Kramer Electronics, Ltd.

USER MANUAL

Model:

FC-49

DVI / Audio to HDMI Converter

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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 TOOLS **FC-49** *HDMI*[2] *to DVI / Audio Converter*. The **FC-49**, which incorporates HDMI™ technology, and is ideal for:

- Home theater, presentation and multimedia applications
- Rental and staging

The package includes the following items:

- **FC-49**
- Power adapter (12V DC Input)
- This user manual[3]

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[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

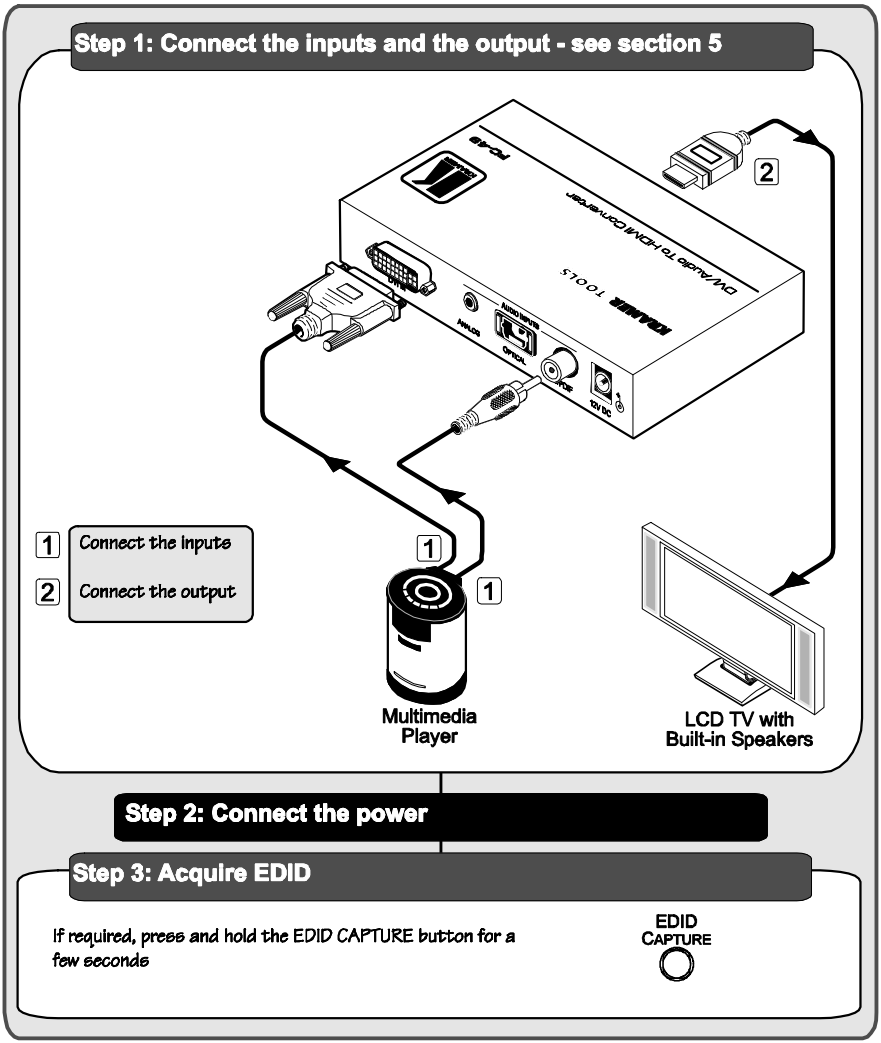
2 High-Definition Multimedia Interface

3 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

4 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 **FC-49** *DVI / Audio to HDMI Converter* accepts a DVI input and an audio input (analog, optical or digital), and combines both these A/V signals into an HDMI output.

In particular, the **FC-49**:

- Adds HDMI output capability to your DVI source so that, for example, an HDMI television can be used with your DVI source[1] with sound
- Supports an operation frequency of up to 1.65Gbps per graphic channel
- Features input format auto detection: digital RGB or YPbPr
- Features audio input auto detection[2]
- Is 12VDC fed
- Is HDCP compliant
- Is Plug and Play

3.1 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard (developed by Intel), protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.2 Defining EDID

The Extended Display Identification Data (EDID[3]) is a data-structure, provided by a display, to describe its capabilities to an HDMI source. The EDID enables the **FC-49** to "know" what kind of display is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

1 For example, the DVI source can also be the DVI graphics output of a PC as well as its audio signal

2 If an analog signal is not detected, the digital input (S/PDIF) is selected. If both analog and digital signals are not detected, the machine selects the optical input (TOSLink)

3 Defined by a standard published by the Video Electronics Standards Association (VESA)

3.3 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital[1] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality. Note that Kramer Electronics Limited is an HDMI Adopter[2] and an HDCP Licensee[3]. In particular, HDMI[4]:

- Provides a simple[5] interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single[6] cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio[7] on a single cable
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed high definition digital video via a single cable[8], and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

HDMI has the capacity to support existing high-definition video formats (720p, 1080i, and 1080p/60), as well as standard definition formats such as NTSC or PAL.

1 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

2 See http://www.hdmi.org/about/adopters_founders.asp

3 See http://www.digital-cp.com/list/

4 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

5 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

6 HDMI technology has been designed to use standard copper cable construction at up to 15m

7 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

8 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

3.4 Recommendations for 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 **FC-49** in a location free from moisture and away from 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 FC-49 DVI / Audio to HDMI Converter

Figure 1 and Table 1 define the **FC-49** *DVI / Audio to HDMI Converter*:

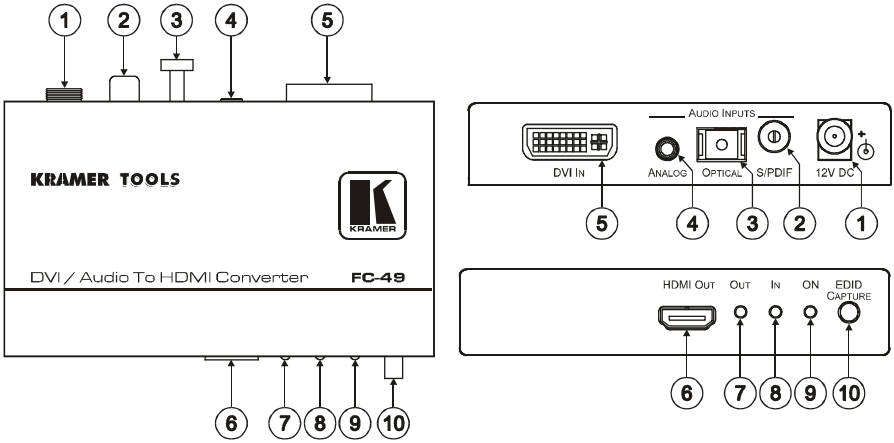


Figure 1: FC-49 DVI / Audio to HDMI Converter

Table 1: FC-49 DVI / Audio to HDMI Converter Features

#	Feature		Function
1	***12V DC***		+12V DC connector for powering the unit
2	***AUDIO INPUTS***	***S/PDIF*** RCA Connector	Connects to the digital audio source
3		***OPTICAL*** TosLink® Connector	Connects to the digital audio source
4		***ANALOG*** 3.5mm Mini Jack Connector	Connects to the analog audio source
5	***DVI IN*** Connector		Connects to the DVI source
6	***HDMI OUT*** Connector		Connects to the HDMI acceptor
7	***OUT*** LED		Illuminates to indicate that a display is connected
8	***IN*** LED		Illuminates to indicate a signal at the input
9	***ON*** LED		Illuminates when receiving power
10	***EDID CAPTURE Button***		Press and hold[1] to acquire EDID

Note that the audio inputs are automatically detected: if an analog input is not detected, the digital (S/PDIF) input is selected. If the digital output is not detected, the machine automatically selects the optical input (TOSLink).

1 For about 5 seconds

4.1 Connecting the FC-49 DVI / Audio to HDMI Converter

To connect the **FC-49**, as the example in Figure 2 illustrates, do the following[1]:

1. Connect the HDMI OUT connector to the HDMI acceptor (for example, an LCD TV with built-in speakers).
2. Connect the DVI source (for example, a multimedia player[2]) to the:
   - DVI IN connector
   - S/PDIF (digital audio) RCA IN connector[3]
3. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not illustrated in Figure 2).

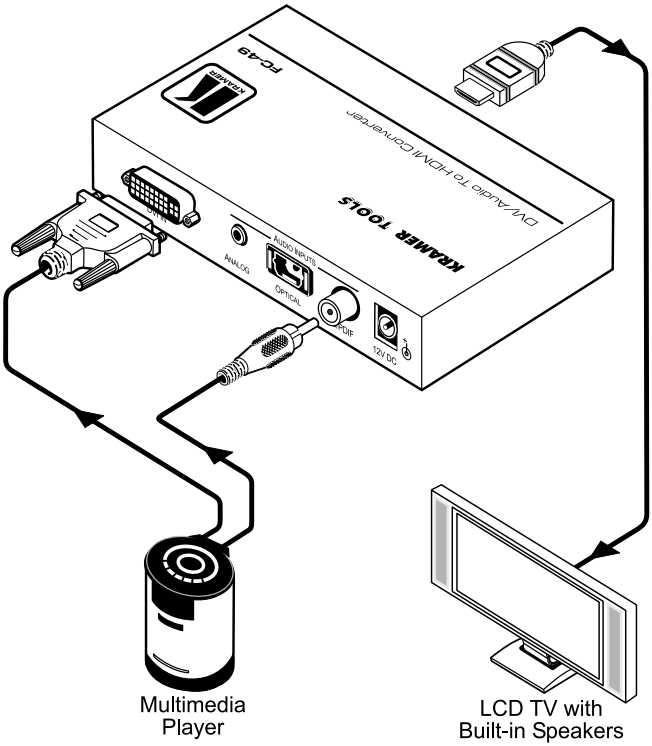


Figure 2: Connecting the FC-49 DVI / Audio to HDMI Converter

1 Switch OFF the power on each device before connecting it to your FC-49. After connecting your FC-49, switch on its power and then switch on the power on each device

2 Alternatively, you can connect a PC

3 Alternatively, you can connect the audio source to ANALOG or OPTICAL audio connector

5 Technical Specifications[1]

Table 2 defines the technical specifications:

Table 2: Technical Specifications of the FC-49 DVI / Audio to HDMI Converter

INPUTS:	1 DVI[2], 1.2Vpp on a DVI Molex 24pin female connector; DDC signal 5Vpp (TTL) 1 S/PDIF (digital audio) on an RCA connector 1 ANALOG on a 3.5mm mini jack connector 1 TosLink® optical connector
OUTPUT:	HDMI Connector
OPERATION FREQUENCY:	Supports up to 1.65Gbps (UXGA, 1080p)
COMPLIANCE WITH HDMI STANDARD:	Supports DVI 1.0, HDMI 1.1, and HDCP[3] 1.0
CONTROLS:	EDID button
INDICATOR LED:	ON, IN, OUT
POWER SOURCE:	12 VDC 190mA
DIMENSIONS:	12cm x 7.2cm x 2.4cm (4.73" x 2.83" 0.95", W, D, H)
WEIGHT:	0.3 kg. (0.67 lbs.) approx.
ACCESSORIES:	Power supply, bracket installation kit
OPTIONS:	Kramer cables

1 Specifications are subject to change without notice

2 On a DVI-I connector. Note that only the digital signal (DVI-D) is available on the DVI connector

3 Compliant with HDCP 1.1 and downward compatible with HDCP 1.0

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.

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