DSL
MODEM

installation guide

DSL Modem Installation Guide, Issue 2
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Copyright Notice

Safety Information

Safety Warnings

Potentially hazardous voltages exist within this unit. Always observe standard safety precautions during installation, operation, and maintenance of this product. There are no user provisionable options.

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

UL Installation Safety Instructions

This device is UL listed. Follow these instructions.

- Never install telephone wiring during a lightning storm.

- Never install telephone jacks in a wet location unless the jack is specifically designed for wet locations.

- Never touch the telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- Use caution when installing or modifying telephone lines.

Table of Contents

1 Introduction

Congratulations on your purchase of a Digital Subscriber Line (DSL) modem. The DSL Modem is part of a system that provides an integrated end-to-end solution for data connectivity, multimedia services, and high-speed Internet access services using an asymmetrical digital subscriber line (ADSL) transmission over your current telephone wiring. With ADSL technology, information can be processed at speeds up to 250 times faster than today's analog modems.

1.1 ADSL Technology

As the interest in telecommuting and the Internet grows, the search for methods of delivering larger amounts of data over the existing copper telephone wire increases. ADSL technology is one method of delivery.

ADSL technology uses advanced digital modulation to transmit data at high speeds over standard telephone wiring. This technology can download data at 8 Mbps and upload data at up to 768 kb/s.

The DSL Modem is part of a system that enables Internet service providers and local telephone companies to offer high-speed Internet access, virtual private networks (VPNs), telecommuting, video on demand, and other broadband services.

To benefit from the high-speed transmission rate of ADSL over your existing telephone wire, your phone line and your computer must be separated. Each DSL line must be wired through a special filter called a splitter. While both the DSL Modem and the telephone share a telephone line to the customer premises, the signals are separated at the splitter, providing an isolated path to the individual wiring, jacks, and other telecommunications hardware. This splitter is installed by the telephone service provider.

With the use of a DSL Modem, splitter, and your existing telephone line, you can use the telephone and download data onto your computer at the same time. The DSL Modem splitter is completely passive, providing "lifeline" or continuous, telephone service even if the power fails. The DSL Modem encodes the data sent from your PC to a corresponding DSL Modem, located at your local telephone company.

1.2 Unpacking Instructions

Before unpacking, make a preliminary inspection of the shipping box. Any evidence of damage should be noted and reported immediately to the customer support center.

> **Note:** *The customer support information can be found in the product information packet provided by your phone company.*

It is recommended that you unpack the equipment on a clean, flat surface.

1. Place the shipping box upright. Cut the sealing tape and then open the flaps.

2. Take out the items in the box. Search the box for any additional small items that may be present.

3. Inspect the product for damage and verify that all parts are included.

4. Report any damage or missing parts to the customer support center. Keep the shipping boxes and packing materials for reuse.

1.3 DSL Modem Package Contents
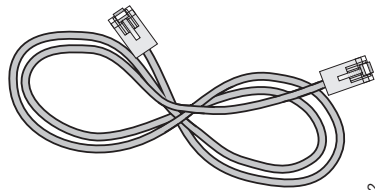
The DSL Modem package contains:

- DSL Modem
- Ethernet (or null) crossover cable
- ASDL cable (straight)
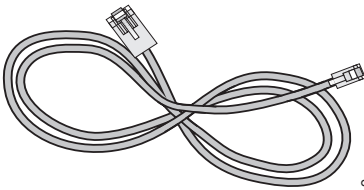- Power supply convertor

Part # FC9660RA12

m0437.2

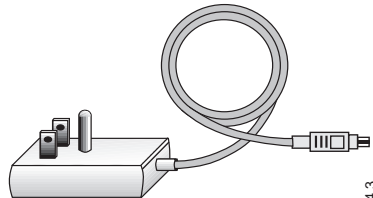**DSL Modem**

Part # FC9660CB23

m0487.2

Ethernet Crossover Cable

Part # FC9660CB22

m0488.2

ADSL Cable (Straight)

Part # FC9660PS11

m0494.3

Power Supply Convertor

2   Installing the DSL Modem

2.1 Mounting the DSL Modem

The DSL Modem can be installed on desktops, shelves or mounted on walls. The wall mounting requires two wall anchors (not included). The feet located on the bottom of the modem are used to hang the unit on the wall anchors.

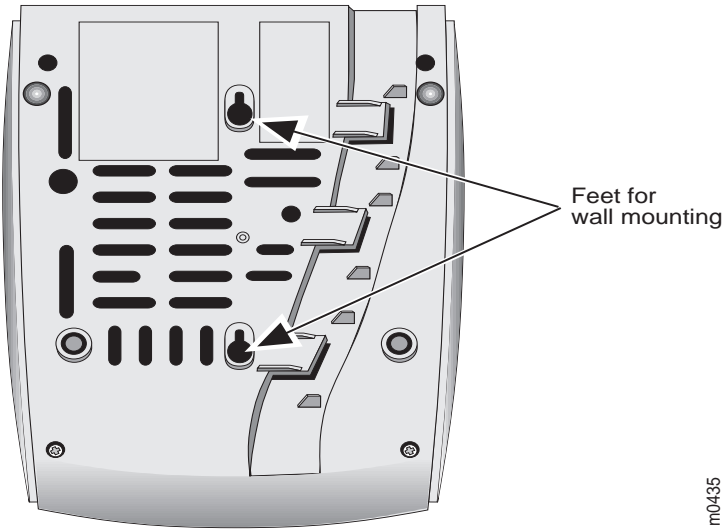Figure 2-1 shows a diagram of how to mount the DSL Modem.

Feet for
wall mounting

m0435

Figure 2-1: DSL Modem Mounting Holes

2.2 DSL Modem Front Panel Description

Figure 2-2 depicts the DSL Modem.

Figure 2-2: DSL Modem

The following table describes the lights on the front panel of the DSL Modem.

Modem Lights	Description
POWER	Indicates if power is applied to the modem.
MODEM	Indicates a valid link with the phone company's equipment.
DATA	Indicates if the ADSL rate is operating at efficient capacity.

2.3 DSL Modem Rear Panel Description

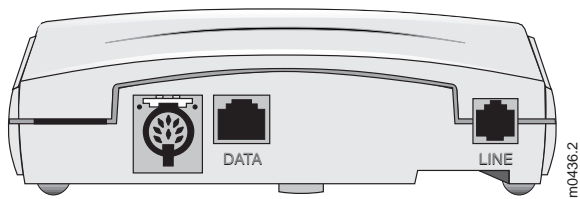Figure 2-3 depicts the rear panel of the DSL Modem.

Figure 2-3: DSL Modem Rear Panel

The following table describes the functions of the items located on the rear panel.

Connector	Description
Power	Multi-pin outlet for connection of the power supply wall transformer. This cable is supplied in the DSL Modem package.
DATA	RJ-45 connector for the Ethernet crossover cable. This cable is supplied in the DSL Modem package.
LINE	RJ-11 and RJ-45 connector for a connection to the RJ-45 wall plate using the ADSL cable (straight). This cable is supplied in the DSL Modem package.

3 Connecting the DSL Modem to the Splitter

3.1 Overview

Note: *The procedures in Section 3 only apply to those customers who choose to wire their own splitter-to-modem connection. If a certified technican is performing the wiring, then proceed to Section 4 Turn-Up and Operation.*

The network interface device (NID) is typically located on the outside of the customer premises. Certain installations, such as those at an apartment complex, require the splitter to be installed closer to the DSL Modem. The telephone or ADSL service provider also installs this type of splitter.

Note: *The telephone service provider will install a splitter in the network interface device (NID) to separate the voice and data interior wire paths.*

Before connecting the wires from the NID to the DSL Modem, verify that the inside wire pair serving the DSL Modem has an isolated path from the NID to the modem. Do not connect a telephone to the same wire pair. In some instances, it may be necessary to reroute the inside wire away from noise sources such as appliances, fluorescent lighting, televisions, light dimmers, and other electrical noise sources. It is recommended that the modem has dedicated inside wiring.

For the DSL Modem, you will only need to connect the wires associated with data output on the NID. The telephone company technician has already connected the voice (or telephone) wiring. The data module provides a connection point for the inside wire pair serving the DSL Modem.

Note: *Category 3 (CAT 3) or Category 5 (CAT 5) twisted-pair wire is recommended.*

For inside wiring procedures see Section 3.2 before you start.

3.2 Inside Wiring Procedures

⚠️ **WARNING:**

Interior home wire is the homeowner responsibility. The following wiring diagrams represent a standard wiring scheme. Not all homes will follow this convention. Standard telephone company inside wire coverage options will not cover the cost to repair voice path problems that may arise as a result of homeowner wiring attempts. These repairs may be billed to homeowner as regular time and materials repair charges. It is recommended that all ADSL inside wiring be performed by a certified technician.

If you are using original inside wire, then see the section Spare Inside Wire. If you are using new inside wire cable (CAT 3 or CAT 5) for the data, then see the section New Inside Wire.

See Figure 3-1 for a diagram of the NID data and voice outputs.

Note: From the NID, open the latch door to the data module. You will see four colored screws. Note the coloring of the wire that is connected to the green and red screws. For this installation, you will only need to connect the wires associated with the data output. The telephone company technician has already connected the voice wiring.
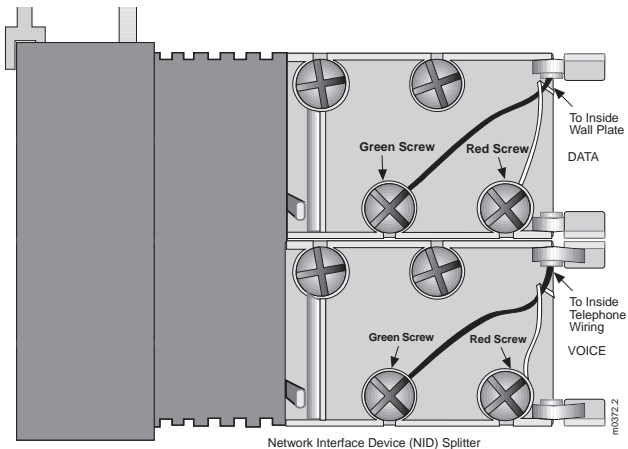

Figure 3-1: Network Interface Device (NID) Splitter

Spare Inside Wire

Note: The following wiring procedure and diagram represents a standard wiring scheme. Not all homes will follow this convention. It is recommended that ADSL inside wiring be performed by a certified technician.

1. If you are using the original inside wire cable pair for the telephone (voice), replace the existing RJ-11 wall plate with an RJ-11/RJ-45 wall plate.

Note: ISDN Users–If you previously had ISDN, you can use the existing ISDN wired RJ-45 jack.

2. If you are using spare inside wire pair for the DSL Modem (data), install a new RJ-11/RJ-45 wall plate.

3. Connect the wires attached to the green and red screws on the NID to the green and red pins on the wall jack. For example, if a black wire is connected to the green screw in the data latch, connect the same black wire to the green pin of the new wall jack. Repeat this step for the voice wire.

4. Connect the RJ-45 end of the ADSL cable (straight) to the RJ-45 jack on the wall plate. Connect the RJ-11 end of the ADSL cable (straight) to the LINE connector on the modem. The LINE connection is located on the back panel of the DSL Modem. The ADSL cable (straight) is included in the DSL Modem package.

5. Connect your telephone set to the RJ-11 jack on the wall plate.

6. Connect one end of the Ethernet crossover cable to the DATA connector on the modem. Connect the other end of the Ethernet crossover cable to the network interface card in the computer. The DATA connection is located on the back panel of the DSL Modem. The Ethernet crossover cable is included in the DSL Modem package.

Note: The Ethernet cable provided is a crossed cable and must be used when connecting the DSL Modem directly to the network interface card in the computer.

Figure 3-2 is a diagram for using spare inside wire. The numbers circled in the diagram correlate to the steps in the Spare Inside Wire procedure.
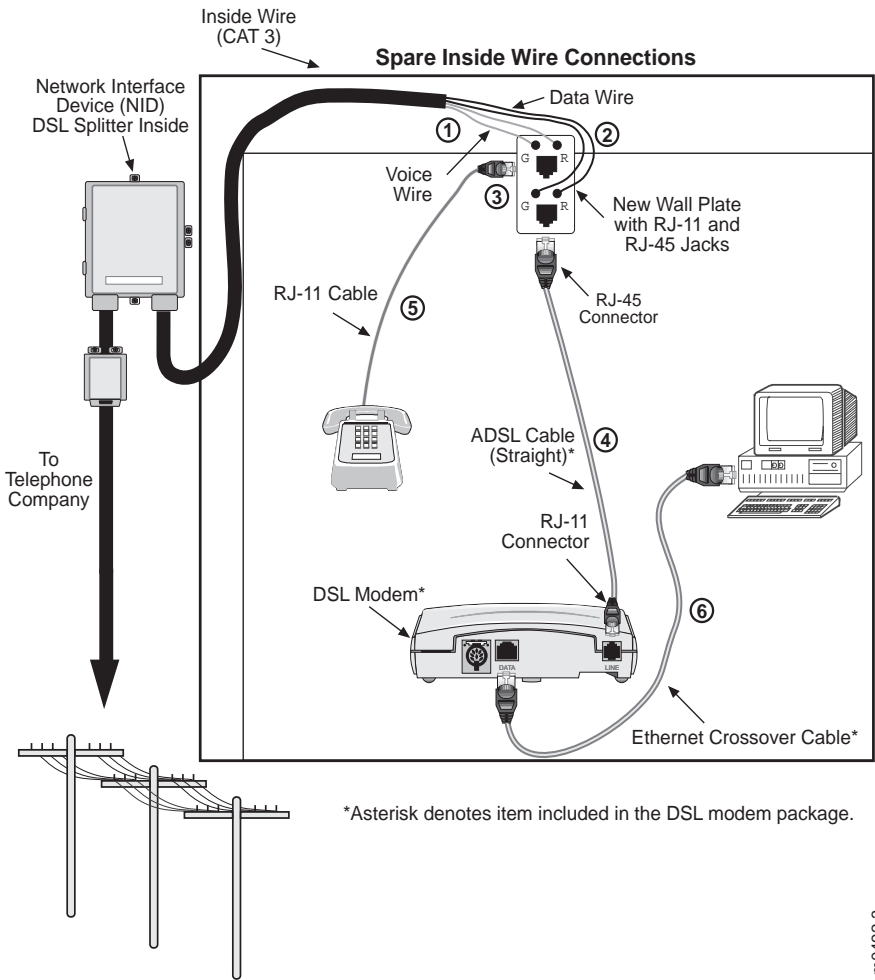

Figure 3-2: Spare Inside Wire Interconnection

New Inside Wire

Note: The following wiring procedure and diagram represents a standard wiring scheme. Not all homes will follow this convention. It is recommended that ADSL inside wiring be performed by a certified technician.

1. If you are using original inside wire cable pair for the telephone (voice), then you can replace the existing RJ-11 wall plate with an RJ-11/RJ-45 wall plate or install a new separate RJ-45 wall plate. Run the original wire only if you are able to run new inside wire to this location.

    Note: ISDN Users–If you previously had ISDN, you can use the existing ISDN wired RJ-45 jack.

2. Run new inside wire cable for ADSL (data) if no existing inside wire pairs are available. Wire the new inside wire pairs to the new RJ-11/RJ-45 wall plate (if installed). Otherwise, install a new RJ-45 wall plate near your PC.

3. Connect the wires attached to the data/voice green and red screws on the NID to the green and red pins on the wall jack. For example, if a black wire is connected to the green screw on the data, connect the same black wire to the green pin on the new RJ-45 wall jack.

4. Repeat Step 3 for the voice wiring.

5. Connect the RJ-45 end of the ADSL cable (straight) to the RJ-45 jack on the wall plate. Connect the RJ-11 end of the ADSL cable (straight) to the LINE connector on the modem. The LINE connection is located on the back panel of the DSL Modem. The ADSL cable (straight) is included in the DSL Modem package.

6. Connect your telephone set to the RJ-11 jack on the wall plate.

7. Connect one end of the Ethernet crossover cable to the DATA connector on the modem. Connect the other end of the Ethernet crossover cable to the network interface card in the computer. The DATA connection is located on the back panel of the DSL Modem. The Ethernet crossover cable is included in the DSL Modem package.

Note: *The ethernet cable provided is a crossed cable and must be used when connecting the DSL Modem directly to the network interface card in the computer.*

A diagram for using new wire is shown in Figure 3-3. The numbers circled in the diagram correlate to the steps in the procedure.
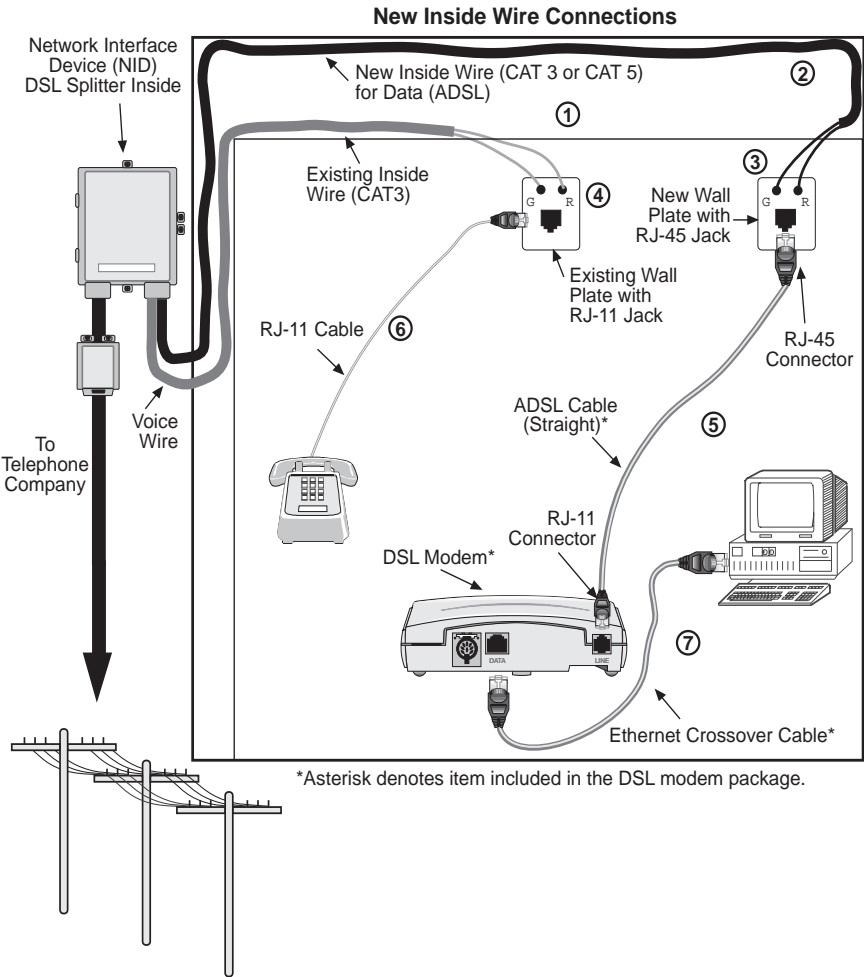

Figure 3-3: New Inside Wire Connections

3.3 Multiple PCs Wiring Procedure

Figure 3-4 shows an example of a residential, small office/home office (SOHO), or small business customer using the ADSL to achieve high-speed access to the Internet. A multiport Ethernet hub is connected to the DSL Modem. The hub allows multiple PCs to share bandwidth to and from the DSL Modem. The Ethernet cable (straight) shown in Figure 3-4 is not included in the DSL Modem package. The wiring procedure for multiple PCs is similar to the procedure for Spare Inside Wire and New Inside Wire.

Note: An Ethernet cable (straight) must be used whenever connecting the DSL Modem to a hubbing device.
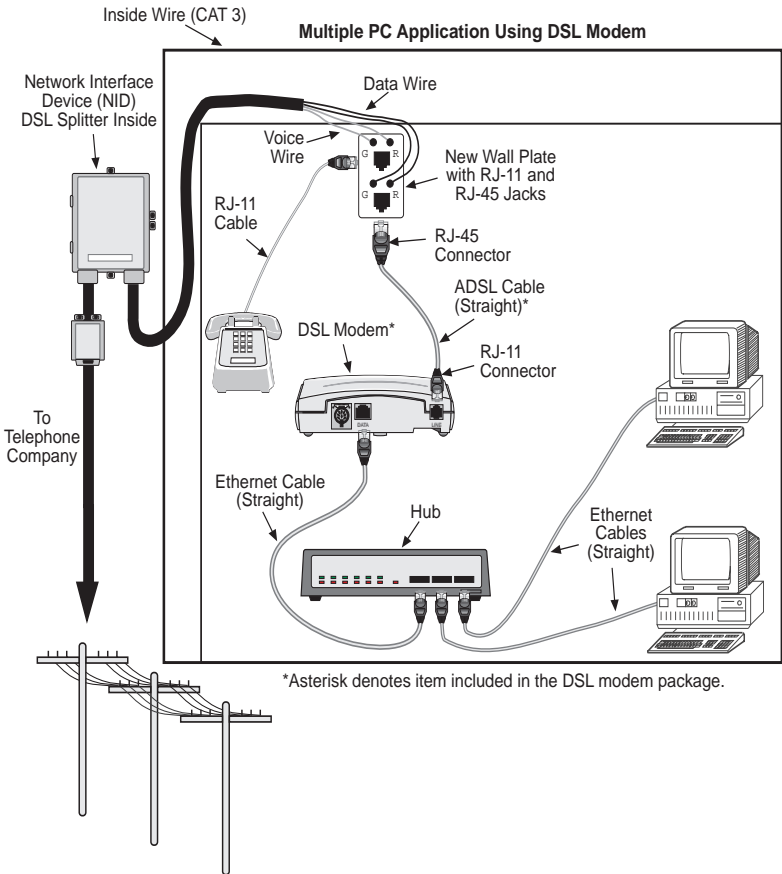

Figure 3-4: Multi-User High-Speed Internet Access

4   Turn-Up and Operation

4.1 Connecting the Power Supply Convertor

The protective ground connection to the DSL Modem must always be made via the power supply convertor. To turn on the DSL Modem, insert the power supply convertor into the Power connection and then plug the power supply into a powered 120 vac wall outlet. The Power connection is located on the back panel of the DSL Modem. The Power Supply Convertor is included in the DSL Modem package.

4.2 Starting the Modem

Once the modem has power, it will then perform several self-tests. The POWER, MODEM, and DATA lights are on.

> **Note:** If the POWER light is blinking, this indicates a failure has been detected during the self-test. Contact the customer support center.

When the ADSL link between the DSL Modem and the telephone company is established, the telephone company checks the software version against the DSL Modem. When this is happening, the POWER light is on and the MODEM light blinks.

If the software versions are incompatible, the DSL Modem will automatically receive a software upgrade of the appropriate version. During a software upgrade, the POWER light stays on and the DATA and MODEM lights blink. The software upgrade is complete and the modem is operating at efficient capacity when the POWER, MODEM, and DATA lights are on.

To determine what the operating speed is on the modem, use the follow guidelines.

- If the POWER and MODEM lights are on and the DATA light is blinking, then the modem is connected and communicating with the phone company, but is operating at a reduced speed.

- If the POWER, MODEM, and DATA lights are on, then the modem is connected and communicating with the phone company, and is operating at full speed.

Figure 4-1 lists the light definitions for turn-up. The modem should initialize in the sequence described in flow chart.
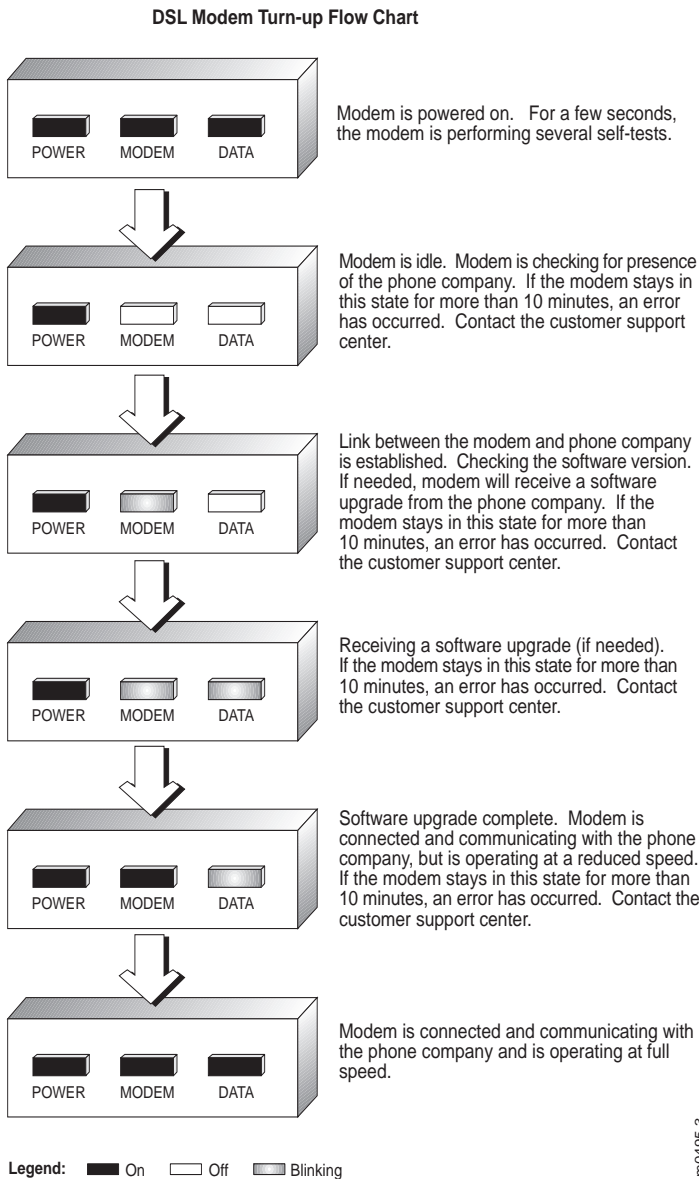
DSL Modem Turn-up Flow Chart

Modem is powered on. For a few seconds, the modem is performing several self-tests.

Modem is idle. Modem is checking for presence of the phone company. If the modem stays in this state for more than 10 minutes, an error has occurred. Contact the customer support center.

Link between the modem and phone company is established. Checking the software version. If needed, modem will receive a software upgrade from the phone company. If the modem stays in this state for more than 10 minutes, an error has occurred. Contact the customer support center.

Receiving a software upgrade (if needed). If the modem stays in this state for more than 10 minutes, an error has occurred. Contact the customer support center.

Software upgrade complete. Modem is connected and communicating with the phone company, but is operating at a reduced speed. If the modem stays in this state for more than 10 minutes, an error has occurred. Contact the customer support center.

Modem is connected and communicating with the phone company and is operating at full speed.

Legend: ■ On □ Off ▨ Blinking

m0495.3

Figure 4-1: Turn-Up Flow Chart