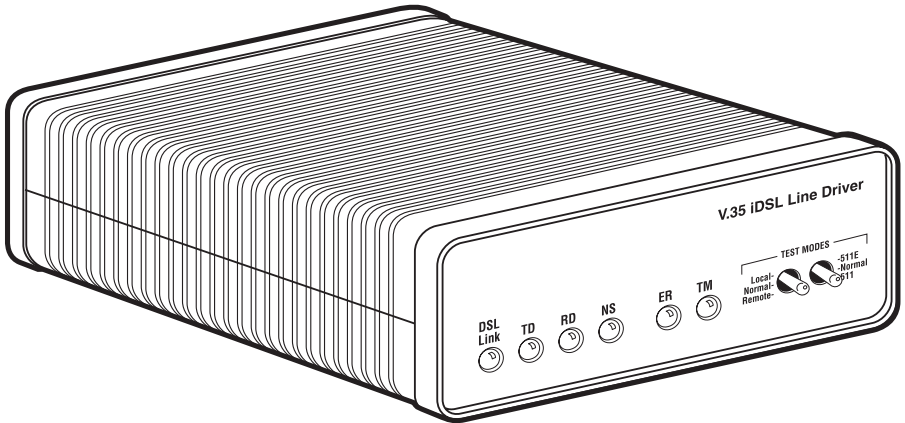




IDSLS Line Driver w/V.35 IDSLS Line Driver w/X.21



**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 B 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.

EUROPEAN UNION DECLARATION OF CONFORMITY

This equipment complies with the requirements of the European EMC Directive 89/336/EEC.



**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. Specifications	7
2. Introduction.	8
2.1 Description	8
2.2 Features	8
2.3 SNMP Management.	9
3. Configuring the Hardware DIP Switches.	10
3.1 Configuring DIP-Switch S1	11
3.1.1 Switches S1-1 and S1-2: Data Rate	11
3.1.2 Switch S1-3: Data Set Ready During Line Loopback Test	12
3.1.3 Switch S1-4: Must Be Set to the ON Position (Reserved)	12
3.1.4 Switch S1-5: Asynchronous/Sync Operation	12
3.1.5 Switches S1-6 and S1-7: System Clock Mode.	13
3.1.6 Switch S1-8: Response to RDL Request.	13
3.2 Configuring DIP-Switch S2	14
3.2.1 Switch S2-1: 19.2 kbps Synchronous Rate Enable	14
3.2.2 Switch S2-2: Front-Panel Switch Disable	15
3.2.3 Switch S2-3: Response to Local Line Loop Requests from DTE.	15
3.2.4 Switches S2-4 and S2-5: Not Assigned	16
3.2.5 Switch S2-6: Response to RDL Requests from DTE	16
3.2.6 Switch S2-7: Compatibility Mode	16
3.2.7 Switch S2-8: Not Assigned	16
4. Installation	17
4.1 Connecting the Twisted-Pair Interface	17
4.2 Connecting the IDSL Line Driver V.35 Serial Interface.	18
4.2.1 Connecting the IDSL Line Driver V.35 to a DTE Device	18
4.2.2 Connecting the IDSL Line Driver V.35 to a DCE Device	19
4.3 Connecting the IDSL Line Driver X.21 Serial Interface	19
4.3.1 Connecting the IDSL Line Driver X.21 to a DCE or DTE Device	19
4.3.2 Opening the Case	20
4.4 Connecting Power	21

Contents (continued)

Chapter	Page
5. Operation	22
5.1 Power-Up	22
5.2 LED Status Indicators	22
5.3 Test Modes	23
5.3.1 Local Line Loopback (LLB)	23
5.3.2 Remote Digital Loopback (RDL)	24
5.4 Using the V.52 (BER) Test-Pattern Generator	26
Appendix A. V.35 Interface Pin Assignments	27
Appendix B. X.21 Interface Pin Assignments	28

1. Specifications

Transmission Format: Synchronous or asynchronous

Transmission Line: Single unconditioned twisted pair

Clocking: Internal, external, or receive loopback

Distance:

- 10.1 miles (16.3 km) on 19-AWG (0.9-mm) wire
- 7.2 miles (11.6 km) on 22-AWG (0.64-mm) wire
- 5 miles (8 km) on 24-AWG (0.5-mm) wire
- 3.4 miles (5.5 km) on 26-AWG (0.4-mm) wire

Data Rates: Synchronous: 19.2, 32, 56, 64, and 128 kbps; Asynchronous: 0 to 38.4 kbps

Diagnostics: V.52-compliant bit error rate pattern (511/511E pattern) generator and detector with error injection mode; Local Line Loopback and Remote Digital Loopback, activated by front-panel switch or via serial interface

Indicators: LEDs: TD, RD, DSL Link, NS (no signal), ER (error), and TM (test mode)

Line Interface: Transformer-coupled 1500-VAC isolation

Connectors: ME0002A-V35 (1) RJ-45, (1) M/34 female; ME0002A-X21: (1) RJ-45, (1) DB15 female

Temperature Range: 32 to 122°F (0 to 50°C)

Humidity: 5 to 95%, noncondensing

Power: 100 to 240 VAC, 50 to 60 Hz (universal input option), 5 watts

Size: 1.6"H x 4.1"W x 6"D (4.1 x 10.4 x 15.2 cm)

Weight: 2 lb. (0.9 kg)

2. Introduction

2.1 Description

The IDSL Line Driver w/V.35 or X.21 is a high-speed, AC-powered short-range modem that is able to operate synchronously or asynchronously—full duplex—over a single twisted pair. Supporting data rates to 128 kbps (synchronous) or 38.4 kbps (asynchronous), the IDSL Line Driver is capable of point-to-point distances up to 5 miles (8 km) using 24-AWG wire.

The Line Driver supports internal, external, or receive loopback clocking in synchronous mode. Data rates and asynchronous data format may be configured locally using DIP switches.

ME0002A-V35 provides a V.35 interface on an M/34 female connector. ME0002A-X21 provides an X.21 interface on a DB15 female connector.

Line connection is via an RJ-45 jack. Standard versions of the Line Driver are powered by a 100- to 240-VAC universal power supply.

2.2 Features

- Synchronous data rates: 19.2, 32, 56, 64, and 128 kbps.
- Asynchronous data rates: 0 to 38.4 kbps.
- Full-duplex operation over a single twisted pair (2-wires).
- Point-to-point distances up to 5 miles (all data rates) on 24-AWG twisted pair.
- Remote digital loopback, local line loopback diagnostic modes.
- Multi-rate symmetric DSL.
- V.35 and X.21 interfaces.
- Interoperable with models ME0001C-V35, ME0001C-X21, and ME0009A-IDSL.
- SNMP manageable with ME0001C-V35 or ME0001C-X21 and RM261C-SNMP as SNMP agent rack card.
- Universal power options.
- Front-panel status indicators.

- Small, convenient desktop unit.
- CE marked.

2.3 SNMP Management

The IDSL Line Driver (ME0002A-V35 or ME0002A-X21) is SNMP manageable when it is connected to a rackmounted model ME0001C. SNMP management is enabled through a RM261C-SNMP rack management card located in the Managed Micro Rack (part number RM260).

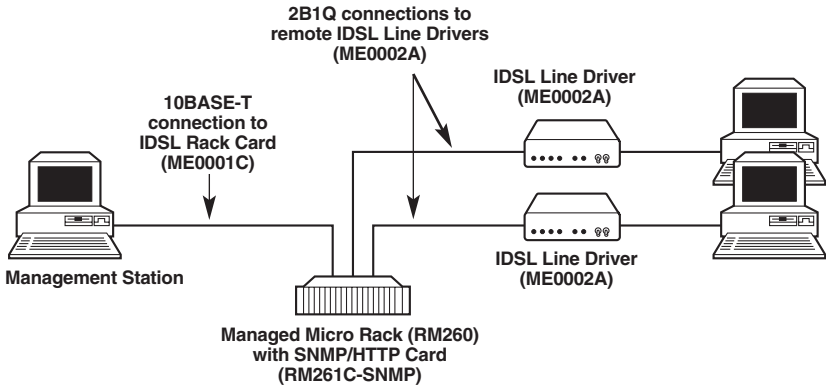


Figure 2-1. Typical application.

HTTP/HTML MANAGEMENT

The Managed Micro Rack SNMP/HTTP Card (RM261C-SNMP) maintains HTML pages that can be viewed through a Web browser. You can display remote statistics and configure IDSL Line Driver parameters simply by entering the SNMP Card's IP address into the browser

3. Configuring the Hardware DIP Switches

The IDSL Line Driver w/V.35 or X.21 is equipped with two sets of eight DIP switches. This chapter describes switch locations and explains all possible configurations.

Using a small flat-tip screwdriver, remove the protective cover located on the underside of the IDSL Line Driver (see Figure 3-1).

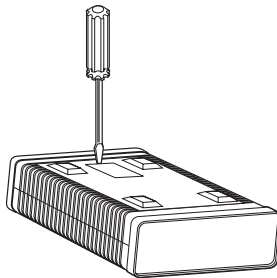


Figure 3-1. Removing the cover to access DIP-switches S1 and S2.

Figure 3-2 shows the orientation of the DIP switches in the ON and OFF positions.

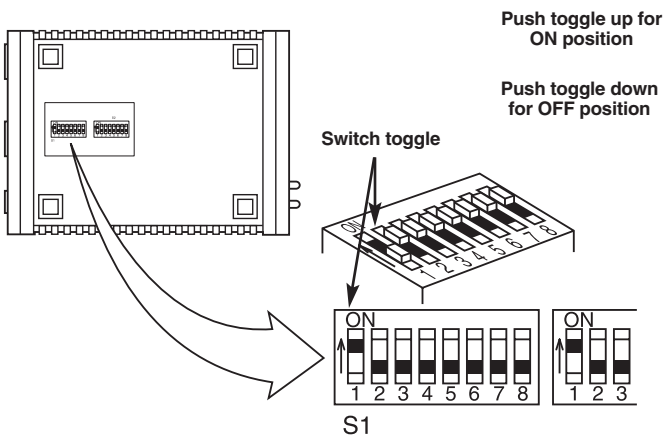


Figure 3-2. DIP-switches S1 and S2.

3.1 Configuring DIP-Switch S1

DIP-switch S1 is where you configure the data rate, asynchronous or synchronous data format, transmit clock source, and response to RDL request. Table 3-1 summarizes default positions of DIP-switches S1-1 through S1-8. Detailed descriptions of each switch follow the table.

Table 3-1. S1 summary.

Position	Function	Factory Default
S1-1	Data Rate	On
S1-2	Data Rate	Off } 64 kbps Sync
S1-3	DSR during Local Line Loop	On DSR On
S1-4	Reserved	On
S1-5	Async/Sync Data Format	Off
S1-6	TX Clock Source	On
S1-7	TX Clock Source	On } Internal Clock
S1-8	Response to RDL Request	On Enable

NOTE

When setting the IDSL Line Driver for SNMP management, the DTE rate switches (S1-1, S1-2, and S2-1) must also be set to the ON position.

3.1.1 SWITCHES S1-1 AND S1-2: DATA RATE

Use Switches S1-1 and S1-2 to configure the asynchronous or synchronous data rate of the IDSL Line Driver. Each setting represents one synchronous data rate and one asynchronous data rate.

Table 3-2. Data rate switches.

S1-1	S1-2	Sync Data Rate	Async Data Rate
On	On	32 kbps	Reserved
Off	On	56 kbps	Reserved
On	Off	64 kbps	Reserved
Off	Off	128 kbps	0 to 38.4 kbps
Off	Off	19.2 kbps	Reserved

NOTE

The IDSL Line Driver can also operate at the 19.2 kbps synchronous rate. To operate at 19.2 synchronous, set Switches S1-1 and S1-2 both to the OFF position and Switch S2-1 to the ON position (see Section 3.2.1 for a description of Switch S2-1).

3.1.2 SWITCH S1-3: DATA SET READY DURING LINE LOOPBACK TEST

Use Switch S1-3 to control the behavior of the DSR signal at the EIA interface during the line loopback test.

Table 3-3. Data Set Ready switch setting.

S-3	Setting
On	DSR is on during local line loop
Off	DSR is off during local line loop

3.1.3 SWITCH S1-4: MUST BE SET TO THE ON POSITION (RESERVED)

Table 3-4. Switch S1-4 setting.

S1-4	Setting
On	Reserved

3.1.4 SWITCH S1-5: ASYNCHRONOUS/SYNC OPERATION

Use Switch S1-5 to configure the IDSL Line Driver for async/sync operation. Switch S1-5 must be set in the Off position. There is no other valid setting.

Table 3-5. Async/sync operation.

S1-5	Setting
Off	Async/Sync

3.1.5 SWITCHES S1-6 AND S1-7: SYSTEM CLOCK MODE

Use Switches S1-6 and S1-7 to configure the IDSL Line Driver for internal, external, or receive recover clock mode.

Table 3-6. System clock mode.

S1-6	S1-7	Clock Mode	Description
On	On	Internal	System clock generated internally
Off	On	External (DTE)	System clock derived from terminal interface
On	Off	Receive Recover	System clock derived from the received line signal
Off	Off	Hardware Reset	

IMPORTANT!

A pair of IDSL line drivers communicate synchronously across the twisted-pair line connection. Therefore, you must set these switches regardless of whether your application is async or sync. For X.21 or async applications, configure one unit for internal clock mode and the other unit for receive recover clock mode.

3.1.6 SWITCH S1-8: RESPONSE TO RDL REQUEST

Use Switch S1-8 to allow the IDSL Line Driver to enter the Remote Digital Loopback diagnostic test when requested to do so by the far end Line Driver. For example, when switch S1-8 is set to “ON,” it will enter RDL mode (see [Section 5.3.2](#)) when requested to do so by the remote Line Driver.

Table 3-7. Remote digital loopback test.

S1-8	Setting
On	Response to RDL Request Enabled
Off	Response to RDL Request Disabled

3.2 Configuring DIP-Switch S2

Use the eight DIP switches in Switch S2 to enable 19.2 kbps synchronous operation, set the loopback modes, and set the speed of the control port. The following table summarizes default positions of DIP-switch S2. Detailed descriptions of each switch follow the table.

Table 3-8. S2 summary.

Position	Function	Factory Default	
S2-1	19.2 kbps enable	On	
S2-2	Front-panel switch	Off	
S2-3	Response to LAL from DTE	Off	Disabled
S2-4	Not assigned	Off	
S2-5	Not assigned	Off	
S2-6	Response to RDL from DTE	On	Enabled
S2-7	Compatibility mode	Off	
S2-8	Not assigned	Off	

3.2.1 SWITCHES S2-1: 19.2 KBPS SYNCHRONOUS RATE ENABLE

Use Switch S2-1 to allow the IDSL Line Driver to operate at the 19.2 kbps synchronous data rate.

Table 3-9. Sync rate enable.

S2-1	Activation	Description
Off	Disabled	Synchronous data rate is 32 to 128 kbps as defined by switches S1-1 and S1-2
On	Enabled	IDSL Line Driver operates at synchronous 19.2 kbps data rate*

***NOTE**

To operate at 19.2 kbps, Set Switches S1-1 and S1-2 to the OFF position (see Section 3.1.1).

3.2.2 SWITCH S2-2: FRONT-PANEL SWITCH DISABLE

Use Switch S2-2 to enable or disable the front-panel toggle switches.

Table 3-10. Front-panel toggle switches.

S2-2	Setting
On	Disable the front-panel switches
Off	Enable the front-panel switches

3.2.3 SWITCH S2-3: RESPONSE TO LOCAL LINE LOOP REQUESTS FROM DTE

Use Switch S2-3 to enable Local Line Loopback from the local DTE interface (see **Section 5.3.1**).

Table 3-11. Local line loopback.

S2-3	Activation	Description
Off	Disabled	Ignore Line Loopback request from DTE interface
On	Enabled	Respond to Line Loopback request from DTE interface

3.2.4 SWITCHES S2-4 AND S2-5: NOT ASSIGNED**3.2.5 SWITCH S2-6: RESPONSE TO RDL REQUESTS FROM DTE**

Use Switch S2-6 to determine the IDSL Line Driver response to RDL requests from the local DTE. In the enabled setting, the Line Driver responds to RDL requests from the local DTE by sending an RDL loop request to the remote Line Driver (see **Section 5.3.2**).

Table 3-12. Remote digital loopback.

S2-6	Activation	Description
Off	Disabled	Ignore Remote Digital Loopback request from DTE interface
On	Enabled	Respond to Remote Digital Loopback request from DTE interface

3.2.6 SWITCH S2-7: COMPATIBILITY MODE

In some instances, you may need to connect an IDSL Line Driver to a third-party IDSL modem. By enabling S2-7, the Line Driver will negotiate and link up to a non Black Box IDSL modem. When using two Black Box units, please set S2-7 to the default position.

Table 3-13. Compatibility mode.

S2-7	Activation	Setting
Off	Disabled	Default position
On	Enabled	Compatibility mode

3.2.7 SWITCH S2-8: NOT ASSIGNED

4. Installation

Once the IDSL Line Driver is properly configured, it is ready to connect to the twisted-pair interface, to the serial port, and to the power source. This section tells you how to make these connections.

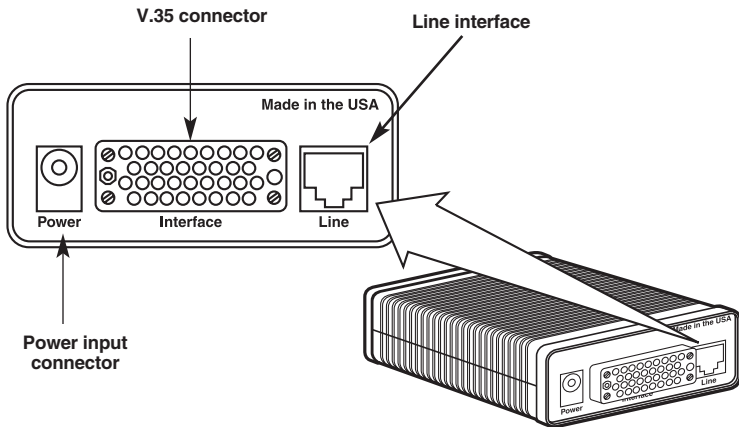


Figure 4-1. Rear view.

4.1 Connecting the Twisted-Pair Interface

The IDSL Line Driver supports communication between two DTE devices at distances to 5 miles (8 km) over 24-AWG (0.5-mm) twisted-pair wire. Two things are essential:

1. These units work in pairs. Both units at the end of the twisted-pair DSL span must be set for the same DTE rate.
2. To function properly, the IDSL Line Driver needs one twisted pair of metallic wire. This twisted pair must be unconditioned, dry, metallic wire, between 19 (0.9 mm) and 26 AWG (0.4 mm); the higher-number gauges will limit distance. Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, or standard, flat modular telephone type cable, are not acceptable.

The RJ-45 connector on the Line Driver's twisted-pair interface is polarity insensitive and is wired for a two-wire interface. The signal/pin relationships are shown in Figure 4-2.

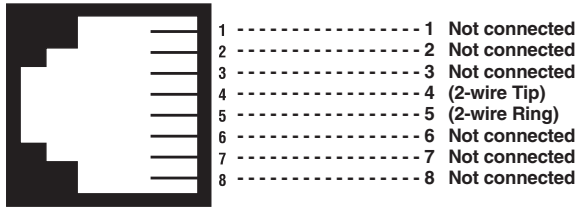


Figure 4-2. RJ-45 twisted-pair interface.

4.2 Connecting the IDSL Line Driver V.35 Serial Interface

The IDSL Line Driver supports V.35 serial port connections. This section describes how to connect the serial ports to your V.35 equipment.

4.2.1 CONNECTING THE IDSL LINE DRIVER V.35 TO A DTE DEVICE

The Line Driver provides a V.35 DCE (Data Circuit Terminating Equipment) interface on an M/34 female connector. As a DCE, this interface is designed to connect to DTE equipment, such as a router. When connecting the V.35 interface of the Line Driver to your DTE device, use a V.35 straight-through cable (see Figure 4-3). **Appendix A** describes pin assignments and signal sources for the Line Driver's V.35 interface. When purchasing or constructing an interface cable, please use **Appendix A** as a guide.

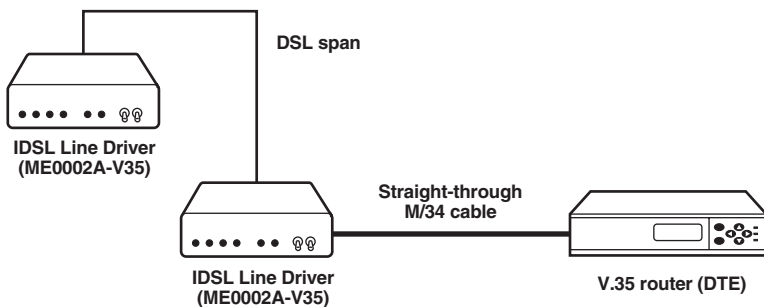


Figure 4-3. Connecting the Line Driver to a V.35 serial DTE.

4.2.2 CONNECTING THE IDSL LINE DRIVER V.35 TO A DCE DEVICE

The Line Driver (ME0002A-V35) provides a V.35 DCE (Data Circuit Terminating Equipment) interface on an M/34 female connector. As a DCE, this interface is designed to connect to DTE equipment, such as a router. However, tail-circuit applications require connection to another piece of DCE equipment, such as a multiplexer. When connecting the V.35 interface of the Line Driver to your DCE device, use a V.35 null-modem cable. Some applications may also require the installation of a V.35 tail-circuit buffer to account for small differences in clock frequency between the Line Driver and the V.35 DCE (multiplexor).

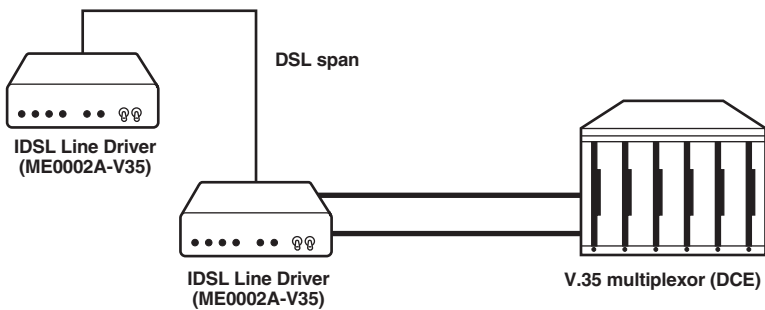


Figure 4-4. Connecting the Line Driver to a V.35 serial DCE.

4.3 Connecting the IDSL Line Driver X.21 Serial Interface

The Line Driver (ME0002A-X21) supports X.21 serial port connections. This section describes how to connect the serial ports to your X.21 equipment.

4.3.1 CONNECTING THE IDSL LINE DRIVER X.21 TO A DCE OR DTE DEVICE

The Line Driver provides an X.21 interface on a DB15 female connector. The X.21 interface default configuration is DCE (Data Circuit Terminating Equipment) for connection to DTE (Data Terminal Equipment) such as a router. However, the X.21 interface on the Line Driver may be configured as DTE (Data Terminal Equipment) for connection to DCE such as a modem or multiplexer. When connecting the X.21 interface of the Line Driver to your DTE device, use a X.21 straight-through cable (see Figure 4-5).

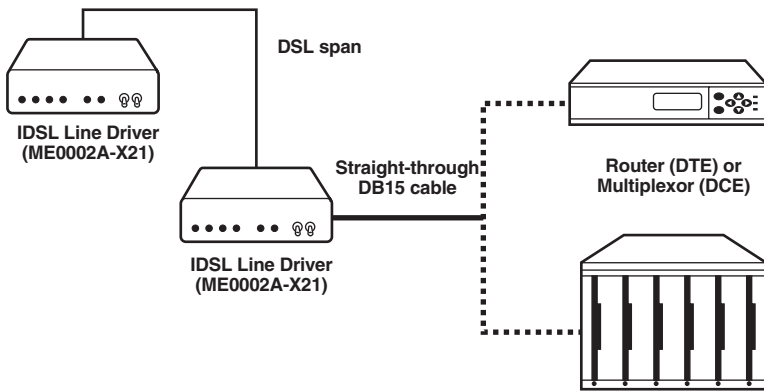


Figure 4-5. Connecting the Line Driver to an X.21 DTE or DCE.

To change the DCE/DTE orientation from the default position (DCE), you must open the case Line Driver's case.

4.3.2 OPENING THE CASE

To open the Line Driver's case, insert a flat-head screwdriver into an open slot on both sides of the case, as in Figure 4-6. Twist the screwdriver head slightly, and the top half of the case will separate from the rest of the case.

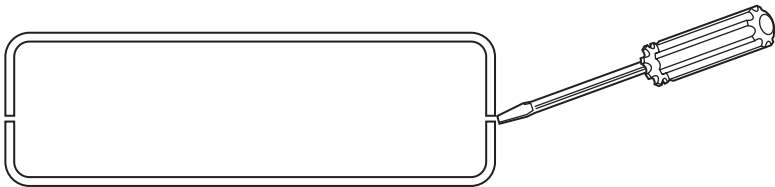


Figure 4-6. Opening the case with a small screwdriver.

The DCE/DTE strap is located on the top side of the Line Driver PC board (see Figure 4-7). The arrows on the top of the strap indicate the configuration of the X.21 port (for example, if the DCE arrows are pointing toward the DB15 connector, the X.21 port is wired as a DCE). Change the DCE/DTE orientation by pulling the strap out of its socket, rotating it 180°, then plugging the strap back into the socket. You will see that the DCE/DTE arrows now point in the opposite directions, showing the new configuration of the X.21 port. To close the case, fit the two halves together snugly and snap them back in place.

In this example, the DCE/DTE strap is configured for DTE because the “DTE” label on the strap is pointed toward the DB15 connector.

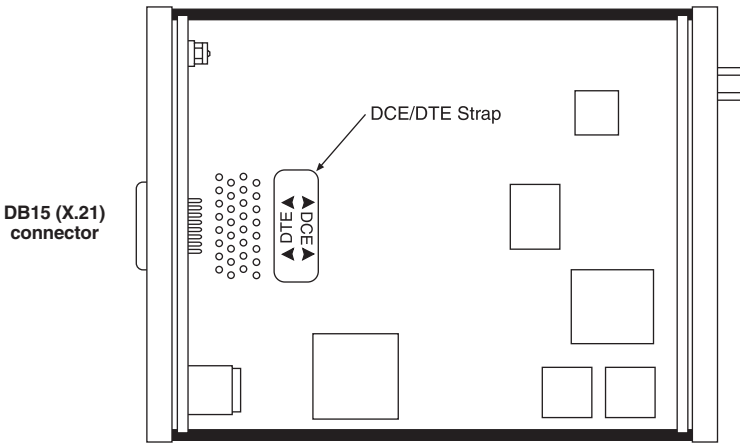


Figure 4-7. Setting the DCE/DTE strap.

4.4 Connecting Power

The Line Driver uses a 5-VDC, 2-A 100- to 240-VAC universal input power supply (center pin is +5V). The power supply has a male IEC 320 power entry connector. This power supply connects to the Line Driver via a barrel jack on the rear panel.

The Line Driver powers up as soon as it is plugged into an AC outlet—there is no power switch. The universal AC supply is equipped with a male IEC 320 connector.

5. Operation

Once the IDSL Line Driver is properly configured and installed, it should operate transparently. This chapter describes power-up, reading the LED status indicators, and using the built-in loopback test modes.

5.1 Power-Up

To apply power to the IDSL Line Driver, first be sure that you have read **Section 4.4**, and that the unit is connected to the appropriate power source. Then power-up the unit.

5.2 LED Status Indicators

The IDSL Line Driver features six front-panel LEDs that monitor power, the DTE signals, network connection, and test modes. Figure 5-1 shows the location of each LED. Following Figure 5-1 is a description of each LED's function. See also Table 5-1.

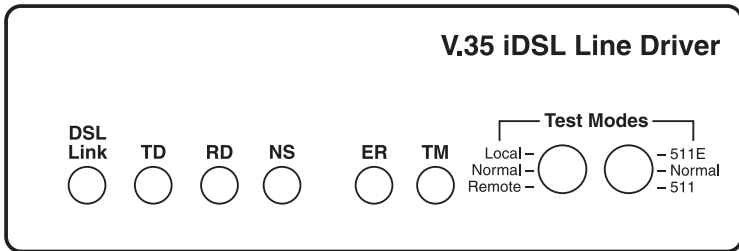


Figure 5-1. Front panel.

Table 5-1. LED descriptions.

LED	Description
DSL Link	(Active Green) Solid green (On) indicates that the end-to-end DSL Framer Link is up, signifying that the link across the DSL span is active. The DSL Link LED is Off when the link is down.
TD and RD	Glows yellow to indicate an idle condition of Binary “1” data on the respective terminal interface signals. Green indicates Binary “0” data.
NS	(No Signal) glows red to indicate that the local Line Driver is not connected with the remote Line Driver.
ER	Blinks ON/OFF after a 511/511E test has timed out. See Section 5.4 (Test-Pattern Generator) for more information.
TM	Glows yellow to indicate test mode.

5.3 Test Modes

The IDSL Line Driver offers two proprietary loopback test modes (plus a built-in V.52 BER test-pattern generator) to evaluate the condition of the modems and the communication link. These tests can be activated via the interface or physically from the front panel.

5.3.1 LOCAL LINE LOOPBACK (LLB)

The Local Line Loopback (LLB) test checks the operation of the local IDSL Line Driver, and is performed separately on each unit. Any data sent to the local Line Driver in this test mode will be echoed (returned) back to the user device. For example, characters typed on the keyboard of a terminal will appear on the terminal screen.

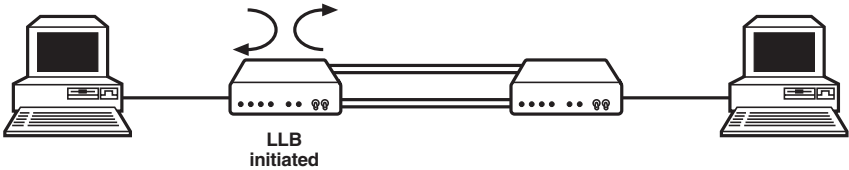


Figure 5-2. Local line loopback.

To perform an LLB test, follow these steps:

1. Activate LLB. This may be done in one of two ways:

Move the front-panel toggle switch up to “Local.”

Raise the LLB signal on the interface.

Once LLB is activated, the IDSL Line Driver transmitter output is connected to its own receiver. Data is also looped back to the line. The TM LED should be lit.

2. Verify that the data terminal equipment is operating properly and can be used for a test.
3. Perform a V.52 BER (bit error rate) test as described in **Section 5.4**. If the BER test equipment indicates no faults, but the data terminal indicates a fault, follow the manufacturer’s checkout procedures for the data terminal. Also, check the interface cable between the terminal and the Line Driver.

5.3.2 REMOTE DIGITAL LOOPBACK (RDL)

The Remote Digital Loopback (RDL) test checks the performance of both the local and remote Line Drivers, and the communication link between them. Any characters sent to the remote Line Driver in this test mode will be returned back to the originating device. For example, characters typed on the keyboard of the local terminal will appear on the local terminal screen after having been passed to the remote Line Driver and looped back.

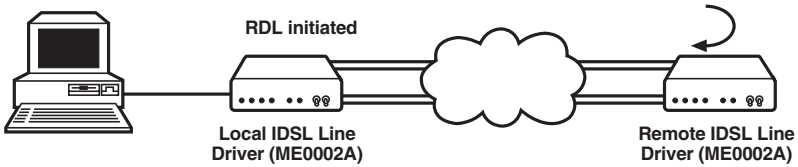


Figure 5-3. Remote digital loop.

IMPORTANT

Do not send a 511 test pattern from the test equipment when you connect external test equipment to the Line Driver.

To perform an RDL test, follow these steps:

1. Activate RDL. This may be done in two ways:

Move the front-panel toggle switch Down to “Remote.”

Raise the RDL signal on the interface.

2. Perform a V.52 BER test as described in **Section 5.4**. If the BER test equipment indicates a fault and the Local Line Loopback test was successful for both Line Drivers, you may have a problem with the twisted-pair line between the modems. You should then check the twisted-pair line for proper connections and continuity.

5.4 Using the V.52 (BER) Test-Pattern Generator

To use the V.52 BER tests in conjunction with the Remote Digital Loopback tests (or with Local Line Loopback tests), do the following:

1. Locate the 511/511E toggle switch on the Line Driver's front panel and set the toggle to the down position. This activates the V.52 BER test mode and transmits a 511 test pattern into the loop. If any errors are present, the local modem's red ER LED will blink continuously.
2. If the above test indicates that no errors are present, move the V.52 toggle switch to the up position, activating the 511E test with errors present. If the test is working properly, the local modem's red ER LED will blink. A successful 511E test will confirm that the link is in place, and that the Line Driver's built-in 511 generator and detector are working properly.

Appendix A. V.35 Interface Pin Assignments

Listed below are the V.35 interface pin assignments (M/34 female connector, DCE orientation).

Pin #	Signal
B	SGND (Signal Ground)
C	RTS (Request to Send) (DTE Source)
D	CTS (Clear to Send) (DCE Source)
E	DSR (Data Set Ready) (DCE Source)
F	CD (Carrier Detect) (DCE Source)
H	DTR (Data Terminal Ready) (DTE Source)
L	LLB (Local Line Loop) (DTE Source)
M	TM (Test Mode) (DTE Source)
N	RDL (Remote Digital Loop) (DTE Source)
P	TD (Transmit Data) (DTE Source)
R	RD (Receive Data) (DCE Source)
S	TD/ (Transmit Data-B) (DTE Source)
T	RD/ (Receive Data-B) (DCE Source)
U	XTC (External Transmit Clock) (DTE Source)
V	RC (Receiver Clock) (DCE Source)
W	XTC/ (External Transmit Clock) (DTE Source)
X	RC/ (Receiver Clock) (DCE Source)
Y	TC (Transmitter Clock-A) (DCE Source)
AA	TC/ (Transmit Clock-B) (DCE Source)

Appendix B. X.21 Interface Pin Assignments

Listed below are the X.21 interface pin assignments (DB15 female connector, DTE/DCE orientation).

Pin #	Signal
1	Frame Ground
2	T (Transmit Data-A) (DTE Source)
3	C (Control-A) (DTE Source)
4	R (Receive Data-A) (DCE Source)
5	I (Indication-A) (DCE Source)
6	S (Signal Element Timing-A) (DCE Source)
7	BT (Byte Timing-A) (DCE Source)
8	SGND (Signal Ground)
9	T/ (Transmit Data-B) (DTE Source)
10	C/ (Control-B) (DTE Source)
11	R/ (Receive Data-B) (DCE Source)
12	I/ (Indication-B) (DCE Source)
13	S/ (Signal Element Timing-B) (DCE Source)
14	BT/ (Byte Timing-B) (DCE Source)



© Copyright 2001. Black Box Corporation. All rights reserved.

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