QuikConnect IDSL Line Driver

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.

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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 connectado 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 fisica 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 lineas de energia.

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 objectos liquidos 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: Objectos 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

VT100™ is a trademark of Compaq Corporation.

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

Contents

1. Specifications

Transmission Format: Synchronous or asynchronous

Transmission Line: Two-wire or four-wire unconditioned twisted pair

Clocking: Internal, external, or receive recovered

Interface Modules: EIA RS-232/ITU/T V.24, RS-232/530, ITU V.35, and ITU/T X.21, 64-kbps G.703, and 10BASE-T Ethernet

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

Table 1-1. 2-wire distance.

Data Rate	AWG Wire Gauge (mm)			
	19 (0.9)	22 (0.6)	24 (0.5)	26 (0.4)
All rates	10.8 (17.2)	7.2 (11.5)	5 (8)	3.4 (5.5)

Table 1-2. 4-wire distance.

Data Rate	AWG Wire Gauge (mm)			
	19 (0.9)	22 (0.6)	24 (0.5)	26 (0.4)
All rates	11.4 (18.2)	7.6 (12.1)	5.3 (8.5)	3.6 (5.7)

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, CTS, CD, DTR, NS (no signal), ER (error), and TM (test mode)

Connectors: RJ-45 on line side; DB25 female, M/34 female, or DB15 female on serial interface side, depending upon which interface module is installed

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

Humidity: 5 to 95% noncondensing

Power: ME0009A-IDSL: 100 to 240 VAC, 50 to 60 Hz (universal input), 10 watts; ME0009A-IDSL-48: -40 to -60 VDC

Size: 1.6"H x 7.3"W x 6.6"D (4.1 x 18.5 x 16.8 cm)

Weight: 2 lb. (1 kg)

2. Introduction

2.1 Description

The QuikConnect IDSL Line Driver allows synchronous or asynchronous data transmissions up to 11 miles (17.7 km) over one or two twisted pair (2- or 4-wire). Supporting synchronous speeds up to 128 kbps and asynchronous speeds up to 38.4, the Line Driver widens the bottleneck for high-speed LAN interconnection or high-speed Internet links.

The QuikConnect HDSL Line Driver is remotely manageable when connected to a rackmounted IDSL Line Driver Rack Card (ME0001C) and using a Managed Micro Rack SNMP/HTTP Card (RM261C-SNMP). Perfect for synchronous tail-circuit applications, the Line Driver supports internal, external, or receive loopback synchronous clocking. Data rates and asynchronous data format may be configured locally using DIP switches.

The QuikConnect features replaceable DCE-DTE interface modules. Available interfaces include V.24/RS-232, V.35, RS-422/530, G.703, X.21, and 10BASE-T Ethernet. Line connection is made by an RJ-45 jack. The standard QuikConnect IDSL Line Driver is powered by a 100- to 240-VAC (Universal) power supply. The DC power supply option supports any DC input between 40 and 60 VDC.

2.2 Features

- Synchronous data rates: 19.2, 32, 56, 64, and 128 kbps in all clock modes.

- Asynchronous data rates: 0 to 38.4 kbps.

- Full-duplex operation over a one or two twisted pair (2- or 4-wires).

- Point-to-point distances up to 11 miles (17.7 km).

- Remote digital loopback and local line loopback diagnostics.

- Internal, external, or receive recovered clocking options.

- LED indicators for TD, RD, CTS, CD, DTR, TM, ER, and NS.

- Standard gas-tube surge protection.

2.3 SNMP Management

The QuikConnect IDSL Line Driver is SNMP manageable when it is connected to a rackmounted IDSL Line Driver Rack Card (ME0001C). SNMP management is enabled through a Managed Micro Rack SNMP/HTTP Card (RM261C-SNMP), located in the Managed Micro Rack (RM260).

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 the QuikConnect IDSL Line Driver parameters simply by entering the SNMP/HTTP Card's IP address into the browser.
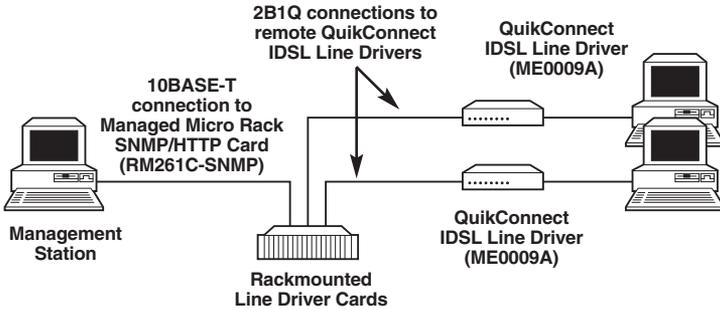
Figure 2-1. Typical application.

3. Configuration

The QuikConnect IDSL Line Driver is equipped with two sets of eight DIP switches, which allow configuration of the unit for a wide variety of applications. This chapter describes switch locations and explains all possible configurations.

3.1 Configuring the Hardware DIP Switches

The 16 external switches are grouped into two eight-switch sets, and are externally accessible from the underside of the QuikConnect (see Figure 3-1).
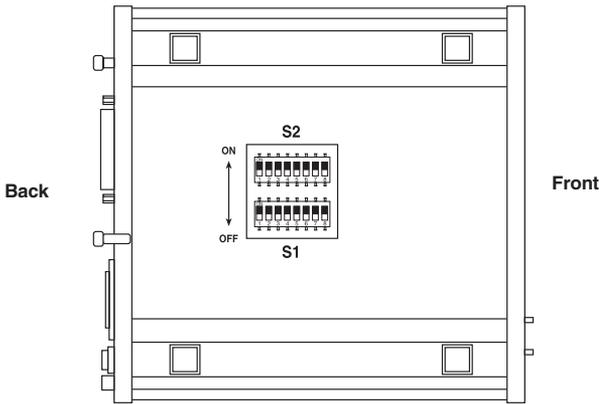
Figure 3-1. Underside of the QuikConnect, showing the location of the DIP switches.

The two sets of DIP switches on the underside of the QuikConnect are called S1 and S2. As Figure 3-2 shows, the orientation of all DIP switches is the same with respect to ON and OFF positions.
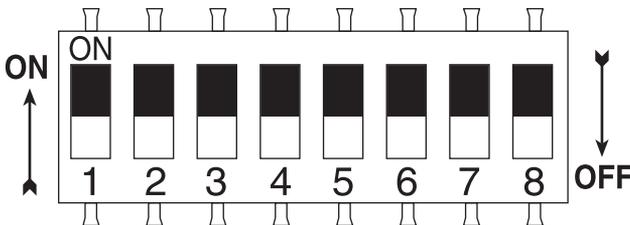
Figure 3-2. Close-up of configuration switches (all sets are identical in appearance.

3.1.1 DIP-SWITCH S1

Use the eight switches in DIP-switch S1 to configure the data rate, asynchronous or synchronous data format, transmit clock source, and response to RDL request. Table 3-1 summarizes the default positions of DIP-switch S1. 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	SNMP Management	Off VT100 Management
S1-5	Reserved	Off
S1-6	TX Clock Mode	On ⎫
S1-7	TX Clock Mode	On ⎭ Internal Clock
S1-8	Response to RDL Request	On Enabled

Switches S1-1 and S1-2: Data Rate

Use switches S1-1 and S1-2 with switch S2-1 to configure the async or sync bit rate for the QuikConnect.

Table 3-2. Data rate.

S1-1	S1-2	S2-1	Sync Data Rate	Async Data Rate
On	On	Off	32 kbps	Reserved
Off	On	Off	56 kbps	Reserved
On	Off	Off	64 kbps	Reserved
Off	Off	Off	128 kbps	0 to 38.4 kbps
On	On	On	Reserved	Reserved
Off	On	On	Reserved	Reserved
On	Off	On	Reserved	Reserved
Off	Off	On	19.2 kbps	Reserved

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. DSR signal.

S1-3	Setting
On	DSR is on during local line loop
Off	DSR is off during local line loop

Switch S1-4: Management Setting

When setting the QuikConnect IDSL Line Driver to SNMP management, the DTE rate switches (S1-1, S1-2, and S2-1) must also be in the On position. Therefore, to set a QuikConnect to SNMP management mode, the following switches have to be in the On position: S1-1, S1-2, S2-1, and S1-4. Use switch S1-4 to configure the QuikConnect's management setting.

Table 3-4. Management setting.

S1-4	Setting
On	SNMP management
Off	Control port management

Switch S1-5: Reserved

Switch S1-5 is reserved and is always in the Off position.

Switches S1-6 and S1-7: System Clock Mode

Use switches S1-6 and S1-7 to configure the QuikConnect for internal, external, or receive recover clock mode.

Table 3-5. 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	Reset to use hardware switches for configuration

Switch S1-8: Response to RDL Request

Use switch S1-8 to allow the QuikConnect to enter the Remote Digital Loopback diagnostic test when requested to do so by the far-end QuikConnect. 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 QuikConnect.

Table 3-6. Response to RDL request.

S1-8	Setting
On	Response to RDL request enabled
Off	Response to RDL request disabled

3.1.2 DIP-SWITCH S2

Table 3-7. S2 summary.

Position	Function	Factory Default	
S2-1	Data Rate	Off	
S2-2	Front-Panel Switch Enable	Off	Enable
S2-3	Response to LAL from DTE	Off	Disabled
S2-4	2-wire/4-wire	Off	2-wire
S2-5	Not assigned	Off	
S2-6	Response to RDL from DTE	On	Enabled
S2-7	Not assigned	Off	
S2-8	Not assigned	Off	

Switch S2-1: DTE Rate

Use switch S2-1 with switches S1-1 and S1-2 to enable additional data rates.
Table 3-2 shows all possible bit rate settings for switches S1-1, S1-2, and S2-1.

Switch S2-2: Front-Panel Switch Enable

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

Table 3-8. Front-panel toggle switches.

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

Switch 2-3: Response to Local Line Loop Requests from DTE

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

Table 3-9. Local Line Loopback response.

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

Switch S2-4: 2-Wire/4-Wire

Use switch S2-4 to configure 2-wire or 4-wire twisted-pair operation.

Table 3-10. 2-wire/4-wire.

S2-4	Setting	Description
Off	2-wire	2-wire operation
On	4-wire	4-wire operation

Switch S2-5: Not Assigned

Switch S2-6: Response to RDL Request from DTE

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

Table 3-11. Response to RDL request from DTE.

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

Switches S2-7 and S2-8: Not Assigned

3.2 Configuring the Software Switches

The QuikConnect IDSL Line Driver features a menu-driven command system that allows you to configure the local Line Driver. Follow the instructions below to configure the Line Driver using the software switches:

1. Connect the serial RS-232 port of a VT100™ or similar DTE with terminal emulation to the control port of the QuikConnect. To construct an RS-232 to EIA-561 patch cable, refer to the control port pinout diagram in **Appendix B**.

2. Power up the terminal and set its RS-232 port as follows:

   9600 baud
   8 data bits, 1 stop bit, no parity
   Local echo
   CR-CR/LF on inbound data
   ANSI, VT100 emulation

3. Power up the QuikConnect IDSL Line Driver.

4. After the QuikConnect is powered on, the control port will send out this message:

   Model: ME0009A-IDSL Software version: x.xx
   Black Box Corporation Copyright © 2000

5. Press [ESC] on the terminal.

6. The QuikConnect will then display the Main Menu screen. You may configure the local QuikConnect IDSL Line Driver from this screen.

IMPORTANT!

To make a selection from any menu, enter the option number. To exit any menu without making a selection, or to return to the previous menu, press the [ESC] key.

CONFIGURING THE LOCAL QUIKCONNECT IDSL LINE DRIVER

To configure the local QuikConnect, make a selection from the following Main Menu.

```
          QUIKCONNECT IDSL LINE DRIVER
               LOCAL CONFIGURATION
                    MAIN MENU

 1. DISPLAY ACTIVE CONFIGURATION
 2. DISPLAY HARDWARE CONFIGURATION
 3. DISPLAY SOFTWARE CONFIGURATION
 4. SETUP SOFTWARE CONFIGURATION
 5. SELECT HARDWARE/SOFTWARE CONTROL
 6. DISPLAY MODEM STATUS
 7. TEST MODES
 8. RESTART UNIT


 ENTER YOUR SELECTION (1-8)>
```

Figure 3-3. Main menu.

Main Menu Option 1: Display Active Configuration

Select Option 1 to display the most recent configuration of the local Line Driver (see Figure 3-4). The QuikConnect IDSL Line Driver uses the active configuration for its operation. If you make changes to the configuration, you must select Main Menu Option 8. This will update the unit to the new active configuration.

```
****************************************************************
*       ACTIVE CONFIGURATION - Esc to MAIN MENU              *
*                                                            *
* Configuration Control:                   Hardware          *
* DTE Rate:                                64 Kbps           *
* Data Format:                             Synchronous       *
* Clock Mode:                              Internal          *
* DSR during Local Line Loop:              Enabled           *
* Response to Remote Digital Loop:         Enabled           *
* DTE controlled Local Line Loop:          Disabled          *
* DTE controlled Remote Digital Loop: Disabled               *
****************************************************************
```

Figure 3-4. Active configuration screen.

Main Menu Option 2: Display Hardware Configuration

Select Option 2 to display the configuration of the hardware DIP switches. To use the hardware configuration for the active configuration, select Main Menu option 5. Then select "Use Hardware DIP Switches." Finally, select Main Menu Option 8 to save the changes.

```
****************************************************************
*      HARDWARE CONFIGURATION - Esc to MAIN MENU             *
*                                                            *
* Configuration Control:                   Hardware          *
* DTE Rate:                                64 Kbps           *
* Data Format:                             Synchronous       *
* Clock Mode:                              Internal          *
* DSR during Local Line Loop:              Enabled           *
* Response to Remote Digital Loop:         Enabled           *
* DTE controlled Local Line Loop:          Disabled          *
* DTE controlled Remote Digital Loop: Disabled               *
****************************************************************
```

Figure 3-5. Hardware configuration screen.

Main Menu Option 3: Display Software Configuration

Select Option 3 to display the configuration of the software switches. To use the software configuration for the active configuration, select Main Menu, Option 5. Then select "Use Software Switches." Finally, select Main Menu option 8 to save the changes.

```
***********************************************************
*      SOFTWARE CONFIGURATION - Esc to MAIN MENU        *
*                                                        *
* Configuration Control:              Software           *
* DTE Rate:                           64 Kbps            *
* Data Format:                        Synchronous        *
* Clock Mode:                         Slaved to RX       *
* DSR during Local Line Loop:         Enabled            *
* Response to Remote Digital Loop:    Enabled            *
* DTE controlled Local Line Loop:     Enabled            *
* DTE controlled Remote Digital Loop: Enabled            *
***********************************************************
```

Figure 3-6. Software configuration screen.

Main Menu Option 4: Setup Software Configuration

Select Option 4 to edit the software configuration of the QuikConnect IDSL Line Driver. To save changes after editing the software configuration, select Main Menu option 5, then select "Use Software Switches." Select Main Menu option 8.

```
***********************************************************
* SOFTWARE CONFIGURATION MENU - Esc to MAIN MENU *
*                                                *
* 1. DTE Rate                                    *
* 2. Data Format (Async/Sync)                    *
* 3. Clock Mode                                  *
* 4. DSR during Local Line Loop                  *
* 5. Response to Remote Digital Loop             *
* 6. DTE controlled Local Line Loop              *
* 7. DTE controlled Remote Digital Loop          *
***********************************************************
Enter your selection(1-7)>
```

Figure 3-7. Software configuration menu.

1. DTE Rate

Select Option 1 in the software configuration menu to select the asynchronous or synchronous DTE Rate of the IDSL Line Driver. The selections are shown in Figure 3-8.

```
        DTE RATE—ESC TO SOFTWARE CONFIG MENU

1. 32 KBPS        3. 64 KBPS (DEFAULT)
2. 56 KBPS        4. 128 KBPS
5. 19.2 KBPS

ENTER YOUR SELECTION (1-5)>
```

Figure 3-8. DTE rate.

2. Data Format

Select Option 2 in the software configuration menu to select the asynchronous or synchronous data format (see Figure 3-9).

```
       DATA FORMAT—ESC TO SOFTWARE CONFIG MENU

   1. SYNCHRONOUS/ASYNCHRONOUS
```

Figure 3-9. Data format.

3. Clock Mode

Select Option 3 in the software configuration menu to select the sync clock mode (see Figure 3-10).

```
************************************************
* CLOCK MODE - Esc to SOFTWARE CONFIG MENU *
*                                              *
* 1. Master Clock - Internal (default)      *
* 2. Master Clock - External (DTE provided)*
* 3. Slaved to Receive Clock                *
************************************************
Enter your selection(1-3)>
```

Figure 3-10. Clock mode.

Set this option as follows:

- Master Clock—Internal: Selection 1 allows the Line Driver to generate an internal clock as the timing source.

- Master Clock—External: Selection 2 allows the Line Driver to derive the system clock from the locally connected DTE.

- Slaved to Receive Clock: Selection 3 to allows the Line Driver to derive the timing source from the incoming data stream from the remote Line Driver.

IMPORTANT

One QuikConnect IDSL Line Driver must be a master clock (either internal or external) and the other must be slaved to the receive clock.

4. DSR During Local Line Loop

Select Option 4 in the software configuration menu to configure the behavior of the local Data Set Ready (DSR) signal during the local line loop test mode (see Figure 3-11).

```
************************************************
*          DSR DURING LOCAL LINE LOOP        *
*          Esc to SOFTWARE CONFIG MENU       *
*                                            *
* 1. DSR ON during Local Line Loop (default) *
* 2. DSR OFF during Local Line Loop          *
************************************************
Enter your selection(1-2)>
```
Figure 3-11. DSR during local line loop.

5. Response to Remote Digital Loop

Select Option 5 in the software configuration menu to instruct the QuikConnect IDSL Line Driver to either respond or ignore the Remote Digital Loop request from the remote Line Driver.

```
***********************************
*  RESPONSE TO REMOTE DIGITAL LOOP  *
*     Esc to SOFTWARE CONFIG MENU   *
*                                   *
* 1. ENABLE (default)     2. DISABLE *
***********************************
Enter your selection(1-2)>>
```

Figure 3-12. Response to remote digital loop.

6. DTE Controlled Local Line Loop

Select Option 6 in the software configuration menu to instruct the Line Driver to either respond or ignore local line loop requests from the DTE. To instruct the Line Driver to respond to local line loop requests from the DTE, select Enable (Option 1). To instruct the Line Driver to ignore local line loop requests from the DTE interface, select Disable (Option 2).

```
***********************************
*   DTE CONTROLLED LOCAL LINE LOOP  *
*     Esc to SOFTWARE CONFIG MENU   *
*                                   *
* 1. ENABLE (default)     2. DISABLE *
***********************************
Enter your selection(1-2)>>
```

Figure 3-13. DTE controlled local line loop.

7. DTE Controlled Remote Digital Loop

Select Option 7 in the software configuration menu to enable DTE control of the remote digital loop menu (see Figure 3-14). The remote digital loop on the Line Driver can be controlled from the DTE interface by selecting Enable (Option 1). To instruct the Line Driver to ignore this request from the DTE interface, select Disable (Option 2).

```
*************************************
* DTE CONTROLLED REMOTE DIGITAL LOOP *
*    Esc to SOFTWARE CONFIG MENU       *
*                                      *
* 1. ENABLE (default)      2. DISABLE *
*************************************
Enter your selection(1-2)>>
```

Figure 3-14. DTE controlled Remote Digital Loop.

8. 2-Wire/4-Wire Selection

Select Option 8 in the software configuration menu to configure 2-wire or 4-wire operation

```
2-Wire/4-Wire Selection
1. 4-Wire Mode
2. 2-Wire Mode
```

Figure 3-15. 2-wire/4-wire operation.

Main Menu Option 5: Select Hardware/Software Control

Option 5 from the Main Menu selects whether the Line Driver will use the hardware switch settings or the software switch settings for its active configuration. If Options 1 or 2 are selected, the Line Driver will use the current hardware or software switch settings as the active configuration. After changing this setting select Main menu option 8 to implement the changes.

```
****************************************************
*    HARDWARE/SOFTWARE CONFIGURATION CONTROL    *
*              Esc to MAIN MENU                 *
*                                               *
* 1. Use Hardware Dip-switches (default)        *
* 2. Use Software Switches                      *
****************************************************
Enter your selection(1-2)>>
```

Figure 3-16. Select hardware/software control.

Main Menu Option 6: Display Modem Status

Select Option 6 from the Main Menu to display the modem status (see Figure 3-17). Press the space bar on the keyboard to update and redisplay the screen.

```
****************************************************
*         MODEM STATUS - Esc to MAIN MENU       *
*                                               *
* Handshake status:    HANDSHAKING              *
* Data Terminal Ready: OFF                      *
* Request To Send:     OFF                      *
* Carrier Detect:      OFF                      *
* Data Set Ready:      OFF                      *
* Clear To Send:       OFF                      *
* Test Mode:           OFF                      *
****************************************************
```

Figure 3-17. Display modem status.

NOTE

Valid QuikConnect IDSL Line Driver handshake statuses are listed below.

1. Handshaking: This status occurs when the Line Driver is in the process of establishing a link with another Line Driver.

2. Data Mode: This status occurs when the Line Driver successfully establishes a link with another Line Driver, allowing the data to flow.

Main Menu Option 7: Test Modes

Select Option 7 from the Main Menu to select the test mode status of the IDSL Line Driver. The Line Driver's test mode settings help to verify the integrity of the data link and isolate communication difficulties.

```
*****************************************************
*     TEST MODE MENU - Esc to MAIN MENU       *
*                                             *
* 1. OFF                                       *
* 2. 511                                       *
* 3. 511 w/errors                              *
* 4. Local Line Loop                           *
* 5. Local Line Loop and 511                   *
* 6. Local Line Loop and 511 w/errors          *
* 7. Remote Digital Loop                       *
* 8. Remote Digital Loop and 511               *
* 9. Remote Digital Loop and 511 w/errors     *
*****************************************************
Enter your selection(1-9)>>
```

Figure 3-18. Test mode menu.

NOTE

Test mode options 2, 3, 7, 8, and 9 require the QuikConnect IDSL Line Driver to be in data mode with the remote Line Driver.

The QuikConnect IDSL Line Driver's test modes are described next. To run or terminate a particular test, key in the option to get to that screen menu.

- OFF: Terminates all tests.

- 511: Initiates the built-in test-pattern generator and detector.

- 511 with Errors: Initiates the built-in test-pattern generator and detector. The test-pattern generator also injects intentional errors approximately once per second.

- Local Line Loop: Initiates the local line loop test.

- Local Line Loop and 511: Initiates the local line loop test and starts the internal 511 generator and detector.

- Local Line Loop and 511 w/errors: Initiates the Local Line Loop test and starts the internal 511 generator and detector. In this test, the 511 pattern generator injects intentional errors into the data stream.

- Remote Digital Loop: Initiates the remote digital loopback test. Any data sent to the remote Line Driver is returned to the originating device.

- Remote Digital Loop and 511: Initiates the remote digital loopback test and starts the internal 511 generator and detectors.

- Remote Digital Loop and 511 with errors: Initiates the remote digital loopback test and starts the 511 test patterns. In this test, the 511 pattern generator will inject initial errors into the data stream.

The modem status screen is displayed upon initiating a test. Press ESC to return to the test mode menu.

Press the space bar to update and redisplay the status.

4. Installation

Once the QuikConnect 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 chapter tells you how to make these connections.

4.1 Connecting the Twisted-Pair Interface

The QuikConnect 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 must have the same 2-wire connection.

2. To function properly, the QuikConnect 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 QuikConnect's twisted-pair interface is polarity insensitive and is wired for a two-wire interface. The signal/pin relationships are shown in Figure 4-1.
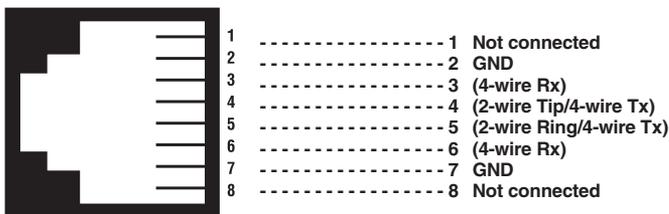


```
1 - - - - - - - - - - - - - - - 1   Not connected
2 - - - - - - - - - - - - - - - 2   GND
3 - - - - - - - - - - - - - - - 3   (4-wire Rx)
4 - - - - - - - - - - - - - - - 4   (2-wire Tip/4-wire Tx)
5 - - - - - - - - - - - - - - - 5   (2-wire Ring/4-wire Tx)
6 - - - - - - - - - - - - - - - 6   (4-wire Rx)
7 - - - - - - - - - - - - - - - 7   GND
8 - - - - - - - - - - - - - - - 8   Not connected
```

Figure 4-1. RJ-45 twisted-pair line interface.

3. Proper 2-wire pinning between the two line drivers is as shown in Figure 4-2.

Signal	Pin #		Pin #	Signal
Tip	4 - - - - - - - - - - - - - - - - -	4		Tip
Ring	5 - - - - - - - - - - - - - - - - -	5		Ring

Figure 4-2. Proper 2-wire pairing.

4. Proper 4-wire pairing between the two line drivers is shown in Figure 4-3.

Signal	Pin #		Pin #	Signal
TX	4 - - - - - - - - - - - - - - - - -	3		RX
TX	5 - - - - - - - - - - - - - - - - -	6		RX
RX	3 - - - - - - - - - - - - - - - - -	4		TX
RX	6 - - - - - - - - - - - - - - - - -	5		TX

Figure 4-3. Proper 4-wire pairing.

4.2 Connecting the Serial Port

The serial port interface on the QuikConnect IDSL Line Driver uses interchangeable QuikConnect Modules. Each QuikConnect module has a 50-pin card edge connector on one side and a serial port interface on the other. Figure 4-4 shows how a QuikConnect module plugs into the back of the QuikConnect IDSL Line Driver.
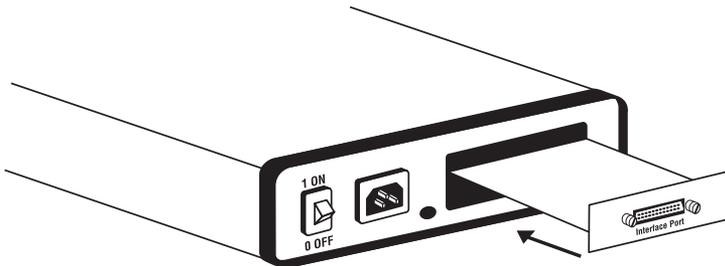

Figure 4-4. Installing the plug-in serial interface module.

4.2.1 CHANGING QUIKCONNECT MODULES

Your QuikConnect IDSL Line Driver has the appropriate QuikConnect module already installed. If you need to install a different QuikConnect module, follow these steps:

Removing the Existing QuikConnect Module

1. Turn the power switch off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.

2. Loosen the two thumbscrews on the module by turning them counter-clockwise.

3. Grasp the two thumbscrews and gently pull the module from the unit. Apply equal force to the thumbscrews to keep the module straight during the removal process.

Installing the New QuikConnect Module

1. Make sure the power switch is off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.

2. Hold the module with the faceplate toward you and align the module with the guide slots in the rear panel of the QuikConnect IDSL Line Driver.

3. While keeping the module's faceplate parallel with the Line Driver's rear panel, slide the module straight in so that the card edge contacts line up with the socket inside the chassis.

NOTE

The card-edge connector should meet the socket when it is almost all the way into the chassis. If you encounter a lot of resistance, remove the module and repeat steps 2 and 3.

4. With the card-edge contacts aligned with the socket, firmly seat the module by using your thumbs to apply pressure directly to the right and left edges of the module faceplate. Applying moderate and even pressure should be sufficient to seat the module. You should hear it "click" into place.

5. To secure the module in place, push the thumbscrews into the chassis and turn the screws clockwise to tighten.

4.2.2 CONNECTING TO A DTE DEVICE

The serial port on most QuikConnect interface modules (all except the X.21 module) is hard-wired as a DCE. Therefore, these modules "want" to plug into a DTE such as a terminal, PC, or host. When making the connection to your DTE device, use a straight-through cable of the shortest possible length—we recommend 6 feet (1.8 m) or less. When purchasing or constructing an interface cable, please use the pin diagrams in **Appendix A** as a guide.

4.2.3 CONNECTING TO A DCE DEVICE

If the Line Driver's QuikConnect interface module is hard-wired as a DCE (all except the X.21 module), you must use a null-modem cable when connecting to a modem, multiplexor, or other DCE device. This cable should be of the shortest possible length—we recommend 6 feet (1.8 m) or less. When purchasing or constructing a null-modem interface cable, use the pin diagrams in **Appendix A** as a guide.

NOTE

Pinout requirements for null-modem applications vary widely between manufacturers. If you have any questions about a specific application, call Black Box Technical Support at 724-746-5500.

4.2.4 CONFIGURING THE X.21 QUIKCONNECT MODULE

The serial port on the X.21 QuikConnect module is default wired as a DCE, but may be switched to a DTE. This is done by reversing the orientation of the DCE/DTE strap, as described below.

To reverse DCE/DTE orientation, remove the module according to the instructions in **Section 4.2.1**. The DCE/DTE strap is located on the bottom side of the module's PC board. 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). Reverse the DCE/DTE orientation by pulling the strap out of its socket, rotating it 180º, 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. Reinstall the module according to the instructions in **Section 4.2.1**.

4.3 Connecting Power

The QuikConnect IDSL Line Driver comes with a 100- to 240-VAC universal power supply (part numbers ME0009A-IDSL) or -40 to -60 VDC power supply (part numbers ME0009A-IDSL-48).

The universal interface AC supply is equipped with a male IEC 320 power connection.

The DC power supply is equipped with a 3-pin "terminal strip" style connector.

4.3.1 CONNECTING TO AN AC POWER SOURCE

To connect the standard or universal power supply, follow these steps:

1. Attach the power cord (supplied) to the shrouded male IEC 320 connector on the rear of the QuikConnect IDSL Line Driver.

2. Plug the power cord into a nearby AC power outlet.

3. Turn the rear power switch ON.

4.3.2 CONNECTING TO A DC POWER SOURCE

The -48-VDC power supply option uses a 3-pin terminal block with spring-type connectors.

WARNING

There are no user-serviceable parts in the power supply section of the Line Driver. Only qualified service personnel should replace the fuse. Contact Black Box Technical Support at 724-746-5500 for more information.

5. Operation

Once the QuikConnect 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 QuikConnect, first be sure that you have read **Section 4.3**, and that the unit is connected to the appropriate power source. Then power-up the unit via the rear-panel power switch.

5.2 LED Status Indicators

The QuikConnect IDSL Line Driver features eight 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.
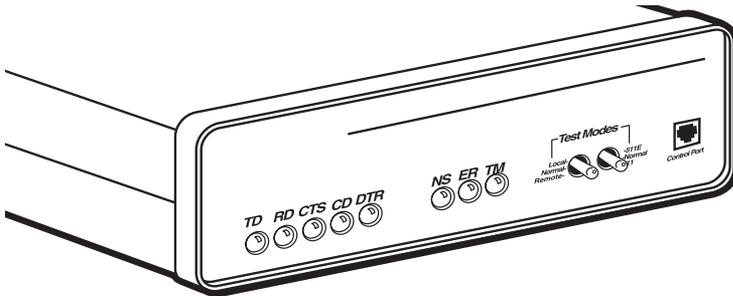
Figure 5-1. Front panel.

• 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

• CTS: Glows green to indicate that the Clear to Send signal from the Line Driver is active. Yellow indicates an inactive Clear to Send signal from the Line Driver.

• CD: Glows yellow if no carrier signal is being received from the remote Line Driver. Green indicates that the remote Line Driver's carrier is being received.

• DTR: Glows green to indicate that the Data Terminal Ready signal from the terminal is active.

- ER: Glows red to indicate the likelihood of a bit error in the received signal. During the 511 or 511/E test, ER will flash to indicate that the test-pattern detector has detected a bit error.

- TM: glows yellow to indicate that the QuikConnect Line Driver has been placed in Test Mode. The unit can be placed in test mode by the local user or by the remote user.

- NS: (No Signal) glows red to indicate that the local QuikConnect Line Driver is not connected with the remote QuikConnect Line Driver.

5.3 Test Modes

The QuikConnect 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 line drivers and the communication link. These tests can be activated physically from the front panel or via the interface.

5.3.1 LOCAL LINE LOOPBACK (LLB)

The Local Line Loopback (LLB) test checks the operation of the local QuikConnect 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 (see Figure 5-2). For example, characters typed on the keyboard of a terminal will appear on the terminal screen.
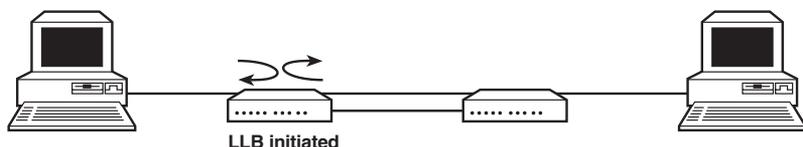

LLB initiated

Figure 5-2. Local line loopback.

To perform an LLB test, follow these steps:

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

    a. Move the front-panel toggle switch to the right to Local.

    b. Raise the LLB signal on the interface (see **Appendix A**).

    c. Set Local Loop from the VT100 screen.

    Once LLB is activated, the Line Driver's 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 5.3.3**. 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 QuikConnect IDSL 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 (see Figure 5-3). 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.
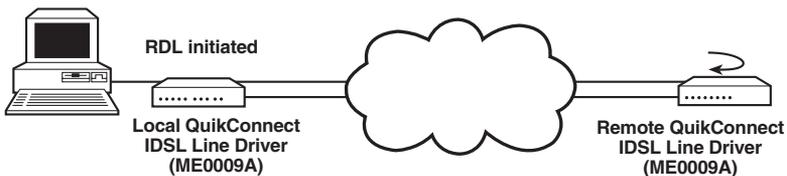

Figure 5-3. Remote line loopback.

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 three ways:

   a. Move the front-panel toggle switch to the left to Remote.

   b. Raise the RDL signal on the interface (see **Appendix A**).

   c. Set Remote Loopback from the VT100 screen.

NOTE

Remote loopback cannot be activated until approximately 45 seconds after the two modems have linked to each other.

2. Perform a V.52 BER test as described in **Section 5.3.3**. If the BER test equipment indicates a fault, and the Local Line Loopback test was successful for both Model 1092As, 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.

5.3.3 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), follow these instructions:

1. Locate the 511/511E toggle switch on the front panel of the QuikConnect IDSL Line Driver and move it up. 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 sporadically.

2. If the above test indicates no errors are present, move the V.52 toggle switch DOWN, activating the 511E test with errors present. If the test is working properly, the local Line Driver's red ER LED will glow. 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. Interface Pin Assignments

Table A-1. RS-232, RS-530 interface pin description, DB25 female connector (DCE configuration).

Pin #	Signal
1	FG (Frame Ground)
1	FG (Frame Ground)
2	TD (Transmit Data)
3	RD (Receive Data)
4	RTS (Request to Send)
5	CTS (Clear to Send)
6	DSR (Data Set Ready)
7	SGND (Signal Ground)
8	CD (Carrier Detect)
9	RC/ (Receive Timing-B)
10	CD/ (Carrier Detect-B)
11	XTC/ (External Transmit Clock)
12	TC/ (Transmit Clock-B)
13	CTS/ (Clear to Send)
14	TD/ (Transmit Data-B)
15	TC (Transmit Clock-A)
16	RD (Receive Data)
17	RC (Receive Timing)
18	LLB (Local Line Loop)
19	RTS/ (Request to Send)
20	DTR (Data Terminal Ready)
21	RDL (Remote Digital Loop)
22	DSR/ (Data Set Ready)
23	DTR/ (Data Terminal Ready)
24	XTC (External Transmit Clock)
25	TM (Test Mode)

**Table A-2. V.35 interface, M/34 female connector
(DCE configuration).**

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

**Table A-3. X.21 interface, DB15 female connector
(DTE/DCE configuration).**

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)

Table A-4. G.703/G.704, RJ-48C cable (8-wire).

Module Signal		G.703/G.704 Network Signal
RX+	1.	TX+
RX-	2.	TX-
TX+	5.	RX+
TX-	4.	RX-
Shield	3.	Shield
Shield	6.	Shield

Table A-5. 10BASE-T Ethernet interface, RJ-45 female connector.

Pin	Signal
1	1 (RX+)
2	2 (RX-)
3	3 (Not connected)
4	4 (TX-)
5	5 (TX+)
6	6 (Not connected)
7	7 (Not connected)
8	8 (Not connected)

Appendix B. Control Port Pin Assignment

The QuikConnect IDSL Line Driver's control port is an 8-position connector that complies with EIA/TIA-561.

Pin Function	RJ-45 Pin No.
Ground	4
Receive data (to DTE)	5
Transmit data (from DTE)	6

Appendix C. Quick Start Guide

1. To perform a hardware reset, turn the power off and set configuration switches S1-6 and S1-7 to Off.

2. Turn on the power for 5 to 10 seconds. Turn the power off and reconfigure the QuikConnect IDSL Line Driver using the following configuration. One unit must be set as the master and the other unit must be set as the slave.

Table C-1. Master unit settings.

DIP Switch	Setting	
S1-1	On	
S1-2	Off	
S1-3	On	
S1-4	Off	
S1-5	Off	
S1-6	On	
S1-7	On	
S1-8	On	
S2-1	Off	
S2-2	Off	
S2-3	Off	
S2-4	On	4-wire operation
	Off	2-wire operation
S2-5	Off	
S2-6	On	
S2-7	On	
S2-8	On	

Table C-2. Slave unit settings.

DIP Switch	Setting
S1-1	On
S1-2	Off
S1-3	On
S1-4	Off
S1-5	Off
S1-6	On
S1-7	Off
S1-8	On

NOTE

Switch S2 settings for the slave unit are the same as those for the master unit.

3. Connect the twisted-pair circuit between the QuikConnect IDSL Line Drivers and turn on the power. After 10 to 15 seconds, the NS (no signal) LED will go off and the CD (carrier detect) LED will turn green.

4. Perform a Local Line Loopback test using the 511/511E test switch (see **Section 5.3.1**).

5. Approximately 45 seconds after the units link up, perform a Remote Digital Loopback test using the 511/511E test switch (see **Section 5.3.2**).

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