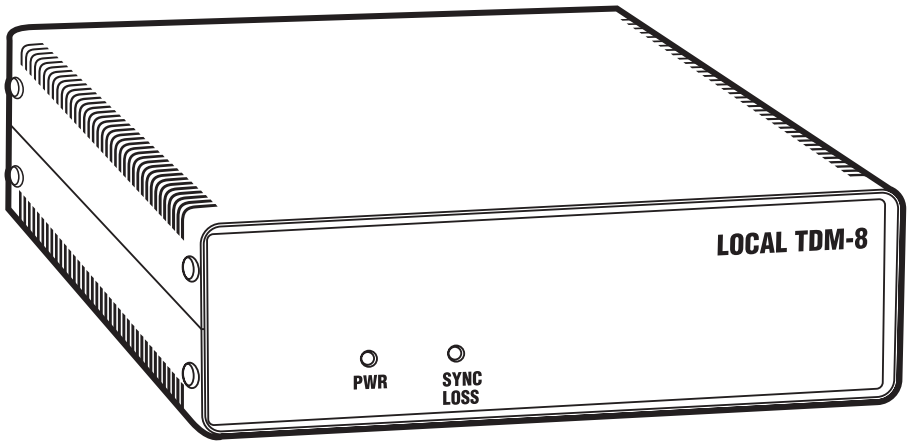




Local TDM-8



**CUSTOMER
SUPPORT
INFORMATION**

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: www.blackbox.com • E-mail: info@blackbox.com

**FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS**

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 Industry Canada.

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

NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

Contents

Chapter	Page
1. Quick Setup Guide.....	6
2. Specifications	9
3. Introduction	10
4. Installation	11
5. Troubleshooting	17
6. Identification of RJ-11 Pins	19

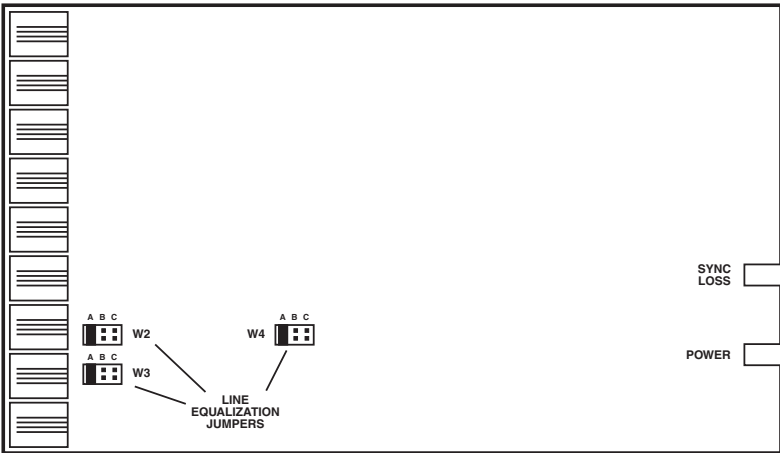
1. Quick Setup Guide

Local TDM-8 RJ-11 Pinning

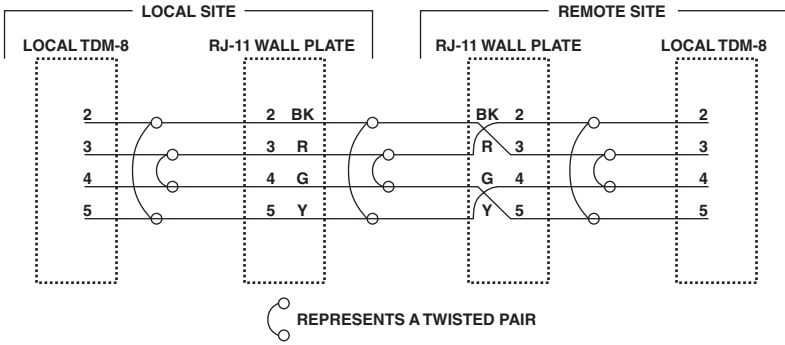
Composite Connector		
Pin	Signal	Description
2	RX	Composite input pair
5	RX	
3	TX	Composite output pair
4	TX	
Channel Connectors CH1 through CH8		
Pin	Signal	Description
2	TXD	Data In
5	RXD	Data Out
3	SG	Signal Ground
4	SG	Signal Ground

NOTE

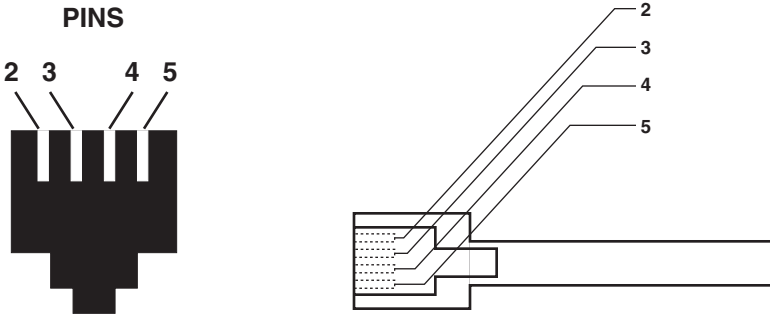
For channel connectors CH1 through CH8, pins 3 and 4 are tied together inside the Local TDM-8.



Line Equalization Jumpers.



Installation Wiring Diagram.



**Female RJ-11 Connector and Male RJ-11 Connector
(shown with the clip on top).**

Line Equalization Jumper Settings (Recommended Settings)

Distance Between Local TDM-8s	Jumper Positions		
	W2	W3	W4
0 to 1500 ft.	A	A	A
1500 to 2500 ft.	A	A	B
2500 to 3500 ft.	B	B	B
3500 to 4500 ft.	B	B	C
4500 to 6000 ft.	C	C	C

Cable Pinning

DTE Cable			
Device		RJ-11	DB25
Terminals Printers (X-ON/X-OFF only)	Data In	2 ←	2
		3 —	7
CPUs (DTE) Plotters (ENG/ACK only) PCs (Comm port)	Data Out	4 —	
		5 →	3
			4
			5
			6
			8
			20
DCE Cable			
Device		RJ-11	DB25
Modems (Async) Serial Printer ports (X-ON/X-OFF only)	Data In	2 ←	3
		3 —	7
CPUs (DCE) Multiplexors (channel/async only)	Data Out	4 —	
		5 →	2
			4
			5
			6
			8
			20

2. Specifications

Connectors — (9) modular RJ-11 female

Composite Interface — Time-division multiplexing, alternate mark inversion (AMI), transformer coupled

Channel Capacity — 8 channels

Channel Rates — 0 to 9600 bps, each port independent and transparent to data

Composite Rate — 671 kbps

LEDs — (2) LEDs: Data Synchronization Lost (SYNC LOST) and Power (PWR)

Diagnostics — Bidirectional loopback

Range — Up to 6,000 ft. (1828.8 m) over 24 AWG wire

Enclosure — Metal

Power Supply — 115/230 VAC, 50/60 Hz, wallmount

Power Consumption — 3.3 watts

Size — 1.5"H x 6.5"W x 8.5"D (3.8 x 16.5 x 21.6 cm)

Weight — Unit only: 2.5 lb. (1.1 kg); Unit with power supply: 3.3 lb. (1.5 kg)

3. Introduction

NOTE

If you are familiar with the operation of the Local TDM-8 and only need cable pinning and jumper settings, refer to page 6.

The Local TDM-8 combines and transmits eight asynchronous channels of RS-232 data on two continuous metallic circuits. Each channel is independent and operates full duplex. The unit is designed to reduce wiring costs and simplify network cable layouts between personal computers, terminals, modems, and other asynchronous devices. The Local TDM-8 is ideally suited for sharing limited cable by “dumb” asynchronous terminals and personal computers. A typical application is shown in Figure 1.

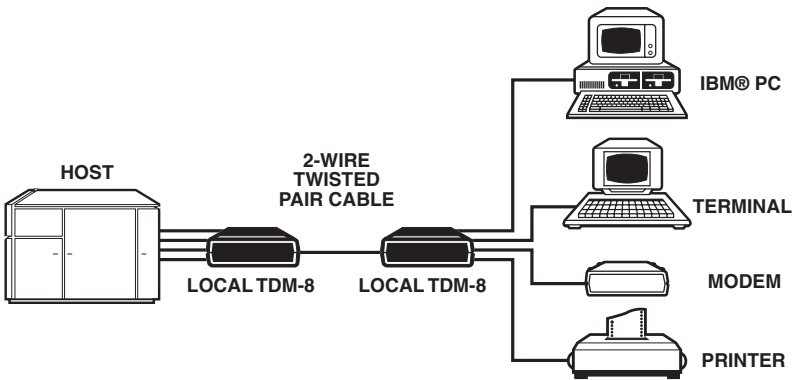


Figure 1. Typical Application.

4. Installation

See Figure 2 for the installation diagram. It is very important that the proper twisted-pair cable wires be crossed and the proper pairs be twisted.

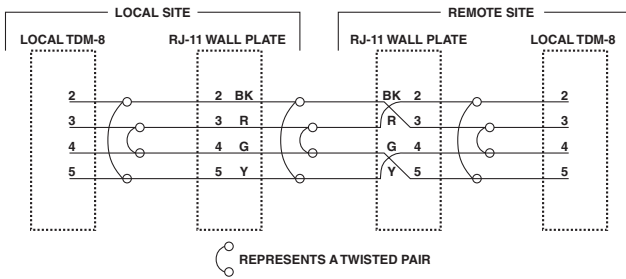


Figure 2. Installation Wiring Diagram.

Proceed as follows to install the Local TDM-8:

1. Remove the two screws from each side of the Local TDM-8 and lift the cover from the unit.
2. Set the Line Equalization jumpers (W2, W3, and W4 in Figure 3) for the distance between the two Local TDM-8s. See Table 1 for the jumper position settings for various distance ranges. These are *recommended* settings. The *ideal* (theoretical) ranges are listed in Table 2, merely for your reference.

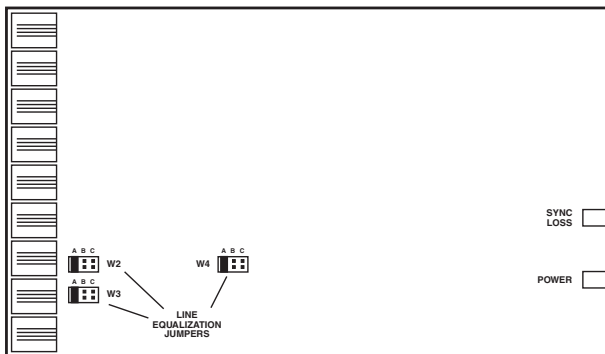


Figure 3. Line Equalization Jumpers.

3. Remove power from the terminals and/or computers to be connected to the TDM-8.
4. Connect a modular adapter to your computer and/or terminal ports. Use Table 3 to determine the type of adapter needed.
5. Connect an RJ-11 cable from the adapters installed in step 4 to the appropriate port on the Local TDM-8. See Tables 4 and 5 for the pinning of these cables. Table 6 gives the pinning of the RJ-11 connectors of the Local TDM-8.

Table 1. Line Equalization Jumper Settings (Recommended Settings)

Distance Between Local TDM-8s	Jumper Positions		
	W2	W3	W4
0 to 1500 ft.	A	A	A
1500 to 2500 ft.	A	A	B
2500 to 3500 ft.	B	B	B
3500 to 4500 ft.	B	B	C
4500 to 6000 ft.	C	C	C

Table 2. Line Equalization Jumper Settings (Ideal Ranges, for Reference Only)

Distance Between Local TDM-8s	Jumper Positions		
	W2	W3	W4
0 to 1800 ft.	A	A	A
1000 to 2900 ft.	A	A	B
1200 to 2800 ft.	B	B	A
2000 to 3800 ft.	B	B	B
2500 to 3700 ft.	A	A	C
3200 to 4600 ft.	B	B	C
4300 to 6000 ft.	C	C	C

6. Connect the Local TDM-8 COMP port to the RJ-11 wallplate using twisted-pair wiring as shown in Figure 2.
7. Connect the wallplate at the local site to the wallplate at the remote site using 24 AWG twisted-pair cable crossed as shown in Figure 2.

NOTE

The cable from the local wallplate to the remote wallplate must be wired as shown in Figure 2 or the unit will not function properly. The wire size should be at least 24 AWG. 26 AWG wire may be used, but the ranges shown in Table 1 will be reduced by at least 30%.

8. Repeat steps 1 through 6 for the Local TDM-8 and terminals and/or computers at the other installation site.
9. At the local site, plug the wall-mount transformer of the Local TDM-8 into a wall outlet and apply power to the devices connected to the Local TDM-8.
10. At the remote site, plug the wall-mount transformer of the Local TDM-8 into a wall outlet and apply power to the devices connected to the Local TDM-8.
11. The SYNC LOST light on the front panel of the Local TDM-8 should not be lit. If it is lit, try setting the Line Equalization jumpers to an adjacent setting until you find a setting that works. If the SYNC LOST LED remains on, refer to **Chapter 5**.
12. When the “SYNC LOST” LED is not lit, the Local TDM-8s are now ready for operation.

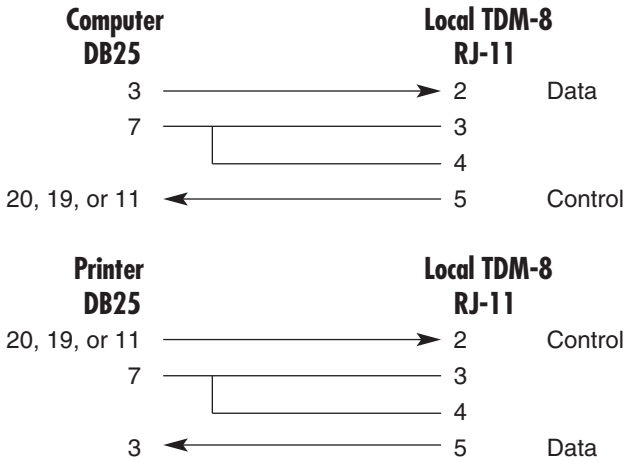
Table 3. DB25/RJ-11 Adapter Selection

Device	Adapter for DTE Cable
Async Terminal	FA252 (male DB25) or FA253 (female DB25)
Printer (X-ON/X-OFF only)	FA252 (male DB25) or FA253 (female DB25)
Plotter	FA252 (male DB25) or FA253 (female DB25)
Computer (modem communications port)	FA252 (male DB25) or FA253 (female DB25)
<hr/>	
Device	Adapter for DCE Cable
Async modem	FA252 (male DB25) or FA253 (female DB25)
Printer port (serial only)	FA252 (male DB25) or FA253 (female DB25)
Async multiplexor	FA252 (male DB25) or FA253 (female DB25)
Computer (terminal port)	FA252 (male DB25) or FA253 (female DB25)

Table 4. Cable Pinning

DTE Cable			
Device		RJ-11	DB25
Terminals Printers (X-ON/X-OFF only)	Data In	2 ←	2
		3 —	7
CPUs (DTE) Plotters (ENG/ACK only) PCs (Comm port)	Data Out	4 —	4
		5 →	3
			5
			8
			20
DCE Cable			
Device		RJ-11	DB25
Modems (Async) Serial Printer ports (X-ON/X-OFF only)	Data In	2 ←	3
		3 —	7
CPUs (DCE) Multiplexors (channel/async only)	Data Out	4 —	4
		5 →	2
			5
			8
			20

Table 5. Pinning for Devices Requiring Hardware Flow Control



NOTES

- 1) For port flow control, attach computer flow control to pin 5 of the Local TDM-8.
- 2) For printer flow control, refer to the printer manual for the pin used for the printer ready indicator (hardware flow control). Attach this pin to pin 2 of the Local TDM-8.

Table 6. Local TDM-8 RJ-11 Pinning

Composite Connector		
Pin	Signal	Description
2	RX	Composite input pair
5	RX	
3	TX	Composite output pair
4	TX	
Channel Connectors CH1 through CH8		
Pin	Signal	Description
2	TXD	Data In
5	RXD	Data Out
3	SG	Signal Ground
4	SG	Signal Ground

NOTE

For channel connectors CH1 through CH8, pins 3 and 4 are tied together inside the Local TDM-8.

5. Troubleshooting

It is possible to verify correct operation or isolate any communications problem to the faulty device using a loopback cable and observing the SYNC LOST LED. When power is applied, the Local TDM-8 transmits an “idle pattern” which can be used for testing. The Local TDM-8 will turn off the SYNC LOST LED when it correctly receives the idle pattern.

Proceed as follows to test the Local TDM-8:

1. Construct a loopback cable using an RJ-11 connector and a twisted pair 2-wire cable. Tie pin 2 to 3 and pin 4 to 5.
2. Connect the loopback cable to the COMP port on the Local TDM-8 as shown in Figure 4.

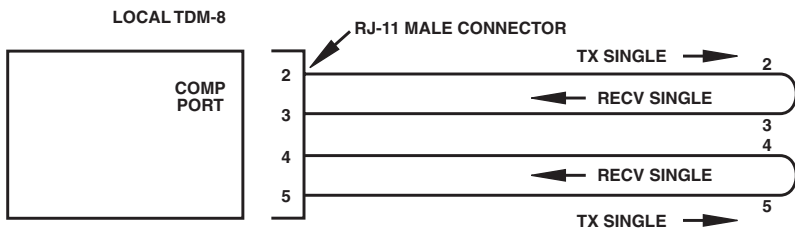


Figure 4. Local TDM-8 Test Wiring Connections.

3. Set the line equalization jumpers (W2, W3, and W4) to the A positions.
4. Apply power. The SYNC LOST LED should not be lit. If the SYNC LOST LED is lit, the Local TDM-8 is defective.

See Table 7 to diagnose any additional problems that may occur.

Table 7. Problems and Probable Causes.

Problem	Possible Cause
No indicator lights.	Unpowered wall outlet. Transformer loose in wall outlet.
SYNC LOST LED lit continuously.	Remote Local TDM-8 not powered on or not connected to line. Line has been broken. Verify with loopback test. Line mismatch. Change Equalization jumpers.
Intermittent SYNC LOST light.	Loose connection in line. Borderline circuit—distance too great. Line mismatch. Change Equalization jumpers.
SYNC LOST light not lit but data is invalid.	Terminal and computer ports not connected. Terminal faulty or set up incorrectly. Port faulty or configured incorrectly. Line mismatch. Change Equalization jumpers.

6. Identification of RJ-11 Pins

Figure 5 shows the physical pinning of the RJ-11 female and male connectors.

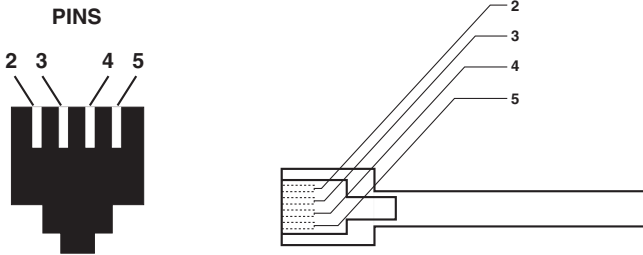


Figure 5. Female RJ-11 Connector (left) Mounted on the Rear of the Local TDM-8 and Male RJ-11 Connector (right) Mounted on the End of Twisted-Pair Cable (shown with the clip on top).



© Copyright 2000. Black Box Corporation. All rights reserved.

1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746