

# T/E-Extender

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**1. DESCRIPTION**

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The DCB T-Extender and E-Extender are 4-wire repeaters for use on customer owned lines or to extend telephone company demarcs. The Extenders are used to extend in-house T-1 and E-1 lines in campus and high-rise environments.

Each pair of T-1/E-1 Extenders may be located up to 5000 feet apart. The Extender circuitry is rated to -36 dB dynamic range at the T-1 rate of 1.544 Mbps and -43 dB dynamic range at the E-1 rate of 2.048 Mbps. As implemented, the parts are slightly de-rated to provide long life at extended temperature range. Therefore the distances specified in this document are only 5000 feet. Solid copper 22 AWG, two twisted pair is the preferred cable for connection between the Extenders. Connection to the Extender is made through RJ48C modular connectors or 4-wire screw down terminal blocks. Each Extender comes standard with two screw down terminal blocks and one RJ48C adapter. If only RJ48C connections are desired extra adapters (part number 9502122) must be ordered separately.

The DCB T-Extenders and E-Extenders are powered by a small wall-mount transformer. The Extenders are designed for connections between T-1 equipment such as PBXs, T-1/E-1 multiplexers, T-1/E-1 line drivers, CSUs, routers or any other T-1/E-1 equipment requiring long customer owned cable runs. T-Extenders and E-Extenders can be used to connect this equipment across a campus, between floors of a high-rise office building or between office buildings with underground cable runs. The T-Extender/E-Extenders are transparent to the type of data sent over the T-1/E-1 link. The data can be D-4 format, ESF, PRI, G.703, G.704, etc.

The T-Extenders are most often used in pairs to extend a telephone company demarc. For example, if a CSU or DSU is limited to 655 feet and is connecting to a phone company smart jack demarc which is limited to 655 feet, the T-Extenders are used in pairs to extend that distance up to 5000 feet.

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## **2. SPECIFICATIONS**

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### 2.1 General

T-1 repeater or E-1 repeater  
Extends T-1 or E-1 bi-polar signals  
Up to 5000 feet between T-Extenders  
Up to 4000 feet between E-Extenders

Indicators: Power

Accessories:

RJ48C wiring adapter P/N 9502122  
Customer to demarc RJ45 cable P/N 9500095  
Customer to customer RJ45 (crossover) cable P/N 9500099  
Rack shelf, 1 U for 1 to 3 T-1/E-1 Extenders  
20 slot, 4U high 19" rack mount chassis

### 2.2 Physical/Electrical

5.5" x 7.5" x 1.5"  
100 ohm T-1, 120 ohm E-1 interface  
2 lbs including wall transformer  
120 VAC external wall transformer supply  
Optional 220 VAC, 12, 24, 48, 125 VDC  
30 ma

### 2.3 Environmental

-40 to +70 C operating temperature

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### 3. INSTALLATION

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#### 3.1 Unpacking

The following is included with each unit:

- Unit and external power supply
- One RJ48C to terminal block adapter.
- Manual
- Information regarding warranty, maintenance contracts and repair

#### 3.2 Location

Place the unit in a clear area where you can reach the rear panel to connect the cables. The unit has an external power supply that requires a 120 VAC outlet. The total power cord length is about 6 feet.

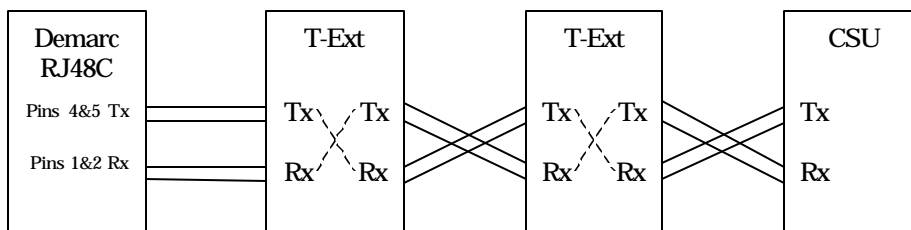
#### 3.3 Connections

On the unit, **transmit is an output, receive is an input**. When connecting units to each other, the transmit of one unit must be connected to the receive of the other. Pairs are not polarity sensitive. See Section 5 for connector pinouts.

Cables for connecting the units to the telco demarc and a DSU/CSU or router are available from DCB. See Section 5 for part numbers.

**NOTE**

Cable should be Category 3, 2 twisted pair, shielded. **DO NOT use Category 5 cable.** Proper operation cannot be guaranteed if Category 5 cable is used.



Connections for most applications.

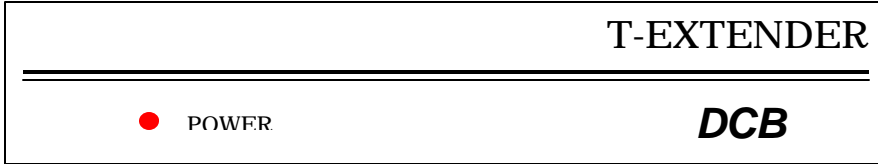
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## 4 FRONT PANEL INDICATORS

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### 4.1 Indicators

<u>Indicator</u>	<u>Condition</u>	<u>Meaning</u>
Power	ON	Power is applied to the unit.

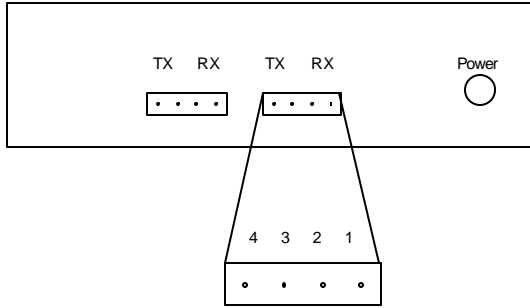


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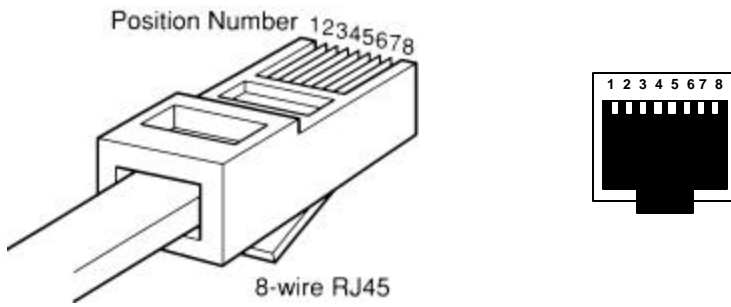
## 5. INTERFACE SIGNALS AND CABLES

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### 5.1 Connector Location and Pin Reference



Rear Panel and Connectors



RJ45 Positions

## 5.2 T-1 Interface

### 5.2.1 Terminal Block

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
1	Receive	IN
2	Receive	IN
3	Transmit	OUT
4	Transmit	OUT

### 5.2.2 RJ48C

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
1	Receive	IN
2	Receive	IN
3	not used	
4	Transmit	OUT
5	Transmit	OUT
6	not used	
7	not used	
8	not used	

## 5.3 Cables

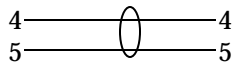
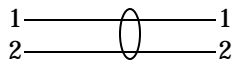
### **NOTE**

These cables require RJ48C to terminal block adapter, P/N 9502122, ordered separately.

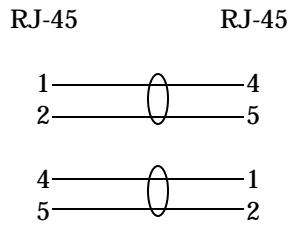
### 5.3.1 Extender to TELCO Demarc

This cable is available from DCB, P/N 9500095.

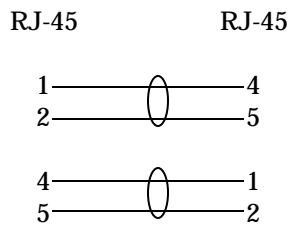
RJ-45                      RJ-45



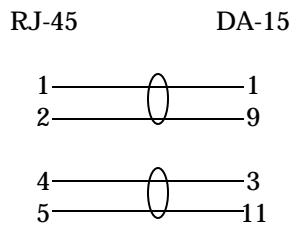
5.3.2 Extender to another Extender



5.3.3 Extender to DSU/CSU or Router  
This cable is available from DCB, P/N 9500099.



5.3.4 Extender to DSU/CSU



5.3.5 Sources for Individually Shielded Twisted Pair Cable:

- Beldon # 7838A
- Comm Scope # 21102D
- General Cable # 7056880
- Madison Cable # 14035
- Quabbin Wire & Cable # 9770



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## **6. TROUBLESHOOTING**

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### 6.1 General Approach

When troubleshooting problems, a rational plan can save you many hours of frustration. The following is a brief outline of standard troubleshooting procedures.

1. Gather the facts to determine the exact nature of the problem.
2. Draw a picture of the system showing the equipment at both the host and remote ends and the phone lines or in-house wiring. Use this as a reference to note your observations, test steps and test results. A picture keeps you focused and often saves duplicate effort.
3. Record the front panel indications before changing anything. This is an important part of fact gathering
4. If you change anything, change only one thing at a time.

### 6.2 Common Problems

The most common problems when installing T/E-Extenders are wiring problems. Wiring problems fall into two categories; incorrect cable type and improper connections.

We recommend using only Category 3, two twisted pair, shielded cable. This cable is available from DCB under part number 7002009.

When connecting T/E-Extenders be sure that outputs are connected to inputs and inputs are connected to outputs. See diagram in Section 3 and interface information in Section 5.

### 6.3 Assistance

If you need assistance troubleshooting your system, contact DCB customer support at (217) 897-6600 between 8:00 am and 5:00 pm central time Monday through Friday.

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**7. WARRANTY**

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DCB products are warranted to be free of defects in materials and workmanship for two years. Data Comm for Business, Inc. will repair or replace any equipment proven to be defective within the warranty period. All warranty work is F.O.B. Dewey, IL. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. DCB liability shall not exceed the original purchase price.

All equipment returned for warranty repair must be accompanied by a Returned Material Authorization (RMA) number. To receive an RMA number, call (217) 897-6600 between the hours of 8 AM and 5 PM central time. Equipment must be shipped prepaid to DCB and will be returned at DCB's expense.

Ship returned items to:

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