



This manual covers 3Com U.S. Robotics® faxmodems.

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3800 Golf Rd.
Rolling Meadows, IL 60008

* **IMPORTANT!** In accordance with the ITU-T standard for 56K transmissions (V.90), U.S. Robotics 56 Kbps modems are capable of 56 Kbps downloads. However, due to FCC rules which restrict power output of service providers, current download speeds are limited to 53 Kbps. Actual speeds may vary due to line conditions and other factors. Uploads from users to server equipment travel at speeds up to 31.2 Kbps. An analog phone line compatible with the V.90 standard or x2 technology and an Internet provider or corporate host site compatible with the V.90 standard or x2 technology are necessary for these high-speed downloads. See **www.3Com.com/56k** for details.

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56K FAXMODEM PRODUCT FEATURES

Modulation Schemes

ITU-T V.90
x2™ technology
ITU-T V.34+
ITU-T V.34
ITU-T V.32bis
ITU-T V.32
ITU-T V.22bis
ITU-T V.22
ITU-T V.23
Bell 212A
ITU-T V.21
Bell 103

Error Control and Data Compression Schemes

ITU-T V.42
ITU-T V.42bis
MNP 2-5

Fax Modulation Schemes

ITU-T V.17
ITU-T V.29
ITU-T V.27ter
ITU-T V.21

Fax Standards

EIA 578 Class 1 FAX
EIA 592 Class 2.0 FAX

Front Channel Link Rates

28000, 29333, 30666, 32000,
33333, 34666, 36000, 37333,
38666, 40000, 41333, 42666,
44000, 45333, 46666, 48000,
49333, 50666, 52000, 53333,
54666, 56000, 57333

Back Channel Link Rates

4800, 7200, 9600, 12000,
14400, 16800, 19200, 21600,
24000, 26400, 28800, 31200
33600

V.34+ Link Rates

4800, 7200, 9600, 12000,
14400, 16800, 19200, 21600,
24000, 26400, 28800, 31200,
33600

V.32bis Link Rates

4800, 7200, 9600, 12000,
14400

Additional Link Rates

300, 1200/75 (V.23), 1200,
2400

Fax Link Rates

2400, 4800, 7200, 9600,
12000, 14400

DTE Rates

300, 1200, 2400, 9600, 19200,
38400, 57600, 115200, 230400*

* The 230400 DTE rate is supported by
the 56K internal faxmodem only.

SOFTWARE INSTALLATION

Windows-based Systems:

Running the Setup Wizard

The instructions for installing your *Connections*[™] CD-ROM software are on the installation map included in your modem's box. If you have not completed this portion of your install, you should do so now.

Using Connections Software

Once installation is complete, you can use the *Connections* CD at any time by following these steps:

- Insert the *Connections* CD into your CD-ROM drive.
- If the CD is already in your drive, take it out and reinsert it.

- If you have disabled AutoPlay, click **Start**, point to **Programs**, point to **3Com U.S. Robotics**, and click **Connections**.

Installing the RapidComm[™] Software



NOTE: If you have an older version of RapidComm software on your system, uninstall it before continuing. To start the uninstall, double-click the **Add/Remove Programs** icon in the Control Panel. This will erase any faxes you have in your inbox. If you need to save them, copy them to a new directory.

SOFTWARE INSTALLATION

The *Connections* CD contains the
RapidComm communications software.
RapidComm is used with the standard

SOFTWARE INSTALLATION

modems; RapidComm Voice is used with modems with voice functionality.

Once you have installed the *Connections* program group, you can install the RapidComm software. (The Setup Wizard does not install RapidComm.)

Follow these instructions to install RapidComm:

1. Start the *Connections* CD (follow the instructions in the section “Using *Connections* Software” on page 2-1).
2. On the main *Connections* menu, click **Software**.
3. Click the **Communications** button.
4. Click the **RapidComm** (if you have a regular faxmodem) or **RapidComm Voice** (if you have a voice faxmodem) button.
5. Follow the on-screen instructions to finish the installation.



NOTE: The CD also contains an electronic user manual for RapidComm and RapidComm Voice.

Congratulations—you are now ready to start using your U.S. Robotics modem!

Macintosh Computers:

Running the Setup Wizard

The instructions for installing your *Connections*™ CD-ROM software are on the installation map included in your modem's box. If you have not completed this portion of your install, you should do so now.

Using Connections Software

Once installation is complete, you can use the *Connections* CD at any time by following these steps:

- Insert the *Connections* CD into your CD-ROM drive.
- Double-click the *Connections* icon on your desktop.

- Double-click the *Connections* icon in the *Connections* folder.

Installing the RapidComm™ Software



NOTE: If you have a version of MacComCenter or any other communications software on your system, read your manual for instructions to uninstall it before continuing. This will erase any faxes you have in your inbox. If you need to save them, copy them to a new folder.

The *Connections* CD contains the RapidComm communications software. RapidComm is used with the standard

SOFTWARE INSTALLATION

modems; RapidComm Voice is used with modems with voice functionality.

Once you have installed *Connections*, you can install the RapidComm software. (The Setup Wizard does not install RapidComm.)

Follow these instructions to install RapidComm:

1. Start the *Connections* CD (follow the instructions in the section “Using *Connections* Software” on page 2-3).
2. On the main *Connections* menu, click **Software**.
3. Click the **Communications** button.
4. Click the **RapidComm** (if you have a regular faxmodem) or **RapidComm Voice** (if you have a voice faxmodem) button.

5. Click **Install Software**.
6. Follow the on-screen instructions to finish the installation.



NOTE: The CD also contains an electronic user manual for RapidComm and RapidComm Voice.

Congratulations—you are now ready to start using your U.S. Robotics modem!

SPEAKERPHONE FEATURES (EXTERNAL VOICE SPEAKERPHONE MODEMS ONLY)

Making a Speakerphone Call with a Telephone

1. Make sure your telephone is plugged into the modem's PHONE jack.
2. Lift the telephone's handset.
3. Dial the phone number.
4. When the person on the other end answers, press the SPEAKER button (on top of the modem).
5. Hang up the handset.
6. To end the call, press the SPEAKER button again.

Making a Speakerphone Call with Communications Software

1. Dial the telephone number using your communications software.
2. To end the call, hang up using your software (see the software's Help file for more information).

Answering an Incoming Call

When you hear your phone ring, press the SPEAKER button. (If you do not hear your phone ring, you may not have the telephone's cord plugged into the modem's

SPEAKERPHONE FEATURES (EXTERNAL VOICE SPEAKERPHONE MODEMS ONLY)

PHONE jack. If you are using your communications software to dial speakerphone calls, the software needs to be running in order for you to hear incoming calls.)

Disabling the Speaker Feature

If you want to talk privately to a caller, you can use a phone handset instead of the speaker.

To disable the speaker for the entire call: Do not press the SPEAKER button when the call comes in. Simply lift the handset of the telephone connected to the modem's PHONE jack.

To disable the speaker during a call: Pick up the handset of the telephone

connected to the modem's PHONE jack. To use the speaker again, press the SPEAKER button and then hang up the handset.

Adjusting Speaker Volume

Press the up and down volume buttons on top of the modem (marked VOLUME).

Muting a Call

If you'd like to say something without the receiving party hearing you, you can press the MUTE button. When you mute a call, the ONLINE light will blink.

To turn off the mute feature, press MUTE again. (The ONLINE light will stop blinking and remain illuminated for the remainder of the call.)

MODEM UPDATE WIZARD

Windows-based Systems:

The *Connections*™ CD-ROM, which came with your modem, includes the U.S. Robotics Modem Update Wizard. This software is designed to quickly update your modem to the latest code.



NOTE: You can also obtain this software from our BBS (847 262 6000; log in as Modem Utility, and the setup file will be downloaded) or from our Web page (<http://www.usr.com/home/online>).

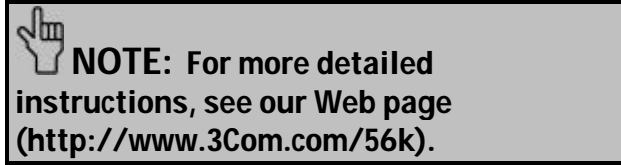
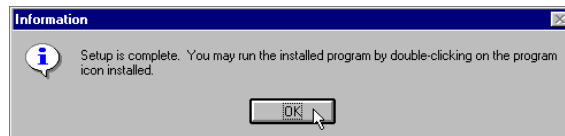


NOTE: Complete the instructions in the "Software Installation" chapter before installing the Modem Update Wizard.

Installing the Wizard

1. Insert the *Connections* CD into your CD-ROM drive.
2. The *Connections* interface will appear automatically in your Web browser.
3. Click **Customer Support**.
4. Click **Modem Software**.
5. Click the **Modem Update Wizard** button.
6. Click **Install Software**.
7. Follow the on-screen instructions to complete the installation.
8. When you see the screen below, the setup is complete. Click **OK**.

MODEM UPDATE WIZARD



Updating Your Modem

1. Click **Start**, point to **Programs**, and then point to **U.S. Robotics Modem Update Wizard**. Finally, click the **Modem Update Wizard** selection.
2. Follow the on-screen instructions to complete the update process.

MODEM UPDATE WIZARD

Macintosh Computers:

The *Connections*[™] CD-ROM, which came with your modem, includes the U.S. Robotics Modem Update Wizard. This software is designed to quickly update your modem to the latest code.



NOTE: You can also obtain this software from our BBS (847 262 6000); log in as Modem Utility, and the setup file will be downloaded) or from our Web page (<http://www.usr.com/home/online>).



NOTE: Complete the instructions in the "Software Installation" chapter before installing the Modem Update Wizard.

Installing the Wizard

9. Insert the *Connections* CD into your CD-ROM drive.
10. The *Connections* interface will appear automatically in your Web browser.
11. Click **Customer Support**.
12. Click **Modem Software**.
13. Click the **Modem Update Wizard** button.
14. Click **Install Software**.
15. Follow the on-screen instructions to complete the installation.
16. When you see a screen indicating that the setup is complete, click **OK**.

MODEM UPDATE WIZARD



NOTE: For more detailed instructions, see our Web page (<http://www.3Com.com/56k>).

Updating Your Modem

1. Double-click your **Hard Drive** icon.
2. Double-click the **Modem Update Wizard** folder.
3. Double-click the **Update Wizard** icon.
4. Follow the on-screen instructions to complete the update process.

UNINSTALLING A U.S. ROBOTICS MODEM



NOTE: These instructions only apply to U.S. Robotics modems. If the modem you'll be uninstalling was made by another manufacturer, refer to that modem's documentation for uninstall instructions.

To Uninstall

- A **Winmodem® Faxmodem**, see page 5-1.
- An **Internal Faxmodem**, see page 5-3.
- An **External Faxmodem**, see page 5-4.
- A **Faxmodem for Macintosh**, see page 5-5.

Uninstalling a Winmodem



CAUTION : To avoid the risk of electric shock, make sure your computer and all peripheral devices are turned off and unplugged.



1. First, remove the Winmodem software from the Windows operating system. From the **Start** menu, point to **Settings** and then click **Control Panel**.
2. Double-click the **System** icon.
3. Select **Device Manager**.
4. Double-click **Modems**.
5. Select **Winmodem**.
6. Click **Properties**.

UNINSTALLING A U.S. ROBOTICS MODEM



7. Choose the **Port Settings** tab and then click the **Uninstall** button.
8. Windows displays the following message: "Warning, you are about to remove this device from your system." Click **OK**. The Winmodem is now uninstalled from your system.
9. Next, verify that you completely uninstalled the Winmodem software. Click **Start**, point to **Settings** and select **Control Panel**.
10. Double-click the **System** icon and click the **Device Manager** tab. If you do not see a modem icon, you've successfully uninstalled your Winmodem software. If you do see an icon, repeat these instructions beginning with step 1.






CAUTION : To avoid the risk of electric shock, make sure your computer and all peripheral devices are turned off and unplugged.

11. Finally, physically remove the Winmodem from your computer. Start by removing the phone cords from the modem's TELCO (or ) and PHONE (or ) jacks. If the modem is a voice modem, remove any microphones or powered speakers attached to the modem.
12. Shut down Windows.
13. Turn off and unplug your computer and all peripherals.



UNINSTALLING A U.S. ROBOTICS MODEM

14. Remove the computer's cover. (If you do not know how, refer to your computer's documentation.)
15. Find the modem inside the computer. (It will be the green board with TELCO (or ) and PHONE (or ) stamped on its metal bracket.)
16. Remove the screw that attaches the modem's metal bracket to the computer.
17. Remove the modem from its slot.
18. Replace the computer's cover.

Uninstalling an Internal Faxmodem

1. First, remove the modem from the Windows operating system. From the **Start** menu, point to **Settings** and then click **Control Panel**.
 2. Double-click the **Modems** icon.
 3. Click to highlight the name of the modem you wish to remove.
 4. Click the **Remove** button.
-  **CAUTION : To avoid the risk of electric shock, make sure your computer and all peripheral devices are turned off and unplugged.**
5. Finally, physically remove the modem from your computer. Start by removing the phone cords from the modem's TELCO (or ) and PHONE (or ) jacks. If the modem is a voice modem, remove any microphones or powered speakers attached to the modem.
 6. Shut down Windows.



UNINSTALLING A U.S. ROBOTICS MODEM

7. Turn off and unplug your computer and all peripherals.
8. Remove the computer's cover. (If you do not know how, refer to the documentation for your computer.)
9. Find the modem inside the computer. (It will be the green board with TELCO (or ) and PHONE (or ) stamped on its metal bracket.)
10. Remove the screw that attaches the modem's metal bracket to the computer.
11. Remove the modem from its slot.
12. Replace the computer's cover.


Uninstalling an External Faxmodem

1. First remove the modem from the Windows operating system. From the

Start menu, point to **Settings** and then click **Control Panel**.

2. Double-click the **System** icon.
3. Click the **Device Manager** tab.
4. Double-click the **Modems** icon.
5. Click to highlight the name of the modem you wish to remove.
6. Click the **Remove** button.
7. Finally, physically remove the modem from your computer. Start by removing the phone cords from the modem's TELCO (or ) and PHONE (or ) jacks.
8. Shut down Windows.
9. Turn off and unplug your computer and all peripherals (including the modem).

UNINSTALLING A U.S. ROBOTICS MODEM

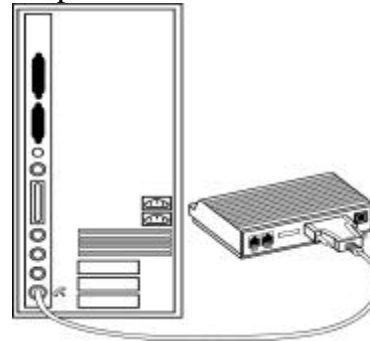
 **CAUTION :** To avoid the risk of electric shock, make sure your computer and all peripheral devices are turned off and unplugged.

10. Unplug the modem's power adapter from the outlet or power strip.
11. Unplug the modem's serial cable from the computer.

Uninstalling a Faxmodem for Macintosh

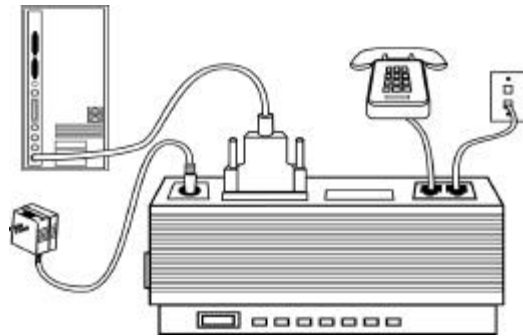
1. Turn off your computer.
2. Disconnect the power adapter from your modem and unplug it from the wall.
3. Detach the serial connecting cable from both the modem and the port on the

back of your computer marked with a telephone icon .



- 4.
5. Unplug the phone cord from the telephone jack of the modem (labeled with a wall plug icon on the bottom of the case) and the other end from the telephone jack.

UNINSTALLING A U.S. ROBOTICS MODEM



Once your modem is disconnected, you'll need to uninstall the RapidComm software. For more information on uninstalling the communications software included with your modem, see the RapidComm manual on your *Connections* CD.

TROUBLESHOOTING AND HELP RESOURCES

**When you try to connect to the Internet, you get the error
“modem not responding” or “modem in use.”**

Possible Solutions:

- If you have an external modem, make sure that power supply is plugged into the modem and into the electrical outlet, and make sure that the modem has been turned on.
- If you have an internal modem, check to make sure that the modem has been firmly inserted into the appropriate slot.
- Another application may be controlling the port that the modem is using. Quit all other applications and see if the issue persists.

The modem won't go off hook to dial or doesn't answer the phone.

Possible Solutions:

- You may have plugged your modem's phone cord into the wrong jack on the modem. Make sure the phone cord is plugged into a jack labeled with the word TELCO or a wall plug icon.

TROUBLESHOOTING AND HELP RESOURCES

- You might have a bad phone cord connection to your modem. The phone cord should be plugged into the TELCO jack on the modem and the wall phone jack. The phone cord should be no longer than 12 feet in length. Use the phone cord included in your 3Com box, if possible.
- You may have plugged your modem's phone cord into a digital line. Plugging your modem's phone cord into a digital phone line can damage the modem. Call your phone company if you are unsure whether or not your phone line is digital.
- You may have devices between the modem and the phone jack. There should be no line splitters, fax machines, or other devices between the modem and the wall jack.
- If you have a Macintosh modem, make sure that your DIP switches are set at 1, 3, 5, and 8 in the down (or on) position. In addition, &D0 should be in your initialization string.

The modem is able to dial out and attempts to connect, but fails to connect to your ISP or Remote Server.

Possible Solutions:

- You may have a poor line connection. Try placing the call again. The phone company routes calls differently each time. To verify a valid phone connection, enter RapidComm's Terminal mode and type **ATX3DT18472626000** (the 3Com BBS) or

TROUBLESHOOTING AND HELP RESOURCES

ATX3DT18475454248 (the 3Com Macintosh BBS) and press **ENTER**. If you need to dial 9 to obtain outside phone access, insert a 9 in the above phone number immediately before the 1. This string bypasses the dial tone, allowing a connection if the modem is functioning properly.

Your modem cannot achieve a 56 Kbps Internet connection.

Possible Solutions:

V.90 supports speeds of up to 56K. Due to phone line restrictions, you will achieve a lower connection; this does not mean you have not achieved a V.90 connection. Our research shows that the vast majority of telephone lines in North America support 56K connections. However, due to unusual or old telephone line configurations, some users will not be able to take full advantage of this technology.

It is important to remember that your line conditions may change, so you may be able to make faster connections in the future. To make sure that you can use 56K technology, perform the following tests:

- a. First, make sure your modem supports V.90. You can verify that your modem supports V.90 by opening a terminal application (RapidComm, HyperTerminal, ZTerm, etc.) typing **ati7** and pressing **ENTER**. If the Options line has V.90 listed, then your modem supports 3Com 56K technology.

TROUBLESHOOTING AND HELP RESOURCES

- b. Make sure that the number you're dialing is an actual V.90 server. Some ISPs may have a mixture of V.90 and non-V.90 servers. You can check this by contacting your ISP and asking them about 56K technology or V.90 availability.
- c. If it is a V.90 server, you may want to try calling it a few more times. Remember, the phone company routes each call in a different fashion each time you place a call. For testing purposes, you may want to call into the 3Com BBS at 847-262-6000 or the 3Com Macintosh BBS at 847 545 4248, which have V.90 servers attached to them.
- d. If you are able to connect at V.90 speeds on the 3Com BBS, there may be something between you and your ISP that is preventing a V.90 connection from being negotiated. You may want to contact your ISP and see if they have received similar reports from other customers.
- e. If you do not make a V.90 connection to our BBS, your line might not be capable of supporting V.90 speeds. If that's the case, then see the next item in this list.
- f. If you are experiencing consistent problems with V.90 connections (i.e., not making a high speed connection, abrupt disconnections, etc.), you can call 3Com Technical Support for U.S. Robotics modems at 847 262 5151.

When you try to connect to the Internet, you get a error of “No Dial Tone.”

TROUBLESHOOTING AND HELP RESOURCES

Possible Solutions:

- You may have plugged your modem's phone cord into the wrong jack on the modem. Make sure the phone cord is plugged into a jack labeled with the word TELCO or a wall plug icon.
- You may have devices between the modem and the phone jack. There should be no line splitters, fax machines, or other devices between the modem and the wall jack.
- Click **Start**, point to **Settings**, and click **Control Panel**. Double-click the **Modems** icon. Highlight your modem and click **Properties**. Click the **Connection** tab and then click the **Advanced** button. In the **Extra Settings** text box, type **X3**. This will enable your modem to bypass the dial tone and attempt to dial out.
- If you have voice mail on the same line that the modem is using, the voice mail system may alter the dial tone to indicate that messages are waiting. Check to see if you have any messages and try using the modem again after you have listened to them.

How do you configure a modem for use with Windows 95/98 Dial Up Network and Windows NT RAS?

Possible Solutions:

TROUBLESHOOTING AND HELP RESOURCES

Windows 95 has built-in dial-up network support. Using Dial-Up Networking, you are able to connect to remote servers and Internet providers. Through some easy steps, you can connect to your local Internet provider or Remote Access Service (RAS).

The first step in setting up Dial-Up Networking is to make sure the service is installed. The Dial-Up service is located in the **Accessories** group and is not part of the default installation. To check to see if it was installed, click **Start**, point to **Programs** and click **Accessories**.

If there is no group containing the title Dial-Up Networking, this means that it is not installed on the system. If you have already installed Dial-Up Networking, skip to Configuring Dial-Up Networking.

Installing Dial-Up Networking

To add dial-up networking, start by clicking **Start**, pointing to **Settings** and clicking **Control Panel**. Then click **Add/Remove Programs**. Click the Windows **Setup** tab. Next, select **Communications** and press **Details....** The Communications screen should appear. Check **Dial-Up Networking**, then click **OK**. Then click **OK** again. It will now look for your Windows 95 CD-ROM or diskette. Place it in the machine and click **OK** (skip this step if the CD-ROM or diskette is already in the drive). Once the files are done copying, and the shortcuts created, it will request that you shut down.

TROUBLESHOOTING AND HELP RESOURCES

Close all your applications and restart the system. You are now finished with the installation process.

Configuring Dial-Up Networking

You first need to add the Dial-Up Adapter. In most cases this will be added automatically. To verify that the Dial-Up Adapter is installed, right-click the **Network Neighborhood** icon, then click **Properties**. If you cannot find this icon on your desktop, you can also open up the **Network** icon in the **Control Panel**. Then look in the configuration section for the Dial-Up Adapter.

If the Dial-Up Adapter is not installed, click **Add** and then click **Adapter**. Click **Microsoft** and then click **Dial-Up Adapter**. Click **OK**.

Next, click **Start**, point to **Programs**, and click **Accessories**. Click **Dial-Up Networking** and then double-click **Make New Connection**.

You are now asked to enter a name for the connection and select the modem you wish to use. Fill in the name field and select the modem you want to use for connecting.

After selecting your modem, click **Configure**. Verify all the modem settings.

Under **Connections**, make sure the data bits, Parity, and Stop bits are set correctly. This is usually set to 8, None, and 1 in that order. Only change this if the site you are connecting to

TROUBLESHOOTING AND HELP RESOURCES

requires it. Make sure that **Wait for dial tone before dialing** is checked to make sure there is no dialing before the line has been picked up.

Once you are done with this, click **OK**, then **Next** as stated above.

Now you will need to add the number of your Service Provider. After you are done, click **Next**, and then **Finish**.

Server Configuration

Under the Dial-Up Networking program group, click once on the Dial-Up account you just created. Click **File** and select **Properties**. The “My Connections” screen should appear.

Click the **Server Types** tab. We recommend unchecking the “NetBEUI” and “IPX/SPX Compatible” boxes if you are connecting to an Internet provider. If you are connecting to a Remote Access Service (RAS) and will be attaching to a Microsoft, Novell, or other network, you can leave these selected.

Now click **TCP/IP settings**. The “TCP/IP Settings” screen should appear. You will now be required to enter your TCP/IP information. This can be set up in several different ways:

TROUBLESHOOTING AND HELP RESOURCES

IP Setting – Possible Scenarios

- Your access provider provides you with a specific IP address that you will use every time. If this is the case, make sure that **Specify an IP address** is checked. Now you must fill in the IP address field with the information your access provider gave you.
- Your access provider provides different IPs to you every time you connect. In this case, the provider is using a pool of addresses that are randomly assigned to you. If this is the case, make sure that **Server assigned IP address** is selected. This is usually the way an Internet provider will work unless you request a specific one.

Name Server Setting

- Your access provider provides you with a specific DNS entry. DNS entries are what you use to be routed to the Internet and other locations. If this is the case, make sure that **Specify name server address** is checked, and fill in the **Primary DNS** and if given, the **Secondary DNS**. The secondary DNS is a backup in case the Primary is unavailable.
- Your access provider assigns DNS entries on connection. In this case, the DNS can change for each connection. You should make sure that **Server Assigned name server addresses** is selected.

After you are done configuring the above settings, click **OK** twice.

Using Dial-Up Networking

Now that everything is configured, it's time to dial out. Click **Start**, point to **Programs**, and click **Accessories**. Click **Dial-Up Networking** and double-click the new icon you created under Dial-Up Networking. You should see the Connect To screen.

Fill in your user name and password and click **Connect** or press **ENTER**. After connecting, you should receive a message stating "Status: Verifying user name and password."

Some Remote Access Services (RAS) allow for callback. If you receive a prompt for a callback number, then you can have the system call you back by entering your phone number. RAS systems can also be set up for auto-callback without asking for a number. In this case, the number is pre-defined at the server end. This is usually done to protect the system from unauthorized people getting in.

Note: If you encounter any connection problems after setup is complete, you should check our online services for updates to the *.INF file for your product. The latest INF files can be obtained from our BBS, FTP site, CompuServe, and AOL. If you connect correctly but find that you can not access the Internet or the network, depending on your application, you should obtain/verify all your Server settings with your service provider.

Plug and Play does not detect your modem. You've installed the modem and Windows has restarted, but you simply see your desktop. You do not see any screens indicating that new hardware has been detected.

Possible Solutions:

- The Plug and Play installation was not successful. Try the following:
 1. Click Windows **Start** and click **Shut Down**. When asked if you wish to shut down your computer, click **Yes**. When Windows indicates that it is safe to turn off your computer, turn it off and wait 15 seconds. Then turn the computer back on. Windows may detect your modem upon this restart even if it did not detect the modem during the initial installation. If you see screens indicating that new hardware has been detected by Windows, continue with instructions on the installation map included with your modem.

If you do not see the new hardware screens, continue with step 2 below.

2. Click Windows **Start**, point to **Settings**, and click **Control Panel**. Double-click the **System** icon and then click the **Device Manager** tab on the "System Properties" screen. Look for "Other Devices" or "Unknown Devices" in the list that appears. If you do not see either of these options in the list, continue with the next section to learn about our

TROUBLESHOOTING AND HELP RESOURCES

support options. If you do see one of these options, double-click the option. If the description that appears matches the modem you are trying to install, click the **Remove** button. Click **OK** when Windows asks if you wish to remove the device. Next, restart the computer and continue with instructions on the installation map included with your modem.

***(Internal Modems Only)* Another device is using the same COM port or IRQ as your modem and is causing a conflict. This is resulting in system lock-ups and/or loss of data.**

Possible Solutions:

Your modem can be set to the following IRQs:

IRQ 2, 3, 4, 5, or 7 (and in some models, IRQ 10, 11, 12, and 15 can be used)

The IRQs available for your modem to use depend on your computer setup. Each IRQ on your computer is assigned a “peripheral device” or other function (you can consult your computer documentation to see what these default settings are, or use Microsoft Diagnostics, as explained later in this section). The typical assignment for the first eleven IRQs are listed next:

TROUBLESHOOTING AND HELP RESOURCES

IRQ Assignment

- 0 System Timer
 - 1 Keyboard
 - 2 Cascade input (mandatory function)
 - 3 COM2
 - 4 COM1
 - 5 Sound/Parallel Port 2 (LPT2)
 - 6 Disk Controller (All internal floppy drives)
 - 7 Parallel Port 1 (LPT1)
 - 8 Real-time clock interrupt
 - 9 Reserved
 - 10 Reserved
 - 11 Reserved

As you can see above, there are no default assignments for COM3 and COM4. In order to use COM3 or COM4, you must assign it to an IRQ. This means sharing that IRQ with

TROUBLESHOOTING AND HELP RESOURCES

its default assignment. This is possible only if the default assignment is not in use. For example, you can assign COM3 to IRQ5, if you are not using LPT2 for a second printer, sound card, or other external parallel device. You cannot assign COM4 to IRQ2 because IRQ2 is being used by the computer for a mandatory function. If you have a mouse attached to COM1, IRQ4 is in use by COM1 and can not be used for COM3. If you plan to use COM3 or COM4, you must assign these COM ports to an IRQ through Windows or your DOS communications software. Before running your software, you must first re-install your modem with the right IRQ and COM port settings (either jumpers or software set for Plug and Play devices).

Reinstalling your Modem

Follow the instructions on the installation map which came with your modem.

Windows Applications

If your communication program is running under Microsoft Windows, you must first assign the modem's COM port to the IRQ you selected through the Window's **Control Panel**. Use the following steps:

- In the **Main** menu of the **Program Manager**, open up the **Control Panel**.
- Double-click the **Ports** icon.

TROUBLESHOOTING AND HELP RESOURCES

- Use the mouse to select the COM port that you are using for your modem.
- Click **Settings**, then **Advanced**.
- Select the IRQ you want to use for your modem.

Be sure to select the appropriate COM port in your communications software. Consult your software's documentation for information on how to make these changes.

Most computers come with two external COM ports (COM1 and COM2). If you have an external COM2 connector (look on the back of your computer), you will have a conflict if you install an internal modem using COM2. Even if nothing is connected to the external port, the COM port is still reserved for that port, unless you disable it in the system BIOS. The reason this happens is that the external connector uses a serial interface card, which reserves COM2 and IRQ3 for the external connector. If you do not plan to use the external COM2 connector, most computers will let you disable it (consult your computer's user guide or its manufacturer's technical support). Your internal modem may then be installed using COM2 and IRQ3, if you choose. Modems are not required to be on COM2 and IRQ3, but we are using this as an example.

Sound cards, network cards, SCSI/IDE, and other serial interface cards use COM ports and/or IRQs. You may have installed such a card in your computer's expansion slot to run an external hard drive, or CD-ROM, or perhaps to connect to your network. Some video cards also use an IRQ. The main issue to watch for with video

TROUBLESHOOTING AND HELP RESOURCES

cards is that many of them share COM4's memory address space. This can conflict if you try putting a modem on COM4. Please contact your graphic card company for support on this issue. You need to determine which COM port and IRQ each serial interface card in your system is using. One way to find this out is to open up your computer, take out the expansion card or cards, and examine their jumper settings (be sure the computer is turned off before removing an expansion card). Another simpler way is to use Microsoft's Diagnostics program.

Using Microsoft Diagnostics

Microsoft Diagnostics is a program included with most versions of MS-DOS. This program tells you what is installed on each COM port and IRQ. Simply type **MSD** at the DOS prompt. If you are in Windows 3.1 or Windows for Workgroups, exit Windows completely, then run MSD. If you are running Windows NT, click **Run**, then type **WINMSD**.

For Windows 95 users, click **Start**, point to **Settings**, and click **Control Panel**. Double-click the **System** icon and then click the **Device Manager** tab. Double-click the **Computer** icon. On the "View Resources" screen, make sure that Interrupt Request (IRQ) is checked at the top. You will now be able to see what devices are assigned to which IRQs, and which IRQs are free.

TROUBLESHOOTING AND HELP RESOURCES

Sometimes it is necessary to change the IRQ setting on an expansion card to free an IRQ for the modem. For example, if your sound card is using IRQ5, you can reinstall it using IRQ11. This would then free IRQ5 for use by your modem.

If you continue to have conflicts, or do not know how to disable the on-board COM ports or other settings, you should contact your computer manufacturer or software manufacturer. If you are sure that there are no conflicts in your system, and your 3Com U.S. Robotics modem still does not function, please contact our technical support department for further assistance.

***(Winmodems Only)* Windows never detected the modem.**

Possible Solutions:

- Make sure the system has a free COM port or IRQ to use.
- Under Windows 95, make sure that the modem is not listed in the Device Manager under "Other Devices." If it is, delete it and reinstall the Winmodem.

Help Resources

Connecting to the 3Com BBS

To connect to the 3Com Bulletin Board System, follow these steps:

1. Start your fax/data communications program. The software settings for our BBS are:

ANSI terminal emulation

Data Bits: 8

Parity: None

Stop Bits: 1

2. Put the program in Terminal mode.
3. Type **ATDS0** (the last digit is a zero) and press **ENTER**.



NOTE: ATDS0 (the last digit is a zero) automatically dials 1 847 262 6000, the 3Com BBS.

If this is your first time connecting to our BBS, you will be asked to enter your name, create a password of your choice, and to fill out a questionnaire.

The BBS gives you access to customer and technical support documents and the BBS library. The library contains hundreds of helpful files and tips to help simplify using your modem.

When you are ready to leave the BBS, type **G** (for “good-bye”) from the main menu.

TROUBLESHOOTING AND HELP RESOURCES

3Com offers a number of other online technical support options. Choose any one of the following options for help with, and/or more information about, your new modem.

Internet FTP

Provides a free library containing the same files as the BBS site. FTP to **ftp.usr.com**.

Internet on Demand

Provides automatic technical support through documents containing product information, quick reference cards, and installation help. To obtain an index of available documents, send a blank e-mail to **support@usr.com**. To have a specific document e-mailed to you, send the document's number in the subject field.

World Wide Web

A 3Com Web page containing the same information as the Internet on Demand listing. Log on to:

<http://www.usr.com/home/online/>

CompuServe

Access the same information as the Internet FTP site. The 3Com forum address is **GO THREECOM**. Address private messages to **76711,707**.

America Online

Connect to 3Com through America Online. Go to the **Keyword** field and type **3Com** to connect to various 3Com resources, such as file libraries, message boards, online customer support, and product announcements.

TROUBLESHOOTING AND HELP RESOURCES

Are You Still Having Problems?

- Review this manual.
- Call or visit your modem dealer. They may be able to provide immediate assistance.
- If your dealer can't help you, contact 3Com Customer Support. When you call, specify your modem serial number (found on the modem and on the outside of the box), the software being used, and, if possible, have the contents of your ati7 screen available.

Customer Support via the Phone

Technical questions about 3Com modems can also be answered by technical support specialists.



NOTE: If you can, have your ati7 information written down on a piece of paper before you call tech support.

Regular Phone Service

847 262 5151

8:00 am - 6:00 pm CST Monday - Friday.
Automated service is available 24 hours a day, 7 days a week.

Priority, No-Hold Service

3Com also staffs its own fee-based 900 number for immediate assistance. These lines are staffed from:

8 a.m. - 10 p.m. CST (Mon. - Fri.)

10 a.m.- 5 p.m. CST (Sat. - Sun.)

No-Hold line 900 555 USR1

TROUBLESHOOTING AND HELP RESOURCES

For a no-hold call, a \$2.00 per minute charge will appear on your local phone bill. You must be 18 or older or have parental permission. (Service available in the U.S. only.)

If You Need to Return the Modem to 3Com for Repair

Contact 3Com Customer Support. If the support representative determines that you need to return the modem for repair, you will receive an SRO (Service Repair Order) number. You must have an SRO number before returning the modem to us.

Ship the unit, postage paid, in a strong box made of corrugated cardboard with plenty of packing material. Do NOT send the modem back in the original box.

Send ONLY the modem (NOT the power supply, manuals, CD-ROM, etc.).

Include your SRO number, name, and address on the shipping label as well as inside the package.

Send the package insured or via a courier capable of tracking the progress of the shipment.

Ship to the following address:

3Com

Client SRO# _____

1800 Central Avenue

Mt. Prospect, IL 60056

GLOSSARY

Cross references are printed in **boldface**.

analog loopback

or an internal test pattern is sent to the modem's transmitter, turned into analog form, looped back to

analog signals

A variety of signals and wavelengths that can be transmitted over communications lines such as the

answer mode

The mode used by your modem when answering an incoming call from an originating modem. The

originating modem, which is in **originate mode**

application

A computer program designed to perform a specific task or set of tasks. Examples include word

ARQ

Automatic Repeat reQuest. A function that allows

be retransmitted. See **MNP** **V.42**.

ASCII

American Standard Code for Information Interchange. A code used to represent letters, numbers, and special **characters** such as \$, !, and /.

asynchronous transmission

Data transmission in which the length of time between transmitted **characters** may vary. Because characters may not be transmitted at set intervals, **start/stop** bits are used to mark the beginning and end of each character.

Auto Answer

detects a certain number of rings. See S-register S0 in the "Technical Reference" chapter of this

GLOSSARY

auto-dial

A process where your modem dials a call for you. The dialing process is initiated by sending an ATDT (dial tone) or ATDP (dial pulse) command followed by the telephone number. Auto-dial is used to dial voice numbers. See command Dn.

baud rate

A term used to measure the speed of an analog transmission from one point to another. Although not technically accurate, baud rate is commonly used to mean **bit rate**.

binary digit

A 0 or 1, reflecting the use of the binary numbering system. Used because the computer recognizes either of two states, OFF or ON. Shortened form of binary digit is bit.

bit rate

Also referred to as transmission rate. The number of **binary digits**, or bits, transmitted per second (**bps**). Communications channels using analog modems are established at set bit rates, commonly 2400, 4800, 9600, 14,400, 28,800 and higher.

bits per second (bps)

The bits (**binary digits**) per second rate. Thousands of bits per second are expressed as kilobits per second (kbps).

buffer

A temporary memory area used as storage during input and output operations. An example is the modem's command buffer.

byte

A group of **binary digits** stored and operated upon as a unit. Most often the term refers to 8-bit units or **characters**. One kilobyte (KB) is equal to 1,024 bytes or characters; 640 KB is equal to 655,360 bytes or characters.

carrier

The basic signal altered or modulated by the modem in order to carry information.

character

A representation, coded in **binary digits**, of a letter, number, or other symbol.

GLOSSARY

characters per second (cps)

A data transfer rate generally estimated from the **bit rate** and the **character** length. For example, at 2400 bps, 8-bit characters with **start/stop bits** (for a total of ten bits per character) will be transmitted at a rate of approximately 240 characters per second (cps). Some **protocols**, such as error-control protocols, employ advanced techniques such as longer transmission **frames** and **data compression** to increase cps.

class 1 and 2.0

International standards used by fax **application** programs and faxmodems for sending and receiving faxes.

cyclic redundancy checking (CRC)

An error-detection technique consisting of a test performed on each block or **frame** of data by both sending and receiving modems. The sending modem inserts the results of its tests in each data block in the form of a CRC code. The receiving modem compares its results with the received CRC code and responds with either a positive or negative acknowledgment.

data communications

The transmission or sharing of data between computers via an electronic medium.

data compression table

A table containing values assigned for each **character** during a call under **MNP5** data compression. **Default** values in the table are continually altered and built during each call: The longer the table, the more efficient **throughput** gained.

data mode

Mode used by a modem when sending and receiving data files.

DCE

Data Communications (or Circuit-Terminating)

Equipment, such as dial-up modems that establish and control the data link via the telephone network.

default

Any setting assumed, at startup or reset, by the computer's software and attached devices. The computer or software will use these settings until changed by the user or other software.

GLOSSARY

detect phase

In the **ITU-T V.42** error-control **protocol**, the first stage in establishing if both modems attempting to connect have **V.42** capability.

dictionary

The term used for compression codes built by the **V.42 bis** data compression algorithm.

digital loopback

A test that checks the modem's RS-232 interface and the cable that connects the **terminal** or computer and the modem. The modem receives data (in the form of **digital signals**) from the computer or terminal, and immediately returns the data to the screen for verification.

digital signals

Discrete, uniform signals. In this manual, the term refers to the **binary digits** 0 and 1.

DTE

Data **Terminal** (or Terminating) Equipment. A computer that generates or is the final destination of data.

duplex

Indicates a communications channel capable of carrying signals in both directions. See **half duplex**, **full duplex**.

Electronic Industries Association (EIA)

Group which defines electronic standards in the U.S.

error control

Various techniques that check the reliability of **characters (parity)** or blocks of data. **V.42** and **MNP** error-control **protocols** use error detection (**CRC**) and retransmission of flawed **frames (ARQ)**.

facsimile

A method for transmitting the image on a page from one point to another. Commonly referred to as fax.

fax mode

The mode used by a modem to send and receive data in **facsimile** format. See definitions for **V.17**, **V.27ter**, **V.29**.

GLOSSARY

flow control

A mechanism that compensates for differences in the flow of data into and out of a modem or other device. See commands &Hn, &In, &Rn.

frame

A **data communications** term for a block of data with header and trailer information attached. The added information usually includes a frame number, block size data, error-check codes, and Start/End indicators.

full duplex

Signals can flow in both directions at the same time over one line. In microcomputer communications, this may refer to the suppression of the online **local echo**.

half duplex

Signals can flow in both directions, but only one way at a time. In microcomputer communications, may refer to activation of the online **local echo**, which causes the modem to send a copy of the transmitted data to the screen of the sending computer.

Hz

Hertz, a frequency measurement unit used internationally to indicate cycles per second.

Internet

An electronic communications network that connects computer networks and organizational computer facilities around the world.

Internet Service Provider

A company which provides dial-up (modem) access to the **Internet** for a fee.

ITU-T

An international organization that defines standards for telegraphic and telephone equipment. For example, the Bell 212A standard for 1200-bps communication in North America is observed internationally as ITU-T **V.22**. For 2400-bps communication, most U.S. manufacturers observe **V.22 bis**.

GLOSSARY

LAPM

Link Access Procedure for Modems. An error-control **protocol** defined in **ITU-T** recommendation **V.42**. Like the **MNP** protocols, LAPM uses **cyclic redundancy checking (CRC)** and retransmission of corrupted data (**ARQ**) to ensure data reliability.

local echo

A modem feature that enables the modem to display keyboard commands and transmitted data on the screen. See command En.

MNP

Microcom Networking Protocol, an error-control **protocol** developed by Microcom, Inc., and now in the public domain. There are several different MNP protocols, but the most commonly used one ensures error-free transmission through error detection (**CRC**) and retransmission of flawed **frames**.

modem

A device that transmits/receives computer data through a communications channel such as radio or telephone lines. It also changes signals received from the phone line back to **digital signals** before passing them to the receiving computer.

nonvolatile memory (NVRAM)

User-programmable random access memory whose data is retained when power is turned off. On the U.S. Robotics modem, it includes four stored phone numbers and the modem settings.

off/on hook

Modem operations that are the equivalent of manually lifting a phone receiver (taking it off-hook) and replacing it (going on-hook).

online fall back/fall forward

A feature that allows high-speed, error-control modems to monitor line quality and fall back to the next lower speed in a defined range if line quality diminishes. As line conditions improve, the modems switch up to the next higher speed.

originate mode

The mode used by your modem when initiating an outgoing call to a destination modem. The transmit/receive frequencies are the reverse of the called modem, which is in **answer mode**.

parity

A simple error-detection method that checks the validity of a transmitted **character**. Character

GLOSSARY

checking has been surpassed by more reliable and efficient forms of error checking, including **V.42** and **MNP 2-4 protocols**. Either the same type of **parity** must be used by two communicating computers, or both may omit parity.

protocol

A system of rules and procedures governing communications between two or more devices. Protocols vary, but communicating devices must follow the same protocol in order to exchange data. The format of the data, readiness to receive or send, error detection and error correction are some of the operations that may be defined in protocols.

RAM

Random Access Memory. Memory that is available for use when the modem is turned on, but that clears of all information when the power is turned off. The modem's RAM holds the current operational settings, a **flow control buffer**, and a command **buffer**.

remote digital loopback

A test that checks the phone link and a remote modem's transmitter and receiver.

remote echo

A copy of the data received by the remote system, returned to the sending system, and displayed on the screen. Remote echoing is a function of the remote system.

ROM

Read Only Memory. Permanent memory, not user-programmable.

serial transmission

The consecutive flow of data in a single channel. Compare to parallel transmissions where data flows simultaneously in multiple channels.

start/stop bits

The signaling bits attached to a **character** before and after the character is transmitted during **asynchronous transmission**.

terminal

A device whose keyboard and display are used for sending and receiving data over a communications link. Differs from a microcomputer or a mainframe in that it has little or no internal processing capabilities.

GLOSSARY

terminal mode

Software mode that allows direct communication with the modem. Also known as command mode.

throughput

The amount of actual user data transmitted per second without the overhead of **protocol** information such as **start/stop bits** or **frame** headers and trailers. Compare with **characters per second**.

V.8

The **ITU-T** standard specification that covers the initial handshaking process.

V.17 fax

An **ITU-T** standard for making **facsimile** connections at 14,400 bps, 12,000 bps, 9600 bps, and 7200 bps.

V.21

An **ITU-T** standard for modems operating in asynchronous mode at speeds up to 300 bps, **full-duplex**, on public switched telephone networks.

V.22

An **ITU-T** standard for modem communications at

1200 bps, compatible with the Bell 212A standard observed in the U.S. and Canada.

V.22 bis

An **ITU-T** standard for modem communications at 2400 bps. The standard includes an automatic link negotiation fallback to 1200 bps and compatibility with Bell 212A/V.22 modems.

V.27 ter

An **ITU-T** standard for **facsimile** operations that specifies modulation at 4800 bps, with fallback to 2400 bps.

V.29

An **ITU-T** standard for **facsimile** operations that specifies modulation at 9600 bps, with fallback to 7200 bps.

V.32

An **ITU-T** standard for modem communications at 9600 bps and 4800 bps. V.32 modems fall back to 4800 bps when line quality is impaired.

V.32 bis

An **ITU-T** standard that extends the V.32 connection range: 4800, 7200, 9600, 12,000, and

GLOSSARY

14,400 bps. V.32 bis modems fall back to the next lower speed when line quality is impaired, fall back further as necessary, and also fall forward (switch back up) when line conditions improve (see **online fall back/fall forward**).

V.34

An **ITU-T** standard that currently allows data rates as high as 28,800 bps.

V.34+

An enhancement to **V.34** that enables data transfer rates as high as 33,600 bps.

V.42

An **ITU-T** standard for modem communications that defines a two-stage process of detection and negotiation for **LAPM error control**.

V.42 bis

An extension of **ITU-T V.42** that defines a specific data compression scheme for use during **V.42** connections.

V.90

The **ITU-T** standard for 56 Kbps modem communications. This technology uses the digital

telephone network to increase the **bit rate** of the receive channel by eliminating the analog to digital conversion commonly found in modem connections. V.90 connections require a modem with V.90 or **x2 technology** calling a digitally connected **Internet Service Provider** or corporate host site compatible with V.90 or **x2 technology**.

World Wide Web

A part of the **Internet** designed to allow easier navigation of the network through the use of graphical user interfaces and hypertext links between different addresses.

x2 Technology

3Com's trademark for its proprietary technology that uses the digital telephone network to increase the **bit rate** of the receive channel by eliminating the analog to digital conversion commonly found in modem connections. x2 connections require a modem with x2 technology calling a digitally connected **Internet Service Provider** or corporate host site compatible with x2 technology.

Xmodem

The first of a family of **error control** software **protocols** used to transfer files between modems.

GLOSSARY

These protocols are in the public domain and are available from many bulletin board services.

XON/XOFF

Standard **ASCII** control **characters** used to tell an intelligent device to stop/resume transmitting data.

Ymodem

An error-checking **protocol** that can send several files of data at a time in 1024-**byte** (1K) blocks. This protocol can use either checksums or **CRC** for error checking.

Ymodem G

Similar to **Ymodem**, except it includes no error checking, which makes it faster.

Zmodem

Similar to **Xmodem** and **Ymodem**, except it includes batch transfer, the ability to recover from a partially complete transfer, an autostart feature, and improved efficiency.

TECHNICAL REFERENCE

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TECHNICAL REFERENCE

Front-of-the-Case Lights (External Faxmodems)

Symbol	Meaning	Status
AA	Auto Answer	Answer mode: ON when register S0 is set to 1 or higher (Auto Answer), and when answering a call; OFF when modem originates a call. Light flashes when there is an incoming call.
CD.....	Carrier Detect	ON if modem receives a valid data signal (carrier) from a remote modem, indicating that data transmission is possible. Always ON if CD override is ON (&C0).
RD.....	Received Data	Flashes when modem sends result codes or passes received data bits from remote.
SD	Send Data	Flashes when computer sends a data bit to modem.
TR	Data Terminal Ready	ON if modem receives a DTR signal from computer. Always ON (modem ignores DTR) if the DTR override is ON (&D0).
CS	Clear to Send	ON until modem lowers CTS when Transmit Data hardware flow control is enabled (&H1, &H3).
ARQ/	Error Control/	Data Mode: Automatic Repeat Request. ON if modem is set to &M4 or &M5 and successfully establishes an error control connection. Flashes when modem retransmits data to remote modem. Fax Mode: flashes to indicate fax mode.
FAX	Fax Operations	

TECHNICAL REFERENCE

Top-of-the-Case Lights (Voice Faxmodem Pro Externals)

Light	What It Means When Lighted
POWER	The modem is turned on.
SEND.....	The computer is sending a data bit to the modem.
RECEIVE.....	The modem is sending result codes or passing received data bits from the remote.
ONLINE.....	The modem is online. (NOTE: This light blinks when the mute feature is being used.)

Typing Commands

- Type commands in either upper or lower case, not a combination. Use the Backspace key to delete errors. (You cannot delete the original AT command since it is stored in the modem buffer.)
- If a command has numeric options and you don't include a number, zero is assumed. For example, if you type **ATB**, the command **ATB0** is assumed.
- Every command except **A/**, **+++**, and **A>** must begin with the AT prefix and be entered by pressing **ENTER**.
- The maximum command length is 58 characters. The modem doesn't count the AT prefix, carriage returns, or spaces.



NOTE: All defaults are based on the &F1—Hardware Flow Control template loaded in NVRAM when the modem is shipped. Defaults are listed in italics.

TECHNICAL REFERENCE

Basic Data Commands

<control key>S

Stop or restart help screens.

<control key>C or <control key>K

Stop help screens.

\$ Use in conjunction with *D*, *S*, or *&* commands (or just AT) to display a basic command list; online help.

A Manual Answer: Goes off hook in answer mode. Pressing any key aborts the operations.

A/ Re-executes the last issued command. Used mainly to re-dial. Does not require the AT prefix or a Carriage Return.

A> Re-executes the last issued command continuously, until the user intervenes or the command is executed forever. Does not require the AT prefix or a Carriage Return.

Any key Aborts off-hook dial/answer operation and hangs up.

AT Required command prefix, except with A/, +++, and A>. Use alone to test for OK result code.

Bn **U.S./ITU-T answer sequence.**

B0 *ITU-T answer sequence*

B1 U.S. answer tone

TECHNICAL REFERENCE

Dn	Dials the specified phone number. Includes the following:	;	(Semicolon) Return to Command mode after dialing.
0-9	Numeric digits	“	Dials the letters that follow (in an alphabetical phone number).
#, *	Extended touch-tone pad tones	!	(Exclamation point) Flashes the switch hook.
L	Dials the last dialed number.	/	Delays for 125 ms. before proceeding with dial string.
P	Pulse (rotary) dial	W	Wait for second dial tone (X2 or X4); linked to S6 register.
R	Originates call using answer (reverse) frequencies.	@	Dials, waits for quiet answer, and continues (X3 or higher).
Sn	Dials the phone number string stored in NVRAM at position n (n = 0–3). Phone numbers are stored with the &Zn=s command.	\$	Displays a list of Dial commands.
T	Tone dial		
,	(Comma) Pause, See S8 definition; which it's linked to.		

TECHNICAL REFERENCE

En Sets local echo.

E0 Echo OFF

E1 *Modem displays
keyboard commands*

Fn Sets online local echo of transmitted data ON/OFF.

F0 Local echo ON.
Modem sends a copy
of the data it sends to
the remote system to
your screen.

F1 *Local echo OFF. Receiving
system may send a remote
echo of data it receives.*

Hn Controls ON/OFF hook.

H0 Hangs up (goes on hook).

H1 Goes off hook.

In Displays the following information.

I0 Four-digit product code

I1 Results of ROM checksum

I2 Results of RAM checksum

I3 Product type

I4 Current modem settings

I5 Nonvolatile memory
(NVRAM) settings

I6 Link diagnostics

I7 Product configuration

I9 Plug and Play information

I11 Extended link diagnostics

Ln Controls speaker volume (internals only).

L0 Low volume

L1 Low volume

L2 *Medium volume*

L3 High volume

TECHNICAL REFERENCE

Mn	Operates speaker.		
	M0	Speaker always OFF.	
	M1	Speaker ON until CONNECT.	
	M2	Speaker always ON.	
	M3	Speaker ON after dial, until CONNECT.	
On	Returns online.		
	O0	Returns online.	
	O1	Returns online and retrains.	
P	Sets pulse dial (for phone lines that don't support touch-tone dialing).		
Qn	Displays/suppresses result codes.		
	Q0	Displays result codes.	
	Q1	Quiet mode; no result codes.	
	Q2	Displays result codes only in Originate mode.	
	Sr.b=n	Sets bit .b of register r to n (0/OFF or 1/ON).	
	Sr=n	Sets register r to n.	
	Sr?	Displays contents of S-Register r.	
	S\$	Displays a list of the S-Registers.	
	T	Sets tone dial.	
	Vn	Displays verbal/numeric result codes.	
	V0	Numeric codes	
	V1	Verbal codes	

TECHNICAL REFERENCE

Xn Sets result code displayed. Default is X4.

(NOTE: Result codes 0 through 155 are for 33.6 products and V.90 products. Result codes above 155 apply only to V.90 products.)

Result Codes	X0	X1	X2	X3	X4
0/OK	•	•	•	•	•
1/CONNECT	•	•	•	•	•
2/RING	•	•	•	•	•
3/NO CARRIER	•	•	•	•	•
4/ERROR	•	•	•	•	•
5/CONNECT 1200		•	•	•	•
6/NO DIAL TONE			•		•
7/BUSY				•	•
8/NO ANSWER*				•	•
9/Reserved					
10/CONNECT 2400		•	•	•	•
13/CONNECT 9600		•	•	•	•
18/CONNECT 4800		•	•	•	•
20/CONNECT 7200		•	•	•	•
21/CONNECT 12000		•	•	•	•
25/CONNECT 14400		•	•	•	•
43/CONNECT 16800		•	•	•	•
85/CONNECT 19200		•	•	•	•
91/CONNECT 21600		•	•	•	•
99/CONNECT 24000		•	•	•	•
103/CONNECT 26400		•	•	•	•
107/CONNECT 28800		•	•	•	•
151/CONNECT 31200		•	•	•	•
155/CONNECT 33600		•	•	•	•

TECHNICAL REFERENCE

<u>Xn</u>	Result Codes (cont.)	X0	X1	X2	X3	X4
	256/CONNECT 28000		•	•	•	•
	260/CONNECT 29333		•	•	•	•
	264/CONNECT 30666		•	•	•	•
	268/CONNECT 32000		•	•	•	•
	180/CONNECT 33333		•	•	•	•
	272/CONNECT 34666		•	•	•	•
	276/CONNECT 36000		•	•	•	•
	184/CONNECT 37333		•	•	•	•
	280/CONNECT 38666		•	•	•	•
	284/CONNECT 40000		•	•	•	•
	188/CONNECT 41333		•	•	•	•
	192/CONNECT 42666		•	•	•	•
	196/CONNECT 44000		•	•	•	•
	200/CONNECT 45333		•	•	•	•
	204/CONNECT 46666		•	•	•	•
	208/CONNECT 48000		•	•	•	•
	212/CONNECT 49333		•	•	•	•
	216/CONNECT 50666		•	•	•	•
	220/CONNECT 52000		•	•	•	•
	224/CONNECT 53333		•	•	•	•
	228/CONNECT 54666		•	•	•	•
	232/CONNECT 56000		•	•	•	•
	236/CONNECT 57333		•	•	•	•
	Adaptive Dialing			•	•	•
	Wait for 2nd Dial Tone (W)			•		•
	Wait for Answer (@)				•	•
	Fast Dial			•		•
	*Requires @ in dial string; replaces NO CARRIER					

TECHNICAL REFERENCE

Yn	Selects power-on/reset default configuration.
Y0	Use profile 0 setting in NVRAM
Y1	Use profile 1 setting in NVRAM
Y2	Use factory configuration 0.
Y3	Use factory configuration 1.
Y4	Use factory configuration 2

Z	Resets modem.
Z0	Resets modem to NVRAM profile selected by Y command or dip 7.
Z1	Resets modem to NVRAM profile 0

Z2	Resets modem to NVRAM profile 1
Z3	Resets modem to factory default profile 0 (&F0)
Z4	Resets modem to factory default profile 1 (&F1)
Z5	Resets modem to factory default profile 2 (&F2)

TECHNICAL REFERENCE

Extended Data Commands

&\$ Displays a list of ampersand (&) commands.

&An Enables/disables additional result code subsets (see **Xn**).

&A0 ARQ result codes disabled

&A1 ARQ result codes enabled

&A2 V.32 modulation indicator added

&A3 *Protocol indicators added^{3/4} LAPM/MNP/NONE (error control) and V42bis/MNP5 (data compression)*

&Bn Manages modem's serial port rate.

&B0 Variable, follows connection rate

&B1 *Fixed serial port rate*

&B2 Fixed in ARQ mode, variable in non-ARQ mode

&Cn Controls Carrier Detect (CD) signal.

&C0 CD override

&C1 *Normal CD operations*

&Dn Controls Data Terminal Ready (DTR) operations.

&D0 DTR override

&D1 DTR toggle causes online Command mode

&D2 *Normal DTR operations*

&D3 Resets on receipt of DTR

&Fn Loads a read-only (non-programmable) factory configuration.

&F0 Generic template

&F1 Hardware flow control template

&F2 Software flow control template

TECHNICAL REFERENCE

&Gn Sets Guard Tone.

- &G0** *No guard tone, U.S. and Canada*
- &G1** 550 Hz guard tone, some European countries, requires B0 setting.
- &G2** 1800 Hz guard tone, U.K., requires B0 setting.

&Hn Sets Transmit Data (TD) flow control (see also &Rn).

- &H0** Flow control disabled
- &H1** *Hardware flow control, Clear to Send (CTS)*
- &H2** Software flow control, XON/XOFF
- &H3** Hardware and software flow control

&In Sets Receive Data (RD) software flow control (see also &Rn).

- &I0** *Software flow control disabled*
- &I1** XON/XOFF signals to your modem and remote system
- &I2** XON/XOFF signals to your modem only

&Kn Enables/disables data compression.

- &K0** Data compression disabled
- &K1** *Auto enable/disable*
- &K2** Data compression enabled
- &K3** MNP5 compression disabled

TECHNICAL REFERENCE

&Mn Sets Error Control (ARQ) for connections at 1200 bps and higher.

&M0 Normal mode, error control disabled
 &M1 Reserved
 &M2 Reserved
 &M3 Reserved
 &M4 *Normal/ARQ*
 &M5 ARQ mode

&Nn Sets connect speed. If connection cannot be made at this speed, the modem will hang up. When used in conjunction with &Un and &Un is greater than 0, &Nn sets the ceiling connect speed. &Un sets the floor connect speed (see also the table in the &Un section). NOTE: &N17 through &N39 apply only to V.90 products.

&N0 Connection speed is determined by the remote modem.

&N1 300 bps
 &N2 1200 bps
 &N3 2400 bps
 &N4 4800 bps
 &N5 7200 bps
 &N6 9600 bps
 &N7 12,000 bps
 &N8 14,400 bps
 &N9 16,800 bps
 &N10 19,200 bps
 &N11 21,600 bps
 &N12 24,000 bps
 &N13 26,400 bps
 &N14 28,800 bps
 &N15 31,200 bps
 &N16 33,600 bps
 &N17 28,000 bps
 &N18 29,333 bps

TECHNICAL REFERENCE

&N19 30,666 bps
&N20 32,000 bps
&N21 33,333 bps
&N22 34,666 bps
&N23 36,000 bps
&N24 37,333 bps
&N25 38,666 bps
&N26 40,000 bps
&N27 41,333 bps
&N28 42,666 bps
&N29 44,000 bps
&N30 45,333 bps
&N31 46,666 bps
&N32 48,000 bps
&N33 49,333 bps
&N34 50,666 bps
&N35 52,000 bps
&N36 53,333 bps
&N37 54,666 bps
&N38 56,000 bps
&N39 57,333 bps

&Pn Sets pulse (rotary) dial make/break ratio.

&P0 U.S./Canada ratio, 39%/61%

&P1 U.K. ratio, 33%/67%

&Rn Sets Receive Data (RD) hardware flow control, Request to Send (RTS) (see also &Hn).

&R0 Reserved

&R1 Modem ignores RTS

&R2 Received Data to computer only on RTS

&Sn Controls Data Set Ready (DSR) operations.

&S0 DSR override; always ON

&S1 Modem controls DSR

TECHNICAL REFERENCE

&Tn Begins test modes.

&T0	Ends testing
&T1	Analog Loopback
&T2	Reserved
&T3	Local Digital Loopback
&T4	Enables Remote Digital Loopback
&T5	<i>Prohibits Remote Digital Loopback</i>
&T6	Initiates Remote Digital Loopback
&T7	Remote Digital with self-test and error detector
&T8	Analog Loopback with self-test and error detector

&Un When set above 0, the value chosen from the table sets the floor connect speed (the lowest acceptable connect speed). If a connection cannot be made at or above this speed, the modem will hang up. This command can also be used in conjunction with &Nn. **NOTE: &U17 through &U39 apply only to V.90 products.**

\$N=0

&U=0 Connects at best possible speed between your modem and the remote modem. **NOTE:** These factory default settings should be sufficient for most users.

&N>0

Connects at a speed at or below &Nn.

&U>0 Connects at any speed faster than the value of &Un.

Connects at any speed between &Nn and &Un.

TECHNICAL REFERENCE

&U0 *No restrictions on the minimum speed for the connection.*

&U1 300 bps
&U2 1200 bps
&U3 2400 bps
&U4 4800 bps
&U5 7200 bps
&U6 9600 bps
&U7 12,000 bps
&U8 14,400 bps
&U9 16,800 bps
&U10 19,200 bps
&U11 21,600 bps
&U12 24,000 bps
&U13 26,400 bps
&U14 28,800 bps
&U15 31,200 bps
&U16 33,600 bps
&U17 28,000 bps
&U18 29,333 bps

&U19 30,666 bps
&U20 32,000 bps
&U21 33,333 bps
&U22 34,666 bps
&U23 36,000 bps
&U24 37,333 bps
&U25 38,666 bps
&U26 40,000 bps
&U27 41,333 bps
&U28 42,666 bps
&U29 44,000 bps
&U30 45,333 bps
&U31 46,666 bps
&U32 48,000 bps
&U33 49,333 bps
&U34 50,666 bps
&U35 52,000 bps
&U36 53,333 bps
&U37 54,666 bps
&U38 56,000 bps
&U39 57,333 bps

TECHNICAL REFERENCE

&Wn Writes current configuration to NVRAM templates.

&W0 Modifies the NVRAM 0 template (Y0)

&W1 Modifies the NVRAM 1 template (Y1)

&Yn Sets break handling.

&Y0 Destructive, but doesn't send break

&Y1 *Destructive, expedited*

&Y2 Nondestructive, expedited

&Y3 Nondestructive, unexpedited

&Zn=s Writes phone number string *s* to NVRAM at position *n* (*n* = 0–3).

&Zn=L Writes last executed dial string to NVRAM at position *n* (*n* = 0–3).

&Zn? Displays the phone number stored at position *n* (*n* = 0–3).

&ZL? Displays the last executed dial string.

#CID=*n* Controls Caller ID feature.

#CID=0 *Caller ID disabled.*

#CID=1 Caller ID enabled with formatted information.

#CID=2 Caller ID enabled with unformatted information.

+++ Escapes to online-command mode.

TECHNICAL REFERENCE

DIP Switches (External Modems with DIP Switches Only)

Note: If a DIP switch is on, it is down. If a DIP switch is off, it is up.

Switch	Factory Setting	Function
1	OFF	Data Terminal Ready (DTR) Override OFF Normal DTR operations: computer must provide DTR signal for the modem to accept commands; dropping DTR terminates a call ON Modem ignores DTR (Override)
2	OFF	Verbal/Numeric Result Codes OFF Verbal (word) results ON Numeric results
3	ON	Result Code Display OFF Suppresses result codes ON Enables result codes
4	OFF	Command Mode Local Echo Suppression OFF Displays keyboard commands ON Suppresses echo
5	ON	Auto Answer Suppression OFF Modem answers on first ring, or higher if specified in NVRAM ON Disables auto answer

TECHNICAL REFERENCE

Switch	Factory Setting	Function
6	OFF	Carrier Detect (CD) Override
	OFF	Modem sends CD signal when it connects with another modem, drops CD on disconnect
	ON	CD always ON (Override)
7	OFF	Power-on and ATZ Reset Software Defaults
	OFF	Loads Y0-Y4 configuration from user-defined nonvolatile memory (NVRAM)
	ON	Loads &F0—Generic template from read only memory (ROM)
8	ON	AT Command Set Recognition
	OFF	Disables command recognition (dumb mode)
	ON	Enables recognition (smart mode)

TECHNICAL REFERENCE

S-Registers

To change a setting, use the `ATS r = n` command, where r is the register and n is a decimal value from 0 – 255 (unless otherwise indicated).

Register	Default	Function
S0	0	Sets the number of rings on which to answer in Auto Answer mode. When set to 0, Auto Answer is disabled.
S1	0	Counts and stores the number of rings from an incoming call. (S0 must be greater than 0.)
S2	43	Stores the ASCII decimal code for the escape code character. Default character is +. A value of 128 – 255 disables the escape code.
S3	13	Stores the ASCII code for the Carriage Return character. Valid range is 0 – 127.
S4	10	Stores the ASCII decimal code for the Line Feed character. Valid range is 0 – 127.
S5	8	Stores the ASCII decimal code for the Backspace character. A value of 128 – 255 disables the Backspace key's delete function.

TECHNICAL REFERENCE

Register	Default	Function
S6	2	Sets the number of seconds the modem waits before dialing. If Xn is set to $X2$ or $X4$, this is the time-out length if there isn't a dial tone.
S7	60	Sets the number of seconds the modem waits for a carrier. May be set for much longer duration if, for example, the modem is originating an international connection.
S8	2	Sets the duration, in seconds, for the pause (,) option in the Dial command.
S9	6	Sets the required duration, in tenths of a second, of the remote modem's carrier signal before recognition by the 3Com U.S. Robotics modem.
S10	14	<p>Sets the duration, in tenths of a second, that the modem waits to hang up after loss of carrier. This guard time allows the modem to distinguish between a line disturbance from a true disconnect (hang up) by the remote modem.</p> <p>Note: If you set $S10 = 255$, the modem will not hang up when carrier is lost. Dropping DTR hangs up the modem.</p>
S11	70	Sets the duration and spacing, in milliseconds, for tone dialing.
S12	50	Sets the duration, in fiftieths of a second, of the guard time for the escape code sequence (+++).

TECHNICAL REFERENCE

Register	Default	Function																											
S13	0	<p>Bit-mapped register. Select the bit(s) you want on and set S13 to the total of the values in the Value column. For example, ATS13 = 17 enables bit 0 (value is 1) and bit 4 (value is 16).</p> <table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>Reset when DTR drops.</td></tr> <tr> <td>1</td><td>2</td><td>Reset non-MNP transmit buffer from 1.5K to 128 bytes.*</td></tr> <tr> <td>2</td><td>4</td><td>Set backspace key to delete.</td></tr> <tr> <td>3</td><td>8</td><td>On DTR signal, autodial the number stored in NVRAM at position 0.</td></tr> <tr> <td>4</td><td>16</td><td>At power on/reset, autodial the number stored in NVRAM at position 0.</td></tr> <tr> <td>5</td><td>32</td><td>Reserved</td></tr> <tr> <td>6</td><td>64</td><td>Disable quick retrains.</td></tr> <tr> <td>7</td><td>128</td><td>Disconnect on escape code.</td></tr> </table>	Bit	Value	Result	0	1	Reset when DTR drops.	1	2	Reset non-MNP transmit buffer from 1.5K to 128 bytes.*	2	4	Set backspace key to delete.	3	8	On DTR signal, autodial the number stored in NVRAM at position 0.	4	16	At power on/reset, autodial the number stored in NVRAM at position 0.	5	32	Reserved	6	64	Disable quick retrains.	7	128	Disconnect on escape code.
Bit	Value	Result																											
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5	32	Reserved																											
6	64	Disable quick retrains.																											
7	128	Disconnect on escape code.																											

* The 1.5K-byte non-ARQ buffer allows data transfer with Xmodem- and Ymodem-type file transfer protocols without using flow control. The 128-byte option lets remote users with slower modems keep data you're sending from scrolling off their screens. When remote users send your computer an XOFF (Ctrl-S) and you stop transmitting, the data in transit from your modem's buffer doesn't exceed the size of their screen. This is also very helpful in situations when a remote modem/printer application is losing characters.

TECHNICAL REFERENCE

Register	Default	Function																											
S14	0	Reserved																											
S15	0	Bit-mapped register setup. To set the register, see instructions for S13.																											
		<table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>Disable ARQ/MNP for V.22.</td></tr> <tr> <td>1</td><td>2</td><td>Disable ARQ/MNP for V.22bis.</td></tr> <tr> <td>2</td><td>4</td><td>Disable ARQ/MNP V.32/V.32bis.</td></tr> <tr> <td>3</td><td>8</td><td>Disable MNP handshake.</td></tr> <tr> <td>4</td><td>16</td><td>Disable MNP level 4.</td></tr> <tr> <td>5</td><td>32</td><td>Disable MNP level 3.</td></tr> <tr> <td>6</td><td>64</td><td>MNP incompatibility.</td></tr> <tr> <td>7</td><td>128</td><td>Disable V.42 operation.</td></tr> </table> <p>To disable V.42 detect phase, select the total of the values for bits 3 and 7 (in other words S15 = 136 [the sum of values 8 and 128])</p>	Bit	Value	Result	0	1	Disable ARQ/MNP for V.22.	1	2	Disable ARQ/MNP for V.22bis.	2	4	Disable ARQ/MNP V.32/V.32bis.	3	8	Disable MNP handshake.	4	16	Disable MNP level 4.	5	32	Disable MNP level 3.	6	64	MNP incompatibility.	7	128	Disable V.42 operation.
Bit	Value	Result																											
0	1	Disable ARQ/MNP for V.22.																											
1	2	Disable ARQ/MNP for V.22bis.																											
2	4	Disable ARQ/MNP V.32/V.32bis.																											
3	8	Disable MNP handshake.																											
4	16	Disable MNP level 4.																											
5	32	Disable MNP level 3.																											
6	64	MNP incompatibility.																											
7	128	Disable V.42 operation.																											
S16	0	Reserved																											
S17	0	Reserved																											

TECHNICAL REFERENCE

Register	Default	Function
S18	0	Test timer for &T loopback testing. Sets the time in seconds of testing before the modem automatically times out and terminates the test. When set to 0, the timer is disabled. Valid range is 1-255.
S19	0	Sets the duration, in minutes, for the inactivity timer. The timer activates when there is no data activity on the phone line; at time-out the modem hangs up. S19 = 0 disables the timer.
S20	0	Reserved
S21	10	Sets the length, in 10-millisecond units, of breaks sent from the modem to the computer; applies to MNP or V.42 mode only.
S22	17	Stores the ASCII decimal code for the XON character.
S23	19	Stores the ASCII decimal code for the XOFF character.
S24	0	Reserved
S25	20	Sets the duration, in hundredths of a second, that DTR must be dropped so that the modem doesn't interpret a random glitch as a DTR loss. (Most users will want to use the default; this register is useful for setting compatibility with older systems running under older operating software.)
S26	0	Reserved

TECHNICAL REFERENCE

Register	Default	Function		
S27	0	Bit-mapped register setup. To set the register, see instructions for S13.		
		Bit	Value	Result
		0	1	Enables ITU-T V.21 modulation at 300 bps for overseas calls; in V.21 mode, the modem answers both overseas and domestic (U.S. and Canada) calls, but only originates V.21 calls (default Bell 103).
		1	2	Enables unencoded (non-trellis coded) modulation in V.32 mode.
		2	4	Disables V.32 modulation.
		3	8	Disables 2100 Hz answer tone to allow two V.42 modems to connect faster.
		4	16	Enables V.23 fallback mode.
		5	32	Disables V.32 <i>bis</i> mode.
		6	64	Disable V.42 selective reject.
		7	128	Software compatibility mode. This setting disables the codes and displays the 9600 code instead. The actual rate of the call can be viewed on the ATI6 screen. Used for unusual software incompatibilities. Some software may not accept 7200, 12,000, and 14,400 bps or greater result codes.

TECHNICAL REFERENCE

Register	Default	Function																											
S28	0	Eliminates the V.32 answer tones for a faster connection.																											
	8	Default item, all times are in tenths of seconds.																											
	255	Disables all connections except V.32 at 9600 bps.																											
S29	20	Sets the duration, in tenths of a second, of the V.21 answer mode fallback timer.																											
S30	0	Reserved																											
S31	128	Reserved																											
S32	2	Bit-mapped register setup. To set the register, see the instructions for S13.																											
		<table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>V.8 Call Indicate enabled.</td></tr> <tr> <td>1</td><td>2</td><td>Enables V.8 mode.</td></tr> <tr> <td>2</td><td>4</td><td>Reserved.</td></tr> <tr> <td>3</td><td>8</td><td>Disable V.34 modulation.</td></tr> <tr> <td>4</td><td>16</td><td>Disable V.34+ modulation.</td></tr> <tr> <td>5</td><td>32</td><td>Disable x2 modulation.</td></tr> <tr> <td>6</td><td>64</td><td>Disable V.90 modulation.</td></tr> <tr> <td>7</td><td>128</td><td>Reserved.</td></tr> </table>	Bit	Value	Result	0	1	V.8 Call Indicate enabled.	1	2	Enables V.8 mode.	2	4	Reserved.	3	8	Disable V.34 modulation.	4	16	Disable V.34+ modulation.	5	32	Disable x2 modulation.	6	64	Disable V.90 modulation.	7	128	Reserved.
Bit	Value	Result																											
0	1	V.8 Call Indicate enabled.																											
1	2	Enables V.8 mode.																											
2	4	Reserved.																											
3	8	Disable V.34 modulation.																											
4	16	Disable V.34+ modulation.																											
5	32	Disable x2 modulation.																											
6	64	Disable V.90 modulation.																											
7	128	Reserved.																											

TECHNICAL REFERENCE

Register	Default	Function																											
S33	0	<p>Bit-mapped register setup. To set the register, see the instructions for S13.</p> <table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>Disable 2400 symbol rate.</td></tr> <tr> <td>1</td><td>2</td><td>Disable 2743 symbol rate.</td></tr> <tr> <td>2</td><td>4</td><td>Disable 2800 symbol rate.</td></tr> <tr> <td>3</td><td>8</td><td>Disable 3000 symbol rate.</td></tr> <tr> <td>4</td><td>16</td><td>Disable 3200 symbol rate.</td></tr> <tr> <td>5</td><td>32</td><td>Disable 3429 symbol rate.</td></tr> <tr> <td>6</td><td>64</td><td>Reserved</td></tr> <tr> <td>7</td><td>128</td><td>Disable shaping.</td></tr> </table>	Bit	Value	Result	0	1	Disable 2400 symbol rate.	1	2	Disable 2743 symbol rate.	2	4	Disable 2800 symbol rate.	3	8	Disable 3000 symbol rate.	4	16	Disable 3200 symbol rate.	5	32	Disable 3429 symbol rate.	6	64	Reserved	7	128	Disable shaping.
Bit	Value	Result																											
0	1	Disable 2400 symbol rate.																											
1	2	Disable 2743 symbol rate.																											
2	4	Disable 2800 symbol rate.																											
3	8	Disable 3000 symbol rate.																											
4	16	Disable 3200 symbol rate.																											
5	32	Disable 3429 symbol rate.																											
6	64	Reserved																											
7	128	Disable shaping.																											
S34	0	<p>Bit-mapped register setup. To set registers, see instructions for S13.</p> <table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>Disable 8S-2D trellis encoding.</td></tr> <tr> <td>1</td><td>2</td><td>Disable 16S-4D trellis encoding.</td></tr> <tr> <td>2</td><td>4</td><td>Disable 32S-2D trellis encoding.</td></tr> <tr> <td>3</td><td>8</td><td>Disable 64S-4D trellis encoding.</td></tr> <tr> <td>4</td><td>16</td><td>Disable non-linear coding.</td></tr> <tr> <td>5</td><td>32</td><td>Disable TX level deviation.</td></tr> <tr> <td>6</td><td>64</td><td>Disable Pre-emphasis.</td></tr> </table>	Bit	Value	Result	0	1	Disable 8S-2D trellis encoding.	1	2	Disable 16S-4D trellis encoding.	2	4	Disable 32S-2D trellis encoding.	3	8	Disable 64S-4D trellis encoding.	4	16	Disable non-linear coding.	5	32	Disable TX level deviation.	6	64	Disable Pre-emphasis.			
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6	64	Disable Pre-emphasis.																											

TECHNICAL REFERENCE

7 128 Disable Pre-coding.

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Register	Default	Function																											
S35-S37		Reserved																											
S38	0	Sets an optional delay, in seconds, before a forced hang-up and clearing of the Transmit buffer when DTR drops during an ARQ call. This allows time for a remote modem to acknowledge receipt of all transmitted data before it is disconnected. The modem immediately hangs up when DTR drops. This option only applies to connections terminated by dropping DTR. If the modem receives the ATH command, it ignores S38 and immediately hangs up.																											
S39-S40	Reserved																												
S41	0	<p>Bit-mapped register setup. To set registers, see instructions for S13.</p> <table> <tr> <th>Bit</th><th>Value</th><th>Result</th></tr> <tr> <td>0</td><td>1</td><td>Distinctive ring enabled.</td></tr> <tr> <td>1</td><td>2</td><td>Speakerphone connect message override (voice products only).</td></tr> <tr> <td>2</td><td>4</td><td>Disable Digital Line Guard (56K internal faxmodems only).</td></tr> <tr> <td>3</td><td>8</td><td>Message waiting (voice products only).</td></tr> <tr> <td>4</td><td>16</td><td>Reserved.</td></tr> <tr> <td>5</td><td>32</td><td>Reserved.</td></tr> <tr> <td>6</td><td>64</td><td>Reserved.</td></tr> <tr> <td>7</td><td>128</td><td>Reserved.</td></tr> </table>	Bit	Value	Result	0	1	Distinctive ring enabled.	1	2	Speakerphone connect message override (voice products only).	2	4	Disable Digital Line Guard (56K internal faxmodems only).	3	8	Message waiting (voice products only).	4	16	Reserved.	5	32	Reserved.	6	64	Reserved.	7	128	Reserved.
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TECHNICAL REFERENCE

S42 0 Reserved

Fax Commands

+FCLASS=<i>n</i>	<p>Sets the mode of operation.</p> <p><i>FCLASS=0</i> <i>Data mode</i></p> <p><i>FCLASS=1</i> Group 3 Facsimile Service Class 1 mode</p> <p><i>FCLASS=2.0</i> Group 3 Facsimile Service Class 2.0 mode</p>
FCLASS?	Displays the current FCLASS mode (see descriptions above).
+FCLASS=?	Displays the FCLASS mode options (see descriptions above).
+FTS=<i>n</i>	<p>Stops the fax transmission. Then the modem waits for a specified time before OK appears on screen. The pause is set in 10 millisecond intervals. <i>n</i> is the number of 10 millisecond intervals that pass before OK appears. (<i>n</i>=0-255)</p>
+FRS=<i>n</i>	<p>Makes the modem wait for a specified length of silence before sending OK to the screen. The pause is set in 10 millisecond intervals. <i>n</i> is the number of 10 millisecond intervals that pass before OK appears. (<i>n</i>=0-255)</p> <p>Note: This command terminates with OK when either the specified amount of silence is detected or when the user types anything (which is ignored).</p>

TECHNICAL REFERENCE

+FTM=<i>n</i>	<p>Transmits data using the modulation specified by <i>n</i>. (<i>n</i> = 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, or 146) Note: See the “Screen Messages” table at the end of this section for an explanation of messages that appear in response to this command.</p>
+FRM=<i>n</i>	<p>Receives data using the modulation specified by <i>n</i>. (<i>n</i> = 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, or 146) Note: See the “Screen Messages” table at the end of this section for an explanation of messages that appear in response to this command.</p>
+FTH=<i>n</i>	<p>Transmits data framed in the HDLC protocol using the modulation specified by <i>n</i>. (<i>n</i> = 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, or 146) Note: See the “Screen Messages” table at the end of this section for an explanation of messages that appear in response to this command.</p>
+FRH=<i>n</i>	<p>Receives data framed in the HDLC protocol using the modulation specified by <i>n</i>. (<i>n</i> = 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, or 146)</p>

TECHNICAL REFERENCE

Note: See the “Screen Messages” table at the end of this section for an explanation of messages that appear in response to this command.

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Screen Messages

Numeric Message	Text Message	Description
0	OK	The previous command has been processed successfully.
1	CONNECT	The modem has just connected to another modem.
2	RING	Reports the receipt of a network altering ring.
3	NO CARRIER	No carrier is being received from the modem.
4	ERROR	The previous command line has not been recognized or was completed abnormally.
6	NO DIAL TONE	(Optional) Dial tone was not received within the time-out period.
7	BUSY	(Optional) A busy signal was deleted.
64 response	CONNECT/FAX	(Optional) The modem has established a fax connection. This is used only when the fax mode is selected.

The Serial Interface

The serial interface is a standard developed by the Electronic Industries Association (EIA). It defines the signals and voltages used when data is exchanged between a computer and a modem or serial printer.

The entire standard covers many more functions than are used in most data communications applications. Data is transmitted between the devices over a shielded serial cable with a 25-pin male (DB-25) connector to the modem and a 25-pin, 9-pin, 8-pin, or custom-built connector to the computer.

FCC regulations require the use of a shielded cable when connecting a modem to a computer to ensure minimal interference with radio and television.

Pin assignments are factory-set in the U.S. Robotics modem to match the standard DB-25 assignments in the following table. DB-9 connectors for IBM/AT-compatible computers should be wired at the computer end of the cable as shown in the DB-9 column.

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Serial Interface Pin Definitions

DB-25	DB-9	Circuit	Function	Signal Source Computer/Modem
1	—	AA	Chassis Ground	Both
2	3	BA	Transmitted Data	Computer
3	2	BB	Received Data	Modem
4	7	CA	Request to Send	Computer
5	8	CB	Clear to Send	Modem
6	6	CC	Data Set Ready	Modem
7	5	AB	Signal Ground	Both
8	1	CF	Carrier Detect	Modem
12	—	SCF	Speed Indicate	Modem
20	4	CD	Data Terminal Ready	Computer
22	9	CE	Ring Indicate	Modem

REGULATORY INFORMATION AND LIMITED WARRANTY

Notice: This modem was not designed or approved for use in Europe, Australia, and New Zealand.

Manufacturer's Declaration of Conformity

3Com Corporation
3800 Golf Road
Rolling Meadows, Illinois 60008
U.S.A.

declares that this product conforms to the FCC's specifications:

Part 15:

Operation is subject to the following two conditions:

- (1) this device may not cause harmful electromagnetic interference, and
- (2) this device must accept any interference received including interference that may cause undesired operations.

This equipment uses the following USOC jacks: RJ-11C.

Part 68:

This equipment complies with FCC Rules Part 68. Located on the bottom of the modem is the FCC Registration Number and Ringer Equivalence Number (REN).

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You must provide this information to the telephone company if requested.

The REN is used to determine the number of devices you may legally connect to your telephone line. In most areas, the sum of the REN of all devices connected to one line must not exceed five (5.0). You should contact your telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

An FCC compliant telephone cord and modular plug are provided with this equipment, which is designed to connect to the telephone network or premises wiring using a Part 68 compliant compatible jack. See installation instructions for details.

9-2

Caution to the User

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada (IC)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled *Digital Apparatus*, ICES-003 of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites

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dans la norme sur le matériel brouilleur:
Appareils Numériques, NMB-003 édictée
par l'Industrie Canada.

UL Listing/CUL Listing (Internal Products Only)

This information technology equipment is UL-Listed and CUL-Listed for use with UL-Listed personal computers that have installation instructions detailing user installation of card cage accessories.

UL Listing/CSA Certification (External Products Only)

This information technology equipment is UL-Listed and CSA Certified for use with personal computers and should be installed as indicated in the instructions included with the product.

Radio and Television Interference

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. The modem has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause interference to radio or television reception, which you can determine by monitoring reception when the modem is installed and when it is removed from the computer, try

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to correct the problem with one or more of the following measures:

- Reorient the receiving antenna (for televisions with antenna reception only) or cable input device.
- Relocate the computer with respect to the receiver.
- Relocate the computer and/or the receiver so that they are on separate branch circuits.

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet, prepared by the Federal Communications Commission, helpful:

How to Identify and Resolve Radio-TV Interference Problems

Stock No. 004-000-0345-4

U.S. Government Printing Office

Washington, DC 20402

In accordance with Part 15 of the FCC rules, the user is cautioned that any changes or modifications to the equipment described in this manual that are not expressly approved by 3Com could void the user's authority to operate the equipment.

For Canadian Modem Users

NOTICE: The Industry Canada (IC) label identifies certified equipment. This certification means the equipment meets certain telecommunications network protective, operational, and safety requirements as prescribed in the

REGULATORY INFORMATION AND LIMITED WARRANTY

appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line, individual service may be extended by means of a certified connector assembly (telephone extension cord.) The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Currently, telecommunication companies do not allow

users to connect their equipment to jacks except in precise situations that are spelled out in tariffing arrangements with those companies.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For your own protection, make sure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

REGULATORY INFORMATION AND LIMITED WARRANTY

CAUTION: Do *NOT* attempt to make such connections yourself. Instead, contact an electric inspection authority or electrician, as appropriate.

WARRANTY AND REPAIR SERVICE CENTER:

Keating Technologies

25 Royal Crest Court, Suite 200

Markham, ONT L3R 9X4

«**AVIS** : L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées cidessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

REGULATORY INFORMATION AND LIMITED WARRANTY

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

Avertissement: L'utilisateur ne doit pas tenter de faire ces raccordements lui même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

Centre de garantie et de service après-vente:

**Keating Technologies
25 Royal Crest Court, Suite 200
Markham, ONT L3R 9X4**

3Com Corporation Limited Warranty

3Com warrants this hardware product to be free from defects in workmanship and materials, under normal use and service, for the lifetime of the product from the date of purchase from 3Com or its authorized reseller. 3Com's sole obligation under this express warranty shall be, at 3Com's option and expense, to repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or if neither of the two foregoing options is reasonably available, 3Com may, in its sole discretion, refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned.

REGULATORY INFORMATION AND LIMITED WARRANTY

3Com warrants any replaced or repaired product or part for ninety (90) days from shipment, or the remainder of the initial warranty period, whichever is longer.

YEAR 2000 WARRANTY: In addition to the Hardware Warranty stated above, 3Com warrants that each product sold or licensed to Customer on and after January 1, 1998 that is date sensitive will continue performing properly with regard to such date data on and after January 1, 2000, provided that all other products used by Customer in connection or combination with the 3Com product, including hardware, software, and firmware, accurately exchange date data with the 3Com product, with the exception of those products identified at 3Com's Web site,

<http://www.3com.com/products/yr2000.html>

as not meeting this standard. If it appears that any product that is stated to meet this standard does not perform properly with regard to such date data on and after January 1, 2000, and Customer notifies 3Com before the later of April 1, 2000, or ninety (90) days after purchase of the product from 3Com or its authorized reseller, 3Com shall, at its option and expense, provide a software update which would effect the proper performance of such product, repair such product, deliver to Customer an equivalent product to replace such product, or if none of the foregoing is feasible, refund to Customer the purchase price paid for such product.

Any software update or replaced or repaired product will carry a Year 2000 Warranty for ninety (90) days after purchase or until April 1, 2000, whichever is later.

REGULATORY INFORMATION AND LIMITED WARRANTY

OBTAINING WARRANTY SERVICE:

Customer must contact a 3Com Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase from 3Com or its authorized reseller may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Service Repair Order (SRO) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured or sent by a method that provides for tracking of the package. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after 3Com receives the defective product. Return the product to:

3Com

SRO# _____

**Attn: Dock 15 PCD
1800 W. Central Ave.
Mt. Prospect, IL 60056**

3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com for repair, whether under warranty or not.

WARRANTIES EXCLUSIVE: IF A 3COM PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY FOR BREACH OF THAT WARRANTY SHALL BE REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. TO THE FULL EXTENT ALLOWED BY

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THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS.

3COM SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT OR MALFUNCTION IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY CUSTOMER'S OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO OPEN, REPAIR OR MODIFY THE PRODUCT, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OTHER HAZARDS, OR ACTS OF GOD.

REGULATORY INFORMATION AND LIMITED WARRANTY

LIMITATION OF LIABILITY. TO THE FULL EXTENT ALLOWED BY LAW, 3COM ALSO EXCLUDES FOR ITSELF AND ITS SUPPLIERS ANY LIABILITY, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE), FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE OR PROFITS, LOSS OF BUSINESS, LOSS OF INFORMATION OR DATA, OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR INTERRUPTION OF ITS PRODUCTS, EVEN IF 3COM OR ITS AUTHORIZED RESELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND LIMITS ITS

LIABILITY TO REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. THIS DISCLAIMER OF LIABILITY FOR DAMAGES WILL NOT BE AFFECTED IF ANY REMEDY PROVIDED HEREIN SHALL FAIL OF ITS ESSENTIAL PURPOSE.

DISCLAIMER: Some countries, states, or provinces do not allow the exclusion or limitation of implied warranties or the limitation of incidental or consequential damages for certain products supplied to consumers, or the limitation of liability for personal injury, so the above limitations and exclusions may be limited in their application to you. When the implied warranties are not allowed to be excluded in their entirety, they will be limited to the duration of the applicable written warranty.

REGULATORY INFORMATION AND LIMITED WARRANTY

This warranty gives you specific legal rights which may vary depending on local law.

GOVERNING LAW: This Limited Warranty shall be governed by the laws of the State of California, U.S.A. excluding its conflicts of laws principles and excluding the United Nations Convention on Contracts for the International Sale of Goods.