



**Black Box Corporation**  
The World's Source for Connectivity™



OCTOBER 1997

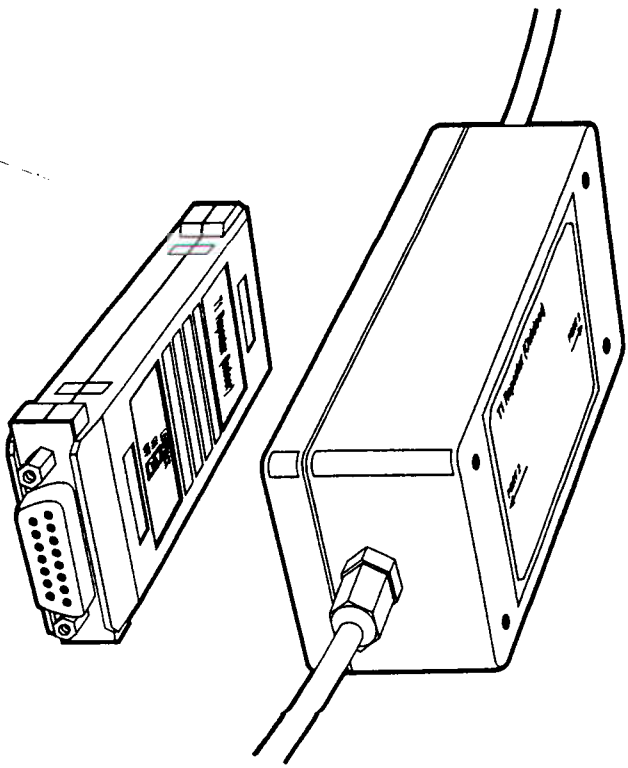
MT311A  
MT312A  
MT313A  
MT314A

30 JUN 1999

# T1 Repeater E1 Repeater



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P.O. Box 12800 • Pittsburgh, PA 15241 • (724) 746-5500 • Fax (724) 746-0746

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**AND**  
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This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.*

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**CONTENTS**

- 1. Specifications .....8
- 2. Introduction .....10
  - 2.1 General .....10
  - 2.2 Features .....12
  - 2.3 Application .....12
- 3. Operation .....13

## 1. Specifications

**Data Rate**—MT311A, MT313A: 1.544 Mbps;  
MT312A, MT314A: 2.048 Mbps

**Line Code**—Bipolar

**Impedance**—100 ohms for T1, 120 ohms for E1

**Signal Levels**—Transmit:  $\pm 3V$ ,  $\pm 10\%$ , Receive (referenced to Transmit Level): 0 to  $-39$  dB for T1, 0 to  $-45$  dB for E1

**Connector**—MT311A, MT312A: (2) DB15 female, Transmit (tip and ring) pins 1, 9, Receive (tip and ring) pins 3, 11; MT313A, MT314A: (2) Terminal block, Transmit (tip and ring) pins 1, 2, Receive (tip and ring) pins 3, 4

**Diagnostics**—Loopback of port 1 data, switch-activated

**Temperature**—32 to 122 °F (0 to 50 °C)

**Humidity**—Up to 90% noncondensing

**Power**—*Line Power*: Source: Telco line, Current: 60 mA simplex loop power (can tolerate up to 140 mA), Voltage drop: 6.3 V; *Local Power*: Source: Wall-mounted external power supply, Voltage: 9 VDC, Current: 100 mA, Connector: Miniature jack, tip positive, sleeve ground

**Size**—MT311A, MT313A: 1.2"H x 2"W x 5.3"D (3 x 4.9 x 13.5 cm); MT312A, MT314A: 2.4"H x 3.2"W x 6.3"D (6 x 8 x 16 cm)

**Weight**—MT311A, MT313A: 3.5 oz. (100 g); MT312A, MT314A: 8.7 oz. (250 g)

## 2. Introduction

### 2.1 General

The T1 Repeater is a miniature G.703 repeater for extending the range of T1 (1.544 Mbps) equipment. The E1 Repeater is a miniature repeater for extending the range of E1/CEPT (2.048 Mbps) equipment.

Four models are available:

- T1 Repeater (Indoor) (MT311A)
- E1 Repeater (Indoor) (MT312A)
- T1 Repeater (Outdoor) (MT313A)
- E1 Repeater (Outdoor) (MT314A)

Indoor models have a miniature plastic case, while outdoor models have an all-weather plastic case.

The Repeater supports up to 39 dB attenuation at 772 KHz for T1, and up to 45 dB at 1024 KHz for E1. For 22-gauge pulp cable this represents a distance between repeaters of up to 7300 feet (2.2 km).

The indoor Repeater can be powered using either telco simplex line power or local power. If available, telco line power is normally used in preference to local power. For telco power, both “through” and “loop” power methods are supported (refer to **Figure 3-2**). For local power, the Repeater can use either a battery or wall-mounted AC power supply. The outdoor version supports telco simplex line power only (and does not support the battery or wall-mounted power supply).

The Repeater supports local loopback via a manual switch. When loopback is issued, the receive data (RX-1) of side 1 is looped back to the transmit data (TX-1) of port 1, with the path from the receive data of port 2 disconnected. The loopback switch is located internally in the outdoor models, and externally in the indoor models.

Connection to each port is via a 15-pin, D-type female connector for the indoor models and via a terminal block for the outdoor models.

## 2.2 Features

- Extends the operating range of T1 or E1 (CEPT) equipment
- Four models available
- Dynamic range: 0 to 39 dB for T1, 0 to 45 dB for E1 (CEPT)
- Use of local or simplex power
- Local loopback support
- Easy to install
- Compact and lightweight

## 2.3 Application

Figure 2-1 shows a typical application of the Repeater.

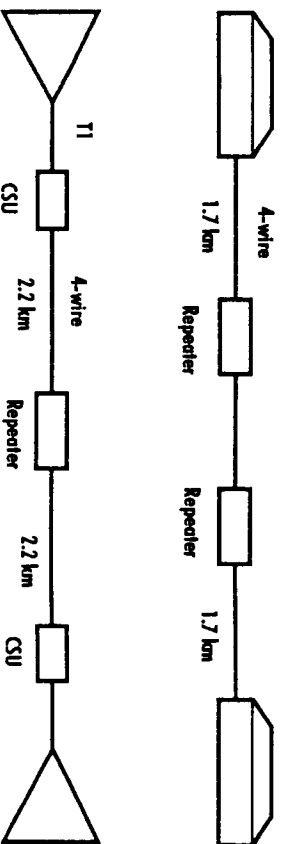


Figure 2-1. Typical Application.

## 3. Operation

The Repeater comes strapped for through-power option. For local power, simply connect the wall-mounted external power supply via the miniature jack. For “loop” power operation, follow these simple steps:

1. For the indoor model, open the unit by pressing the marked places on the sides, or alternatively insert a small screwdriver into the slot, and lift the handle, gently levering the tip of the screwdriver down. The cover will separate without pressure.

### NOTE

Do not insert the screwdriver straight into the middle of the slot, as this may break off the prongs that snap the cover together.

2. Change the switch position to “loop power” (refer to **Figure 3-1**).

### NOTE

If the Repeater is located as the last unit in the link with telco line power, the power switch (SW1) must be set to the LOOP position. In all other cases of telco line power, the Repeater power switch must be set to THRU position.

3. Close the unit and connect both sides directly to the T1/E1 line.

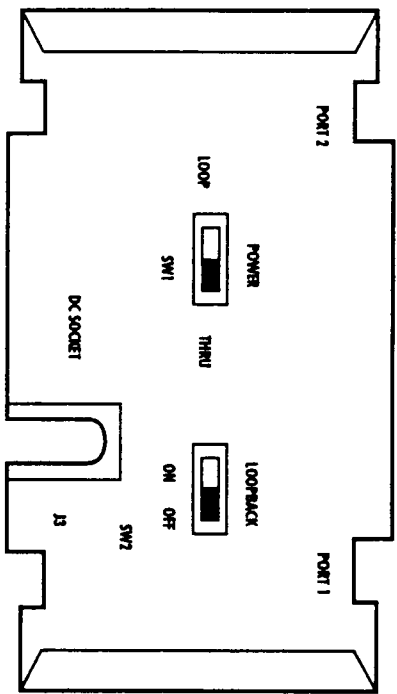


Figure 3-1. Strapping Diagram.

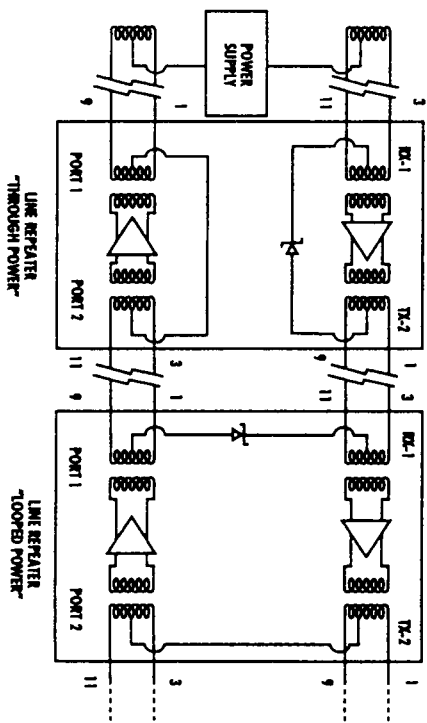


Figure 3-2. Telco Simplex Power Arrangement.