Kramer Electronics, Ltd.

USER MANUAL

Model:

C-FODPM/FODPM

Optical DisplayPort Extension Cable

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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 groups[1] that are clearly defined by function.

Congratulations on purchasing your Kramer **C-FODPM/FODPM** *Optical DisplayPort (DP) Extension Cable*, which is ideal for:

- Digital flat panel and plasma displays, for medical, commercial and travel applications
- Conference rooms and auditoriums
- Kiosks with digital flat panel displays for presenting information
- LED signboards in streets and stadiums

The **C-FODPM/FODPM** package includes the following items:

- An *Optical DisplayPort Extension Cable*[2] and two DisplayPort copper cables
- One Power adapter (5V DC Input) and 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]

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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

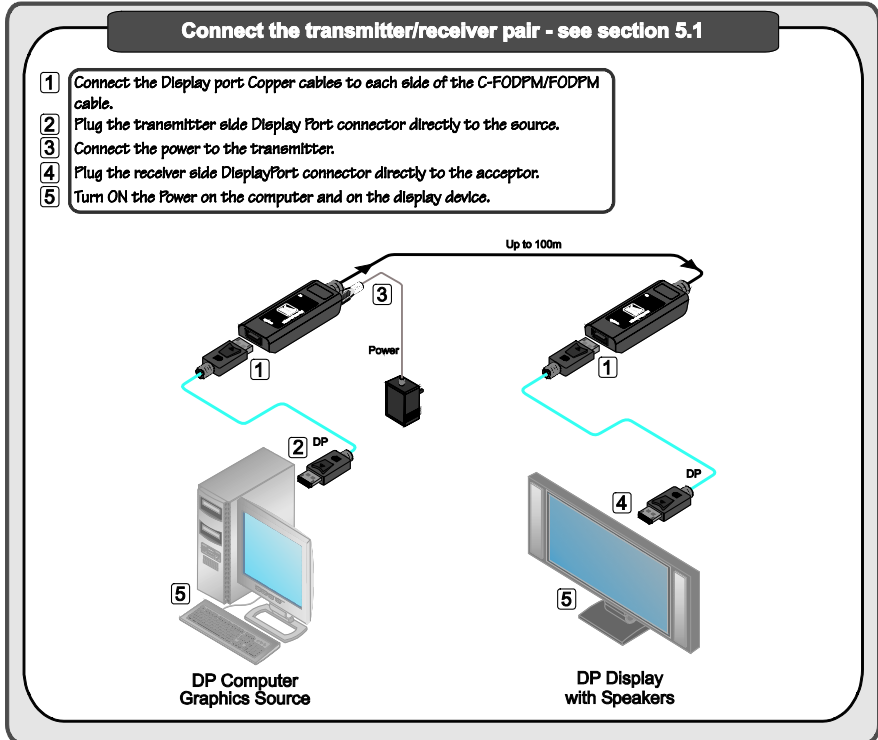2 Available in lengths of 10m, 30m, 50m and 100m (32.8 to 328ft).

3 Download up-to-date Kramer user manuals from the Internet at 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.

Connect the transmitter/receiver pair - see section 5.1

1. Connect the Display port Copper cables to each side of the C-FODPM/FODPM cable.
2. Plug the transmitter side Display Port connector directly to the source.
3. Connect the power to the transmitter.
4. Plug the receiver side DisplayPort connector directly to the acceptor.
5. Turn ON the Power on the computer and on the display device.

Up to 100m

Power

DP

DP

DP Computer
Graphics Source

DP Display
with Speakers

3   Overview

The Kramer **C-FODPM/FODPM** *Optical DisplayPort Extension Cable* is a hybrid cable with four multi-mode fiber cables for the DP interface including embedded copper wires to support the auxiliary channel, Hot Plug Detect and a power management advanced solution that is designed to extend DisplayPort over hybrid (fiber + copper) cable up to 100 meters.

The **C-FODPM/FODPM** extension cable:

- Supports resolutions of up to WQXGA (2560x1600) at 60Hz vertical refresh rate or 2.7Gbps bandwidth per lane (total data rate is 10.8Gbps)
- Is fire retardant PVC, employing 4-fiber strands and 5 shielded copper wires
- Lets you extend DisplayPort up to 328 feet (100 meters) for WQXGA (2560x1600) at a 60Hz refresh rate

KRAMER: SIMPLE CREATIVE TECHNOLOGY

- Complies with VESA's EDID (extended-display-identification) and MCCS (monitor-control-command-set) standards
- Easily allows direct connection to the HDTV source and display peripheral devices
- Supports DP 1.1 with 36 bit color depth, and DVI 1.0 (DDC2B), fully implemented by fiber-optic communication
- Complies with the limits for a Class A digital device, pursuant to part 15 and 2 of FCC and CE
- Does not require any special memory size, CPU speed and chipsets, when using a computer
- Provides data security with negligible RFI/EMI emissions
- Is HDCP compliant and HDTV compatible
- Passes EDID/HDCP signals from source to display (EDID PassThru)

3.1 About DisplayPort

DisplayPort (DP) is a digital display interface standard for the PC industry. It delivers the highest resolutions and sound quality.
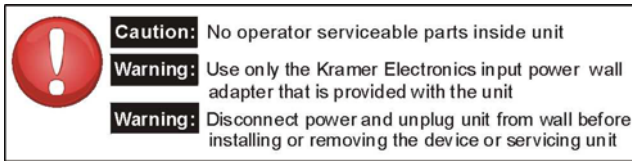
In addition, DisplayPort:

- Provides a simple interface between a PC and a display, projector or TV
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of 1.62Gb or 2.7Gb per second
- Has a maximum length of 15 meters for video transmission, at a resolution of 1080p/60Hz and 3 meters for full bandwidth transmission
- Video specs include a video path that supports 6 to 16 bits per color channel, a maximum resolution of 2560x1600 pixels and a total maximum bandwidth of 10.8Gbps over four lanes
- Is backward-compatible with HDMI, DVI (Digital Visual Interface) and VGA, via an appropriate adapter
- Version 1.1 supports HDCP (see section 3.2)
- Supports two-way communication over its auxiliary channel between the video source (for example, a PC) and the digital display, enabling new functionality such as automatic configuration and one-button play
- Replaces the interface needed between the PC and an external display, as well as the low voltage differential signaling (LVDS) interface in notebook computers, monitors, to connect to LCD panels

3.2 About HDCP

The High-Bandwidth Digital Content Protection (HDCP) standard[1] 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.

To achieve the best performance:

- Connect 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)
- Position your Kramer **C-FODPM/FODPM** 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 the unit

Warning: Disconnect power and unplug unit from wall before installing or removing the device or servicing unit

4 Your C-FODPM/FODPM Optical DisplayPort Extension Cable

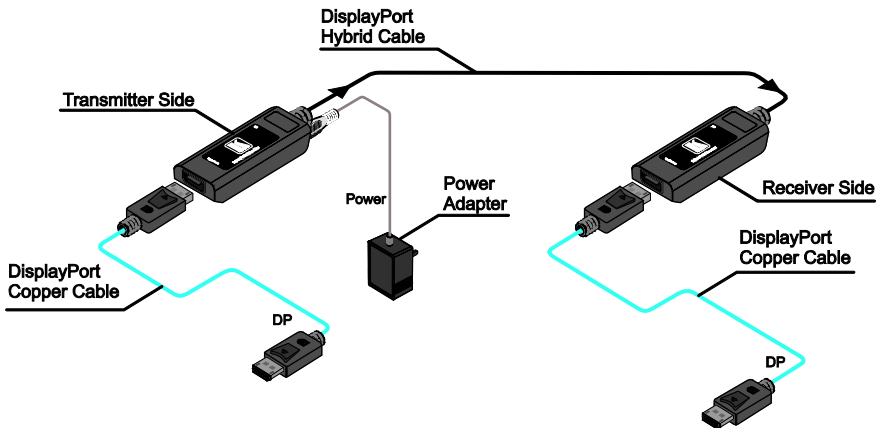Figure 1 illustrates the **C-FODPM/FODPM** *Optical DisplayPort Extension Cable* extension system:

Figure 1: C-FODPM/FODPM Optical DP Extension Cable

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1 Developed by Intel

5 Using the C-FODPM/FODPM Optical DP Extension Cable

This section describes how to:

- Connect the **C-FODPM/FODPM** *Optical DP Extension Cable* (see Section 5.1)
- Avoid pitfalls when using the **C-FODPM/FODPM** (see Section 5.2)

5.1 Connecting the C-FODPM/FODPM Optical DP Extension Cable

To connect the **C-FODPM/FODPM** *Optical DisplayPort Extension Cable*, as the example in Figure 2 illustrates, do the following:

1. Connect the Display port Copper cables to each side of the C-FODPM/FODPM cable.

2. Plug the transmitter DisplayPort connector[1] **directly**[2] to the DisplayPort connector of the source (for example, a computer graphics source).

3. Connect the **C-FODPM/FODPM** transmitter side[3] to the 5V DC power adapter and connect the adapter to the mains electricity.

4. Plug the receiver DisplayPort connector[4] **directly**[2] to the DisplayPort connector of the acceptor (for example, a display).

5. Turn ON the Power on the computer and on the display device.

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1 Of the copper DisplayPort cable connected to the transmitter

2 Using an intermediate cable or adapter may deteriorate the signal transmission performance

3 On the Computer graphics source side

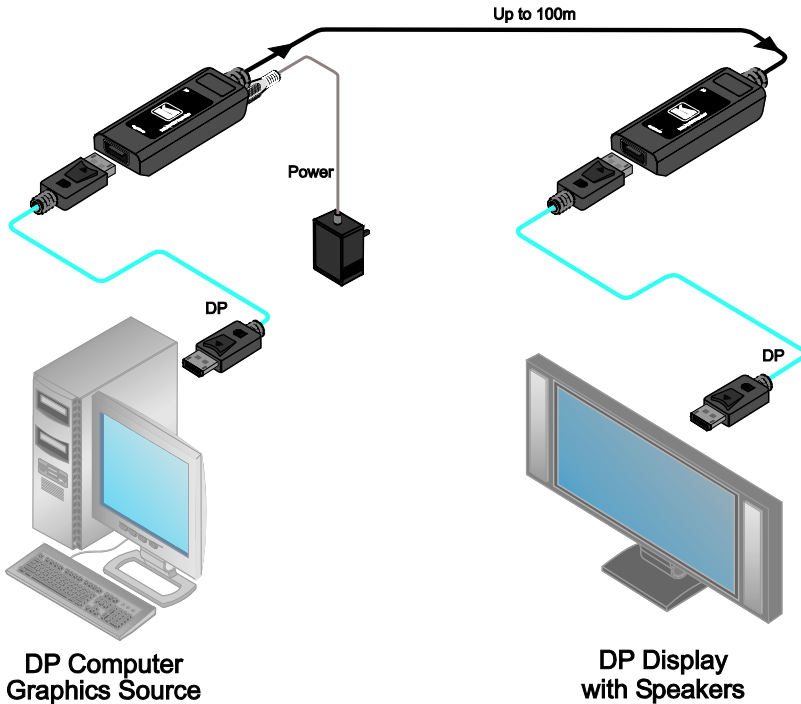4 Of the copper DisplayPort connector connected to the receiver

Figure 2: Connecting the C-FODPM/FODPM Optical DP Extension Cable

5.2 Avoiding Pitfalls using the C-FODPM/FODPM Cable

If the display device shows only a black screen:

- Make sure that all the AC and DC plugs and jacks used by the external power supplies are firmly connected

- Be sure that the DP ports are firmly plugged into the computer and the display device, and be sure that the Transmitter and Receiver modules are correctly plugged into the computer and display device, respectively

- Check if the computer and display are powered ON and properly booted

- Reset the system by unplugging and then replugging the Transmitter DP port or Receiver DP port and then reboot the system

If the screen is distorted or displays noise, disconnect and reconnect the optical cables.

Be sure that at all times the cables are stored and used away from liquid or dirt

6 Technical Specifications

Table 1 includes the technical specifications:

Table 1: Technical Specifications[1] of the C-FODPM/FODPM

INPUT:	DisplayPort In
OUTPUT:	DisplayPort Out
BANDWIDTH:	2.7Gbps per lane (10.8Gbps total); up to WQXGA @60Hz
COMPLIANCE WITH DP STANDARD	Supports DP 1.1 with 36-bit color depth and DVI 1.0 (DDC2B), fully implemented by fiber optic communication
EXTENSION LIMIT:	100m (330feet) for WQXGA (2560x1600) @60Hz refresh rate
HYBRID FIBER-OPTIC CABLE:	Flame retardant PVC employing four fiber strands and five shielded copper wires
TENSILE LOAD:	180N
MINIMUM BEND RADIUS:	15.4cm
OUTER DIAMETER OF CABLE:	7.2cm
OPERATING TEMPERATURE:	0°C to 50°C
STORAGE TEMPERATURE:	-10°C to 85°C
HUMIDITY:	5% to 85%
POWER SOURCE:	AC 100-240V, 50/60Hz 0.1A, +5 V, 1.0A SMPS DC-power Adapter Core is 5V and outer is GND
DIMENSIONS:	3.5cm x 9.9cm x 1.6cm (1.38" x 3.9" x 0.63") W, D, H
WEIGHT:	0.14kg (0.31lbs) approx.
ACCESSORIES:	Power supply

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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 one year 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.