FT8301/FR8301 Fiber Transmitter and Receiver

Single-Channel Digitally Encoded Video

C1641M-A (3/05)

Contents

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Important Safety Instructions

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this apparatus near water.

6. Clean only with dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the points where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15. Apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases shall be placed on the apparatus.

16. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

17. Installation should be done only by qualified personnel and conform to all local codes.

18. Unless the unit is specifically marked as a NEMA Type 3, 3R, 3S, 4, 4X, 6, or 6P enclosure, it is designed for indoor use only and it must not be installed where exposed to rain and moisture.

19. Use only installation methods and materials capable of supporting four times the maximum specified load.

CAUTION: These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other that contained in the operating instructions unless you are qualified to do so.

The product and/or manual may bear the following marks:

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

CAUTION:
RISK OF ELECTRIC SHOCK. DO NOT OPEN.

Regulatory Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RADIO AND TELEVISION INTERFERENCE

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and the receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

You may also find helpful the following booklet, prepared by the FCC: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402.

Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Product Overview

DESCRIPTION

The FT8301/FR8301 fiber transmitter and receiver provide the ability to transmit one composite video channel over one optical fiber (refer to Figure 1).

Figure 1. Single-Channel Video FT8301 Transmitter and FR8301 Receiver

Features of the FT8301/FR8301 fiber optic transmission system include the following:

- 8-bit digitally encoded video for high-quality video transmission over a single fiber

- Multimode fiber support for distances up to 6 km (3.7 mi)

- Single-mode fiber support for distances up to 30 km (18.6 mi)

- Exceeds all requirements for the RS-250C Medium-Haul Transmission specification

- 12 VDC or 24 VAC power supply

- Compatible with NTSC, PAL, and SECAM video standards

- No performance adjustments required

- LED indicators for monitoring of signal status and operating power

NOTE: The FT8301 transmitter/FR8301 receiver is a Class 1 laser product that complies with FDA radiation performance standard 21CFR Subchapter J and with IEC 60825-1 Edition 1.2, 2001-08.

MODELS

The FT8301/FR8301 fiber transmitter and receiver consist of the following series of models:

Multimode Models:

FT8301MST   Single-channel fiber optic video transmitter; multimode, ST connector; transmission distance up to 2 km

FR8301MSTR   Single-channel fiber optic video receiver; multimode, ST connector; transmission distance up to 2 km

FT8301MSTE   Single-channel fiber optic video transmitter; multimode, ST connector; transmission distance up to 6 km (extended distance)

FR8301MSTRE   Single-channel fiber optic video receiver; multimode, ST connector; transmission distance up to 6 km (extended distance)

Single-Mode Models:

FT8301SST   Single-channel fiber optic video transmitter; single-mode, ST connector

FR8301SSTR   Single-channel fiber optic video receiver; single-mode, ST connector

FT8301SFC   Single-channel fiber optic video transmitter; single-mode, FC connector

FR8301SFCR   Single-channel fiber optic video receiver; single-mode, FC connector

OPTIONAL ACCESSORIES
(Applicable to Receiver Only)

The following optional accessories are available for the FR8301 receiver:

WM5001-3U   Wall mount base kit for single-width module

WM5001-3UEXP   Wall mount expansion kit for single-width module

RK5000-3U   19-inch rack mount chassis for 14 slots (no power), 3 RUs

RK5000PS-3U   19-inch rack mount chassis for 12 slots with power, 3 RUs

EPS5000-120   External/redundant power supply, 1 RU, 120 W x 2

RK5001B-3U   Blank filler panel, single width

RK5002B-3U   Blank filler panel, double width

RK5001-1UEXP   Adapter kit that allows a 3 RU single-width fiber module to be used in RK5000PS-5U rack mount chassis

FRONT PANEL

The front panel of the FT8301 transmitter and the FR8301 receiver provides LED indicators that allow you to monitor signal status and operating power. The following sections provide a view of the front panel of the FT8301 transmitter and the FR8301 receiver.

FRONT PANEL - FT8301 TRANSMITTER

Figure 2 illustrates the front panel of the FT8301 transmitter.
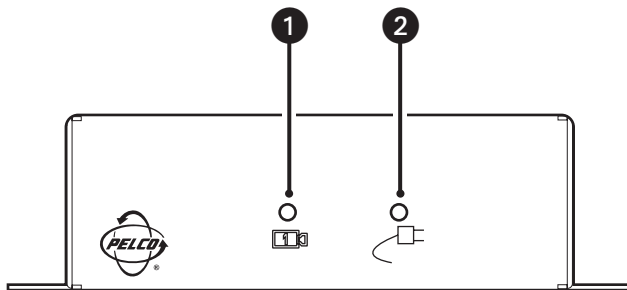
Figure 2. Front Panel of FT8301 Transmitter

❶ VIDEO PRESENT LED

❷ POWER LED

For detailed information about the front-panel indicators, refer to the *Troubleshooting* section.

FRONT PANEL - FR8301 RECEIVER

Figure 3 illustrates the front panel of the FR8301 receiver.

Figure 3. Front Panel of FR8301 Receiver

1 VIDEO PRESENT LED

2 CARRIER DETECT LED

3 POWER LED (Pelco badge)

For detailed information about the front-panel indicators, refer to the *Troubleshooting* section.

REAR PANEL

Connections to the FT8301 transmitter and the FR8301 receiver are made to the rear panel of the modules. The following sections provide a view of the rear panel of the FT8301 transmitter and the FR8301 receiver.

REAR PANEL - FT8301 TRANSMITTER

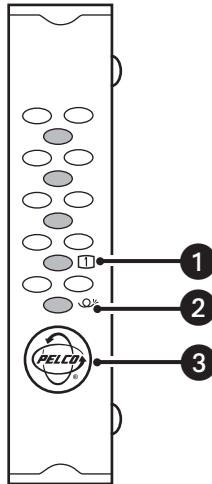Figure 4 illustrates the rear panel of the FT8301 transmitter.

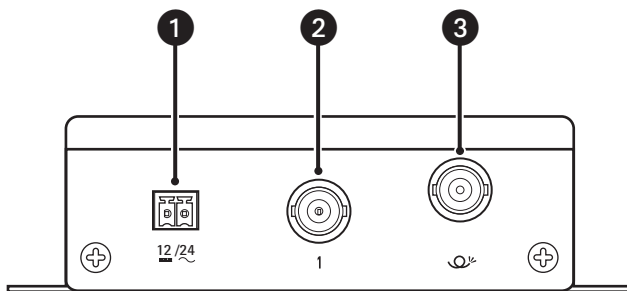**Figure 4.** Rear Panel of FT8301 Transmitter

1 POWER CONNECTOR, 2-pin connector; removable mating connector with screw terminals (not shown)

2 VIDEO IN CONNECTOR, 75-ohm BNC analog video input

3 FIBER OPTIC CONNECTOR, ST or FC (dependent on FT8301 model)

For additional information about rear-panel connections, refer to the *Installation* section.

REAR PANEL - FR8301 RECEIVER

Figure 5 illustrates the rear panel of the FR8301 receiver.
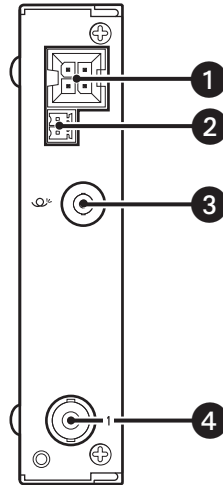
Figure 5. Rear Panel of FR8301 Receiver

1 RACK POWER/ALARM CONNECTOR, 4-pin connector for power/alarm connection of rack-mounted module

2 STANDALONE POWER CONNECTOR, 2-pin connector for power connection of standalone module; removable mating connector with screw terminals (not shown)

3 FIBER OPTIC CONNECTOR, ST or FC (dependent on FR8301 model)

4 VIDEO OUT CONNECTOR, 75-ohm BNC analog video output

For additional information about rear-panel connections, refer to the *Installation* section.

Installation

PACKAGE CONTENTS

The following items are supplied:

- **With the FT8301 transmitter:**
    - 1 Regulated switching power supply with four plug adapters (North American, Australian, U.K., and European configurations); 100-240 VAC input, 12 VDC output
    - 1 FT8301/FR8301 Fiber Transmitter and Receiver Installation manual (this manual)

- **With the FR8301 receiver:**
    - 1 Regulated switching power supply with four plug adapters (North American, Australian, U.K., and European configurations); 100-240 VAC input, 12 VDC output
    - 1 Wall clip with two 4-40 x .250-inch Phillips pan head screws with lock washers (for attachment of single module to wall)
    - 1 FT8301/FR8301 Fiber Transmitter and Receiver Installation manual (this manual)

MOUNTING

The miniature FT8301 transmitter is a standalone module that can be placed on a desktop or can be mounted to a wall. The FR8301 receiver, which is standard in size, can be mounted into a rack or can be used as a standalone module by being placed on a desktop or mounted to a wall.

MOUNTING THE FT8301 TRANSMITTER

NOTE: Before mounting the FT8301 transmitter to a wall, ensure that the positioning of the unit allows viewing of the front-panel LEDs and provides space for making the various rear-panel cable connections.

To mount the FT8301 transmitter to a wall, attach the unit using two screws (not provided) using either the wall-mounting holes or the wall-mounting keyholes (refer to Figure 6).
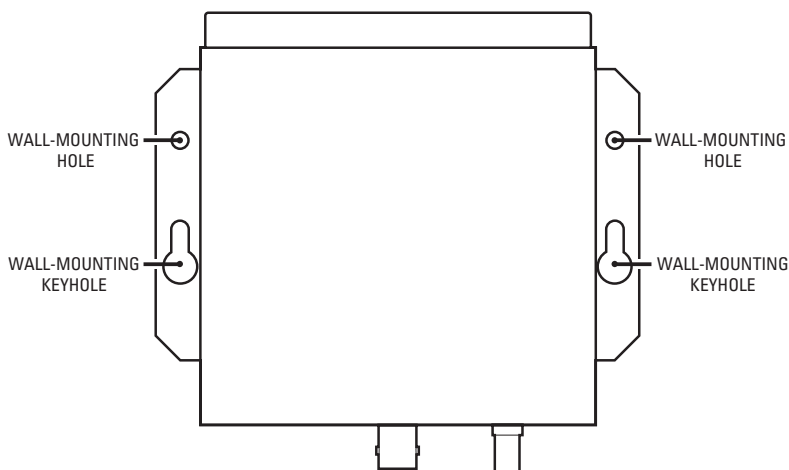

Figure 6. Mounting the FT8301 Transmitter to a Wall (Top View of FT8301 Transmitter)

MOUNTING THE FR8301 RECEIVER

The following sections provide information about mounting the FR8301 receiver into a rack or onto a wall.

Mounting the FR8301 Receiver into a Rack

The FR8301 receiver can be installed into an RK5000 Series rack mount chassis, which can be mounted into an industry-standard 19-inch (48.26 cm) equipment rack. The RK5000 Series rack mount chassis includes the following models:

- **RK5000PS-3U and RK5000-3U:** Designed to accommodate fiber optic modules as follows:
    - The RK5000PS-3U rack mount chassis provides 12 module slots and a power supply.
    - The RK5000-3U rack mount chassis provides 14 module slots (a power supply is not included). Power to the modules can be supplied using the optional external power supply (EPS5000-120).

    For additional information, refer to the RK5000PS-3U/RK5000-3U Fiber Rack Mount Chassis Installation manual.

- **RK5000PS-5U:** Designed to accommodate Endura™ modules but can also accommodate fiber optic modules with the use of the appropriate adapter kit. The RK5001-1UEXP adapter kit is required for installation of the FR8301 receiver into the RK5000PS-5U chassis.

    For information about the RK5000PS-5U chassis, refer to the RK5000PS-5U Rack Mount Chassis Installation manual.

Mounting the FR8301 Receiver to a Wall

The FR8301 receiver can be mounted to a wall in the following ways:

- Using the supplied wall clip for attachment of a single module to a wall. For installation instructions, refer to the *Mounting the FR8301 Receiver Using the Wall Clip* section below.

- Using the optional WM5001 wall mount kits, which are designed for mounting of single-width fiber optic modules. The WM5001-3U base kit allows attachment of a single module to the wall. The WM5001-3UEXP expansion kit allows attachment of an additional module to the wall. It is recommended that a maximum of three expansion kits be used with the base kit, allowing a maximum of four single-width modules to be attached to the wall.

    NOTE: The WM5001 wall mount kits can be used with the WM5002 wall mount kits, which are designed for mounting of double-width fiber optic modules. If mounting a mix of single-width and double-width modules is desired, it is recommended that a maximum of two single-width modules and one double-width module be mounted in combination with one another.

    For mounting instructions using the wall mount kits, refer to the WM5000 Series Wall Mount Kit Installation manual.

Mounting the FR8301 Receiver Using the Wall Clip

NOTE: Before mounting the FR8301 receiver to a wall, ensure that there is adequate space at both ends for viewing the front-panel LEDs and for making the various rear-panel cable connections.

To attach the FR8301 receiver to a wall using the supplied wall clip, refer to Figure 7 and do the following:

1. Using the two vertical or horizontal wall-mounting holes, attach the wall clip to a wall using two screws (not provided).

2. Slide the module into the clip until the two holes on the bottom of the module align with the two holes on the lower flange of the clip.

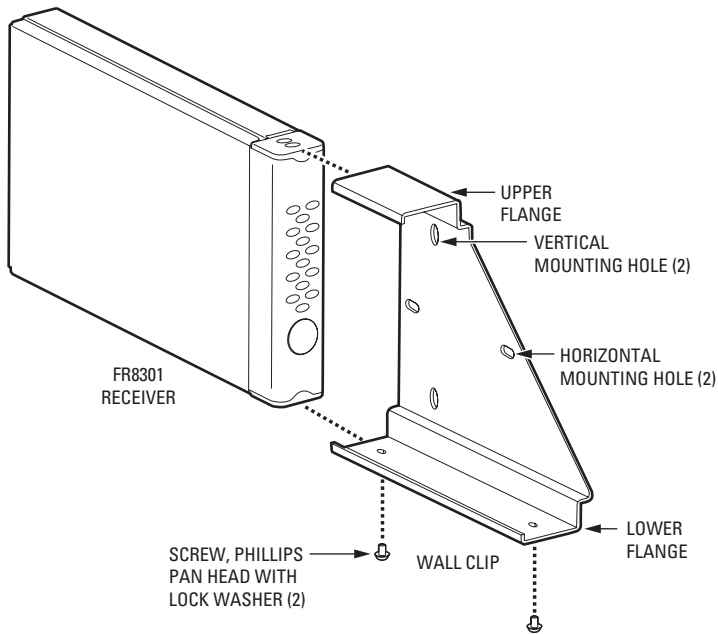3. Attach the module to the clip using the two Phillips pan head screws provided for the clip.

Figure 7. Mounting the FR8301 Receiver to a Wall Using the Wall Clip

CONNECTIONS

Connections to the FT8301 transmitter and the FR8301 receiver are made on the rear panel of the modules and consist of the following:
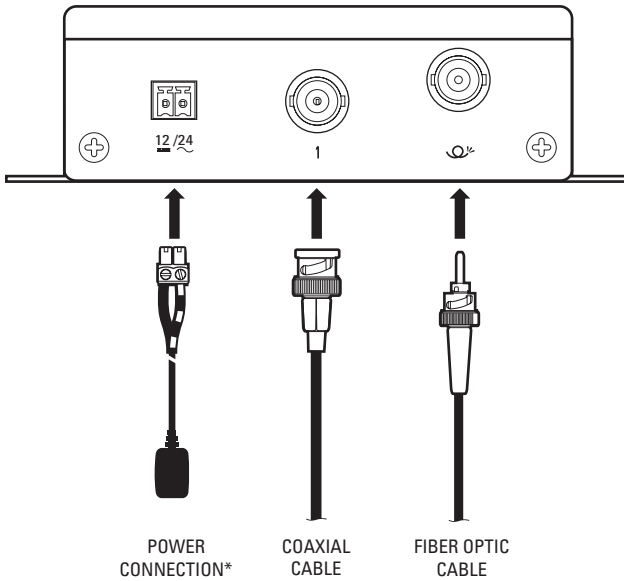
• Power connection

NOTE: A 12 VDC or 24 VAC power supply can be used to power the transmitter/receiver when used as a standalone module. A 12 VDC power supply is provided. If a 24 VAC power supply is used, the power supply must be a Listed Direct Plug-In Power Unit marked as Class 2 and rated as 24 VAC, 200 mA (minimum output).

• Fiber connection

• Video input connection (transmitter only)

• Video output connection (receiver only)

The following sections provide a view of FT8301 transmitter and FR8301 receiver connections.

CONNECTING THE FT8301 TRANSMITTER

Figure 8 illustrates FT8301 transmitter connections.

POWER CONNECTION*   COAXIAL CABLE   FIBER OPTIC CABLE

*THE STRIPED WIRE OF THE SUPPLIED 12 VDC POWER SUPPLY CONNECTS TO THE PIN 1 SCREW TERMINAL (DC+) OF THE POWER CONNECTOR. THE OTHER WIRE CONNECTS TO THE PIN 2 SCREW TERMINAL (DC-).

Figure 8. FT8301 Transmitter Connections

CONNECTING THE FR8301 RECEIVER

Figure 9 illustrates FR8301 receiver connections.

POWER/ALARM CONNECTION FOR RACK-MOUNTED MODULE*

POWER CONNECTION FOR STANDALONE MODULE†

FIBER OPTIC CABLE

COAXIAL CABLE

*REFER TO THE RK5000PS-3U/RK5000-3U FIBER RACK MOUNT CHASSIS INSTALLATION MANUAL FOR INFORMATION.
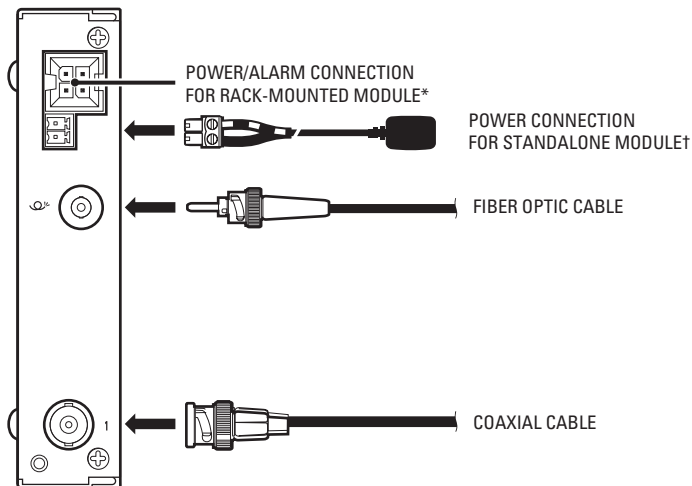†THE STRIPED WIRE OF THE SUPPLIED 12 VDC POWER SUPPLY CONNECTS TO THE PIN 1 SCREW TERMINAL (DC+) OF THE STANDALONE POWER CONNECTOR. THE OTHER WIRE CONNECTS TO THE PIN 2 SCREW TERMINAL (DC-).

Figure 9. FR8301 Receiver Connections

Troubleshooting

LED indicators on the front panel of the FT8301 transmitter/FR8301receiver (refer to Figure 2 and to Figure 3, respectively) allow you to monitor signal status and operating power. Table A provides information about the front-panel indicators and associated troubleshooting guidelines.

Table A. Troubleshooting with Front-Panel Indicators

Indicator Color	Meaning	Possible Cause	Corrective Action
Power LED *(Transmitter)*			
Green	Power is being applied to the module.	–	No action required.
Not lit	Power is not being applied to the module.	Power connection is faulty.	Check power connection. If module is rack mounted, reseat module or power supply as necessary.
		Power supply has failed.	Replace power supply.
		Loss of power occurs due to tripped circuit breaker(s), blown fuse(s), or faulty electrical service.	Check circuit breaker(s), fuse(s), or electrical service as necessary.
Power LED (Pelco badge) *(Receiver)*			
Blue Pelco logo lights.	Power is being applied to the module.	–	No action required.
Blue Pelco logo does not light.	Power is not being applied to the module.	Power connection is faulty.	Check power connection. If module is rack mounted, reseat module or power supply as necessary.
		Power supply has failed.	Replace power supply.
		Loss of power occurs due to tripped circuit breaker(s), blown fuse(s), or faulty electrical service.	Check circuit breaker(s), fuse(s), or electrical service as necessary.

(Continued on next page)

Table A. Troubleshooting with Front-Panel Indicators (Continued)

Indicator Color	Meaning	Possible Cause	Corrective Action
Video Present LED			
Green	Incoming video signal is present on the channel.	–	No action required.
Not lit on transmitter	Incoming video signal is not present on the channel.	Video source is not powered on.	Check power connection to the video source.
		Video source is not connected to the transmitter.	Check BNC connections.
		Coaxial cable is defective.	Replace cable.
Red on receiver	Incoming video signal is not present on the channel.	Optical signal is not being received from the transmitter. Carrier Detect LED is also red.	Refer to the Carrier Detect LED troubleshooting section below.
		Video source is not powered on.	Check power connection to the video source.
		Video source is not connected to the transmitter.	Check BNC connections.
		Coaxial cable connected to the transmitter is defective.	Replace cable.

(Continued on next page)

Indicator Color	Meaning	Possible Cause	Corrective Action
Carrier Detect LED *(Receiver Only)*			
Green	The optical signal is being received from the transmitter.	–	No action required.
Red	The optical signal is not being received from the transmitter.	Transmitter is not powered on.	Check power connections. Replace power supply if necessary.
		Fiber optic cable is not connected.	Check fiber optic connections.
		Fiber optic cable connectors are dirty or are damaged.	Clean, polish, or replace fiber optic cable connectors as necessary.
		Fiber optic cable is defective.	Replace cable.
		A problem exists with the optical power budget.	Verify that losses in fiber optic cable do not exceed the optical power budget specification of the fiber optic link. If the losses do exceed the optical power budget, contact Product Support.

Specifications

VIDEO

Number of Channels	1
Modulation Type	Pulse code modulation, 8-bit resolution
Video Input	1.0 Vp-p, 75 ohms; NTSC, PAL, and SECAM
Bandwidth	6.5 MHz
Gain	Unity
Differential Gain	<2%
Differential Phase	<1°
Tilt	<1%
Signal-to-Noise Ratio	>60 dB (CCIR weighted)

GENERAL

Operating Temperature	-40° to 167°F (-40° to 75°C)
Input Power Requirements	12 VDC or 24 VAC, 170 mA
LED Indicators	
Transmitter	Power
	Video Present
Receiver	Power
	Video Present
	Carrier Detect
Dimensions	
Transmitter	4.12" D x 3.90" W x 1.38" H
	(10.46 x 9.90 x 3.51 cm)
Receiver	8.75" D x 1.08" W x 4.81" H
	(22.23 x 2.74 x 12.22 cm)
Unit Weight	
Transmitter	0.82 lb (0.37 kg)
Receiver	1.40 lb (0.64 kg)

MECHANICAL

Connectors	
Video	BNC
Rack Power/Alarm	4-pin connector
Standalone Power	2-pin connector, screw terminal
Fiber Optic	ST for multimode fiber
	ST or FC for single-mode fiber

OPTICAL POWER BUDGET, TRANSMISSION DISTANCE, AND LASER CLASS 1 LIMIT

Fiber	Wavelength	Optical Power Budget	Maximum Transmission Distance	Laser Class 1 Limit*
Multimode (62.5/125 µm)	850 nm	15 dB[†]	2 km (1.2 mi)[††]	<0.78 mW
	1310 nm	20 dB[†]	6 km (3.7 mi)[††]	<15.6 mW
Single-mode (9/125 µm)	1310 nm	20 dB	30 km (18.6 mi)[§]	<15.6 mW

*The FT8301 transmitter/FR8301 receiver is classified by the FDA as a Class 1 laser product.

[†]When using 50/125 µm fiber, subtract 3 dB from the optical power budget.

[††]Maximum transmission distance is limited by fiber bandwidth.

[§]Maximum transmission distance is based on attenuation of 0.5 dB/km plus a 5 dB buffer for connector and splice losses.

PRODUCT WARRANTY AND RETURN INFORMATION

WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship **for a period of one year** after the date of shipment.

Exceptions to this warranty are as noted below:

- Five years on FT/FR8000 Series fiber optic products and the following fixed camera models: CC3701H-2, CC3701H-2X, CC3751H-2, CC3651H-2X, MC3651H-2, and CC3651H-2X.
- Three years on all other fixed camera models (including Camclosure® Integrated Camera Systems) and Genex® Series (multiplexers, server, and keyboard).
- Two years on all standard motorized or fixed focal length lenses.
- Two years on Legacy®, CM6700/CM6800/CM8500/CM9500/CM9700 Matrix, DF5 and DF8 Series Fixed Dome products.
- Two years on Spectra®, Esprit®, and PS20 Scanners, including when used in continuous motion applications.
- Two years on Esprit® and WW5700 series window wiper (excluding wiper blades).
- Eighteen months on DX Series digital video recorders and NVR300 Series network video recorders.
- One year (except video heads) on video cassette recorders (VCRs). Video heads will be covered for a period of six months.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warrant all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair).

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

Goods returned for repair or credit should be clearly identified with the assigned CA or RA number and freight should be prepaid. Ship to the appropriate address below.

If you are located within the continental U.S., Alaska, Hawaii or Puerto Rico, send goods to:

> Service Department
> Pelco
> 3500 Pelco Way
> Clovis, CA 93612-5699

If you are located outside the continental U.S., Alaska, Hawaii or Puerto Rico and are instructed to return goods to the USA, you may do one of the following:

If the goods are to be sent by a COURIER SERVICE, send the goods to:

> Pelco
> 3500 Pelco Way
> Clovis, CA 93612-5699 USA

If the goods are to be sent by a FREIGHT FORWARDER, send the goods to:

> Pelco c/o Expeditors
> 473 Eccles Avenue
> South San Francisco, CA 94080 USA
> Phone: 650-737-1700
> Fax: 650-737-0933

REVISION HISTORY

Manual #	Date	Comments
C1641M	9/04	Original version.
C1641M-A	3/05	Added support of Endura rack and updated wall mount kit, wall clip, and optical power budget information.

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