KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

FC-49
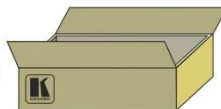DVI / Audio to HDMI Converter

P/N: 2900-000286 Rev 6

FC-49 Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ☑ The **FC-49** DVI / Audio to HDMI Converter
- ☑ 1 Power adapter
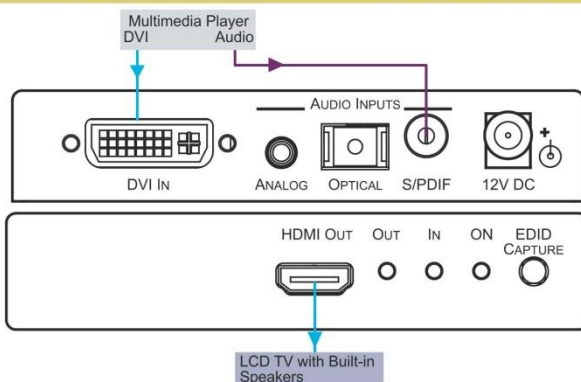- ☑ Mounting brackets
- ☑ 4 Rubber feet
- ☑ 1 Quick Start Guide

Save the original box and packaging materials in case you need to return your **FC-49** for service.

Step 2: Install the FC-49

Mount the machine in a rack or place on a table.

Step 3: Connect inputs and output

Always switch off the power on each device before connecting it to your **FC-49**.

Multimedia Player
DVI   Audio

AUDIO INPUTS

DVI IN   ANALOG   OPTICAL   S/PDIF   12V DC

HDMI OUT   OUT   IN   ON   EDID CAPTURE

LCD TV with Built-in Speakers

For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the **FC-49**.

Step 4: Connect the power

Connect the 12V DC power adapter to the **FC-49** and plug the adapter into the mains electricity.

Step 5: Acquire the EDID

1. Connect the power supply.
2. Connect the new output display (or keep disconnected to acquire the default EDID).
3. Press and hold the EDID CAPTURE button until the green IN LED starts blinking and then release the button.

The EDID is acquired after the LED stops flashing

Contents

Figures

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 groups that are clearly defined by function: 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 and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer TOOLS **FC-49** *DVI / Audio to HDMI Converter*, which is ideal for:

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

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

> Go to http://www.kramerelectronics.com/support/product_downloads.asp to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) 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

- Position your Kramer **FC-49** away from moisture, excessive sunlight and dust

> This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions

> **Caution:** There are no operator serviceable parts inside the unit
>
> **Warning:** Use only the Kramer Electronics input power wall adapter that is provided with the unit.
>
> **Warning:** Disconnect the power and unplug the unit from the wall before installing

2.3 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

3 Overview

The Kramer **FC-49** *DVI / Audio to HDMI Converter* is a high−quality format converter and embedder for DVI and audio signals. It converts a DVI signal and embeds an unbalanced stereo, S/PDIF or TOSLINK® audio signal to an HDMI output.

The **FC-49** *DVI / Audio to HDMI Converter* features:

- A maximum data rate up to 4.95Gbps (1.65Gbps per graphics channel)

- HDCP compliance

- HDTV compatibility

- Auto Format Detection for digital RGB or YPbPr

- A DVI−D input signal on a DVI−I connector

- I-EDIDPro™ Kramer Intelligent EDID Processing™ - Intelligent EDID handling and processing algorithm ensures Plug and Play operation for HDMI systems

In addition, the **FC-49** *DVI / Audio to HDMI Converter*:

- Adds HDMI output capability to your DVI source so that, for example, an HDMI television can be used with your DVI source (For example, the DVI source can also be the DVI graphics output of a PC as well as its audio signal) with sound

- Includes automatic audio input detection. If a digital input (S/PDIF or TOSLINK®) is detected, the **FC-49** selects the digital input. If no digital input is detected, the machine selects the analog input.
  Note that S/PDIF and TOSLINK® inputs may not be connected simultaneously

- Supports a TOSLINK® sample rate of 44.1kHz and 48kHz

- Is housed in a Kramer TOOLS™ enclosure. Three units can be rack mounted side−by−side in a 1U rack space with the optional RK−3T rack adapter
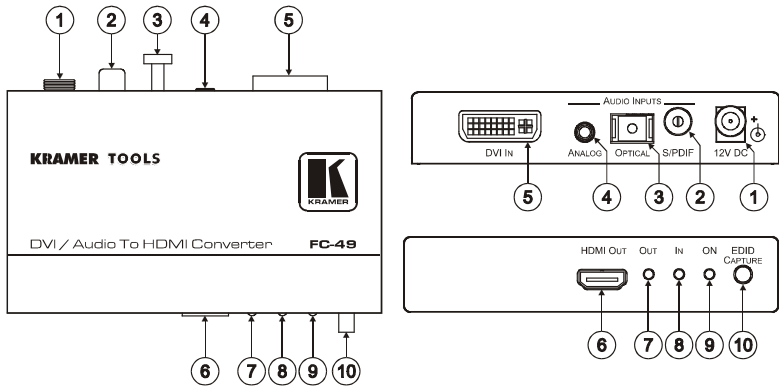
3.1 Defining the FC-49 DVI / Audio to HDMI Converter

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

#	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	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 to acquire EDID

The audio inputs are automatically detected: if a digital input (S/PDIF or TOSLINK®) is detected, the machine selects the digital input. If no digital input is detected, the machine selects the analog input.
Note that S/PDIF and TOSLINK® inputs cannot be connected simultaneously.

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

Always switch off the power to each device before connecting it to your **FC-49**. After connecting your **FC-49**, connect its power and then switch on the power to each device.

To connect the **FC-49**, as illustrated in the example in Figure 2 do the following:

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 (or a PC) to the:

    ▪ DVI IN connector

    ▪ S/PDIF (digital audio) RCA IN connector (or you can connect the audio source to the ANALOG or OPTICAL audio connector)

    Note: S/PDIF in the **FC-49** supports stereo audio and not 5.1 channel audio.

3. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity (not illustrated in Figure 2).

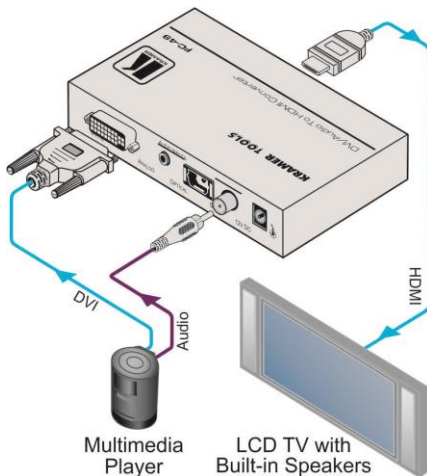Figure 2: Connecting the FC-49 DVI / Audio to HDMI Converter

5 Acquiring an EDID

To acquire a new EDID, do the following:

1. Connect the power supply.

2. Connect the new output display (or keep it disconnected to acquire the default EDID).

3. Press and hold the EDID CAPTURE button until the green IN LED starts flashing, and then release the button.

The EDID is acquired after the IN LED stops flashing.

6   Technical Specifications

INPUTS:	1 DVI-D on a DVI-I connector, 1.2Vpp on a Molex 24-pin female connector; DDC signal 5Vpp (TTL) 1 S/PDIF on an RCA connector (stereo audio and not 5.1 channel audio) 1 unbalanced stereo audio on a 3.5mm mini jack, 1.5Vpp max. 1 TOSLINK® optical connector
OUTPUT:	HDMI connector
MAX. DATA RATE:	4.95Gbps (1.65Gbps per graphics channel) (UXGA, 1080p)
COMPLIANCE WITH HDMI STANDARD:	Supports DVI 1.0, HDMI, and HDCP 1.1 and downward compatible with HDCP 1.0
TOSLINK SAMPLE RATE:	44.1kHz and 48kHz
CONTROLS:	EDID button
INDICATOR LED:	ON, IN, OUT
POWER SOURCE:	12V DC, 400mA
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	12cm x 7.2cm x 2.4cm (4.73" x 2.83" 0.95") W, D, H
WEIGHT:	0.3kg (0.6lbs) approx.
ACCESSORIES:	Power supply, bracket installation kit
OPTIONS:	RK-3T 19" rack adapter
Specifications are subject to change without notice	

7   Default EDID

Monitor #2 [Real-time 0x0031]
  Model name............... FC-49
  Manufacturer............ KRM
  Plug and Play ID......... KRM0000
  Serial number............ 1
  Manufacture date......... 2006, ISO week 12
  Filter driver............ None

  EDID revision............ 1.3
  Input signal type........ Digital (DVI)
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 700 x 390 mm (31.5 in)
  Power management......... Not supported
  Extension blocs.......... 1 (CEA-EXT)

  DDC/CI.................. Not supported

Color characteristics
  Default color space...... Non-sRGB
  Display gamma............ 2.20
  Red chromaticity......... Rx 0.640 - Ry 0.341
  Green chromaticity....... Gx 0.286 - Gy 0.610
  Blue chromaticity........ Bx 0.146 - By 0.069
  White point (default).... Wx 0.284 - Wy 0.293
  Additional descriptors... None

Timing characteristics
  Horizontal scan range.... 30-91kHz
  Vertical scan range...... 55-85Hz
  Video bandwidth.......... 160MHz
  CVT standard............. Not supported
  GTF standard............. Supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:9)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #1....... 720x480p at 60Hz (16:9)
    Modeline............... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

Standard timings supported
     720 x 400p at 70Hz - IBM VGA
     640 x 480p at 60Hz - IBM VGA
     640 x 480p at 67Hz - Apple Mac II
     640 x 480p at 72Hz - VESA
     640 x 480p at 75Hz - VESA
     800 x 600p at 56Hz - VESA
     800 x 600p at 60Hz - VESA
     800 x 600p at 72Hz - VESA
     800 x 600p at 75Hz - VESA
     832 x 624p at 75Hz - Apple Mac II
    1024 x 768p at 60Hz - VESA
    1024 x 768p at 70Hz - VESA
    1024 x 768p at 75Hz - VESA
    1280 x 1024p at 75Hz - VESA
    1600 x 1200p at 60Hz - VESA STD
    1280 x 960p at 85Hz - VESA STD
    1360 x 765p at 85Hz - VESA STD
    1024 x 768p at 85Hz - VESA STD
     800 x 600p at 85Hz - VESA STD
     640 x 480p at 85Hz - VESA STD

EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Not supported
  YCbCr 4:2:2.............. Not supported

Native formats........... 1
Detailed timing #1....... 720x480p at 60Hz (4:3)
  Modeline............... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
Detailed timing #2....... 1920x1080i at 60Hz (16:9)
  Modeline............... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync
+vsync

CE video identifiers (VICs) - timing/formats supported
    640 x 480p at 60Hz - Default (4:3, 1:1)
    720 x 480p at 60Hz - EDTV (4:3, 8:9)
    720 x 480p at 60Hz - EDTV (16:9, 32:27)
  1280 x 720p at 60Hz - HDTV (16:9, 1:1) [Native]
  1920 x 1080i at 60Hz - HDTV (16:9, 1:1)
  NB: NTSC refresh rate = (Hz*1000)/1001

CE audio data (formats supported)
  LPCM   2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE speaker allocation data
  Channel configuration.... 2.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. No
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No

CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz

Report information
  Date generated........... 29/05/2012
  Software revision........ 2.60.0.964
  Data source.............. Real-time 0x0031
  Operating system......... 5.1.2600.2.Service Pack 3

Raw data
00,FF,FF,FF,FF,FF,00,2E,4D,00,00,01,00,00,00,00,0C,10,01,03,81,46,27,78,0B,D5,7C,A3,57,49,9C,25,
11,48,4B,BF,EF,00,A9,40,81,59,8B,D9,61,59,45,59,31,59,01,01,01,01,01,1D,00,72,51,D0,1E,20,6E,28,
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10,3E,96,00,13,8E,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,00,00,00,00,
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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.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

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

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

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.

What Kramer Electronics will not do Under This Limited Warranty

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.

How to Obtain a Remedy under this Limited Warranty

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.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

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 where updates to this user manual may be found.

We welcome your questions, comments, and feedback.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com

C E

ISO 9001:2008
IQC

! SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

P/N: 2900-000286   Rev: 6

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