaining hubs together, you can build up dozens of available FireWire ports on a single computer.

1 Originally developed by Apple™ and published as IEEE 1394 by the Institute of Electrical and Electronics Engineers

2 Hardware items include digital cameras, computers, printers, VCRs, CD-ROMs, hard disks, scanners and graphic cards

3 Configures automatically. Whenever a device is added or removed the 1394 bus re-enumerates

4 You can connect and disconnect inputs and outputs dynamically, without having to restart the PC or cycle power

5 Video / audio applications require constant transfer rates, which the serial bus provides by supporting isochronous transfers

In some ways, you could consider the hub as similar to an audio/video distributor. However, contrary to audio/video one-way signals, a FireWire hub is like a network, with bi-directional signals. The standard defines FireWire as Peer-to-Peer connection: that is why two devices, or a device and a computer can talk to each other.

It is important to note that everything depends on your computer's software, and the firmware of the devices. Sometimes, it is possible that a computer can work with many FireWire devices simultaneously (like a distribution), sometimes it can work with many devices in time-sharing mode (like a switcher). But most often it is possible to work one-to-one. In this case, you have to disconnect all the devices that are unnecessary at this time and leave only two of them. Since the FireWire is hot-plug standard, you can connect/disconnect devices at any time.

Hubs can be powered or unpowered. The FireWire standard lets devices draw their power from their FireWire connection. Obviously, a high-power device, like a professional DV camcorder, will have its own power supply, but low-power devices like a Webcam derive their power from the bus in order to simplify them. The power for this (up to 1.5 amps at 12 volts) comes from the computer.

If you have several self-powered devices, then your hub does not need to be powered, as none of the devices connecting to the hub needs additional power, and the hub itself can derive power from the computer. If you have many unpowered devices, you probably need a powered hub. The hub has to be powered from an AC adapter, which supplies power to the bus.

3.2 FireWire Compliance

In particular, the **VS-4FW**, **VS-6FW** and **VS-8FW**:

- Fully support the provisions of the IEEE 1394-1995 Standard for High Performance Serial Bus and the P1394a Supplement
- Are fully interoperable with FireWire™ and i.LINK™ implementation of IEEE Std 1394
- Are fully compliant with OpenHCI requirements
- Provide P1394a Fully Compliant Cable Ports at 100/200/400 Megabits per Second (Mbits/s)
 - Include full P1394a support, that is, Connection Debounce, Arbitrated Short Reset, Multispeed Concatenation, Arbitration Acceleration, Fly-By Concatenation, Port Disable/Suspend/Resume
 - Include Extended Resume Signaling for Compatibility with Legacy DV Devices

- Include built-in protection from electrostatic discharge (ESD)¹, by suppressing all transient high voltages down to the allowed level. In particular, ESD protection for high-speed data lines to IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC 61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns)

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 and positioning your *FireWire Repeater / HUB* 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 unit².

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

4 Your FireWire Repeater / HUB

This section describes how to connect the *FireWire Repeater / HUB*. In particular, how to:

- Connect the **VS-4FW** (see section 4.1)
- Connect the **VS-6FW** (see section 4.2)
- Connect the **VS-8FW** (see section 4.3)

¹ Often when connecting a "live" DV source to a receptor, an electrical potential difference or any other element creating a high voltage (such as ESD or a live chassis) may permanently damage one or both of the connected devices. This high voltage may be seen as a spark occurring at the instant of connection, or may not be seen at all, but nevertheless can result in costly damage

² For example: model number AD2512C, part number 2535-000251

4.1 VS-4FW FireWire Repeater / HUB

Figure 1 and Table 1 define the **VS-4FW**:

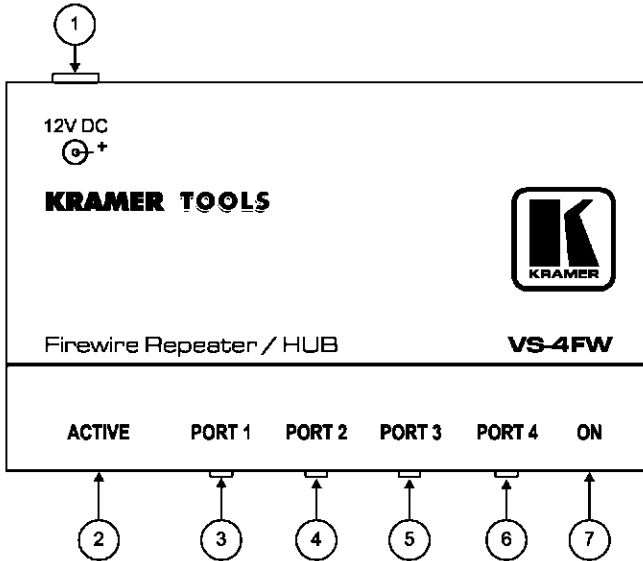


Figure 1: VS-4FW FireWire Repeater / HUB

Table 1: VS-4FW FireWire Repeater / HUB Features

| # | Feature | Function |
|---|------------|----------------------------------------------------------|
| 1 | 12V DC | +12V DC connector for powering the unit |
| 2 | ACTIVE LED | Lights when a cable from an external device is connected |
| 3 | PORT 1 | Connects to the FireWire device 1 |
| 4 | PORT 2 | Connects to the FireWire device 2 |
| 5 | PORT 3 | Connects to the FireWire device 3 |
| 6 | PORT 4 | Connects to the FireWire device 4 |
| 7 | ON LED | Illuminates when receiving power |

4.2 VS-6FW FireWire Repeater / HUB

Figure 2 and Table 2 define the VS-6FW:

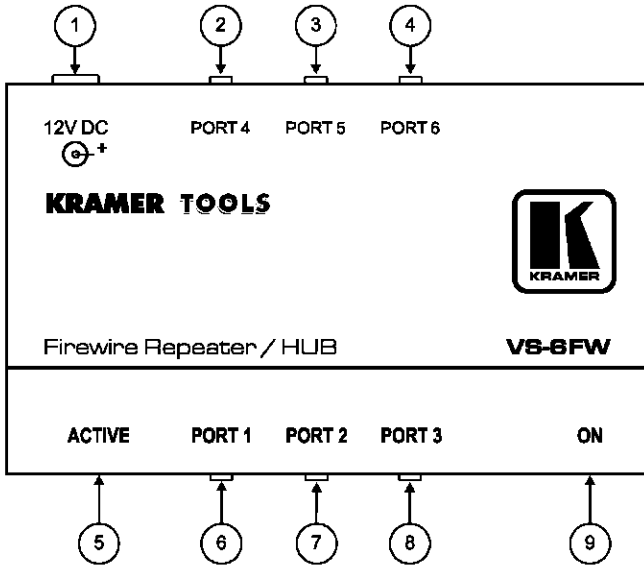


Figure 2: VS-6FW FireWire Repeater / HUB

Table 2: VS-6FW FireWire Repeater / HUB Features

| # | Feature | Function |
|---|------------|------------------------------------------------------------|
| 1 | 12V DC | +12V DC connector for powering the unit |
| 2 | PORT 4 | Connects to the FireWire device 4 |
| 3 | PORT 5 | Connects to the FireWire device 5 |
| 4 | PORT 6 | Connects to the FireWire device 6 |
| 5 | ACTIVE LED | Lights when the internal FireWire circuitry works properly |
| 6 | PORT 1 | Connects to the FireWire device 1 |
| 7 | PORT 2 | Connects to the FireWire device 2 |
| 8 | PORT 3 | Connects to the FireWire device 3 |
| 9 | ON LED | Illuminates when receiving power |

4.3 VS-8FW FireWire Repeater / HUB

Figure 3 and Table 3 define the VS-8FW:

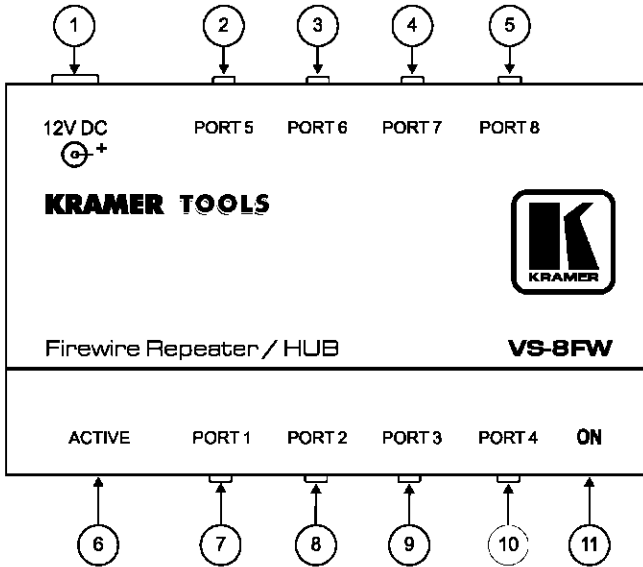


Figure 3: VS-8FW FireWire Repeater / HUB

Table 3: VS-8FW FireWire Repeater / HUB Features

| # | Feature | Function |
|----|------------|------------------------------------------------------------|
| 1 | 12V DC | +12V DC connector for powering the unit |
| 2 | PORT 5 | Connects to the FireWire device 5 |
| 3 | PORT 6 | Connects to the FireWire device 6 |
| 4 | PORT 7 | Connects to the FireWire device 7 |
| 5 | PORT 8 | Connects to the FireWire device 8 |
| 6 | ACTIVE LED | Lights when the internal FireWire circuitry works properly |
| 7 | PORT 1 | Connects to the FireWire device 1 |
| 8 | PORT 2 | Connects to the FireWire device 2 |
| 9 | PORT 3 | Connects to the FireWire device 3 |
| 10 | PORT 4 | Connects to the FireWire device 4 |
| 11 | ON LED | Illuminates when receiving power |

5 Using the FireWire Repeater / HUB

To use the **VS-8FW¹** FireWire Repeater / HUB, as the example in Figure 4 illustrates, do the following²:

1. Connect FireWire devices to some of the eight 6 pin ports, for example: PORT 1 to a laptop, PORT 2 to a hard drive, PORT 5 to a video camcorder, PORT 6 to a video camcorder, and PORT 8 to a PC.
2. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not shown in Figure 4).
The ON red LED lights.
3. Be sure that the power on each device is turned ON.
The ACTIVE green LED lights indicating that the internal FireWire circuitry works properly³.

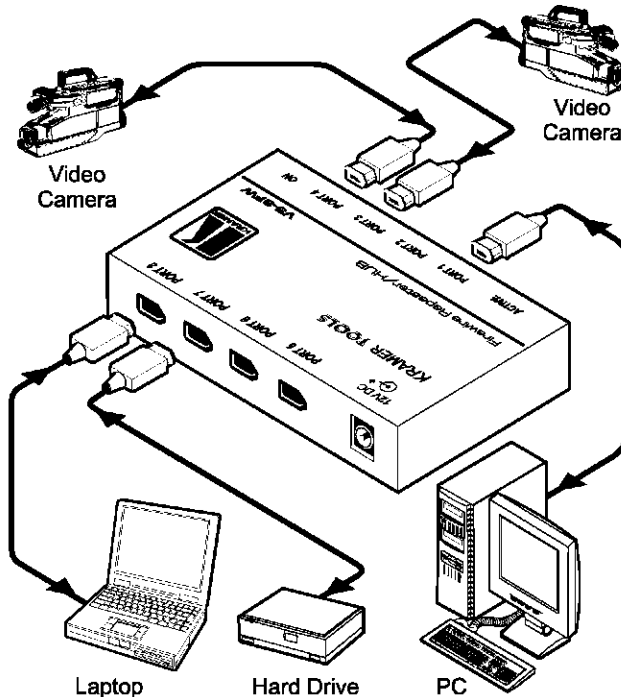


Figure 4: Connecting the VS-8FW FireWire Repeater / HUB

1 Connecting the VS-4FW or VS-6FW is similar to the VS-8FW, except to just four or six devices, respectively

2 Not all ports need to be connected. Any unused port should simply be left unconnected

3 Also applies to the VS-6FW. For the VS-4FW, the Active LED lights whenever an external FireWire device is connected

6 Technical Specifications

Table 4 includes the technical specifications:

Table 4: Technical Specifications¹ of the VS-4FW, VS-6FW and VS-8FW

| | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORTS: | VS-4FW: Four 6-pin serial 1394 Ports VS-6FW: Six 6-pin serial 1394 Ports VS-8FW: Eight 6-pin serial 1394 Ports |
| TRANSFER RATE: | 100/200/400 Mbps |
| STANDARDS: | Fully supports the provisions of the IEEE 1394-1995 Standard for High Performance Serial Bus and the P1394a Supplement; Fully interoperable with FireWire™ and i.LINK™ implementation of IEEE Std 1394; Fully compliant with OpenHCI requirements; Provides Six P1394a Fully Compliant Cable Ports at 100/200/400 Megabits per Second (Mbits/s); Full P1394a support includes: Connection Debounce, Arbitrated Short Reset, Multispeed Concatenation, Arbitration Acceleration, Fly-By Concatenation, Port Disable/Suspend/Resume; Extended Resume Signaling for Compatibility with Legacy DV Devices; ESD protection for high-speed data lines to IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact), IEC 61000-4-5 (Lightning) 12A (8/20us), and IEC 61000-4-4 (EFT) 40A (5/50ns) |
| POWER SOURCE: | VS-4FW: 12 VDC, 200mA VS-6FW: 12 VDC, 250mA VS-8FW: 12 VDC, 300mA |
| DIMENSIONS: | 12cm x 7.5cm x 2.5cm (4.7" x 2.95" x 0.98", W, D, H) |
| WEIGHT: | 0.3 kg. (0.67 lbs.) approx. |
| ACCESSORIES: | Power supply, mounting bracket, one 6 pin to 6 pin connector cable |

¹ 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 your 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.



Caution

Safety Warning:

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



Kramer Electronics, Ltd.

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P/N: 2900-000468 REV 3