



**4040 Series**

# **USER'S MANUAL**



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# GENERAL INFORMATION

## Introduction

The Pure Digital Fiberlink® 4040 series optical transmission system is a configurable, adjustment-free transmitter/receiver pair that employs digital processing and transmission techniques to convey up to four 1-way channels of audio.

The use of digital encoding assures high-quality noise-free transmissions that retain all of their initial parameters regardless of fiber optic cable attenuation. In addition, integral LED indicators are provided on each unit to continuously signify the presence of audio signals and, thus, the proper operation of each side of the system.

## Technical Specifications

### Model Part Numbering Configurations:

X Values:

1 = 850 nm Multimode

3 = 1310 nm Multimode

7 = 1310 nm Single Mode

9 = 1550 nm Single Mode

Unit Type	Part Number
Transmitter Box	4040-BXY
Transmitter Card	4040-CXY
Receiver Box	4041-BXY
Receiver Card	4041-CXY

Y Values:

S = ST connector

F = FCPC connector

### Audio:

Bandwidth .....	20 Hz to 20 kHz
Input Impedance .....	600 Ohms terminated or >24 K Ohms unterminated; balanced or unbalanced
Output Impedance .....	50 Ohms
Input/Output Voltage .....	+24dBu max
THD+N .....	0.002%; 20 Hz - 20 kHz
SNR (A-Weighted) .....	95 dB
System Latency .....	200 uS + fiber cable propagation delay (typically 5 uS/km of fiber)
Signal Connectors .....	Removable terminal block

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**Optical:**

Operating Wavelength ..... 850nm, 1310nm, 1550nm MM/SM  
Optical Fiber ..... 62.5/125microns MM or  
8-10/125 microns SM  
Optical Connectors ..... ST or FCPC

Wavelength	Loss Budget (in dB)	Distance* (in km)
850 MM	0-20	0-2
1310 MM	0-25	0-10
1310 SM	0-25	0-60
1550 SM	0-25	0-80

*\*Note: Distance specifications are only approximate and are not guaranteed.  
Operating loss budget must not be exceeded.*

**Misc:**

Operating Temperature Range ..... -35 to +60 degrees C  
Operating Power ..... 9 to 24 Volts AC or DC @ 5 watts (max)

**CAUTION!** The transmitting element in some versions of the Pure Digital Fiber-link transmitter unit is a solid-state Laser Diode located in the optical connector on the unit. This device emits invisible infrared electromagnetic radiation which can be harmful to human eyes. The radiation from this optical connector, if viewed at close range without a fiber optic cable connected to the optical connector, may be of sufficient intensity to cause instantaneous damage to the retina of the eye. Direct viewing of this radiation should be avoided at all times.

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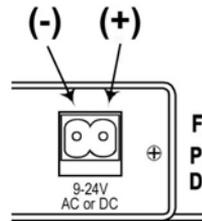
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# INSTALLATION INSTRUCTIONS

## Installation Procedure

The Pure Digital Fiberlink 4040 Series transmission systems are normally preset for immediate use with audio input circuitry set for balanced 600 Ohm input impedance and output set for balanced audio. If a different protocol is desired, it can be easily selected using the flip switches located on the back panel of the unit. (See table on next page.) There are indicator LEDs on the units for monitoring purposes and several user selectable options for configuring audio inputs and outputs. The following instructions describe the typical installation procedure and the function of the LED indicators.

1. The various options, as already mentioned, have been preset. If unbalanced high-input impedance or unbalanced output is desired, please refer to instructions on the following page.
2. Connect the fiber optic cable between the two Pure Digital Fiberlink units.
3. Apply power to both Pure Digital Fiberlink units. Refer to Figure 1 for DC power connections.
4. When power is applied, the green POWER LED will light, indicating the presence of operating power.
5. Connect the audio input signals to the proper positions on the removable terminal blocks. (Refer to the next section for details.) Be certain to check all connections and assure that inputs and outputs are not intermixed.
6. The green audio LED indicators (one per channel) will give an indication as stated on page 7. Note that the rack card version also has a red LED for indicating the presence of an alarm condition.
7. The system should now be operational.



**FIGURE 1:  
POWER CONNECTOR  
DC INPUT POLARITY**

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## System Switch Settings

The audio interface circuit used in this product has external switches that are used to configure the signal options. If you wish to make changes to the factory default settings, please refer that the charts below:

### Audio Input (Transmitter Unit)

Audio Input Channel	Switch Position	On	Off
1	1	600 Ohm input impedance	24K Ohm input impedance
	2	unbalanced input	balanced input
2	3	600 Ohm input impedance	24K Ohm input impedance
	4	unbalanced input	balanced input
3	5	600 Ohm input impedance	24K Ohm input impedance
	6	unbalanced input	balanced input
4	7	600 Ohm input impedance	24K Ohm input impedance
	8	unbalanced input	balanced input

### Audio Output (Receiver Unit)

Audio Output Channel	Switch Position	On	Off
1	1	unbalanced output	balanced output
2	2	unbalanced output	balanced output
3	3	unbalanced output	balanced output
4	4	unbalanced output	balanced output

*Note: Switches 5,6,7 and 8 are not used on the 4041-Bxy and should be left in the off position.*

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## System Terminal Block Connections

The input and output connections for the Pure Digital Fiberlink 4040 Series system are as follows:

### Audio Connector - Transmitter Unit:

	<b>Balanced</b>	<b>Unbalanced</b>
Position 1-	Channel 1 Input (-)	Channel 1 Ground
Position 1+	Channel 1 Input (+)	Channel 1 Signal
Position G	Ground	
Position 2-	Channel 2 Input (-)	Channel 2 Ground
Position 2+	Channel 2 Input (+)	Channel 2 Signal
Position 3-	Channel 3 Input (-)	Channel 3 Ground
Position 3+	Channel 3 Input (+)	Channel 3 Signal
Position G	Ground	
Position 4-	Channel 4 Input (-)	Channel 4 Ground
Position 4+	Channel 4 Input (+)	Channel 4 Signal

### Audio Connector - Receiver Unit:

	<b>Balanced</b>	<b>Unbalanced</b>
Position 1-	Channel 1 Output (-)	Channel 1 Ground
Position 1+	Channel 1 Output (+)	Channel 1 Signal
Position G	Ground	
Position 2-	Channel 2 Output (-)	Channel 2 Ground
Position 2+	Channel 2 Output (+)	Channel 2 Signal
Position 3-	Channel 3 Output (-)	Channel 3 Ground
Position 3+	Channel 3 Output (+)	Channel 3 Signal
Position G	Ground	
Position 4-	Channel 4 Output (-)	Channel 4 Ground
Position 4+	Channel 4 Output (+)	Channel 4 Signal

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## Indicator LEDs and Alarm Circuitry

The stand-alone box version of the Pure Digital Fiberlink 4040 Series transmission unit has five integral indicator LEDs that are used to monitor the state of the unit.

The rack card version of this product has an additional red indicator LED that lights when an alarm condition exists. The rack card unit also provides an output to drive a model 6020 Alarm Sensing Module which provides an audible tone and activates a set of contacts for external signaling purposes.

The status of these LEDs are as follows:

### TRANSMITTER and RECEIVER:

Power: (Green) Indicates that correct power has been applied.

### TRANSMITTER:

Audio **OFF:** Indicates no audio detected on the transmitter unit.

1,2,3,4:

**BLINKING:** Indicates audio detected on the transmitter unit.

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Alarm\*: **ON:** Loss of audio data (rack card only)

### RECEIVER:

Audio: **OFF:** Indicates no audio detected over fiber and, as a result, no

1,2,3,4: active audio detected to the receiver unit.

**BLINKING:** Indicates audio detected over fiber and, as a result, active audio detected by the receiver unit.

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Alarm\*: **ON:** Loss of optical signal (rack card only)

*\*Note: On the rackcard version, setting an alarm switch to the "DIS" position disables that alarm. This setting should be used for all audio channels not in use.*

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# OPERATING POINTERS AND TROUBLESHOOTING

## OPTICAL FIBER:

The 4040 Series is available in versions that operate with most multimode (MM) and single-mode (SM) optical fibers. Be certain that the correct size fiber is being used for the particular transmitter/receiver combination.

Also be certain that the attenuation and bandwidth of the fiber optic cable being used is within the range of the system's loss budget specifications.

## TROUBLESHOOTING:

Multimode fiber optic cable contains an optical fiber with a light carrying "core" that is only .0025 inches (62.5 microns) in diameter. Single-mode fiber optic cable has an even smaller "core", only 00032 to .0004 inches (8-10 microns). This is smaller than a human hair! As a result, any minute particles of dirt or dust can easily block the fiber from accepting or radiating light. *Therefore, the key word is cleanliness.* Always use the dust caps provided with all optical connectors whenever they are exposed to air. Also, it is a good idea to gently clean the tip of an optical connector with a lint-free cloth moistened with alcohol whenever dust is suspected.

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The status of any of the audio indicator LEDs should provide the first clue as to the origin of any operation failure. If all the LEDs are off, it usually means that the fiber is broken or has too much attenuation. Next, be certain that the input and output signal connections are proper. Due to the number of positions, it is possible that there may be wrong connections.

Finally, although multimode and single mode devices may look the same, they will not operate properly together. Using the wrong device or fiber can easily add more attenuation than specified, resulting in poor overall performance.

If, after reviewing the above possibilities, the system is still not operating, please contact the Customer Service Department for further assistance

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# MAINTENANCE

The Pure Digital Fiberlink 4040 Series transmission units have been manufactured using the latest semiconductor devices and techniques that electronic technology has to offer. They have been designed for long, reliable, and trouble free service and are not normally field repairable. Should difficulty be encountered, Communications Specialties maintains a complete service facility to render accurate, timely and reliable service of all products.

The only maintenance that can be provided by the user is to ascertain that optical connectors are free of dust or dirt that could interfere with light transmission and that electrical connections are secure and accurate.

All other questions or comments should be directed to our Customer Service Department. It should be noted that many “problems” can easily be solved by a simple telephone call.

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## LIMITED WARRANTY

Communications Specialties, Inc. (CSI) warrants that for a period of three years after purchase by the Buyer, the Pure Digital Fiberlink 4040 Series Transmission System will be free from defects in material and workmanship under normal use and service. A Return Material Authorization (RMA) number must be obtained from CSI before any equipment is returned by the Buyer. All material must be shipped to CSI at the expense and risk of the Buyer. CSI's obligation under this warranty will be limited, at its option, to either the repair or replacement of defective units, including free materials and labor. In no event shall CSI be responsible for any incidental or consequential damages or loss of profits or goodwill. CSI shall not be obligated to replace or repair equipment that has been damaged by fire, war, acts of God, or similar causes, or equipment that has been serviced by unauthorized personnel, altered, improperly installed or abused.

RMA numbers and repairs can be obtained from:

**Communications Specialties, Inc.**  
**55 Cabot Court**  
**Hauppauge, N.Y. 11788 USA**  
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Please have your serial number (located on the top label of the unit) available when contacting us.