



**MT660A-MM  
MT661A-SM  
MT660A-MM-E  
MT661A-SM-E**

**FlexPoint™ T1/E1 Copper to Fiber  
Line Driver**

**CUSTOMER  
SUPPORT  
INFORMATION**

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# FlexPoint T1/E1 Copper to Fiber Line Driver

## User Instructions

### **Description:**

The FlexPoint T1/E1 connects T1 and E1 devices, such as PBXs, CSUs and routers, via Multimode (MM) or single-mode (SM) fiber. Designed to extend the standard T1/E1 twisted pair or Coax network distances over fiber, this converter provides protection from environmental noise and effectively increases high-speed network reliability. The following models are described here.

<b><u>Model #:</u></b>	<b><u>Fiber Type:</u></b>	<b><u>Max Distance:</u></b>
MT660A-MM	MM,ST,1300nm	5km / 3.1mi
MT661A-SM	SM, ST, 1300nm	28km / 16.8mi
MT660A-MM-E	MM,ST, 1300nm	5km / 3.1mi
MT661A-SM-E	SM, ST, 1300nm	28km / 16.8mi

### **Power Adapter Notice:**

1. When using in a stand-alone configuration, this product is intended to be and must be used only with a Listed Direct Plug-In Power Unit marked "Class 2" and rated at 9VDC, 1 Amp.
2. This product should always be used only with the supplied power unit.
3. Models shipped with international power supplies are capable of auto switching form 100-230VAC, and are supplied with a U.S. type NEMA 5-15 power cable.
4. For products being shipped outside of the U.S., the user is required to install a properly grounded IEC 320 appliance cable with a minimum rating of 10 AMPs.
5. User-supplied cables must meet the required safety agency approvals, applicable international standards and electrical ratings for the region.

## **Warning!**

*Before inserting the Power Adapter, verify that the power  
On the unit is appropriate for your AC line voltage source.*

### **Mounting Instructions:**

The Flex Point Fiber Converter can be solo-mounted using a wall-mounting kit, or rack-mounted using a 5-unit shelf, or a high-density Flex Point 14-unit Power-Redundant Chassis.

**Fiber Optic Cable Attachment:**

Connect the fiber cables between the Flex Point T1/E1 converters. The transmit (Tx) must attach to the receive (Rx) side and the receive (Rx) side must attach to the transmit (Tx) side.

**Note:** Use fiber cables that are compliant with the specifications that are outlined in fiber cable specifications.

**Copper Cable Attachment:**

*RJ-45 / RJ-48 T1 / E1 connector*

Connect to the RJ-45/48 connector on the Flex Point T1/E1 converter via a category 3 or better cable (Category 5 is recommended) and attach the other end to the network equipment. (the twisted pair connection requires two active pairs in a T1/E1 environment. The active pairs are pins 1&2 and pins 4&5. Only dedicated wire pairs should be used for the active pins.) Set the UTP DCE/DTE switch for the RJ-45/48 port to the appropriate setting.

**Note:** Use copper cables that are compliant with the specifications that are outlined in copper cable specifications.

*Coax E1 Connector*

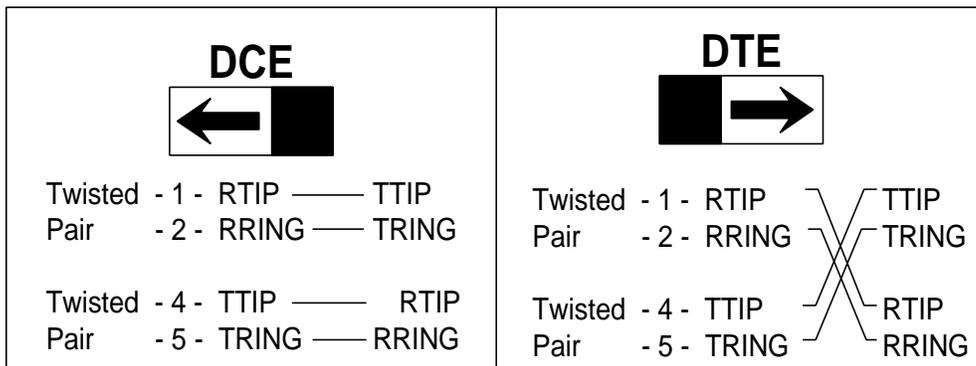
Attach the BNC to the Flex Point T1/E1 converter and attach the other end of the BNC to the network equipment.

**Note:** Use copper cables that are compliant with the specifications that are outlined in copper cable specifications.

**Switch Settings:**

*UTP DCE/DTE setting*

The UTP DCE/DTE switch is used to eliminate the need for crossover and custom cables to connect devices together when using the RJ-45/48 port. Set this switch to DCE to use a straight-through cable and to DTE when a crossover-cable would be required.



*T1/E1 Copper Line Configuration Settings:*

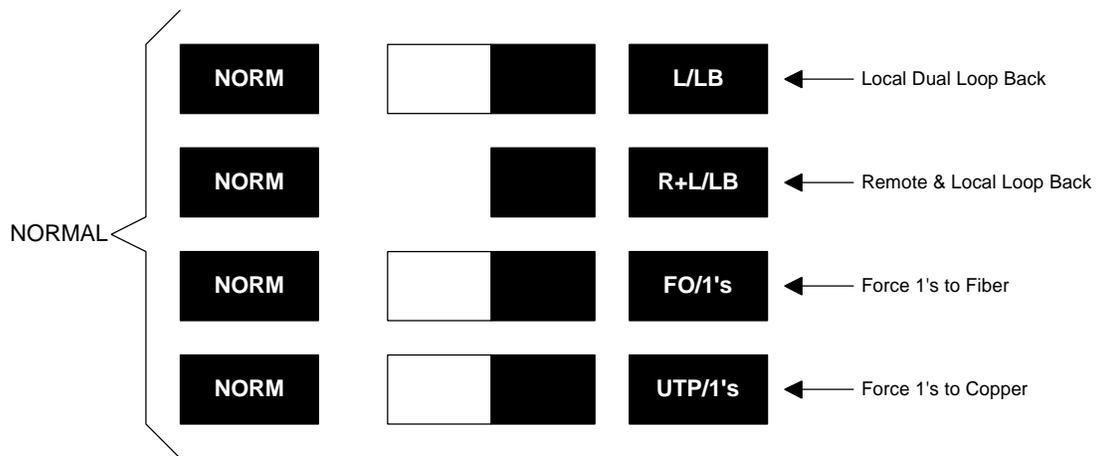
The T1/E1 copper line codes and line lengths are configured using dip switches located on the side of the Flex Point T1/E1 media converter.

<u>Line Type</u>	<u>Port Type</u>	<u>Distances</u>	<u>Switch Positions</u>			
			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
T1 DSX-1	RJ-45/48	0' – 133'	D	D	D	D
T1 DSX-1	RJ-45/48	133' – 266'	D	D	D	U
T1 DSX-1	RJ-45/48	266' – 399'	D	D	U	D
T1 DSX-1	RJ-45/48	399' – 533'	D	D	U	U
T1 DSX-1	RJ-45/48	533' – 655'	D	U	D	D
T1 DS-1	RJ-45/48	0 dB	D	D	D	D
T1 DS-1	RJ-45/48	-7.5 dB	D	U	D	U
T1 DS-1	RJ-45/48	-15.0 dB	D	U	U	D
T1 DS-1	RJ-45/48	-22.5 dB	D	U	U	U
E1 75 ohm	Coax/BNC	Standard	U	D	D	D
E1 120 ohm	RJ-45/48	Standard	U	D	D	U
E1 75 ohm	Coax/BNC	Extended	U	D	U	D
E1 120 ohm	RJ-45/48	Extended	U	D	U	U

**D = Down      U = Up**

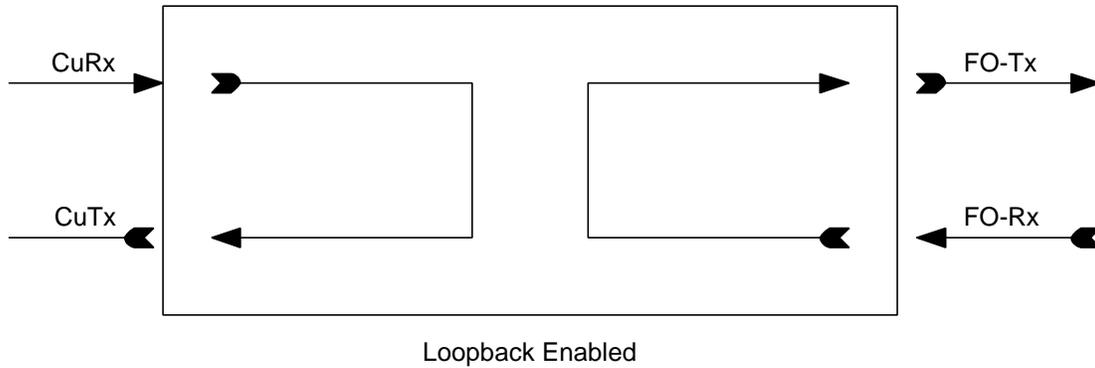
*Operational Switch Settings and Functions:*

The following operational switches located on the front of the Flex Point T1/E1 converter are to assist in installation and fault isolation.



### *Local Loop-Back (L/LB)*

This switch will set the Flex Point T1/E1 converter in a loop-back mode on both the fiber and copper connections. By turning the switch to the normal position, the unit will resume to normal operation.



### *Transmit/force 1's to Fiber*

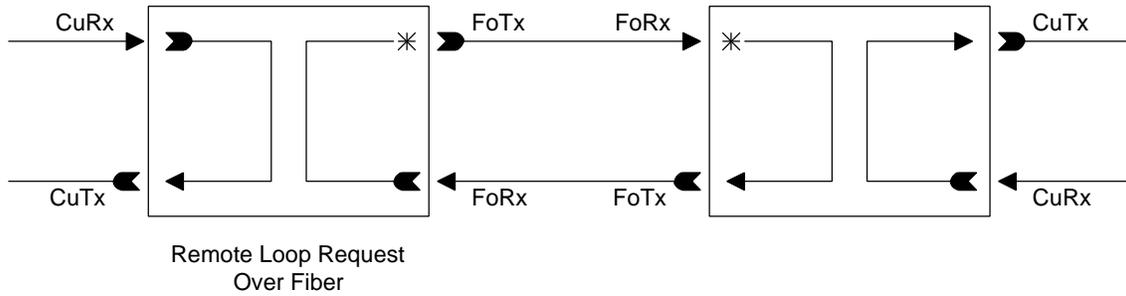
This switch is used to insert an “all ones” pattern into the data stream being transmitted out of the fiber port on the Flex Point T1/E1 converter. Data being received on the coax or twisted pair will be disabled and data being received on the fiber is passed through to the coax or twisted pair side. By returning the switch to the normal position, the unit will resume to normal operation.

### *Transmit/force 1's to Coax or UTP*

This switch is used to insert an “all ones” pattern into the data stream being transmitted out of the coax or twisted pair on the Flex Point T1/E1 converter. Data being received on the fiber will be disabled and data being received on the coax or twisted pair is passed through to the fiber side. By returning the switch to the normal position, the unit will resume to normal operation.

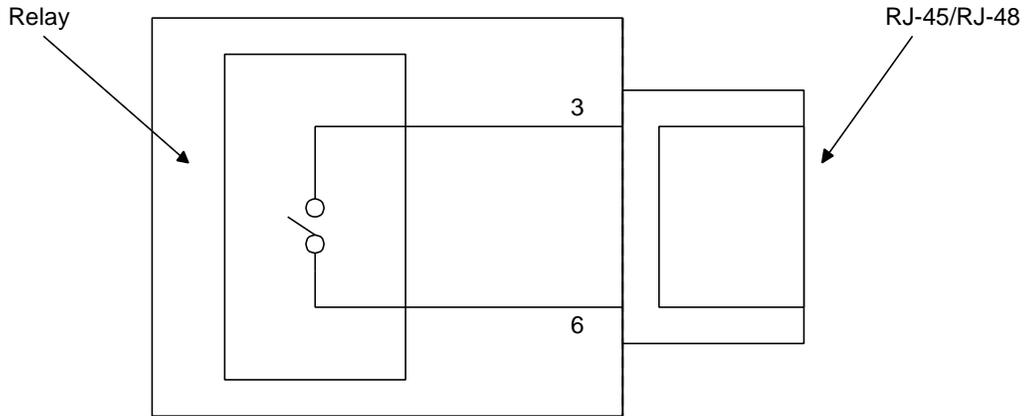
### Remote loop-back (R+L/LB)

This switch will allow the entire fiber segment to be tested at either of the Flex Point T1/E1 converters without having to set switches on both units. When set in this mode of operation, the local unit is switched in a local loop-back mode. And in addition to the local loop-back mode of operation, the fiber Tx port will be further encoded to carry a remote loop-back protocol. This remote loop-back protocol will set the far end Flex Point T1/E1 converter to remote loop-back mode of operation and return a signal to the sending unit. An LED on the local and remote Flex Point T1/E1 converters will show a configuration that the fiber segment is communicating properly between devices. By returning the switch to the normal position, it will resume to normal operation.



### Alarm Relay Contacts

The Flex Point T1/E1 converter also features dry relay contacts for optionally connecting the media converter into a separate T1/E1 alarm circuit. The relay closes when a loss of power or when signal detect is lost to the copper or fiber connection.



Operational rating on relay pins 3 & 6: 0 - 220 VDC max 2A

### **LED Indicators:**

<b><u>LED</u></b>	<b><u>Color</u></b>	<b><u>Status</u></b>	<b><u>Description</u></b>
Power:	Yellow	On	Power applied
Fiber:	Green	Off On Blink	No Signal Detect Signal Detect All Ones received
UTP/Coax:	Green	Off On Blink	No Signal Detect Signal Detect All Ones received
Test:	Green	Off On Blink Fast Blink	Normal Operation L/LB or All 1's Test Mode R+L/LB Received Master R+L/LB Received Slave

### **Fiber Cable Specifications:**

#### *Multimode*

Cable: 50/125, 62.5/125, 100/140 um  
Wavelength: 1300 nm  
Max Distance: 5km / 3.1 mi.

#### *Singlemode:*

Cable: 9/125um  
Wavelength: 1300 nm  
Max Distance: 28km / 16.8 mi.

#### *Singlemode Long-haul*

Cable: 9/125um  
Wavelength: 1300nm  
Max Distance: 58km / 36 mi.

## **Copper Cable Specifications:**

### *Twisted-Pair cable for T1*

Gauge: 22 to 24 AWG  
Impedance: 100 ohm +/- 10%  
Impedance characteristic: 2.6 dB / 100m @ 1.0 MHz  
Maximum Distance: 6,000 ft.

### *Twisted-Pair cable for E1*

Gauge: 22 to 24 AWG  
Impedance: 120 ohm +/- 10%  
Impedance characteristic: 2.6 dB / 100m @ 1.0 MHz  
Maximum Distance: 8,000 ft.

### *Coax cable for E1*

Gauge: 22 to 24 AWG  
Impedance: 75 ohm +/- 10%  
Impedance characteristic: 2dB / 100m @ 1.0 MHz  
Maximum Distance: 8,000 ft.