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NETWORK SERVICES

This FaxBack contains a DSL overview and information on VDSL Line Drivers (ME0010A-VDSL and ME0011A-VDSL) and Interface Cards with Voice Support (ME481C-FXO and ME481C-FXS).

For information on other related products, see the chart below.

For information on product code…	…request this FaxBack number.
ME0001C–ME0002C, ME0009A	25845
ME0003C–ME0004C, ME0007A–ME0008A	25852
ME0005A–ME0006A	25869
ME0092A	26066
ME620A–ME621A	21748
ME480A, ME480AE, ME480A-D48, ME485A, ME485AE, ME485A-D48, ME485C-35-A, ME485C-35/B	18203
ME481C-232, ME481C-422, ME481C-35, ME481C-X21, ME481C-G703	21748 *and* 18203

NOTE: Page 2 of this FaxBack contains a general DSL overview. It provides information about DSL service ordered from the phone company or from a service provider. The products from Black Box described on pages 3 through 6 do not require you to order DSL service; these products simply use DSL technology over a phone wire that you already have installed. For example, for the ME0010A-VDSL or ME0011A-VDSL, you will use a single phone line to connect the line driver labeled "Service Provider" to the line driver labeled "Customer Premise."

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DSL OVERVIEW
Use your ordinary phone cables for data connections.

About DSL

The pair of copper wires that the phone company typically installs in your home has enough bandwidth to carry data as well as voice signals. Voice signals use only a fraction of the available capacity on the wires. DSL uses the remaining capacity to carry data on the wire without disturbing the line's ability to carry conversations.

Standard phone service limits the frequencies that digital modems, telephones, and other equipment can carry. Human voices, speaking in normal conversational tones, can be carried in a frequency range of 400 to 3400 Hertz (cycles per second). But the wires have the potential to handle frequencies of up to several million Hertz. Via DSL, modern equipment that sends digital (rather than analog) data can safely use much more of the telephone line's capacity.

DSL uses two digital modems, one on the customer end (customer premise) and one at the provider end (central office). It's a distance-sensitive technology: As the connection's length increases, the signal quality and connection speed decreases.

Although distance is a limitation for DSL, it's not a limitation for voice telephone calls. This is because small amplifiers, called loading coils, are added by the telephone company to boost voice signals. These loading coils are incompatible with DSL signals, since the amplifier disrupts the integrity of the data.

To order DSL service, contact your local telephone company or service provider. You'll need a digital modem to connect to the DSL line and modem filters to connect to your telephones.

DSL at a glance

DSL Type	Maximum Send Speed	Maximum Receive Speed	Maximum Distance	Lines Required	Phone Support
ADSL	800 kbps	8 Mbps	18,000 ft. (5500 m)	1	Yes
HDSL	1.54 Mbps	1.54 Mbps	12,000 ft. (3650 m)	2	No
IDSL	144 kbps	144 kbps	35,000 ft. (10,700 m)	1	No
MSDSL	2 Mbps	2 Mbps	29,000 ft. (8800 m)	1	No
SDSL	2.3 Mbps	2.3 Mbps	22,000 ft. (6700 m)	1	No
VDSL	16 Mbps	52 Mbps	4000 ft. (1200 m)	1	Yes

Types of DSL

Several types of DSL technology exist. You might see the term xDSL, where x is a variable, to refer to DSL in general. The main difference between these types is how fast they can send and receive data. Other variables include the maximum distance each type can send and receive data, the number of lines required, and whether or not phone support is required.

- Asymmetric DSL (ADSL) is called "asymmetric" because the download speed (8 Mbps) is greater than the upload speed (800 kbps). ADSL is ideal for Internet applications because most Internet users download much more information than they upload. ADSL offers phone support.

- High bit-rate DSL (HDSL) provides transfer rates comparable to a T1 line (about 1.54 Mbps). HDSL receives and sends data at the same speed, but it requires two lines that are separate from your normal phone line. Typically, you'd run HDSL where T1 is not practical.

- ISDN DSL (IDSL), also known as Integrated Services Digital Network (ISDN) DSL, is slower than most other forms of DSL, operating at a fixed rate of 144 kbps in both directions. A typical application for IDSL would provide satellite-based access services to remote devices in a retail environment.

- Multirate Symmetric DSL (MSDSL) is capable of more than one transfer rate. The service provider offers several different transfer rates (the faster the speed, the higher the price). The maximum send/receive data rate is 2 Mbps. High-speed and long-distance Internet applications are the typical MSDSL applications.

- Symmetric DSL (SDSL) is similar to HDSL in that it receives and sends data at the same speed (2.3 Mbps). While SDSL also requires a separate line from your phone, it uses only a single line instead of the two used by HDSL. It's ideal for high-speed, long-distance use.

- Very high bit-rate DSL (VDSL) gives you an extremely fast asymmetric or symmetric connection (it receives data at 52 Mbps and sends data at 16 Mbps). However, it only works over a short distance (up to 4000 feet) using standard copper phone wiring. High speed is the defining factor. VDSL offers phone support.
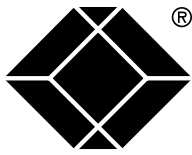
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VDSL LINE DRIVERS
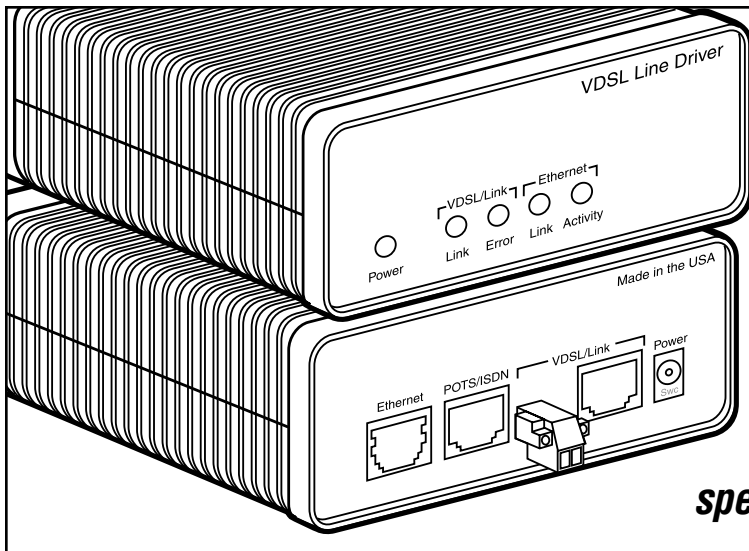
Send voice and/or data at high speeds over a single twisted-pair wire.

Key Features

▶ **Extends Ethernet distance more than a mile over 2-wire, 24 AWG unconditioned lines.**

▶ **Switch-selectable asymmetrical or symmetrical line rates up to 16.67 Mbps.**

▶ **ME0010A-VDSL integrates voice, video, and data over existing voice-grade telephone wire; also includes built-in POTS splitter.**

▶ **Autosenses 10BASE-T or 100BASE-T and full- or half-duplex.**

Extend Ethernet and phone at high speeds over existing copper wire with the vDSL Line Driver.

Two models are available: one for data and voice and one for data only. Both models provide up to 16.67 Mbps of high-speed Ethernet services between LANs or other network-enabled devices over a single twisted-pair cable. When you order the data/voice or data-only models, you get two boxes: one is configured as the customer premise line driver, the other as the service provider line driver.

These variable-rate standalone line drivers let you select various asymmetrical and symmetrical rates to satisfy a broad range of applications. Typical uses in symmetrical mode include videoconferencing, interactive video, and telecommuting. Asymmetrical mode is used primarily for delivering Internet service to residential customers.

Both models operate over a twisted-pair phone cable you already have installed, so you won't have to recable with CAT5e or fiber cable.

The drivers are easy to install, too. Simply plug and play, and use the handy DIP switches to select mode and speed.

The data/voice model (ME0010A-VDSL) features a built-in POTS/ISDN splitter and line-sharing capabilities that allow for simultaneous use of voice and data services. This means that end users can download files from the Internet, surf the Web, and answer email messages while talking on the phone or faxing documents.

The data-only model (ME0011A-VDSL) is ideal for transferring data at high speeds. Choose this model when you don't need to have a voice connection to your DSL line.

The line drivers must be used in pairs and require one unit for the local site (or service provider) and one unit for the remote site (customer premise) for proper operation. If you have a data/voice model at one end of the link, you must use another data/voice model at the other end of the link. Or you can use a pair of data-only models. You cannot mix data/voice and data-only models in one link.

If you want to take your network and voice connections farther and faster over existing copper *and* eliminate the expense of fiber, choose the VDSL Line Drivers.

Send super-fast data/voice signals over ordinary twisted-pair phone wire.
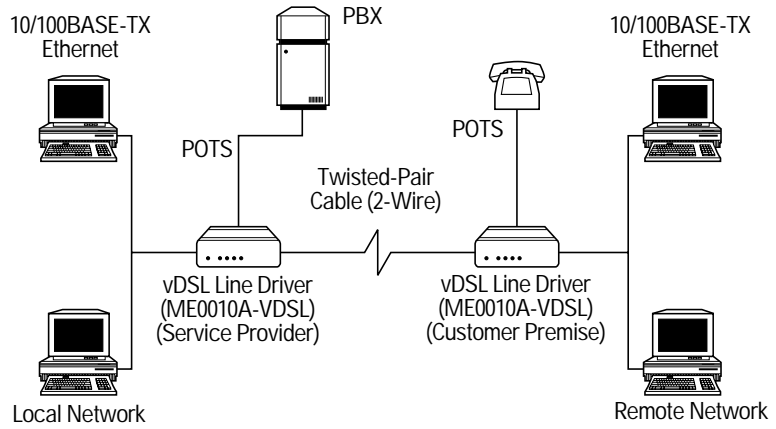
Specifications

Clocking: Internal, external, or receive recover

Indicators: (5) LEDs: (1) Power; VDSL: (1) Link, (1) Error; Ethernet: (1) Link, (1) Activity

Connectors: ME0010A-VDSL: (1) shielded RJ-45, (2) RJ-45, (2) screw terminals; ME0011A-VDSL: (1) shielded RJ-45, (1) RJ-45, (2) screw terminals; Power (both models): (1) IEC-320

Interfaces: Ethernet: 10/100BASE-T, Phone: 2-wire

Speed/Distance: See charts below

Operation: Ethernet: Full duplex or half-duplex

Power: External, 120/250 VAC, 50/60 Hz, universal, autosensing

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

Weight: 2.2 lb. (1 kg)

Speed/Distance for VDSL—Asymmetric

Line Rates		Distance*
Upstream	Downstream	
1.56 Mbps	4.17 Mbps	6000 ft. (1828.8 m)
1.56 Mbps	9.38 Mbps	5500 ft. (1676.4 m)
2.34 Mbps	16.67 Mbps	5000 ft. (1524 m)

Speed/Distance for VDSL—Symmetric

Line Rates		Distance*
Upstream	Downstream	
6.25 Mbps	6.25 Mbps	4500 ft. (1371.6 m)
9.38 Mbps	9.38 Mbps	4150 ft. (1264.9 m)
12.50 Mbps	12.50 Mbps	4000 ft. (1219.2 m)
16.67 Mbps	16.67 Mbps	3300 ft. (1005.8 m)

*The charts above apply both line-driver models. Although the maximum distance for VDSL listed on **page 2** of this FaxBack is 4000 ft. (1200 m) at 16 Mbps upstream and 52 Mbps downstream speeds, these line drivers can support distances up to 6000 ft. (1828.8 m) at slower speeds. The speeds of these products are high, but they do not support the exceptionally fast speeds listed in the general VDSL overview on **page 2**.

FYI

The vDSL Line Drivers conform to the VDSL specification, but the lower-case "v" is used by the manufacturer of the Line Drivers instead of the commonly-known capital "V" in VDSL.
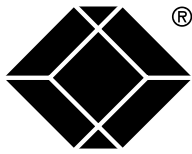
These products do not require you to order DSL service from the phone company. Instead, they use DSL technology over your existing installed phone lines.

Ordering Information

ITEM	CODE
vDSL Line Drivers	
Data/Voice	ME0010A-VDSL
Data Only	ME0011A-VDSL

NOTE: When you order, you get two boxes: one labeled Customer Premise and one labeled Service Provider.
<u>*You might also need…*</u>
CAT5 100-MHz Patch Cables, 24 AWG, RJ-45, 4-Pair, PVC, T568B, Straight-Pinned.................EVNSL07
CAT5 100-MHz Bulk Cables, 24 AWG, 2-Pair, Beige, PVC..EYN717A
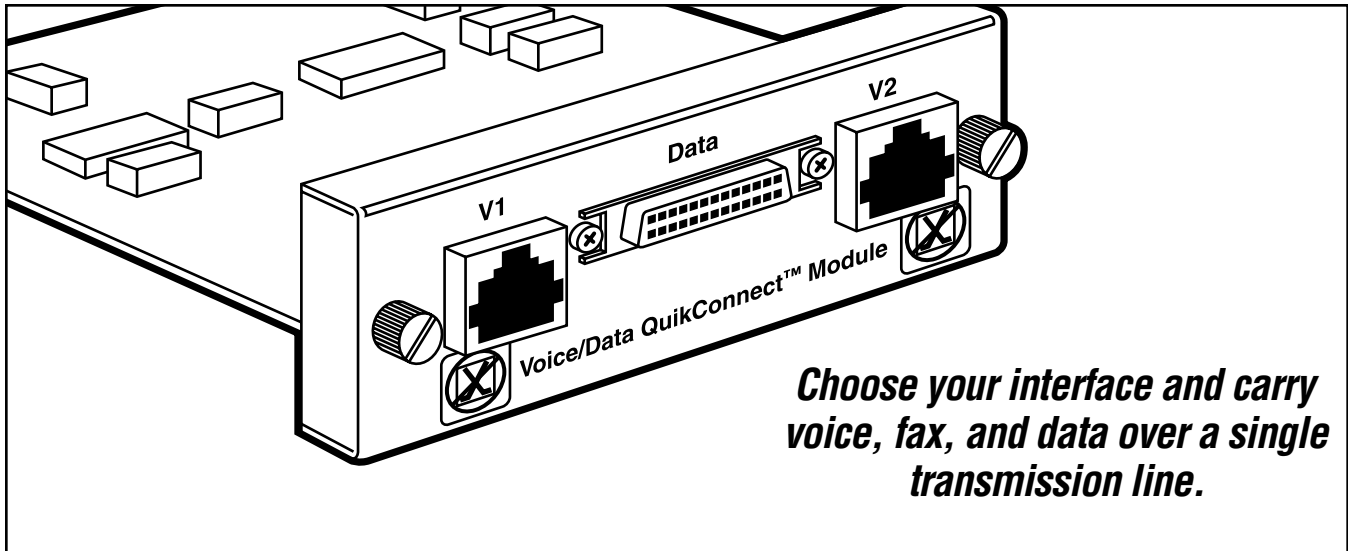
Black Box offers the best warranty program in the industry—Fido Protection®. For more information, request **FaxBack 22512**.

INTERFACE CARDS WITH VOICE SUPPORT

Choose your interface and carry voice, fax, and data over a single transmission line.

Key Features

▶ *Easily change the interface to match a specific application.*

▶ *Voice, fax, and data traffic are carried over one transmission circuit using a single twisted-pair wire.*

▶ *Two RJ-11 voice/fax ports support FXS, FXO, and G3 fax while using just 64 kbps of bandwidth.*

▶ *Configure the universal data port for V.35, X.21/RS-422, RS-485, or RS-232 interfaces.*

Modular Line Drivers provide flexibility for your single DSL connections. Simply insert your choice of interface cards into the driver. A new type of card, the Interface Card with Voice Support (ME481C-FXS or ME481C-FXO), allows voice, fax, and data traffic to be carried over a single transmission line. Inserted in the Modular Line Driver, the card combines voice, data, and fax traffic onto a typical 2- or 4-wire circuit at speeds up to 128 kbps at distances of up to 5.8 mi. (9.3 km) or up to 2.304 Mbps at distances up to 3 mi. (4.8 km).

This card provides two RJ-11 voice/fax ports and a universal data port that you can configure for your choice of interface including V.35, X.21/RS-422, RS-485, or RS-232. To configure, simply set the DIP switches on the card for the desired interface.

Then connect one end of an adapter cable to the card's HD26 connector and the other end to your V.35, X.21/RS-422, RS-485, or RS-232 device.

The RJ-11 voice/fax ports on the card support Foreign Exchange Service (FXS), Foreign Exchange Office (FXO), and Group 3 (G3) fax and use just 64 kbps of bandwidth.

The drivers must be used in pairs. To connect a phone at one end of the link to a phone at the other end, use two FXS boxes. To connect a phone to a PBX, use one FXS and one FXO box.

In small office/home office (SOHO) environments, the Modular Line Driver (with the interface card inside) can be connected to a low-cost router to combine Internet/Intranet LAN traffic with voice and fax across one circuit.

A typical application might include using a pair of cards installed in Modular Line Drivers to connect a telephone and fax machine in a remote branch office to a PBX in the head office. Serial data traffic will share the same two-wire interface.

The maximum speed of the interface depends on the type of DSL your equipment uses. The Interface Card with Voice Support works with IDSL, HDSL, and MSDSL devices. The maximum distance it can span depends on the gauge of the twisted-pair wire and the type of DSL you are using. For example, using MSDSL technology over 24 AWG wire, the card can support a distance of up to 5.8 mi. (9.3 km) at 128 kbps. For more speed/distance specifications, see the chart on **page 6**.

Specifications

Connectors: (2) RJ-11, (1) HD26 female

Speed/Distance: See the chart below

Operation: DSL: Synchronous, 2-wire

Interfaces: DSL: 2-wire; Data port: V.35, X.21/RS-422, RS-485, or RS-232

Power: From the unit the card plugs into

Size: 2.9"H x 3.2"L (7.4 x 8.1 cm)

Weight: 0.4 lb. (0.2 kg)

Speed/Distance

Type of DSL	DTE Speed**	Maximum Distance on 24 AWG Wire*
IDSL	64 kbps/128 kbps	5 mi. (8 km)
HDSL	n x 64 kbps	4.6 mi. (7.4 km) at 128 kbps
	Up to 1.152 Mbps	2.8 mi. (4.5 km) at 1.152 Mbps
MSDSL	n x 64 kbps	5.8 mi. (9.3 km) at 128 kbps
	Up to 2.304 Mbps	3 mi. (4.8 km) at 2.304 Mbps

*Although the maximum distances for IDSL, HDSL, and MSDSL listed on **page 2** are different than those shown in this chart, the line drivers can achieve longer distances at lower speeds. For details, call Tech Support.

**IDSL can only operate at two speeds: 64 and 128 kbps. HDSL and MSDSL can operate in increments of 64 kbps (n is the number of increments) up to 1.152 or 2.304 Mbps.

The Black Box Interface Cards with Voice Support offer the DTE speeds listed in the chart above, *not* the DTE speeds listed for IDSL, HDSL, and MSDSL in the general overview for DSL on **page 2**.

Compatible Line Drivers

Refer to **page 2** of this FaxBack for a DSL overview, which lists the features of each xDSL technology.

These products do *not* require you to order DSL service from the phone company. Instead, they use DSL technology over your existing installed phone lines.

• For MSDSL technology, use the ME0008A-MCAMP or ME0008A-MCAMP-48. Both drivers attain speeds of 2.304 Mbps. The ME0008A-MCAMP requires 110 to 240 VAC power, and the ME0008A-MCAMP-48 uses 48 VDC. For more information, request FaxBacks 25845 and 25852.

• For MSDSL technology at E1 speeds (64 kbps to 2.048 Mbps), choose the ME0008A-ME1 or ME0008A-ME1-48. The ME0008A-ME1 requires 110 to 240 VAC power, and the ME0008A-ME1-48 uses 48 VDC. For more information, request FaxBacks 25845 and 25852.

• For MSDSL technology at T1 speeds (64 kbps to 1.536 Mbps), select the ME0008A-MT1 or ME0008A-MT1-48. The ME0008A-MT1 requires 110 to 240 VAC power, and the ME0008A-MT1-48 uses 48 VDC. For more information, request FaxBacks 25845 and 25852.

• For HDSL technology, use the ME0007A-HDSL. It provides fractional T1 speeds and uses 110 to 240 VAC power. For more information, request FaxBacks 25845 and 25852.

• For IDSL technology, use the ME0009A-IDSL or ME0009A-IDSL-48. Both drivers attain speeds of 128 kbps sync or 38.4 kbps async. The ME0009A-IDSL uses 110 to 240 VAC power, and the ME0009A-IDSL-48 requires 48 VDC. For more information, request FaxBacks 25845 and 25852.

• For VDSL technology, choose the ME0010A-VDSL for data/voice connections, or the ME0011A-VDSL for data-only connections. See **pages 2–3** of this FaxBack for more details.

• For fiber connections, choose the ME620A or ME621A. The ME620A reaches speeds up to 256 kbps, and the ME621A runs at speeds up to 128 kbps. Both models have ST connectors.

You might also need

Adapter Cables

• HD26 Male to DB25 Male, RS-232 (EHN092-232M)

• HD26 Male to DB25 Female, RS-232 (EHN092-232F)

• HD26 Male to DB25 Male, RS-530 (EHN092-530M)

• HD26 Male to DB25 Female, RS-530 (EHN092-530F)

• HD26 Male to M/34 Male, V.35 (EHN092-V35M)

• HD26 Male to M/34 Female, V.35 (EHN092-V35F)

Ordering Information

ITEM	CODE
Interface Cards with Voice Support	
FXO	ME481C-FXO
FXS	ME481C-FXS

Black Box offers the best warranty program in the industry—Fido Protection®. For more information, request **FaxBack 22512**.