

**3Com U.S. Robotics®**

# **56K Faxmodem**

**User's Guide & Reference**

**PN 1.024.1697-00**

This manual covers installation and operating instructions for the following modems:

**3Com U.S. Robotics® 56K\* internal faxmodems and internal voice faxmodems**

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**\*IMPORTANT!** In accordance with the ITU standard for 56K transmissions (V.90), this modem is capable of 56 Kbps downloads. However, due to FCC rules which restrict power output of the service providers' modems, current download speeds are limited to 53 Kbps. Actual speeds may vary depending on 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 3Com 56K technology, and an Internet provider or corporate host site compatible with the V.90 standard or 3Com 56K technology are necessary for these high-speed downloads. See <http://www.3com.com/56k> for details.



## **PRODUCT DISCLAIMER**

- This manual covers features that may or may not be present on your modem. Please consult your computer manufacturer's documentation for a list of your modem's supported features.
- For service and repair issues, please contact your computer system manufacturer.



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## WELCOME TO 56K\* INFORMATION ACCESS



The International Telecommunication Union (ITU) determines the technical protocols that communications devices must use to operate with each other. Modems that comply with ITU standards can “talk” to other standards-compliant modems and fax machines worldwide.

The ITU has decided on a worldwide standard for 56K modem technology. With a 3Com U.S. Robotics modem, you can get 56K Internet access from any service provider who offers the ITU V.90 standard or 3Com 56K technology. 3Com is working with providers

everywhere to quickly upgrade their service to the ITU V.90 standard.

**\* IMPORTANT!** In accordance with the ITU standard for 56K transmissions (V.90), this modem is capable of 56 Kbps downloads. However, due to FCC rules which restrict power output of the service providers’ modems, current download speeds are limited to 53 Kbps. Actual speeds may vary depending on 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 3Com 56K technology, and an Internet provider or corporate host site compatible with the V.90 standard or 3Com 56K technology are necessary for these high-speed downloads. See <http://www.3com.com/56k> for details.

# PRODUCT FEATURES

## **Modulation Schemes**

ITU-T V.90  
3Com 56K 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

## **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

## ***PRODUCT FEATURES***

### **Voice Faxmodem Features**

If your new modem has voice capabilities, the following information will apply.

#### **Speakerphone**

With the addition of a microphone, external powered speakers, and the appropriate software, your new voice modem provides all the convenience of a full-duplex speakerphone. Unlike many half-duplex speakerphones, your modem allows you to converse normally without annoying echoes and distortion. Simply plug the speakers into the jack on the modem identified with the  icon, plug the microphone into the jack on the modem identified with the  icon, and you are ready to go.

For voice enabled modems that do not have audio connectors on the bracket, you will have to connect your modem to the sound card via the 4-pin connector which is found on the modem card.

#### **Personal Voice Mail**

Personal Voice Mail turns your modem into a full-featured messaging system. Enjoy the convenience of professional voice mail in your home or office for a fraction of the cost.

With Personal Voice Mail and the appropriate software, you can record custom greetings, receive messages, and set up multiple voice “mailboxes.” You can even access your voice messages remotely. Your modem will automatically detect incoming fax/data/voice calls and route them appropriately.

***PRODUCT FEATURES***

## **PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

### **Plug and Play Installation**

Your 3Com U.S. Robotics<sup>®</sup> modem is a Plug and Play device. You simply plug the modem into your computer, power up, and you are ready to work. The operating system does all the work of recognizing and configuring the modem for you. The modem must be installed before any communications software is loaded.

Plug and Play will not work if you do not have the necessary resources available or if devices on your system are not reporting resource usage correctly. Your modem requires one COM port and one IRQ setting. Here is how you can verify that your system has the necessary resources before installing the modem.

### **Determining Available Resources**

#### **Windows 95 and Windows 98**

Your modem requires one COM port and one IRQ setting. Here is how you can verify that your system has the necessary resources before installing the modem.

- 1.** Click the Windows **Start** button, point to **Settings**, and then click **Control Panel**.
- 2.** Double-click the **System** icon.
- 3.** When the “System Properties” screen appears, click the **Device Manager** tab.
- 4.** Double-click **Computer** and the “Computer Properties” screen appears.

***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

Select the option at the top of the screen to show Interrupt Requests (IRQs).

- 5.** You will see the IRQs your system is currently using. If IRQs 3, 4, 5, and 7 are being used, you need to free an IRQ before you begin installation. This process involves moving a device from the IRQ you want to use to a different (and usually higher) IRQ setting. Please read the documentation for (or contact the manufacturer of) the device that is currently using the IRQ you want to use for your modem, to learn more about what you should do to move the other device.

**Windows NT 4.0**

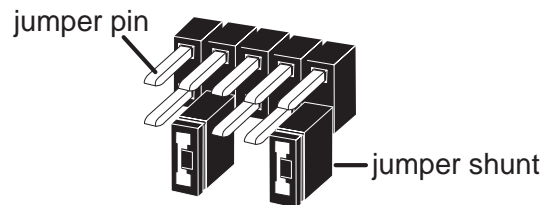
- 1.** Click **Start**, point to **Programs**, point to **Administrative Tools (Common)**, and click **Windows NT Diagnostics**.
- 2.** Click the **Resources** tab. Then click the **IRQ** button. The IRQs being used by your system are listed. If IRQs 3, 4, 5, and 7 are being used, you need to free an IRQ before you begin installation. This process involves moving a device from the IRQ you want to use to a different (and usually higher) IRQ setting. Please read the documentation for (or contact the manufacturer of) the device that is currently using the IRQ you want to use for your modem, to learn more about what you should do to move the other device.

## **How to Insert the Modem into the Computer**

**Before installing your modem, write its serial number in the space below. You will find the serial number underneath the bar code on the white label on the modem.**

**Serial Number** \_\_\_\_\_

- 1.** Make sure the jumper shunts on your modem are hanging from single jumper pins, as in this illustration.



- 2.** Turn off your computer and unplug it from the electrical outlet.

- 3.** Unplug any peripheral devices (printer, monitor, keyboard, mouse, etc.) from the computer.

**Before you unplug any cords, label them or make a sketch of how they are connected. This can be helpful when you plug them back in later.**

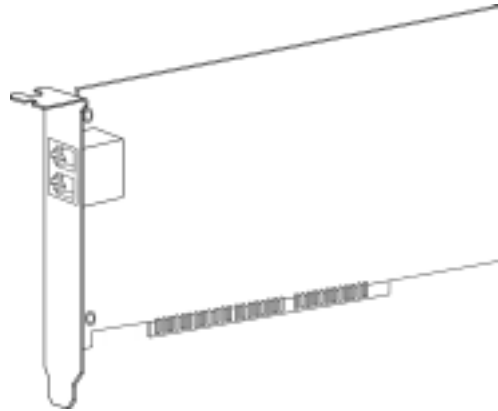
**To avoid risk of electric shock, make sure your computer and all peripheral devices are turned off and unplugged from electrical outlets.**

- 4.** Remove the cover. Refer to your computer manufacturer's manual if you need further instructions.
- 5.** Your modem is designed to fit into either a PCI expansion slot or an ISA expansion slot. Hold the modem so that the gold connectors are pointing at the

***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

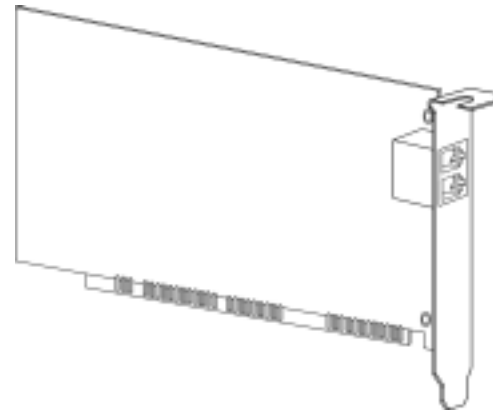
floor and the other components (speaker, processor, etc.) are facing you.

- If your modem is designed to fit into a PCI slot, it's bracket will be on the LEFT side of the modem, as in the following illustration.



- If your modem is designed to fit into an ISA slot, it's bracket will be on the

RIGHT side of the modem, as in the following illustration.

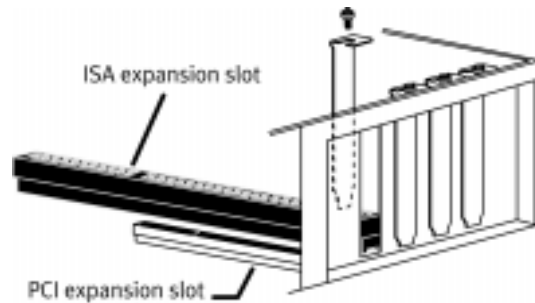


6. Find an empty expansion slot that your modem can use. ISA slots are usually dark plastic grooves lined with silver metal. PCI slots are usually white plastic grooves lined with silver metal. Unscrew and remove the expansion slot cover. It is the long narrow piece of metal that

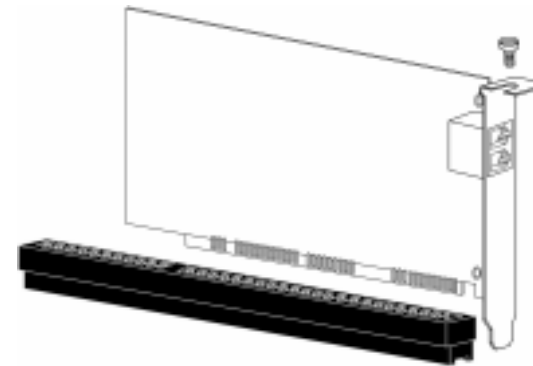


***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

keeps dust from entering through the opening perpendicular to the slot.



- 7.** Holding the modem by each corner, align the gold edge with the empty expansion slot. Push down gently until the modem snaps into the slot. The diagram shows horizontally aligned expansion slots. Some computers have vertically aligned slots. The instructions apply to both styles. (The following illustration shows a non-voice modem being inserted into an ISA slot.)





- 8.** You need to apply a little pressure to seat the modem properly. Sometimes a gentle back and forth motion helps fit the modem all the way into the slot. If you feel resistance, the modem may not be properly lined up with the slot. Do not force it into the slot. Remove the modem and try again.
- 9.** Once the modem is inserted, fasten it firmly into place using the screw that you removed in step 4.

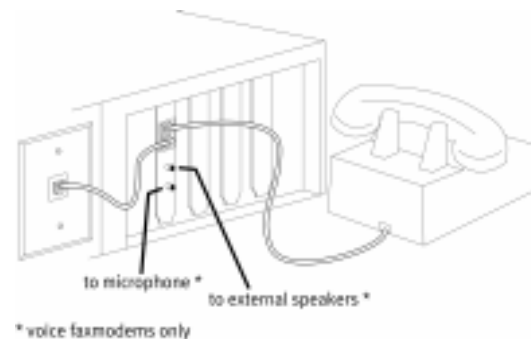
**PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0**

10. Replace the computer's cover.
11. Locate the wall jack you plan to use for the modem. If you have a phone plugged into this jack, disconnect the telephone cord from the jack.


**The phone jack you use must be for an ANALOG phone line (the type found in most homes). Many office buildings have digital phone lines. Be sure you know which type of line you have. The modem will be damaged if you use a digital phone line.**

12. Plug one end of the phone cord included with the modem into the modem jack labeled .
13. Plug the other end of the cord into the wall jack. If you want to use a telephone on the same line as the modem when the


modem is not in use, plug your telephone cord into the jack labeled .



**You cannot use the modem and a phone at the same time if they share the same telephone line.**

14. If your modem is a voice modem, it may have come with a microphone. Plug the microphone into the jack labeled . You should also attach a set of powered

## ***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

speakers (not included) to the jack labeled .

- 15.** Plug the power cords, cables, and peripherals back into the computer and turn on the computer.
- 16.** Start Windows.
- 17.** Next, you will need to install the modem's drivers.
  - If you have a Windows 95 system, turn to “Installing Modem Drivers with Windows 95” on this page.
  - If you have a Windows 98 system, turn to “Installing Modem Drivers with Windows 98” on page 13.
  - If you have a Windows NT system, turn to “Installing Modem Drivers with Windows NT” on page 16.

## **Installing Modem Drivers with Windows 95**

- 1.** When you see the following screen:
  - If you have a CD-ROM that contains your modem's drivers, insert the CD-ROM into your CD-ROM drive.
  - If you have a floppy diskette that contains your modem's drivers, insert the diskette into your floppy drive.

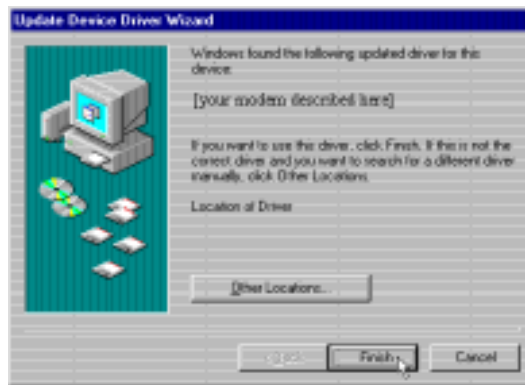
Click **Next**.



**PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0**

**If this screen does not appear, go to “Non-Plug and Play Modem Installation with Windows 95, Windows 98, and Windows NT 4.0” on page 21.**

2. Click **Finish**. Windows will begin copying files to your hard drive.



3. When Windows is finished copying files, you should verify that the modem

installation was a success. Click the Windows **Start** button and point to **Settings**. Then click **Control Panel**.

4. Double-click the **Modems** icon.
5. In the “Modems Properties” screen, you should see a description of your modem. This means the installation was a success. Click **OK**.

**If you do not see your modem listed, the installation was unsuccessful. Please refer to “Troubleshooting” on page 29.**

6. Next, click the **Diagnostics** tab at the top of the “Modems Properties” screen. Write down the COM setting for your modem in the following space. You may need to know this setting when you install your communications software.

**COM Port**\_\_\_\_\_

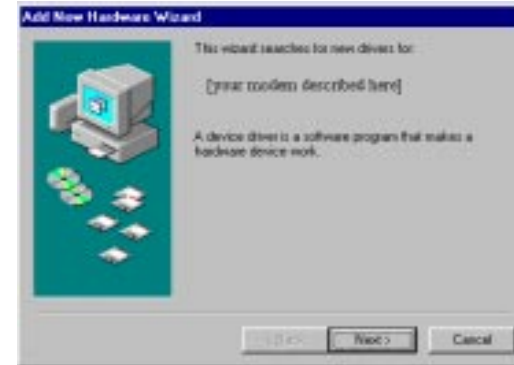
***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

7. Click **More Info...** The modem's status screens should appear in the box. Click **OK**.

**If you do not see your modem's status screens when you click **More Info**, the installation was unsuccessful. Please refer to "Troubleshooting" on page 29.**

### **Installing Modem Drivers with Windows 98**

1. When you see this screen, Windows has detected the modem. Click **Next**.



**If this screen does not appear, go to the section titled "Non-Plug and Play Modem Installation with Windows 95, Windows 98, and Windows NT 4.0" on page 21.**

**PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0**

2. Make sure the “Search for the best driver for your device” option is checked. Then click **Next**.



3. When you see the following screen:

- If you have a CD-ROM that contains your modem’s drivers, check the “CD-ROM drives” option and insert the CD-ROM into your drive.

- If you have a floppy diskette that contains your modem’s drivers, check the “Floppy disk drives” option and insert the diskette into your drive.



***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

4. The next screen tells you that Windows has found the driver for your modem. Click **Next**.



5. Click **Finish**.



6. When Windows is finished copying files, you should verify that the modem installation was a success. Click the Windows **Start** button and point to **Settings**. Then click **Control Panel**.
7. Double-click the **Modems** icon.
8. In the “Modems Properties” screen, you should see a description of your modem.

***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

This means the installation was a success. Click OK.

**If you do not see your modem listed, the installation was unsuccessful. Please refer to “Troubleshooting” on page 29.**

9. Next, click the **Diagnostics** tab at the top of the “Modems Properties” screen. Write down the COM setting for your modem in the following space. You may need to know this setting when you install your communications software.

**COM Port** \_\_\_\_\_

## **Installing Modem Drivers with Windows NT 4.0**

If you already have the Windows NT 4.0 Plug and Play utility installed, turn to “Windows NT 4.0 Modem Driver Installation with the PNP Utility Installed” on page 17. Otherwise, continue reading below.

### **Windows NT 4.0 Plug and Play Utility Installation**

1. With your computer on, place the Microsoft Windows NT 4.0 disc into your CD-ROM drive.
2. Start the Windows NT Explorer and browse the CD-ROM drive. Open the folder \DRVLIB\PNPISA\X86.
3. Right-click the file PNPISA.INF and select Install from the pop-up menu. If



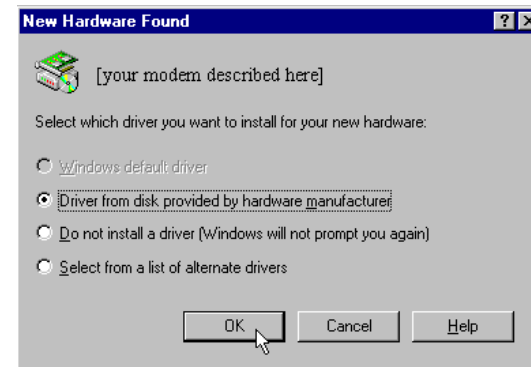
### ***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

you can't see this file in the folder, click the View menu and select the options command. Click on the View tab and turn off the "Hide extensions for known file types" option.

4. Restart the computer as instructed by Windows NT.
5. When your computer restarts, log in as an account with Administrator privileges.
6. Continue reading to learn how to navigate the screens that appear when Windows NT begins detecting your new modem.

#### **Windows NT 4.0 Modem Driver Installation with the PNP Utility Installed**

1. After the Windows NT login, Windows NT should detect the modem. If it does, you will see the following screen.



Click **Driver from disk provided by hardware manufacturer** and click **OK**.

**If this screen does not appear, go to the section titled "Non-Plug and Play Modem Installation with Windows 95, Windows 98, and Windows NT 4.0" on page 21.**

2. When you see the following screen:

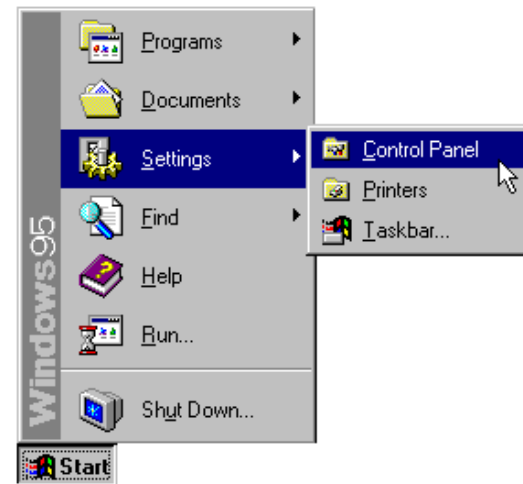
**PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0**

- If you have a CD-ROM that contains your modem's drivers, insert the CD-ROM into your drive, type **D:\** in the text box, and click **OK**. (If your CD-ROM drive uses a letter other than **D**, use that letter instead.)
- If you have a floppy diskette that contains your modem's drivers, insert the diskette into your drive, type **A:\** in the text box, and click **OK**.



3. Once Windows finishes loading the information from the CD-ROM, you should verify that the modem installation was a success. When your desktop

returns, click the Windows **Start** button and point to **Settings**. Then click **Control Panel**.

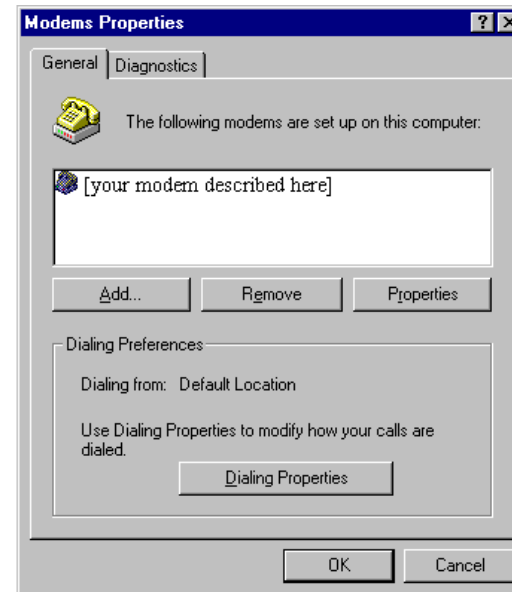


**PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0**

4. Double-click the **Modems** icon (circled in the screen image below).



5. In the “Modems Properties” screen, you should see a description of your modem.



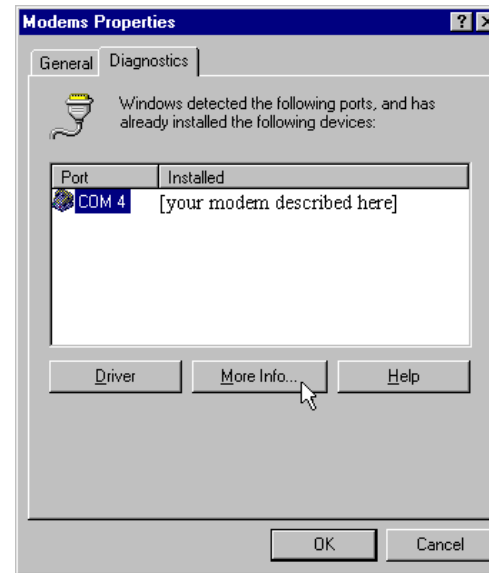
This means the installation was a success. Click **OK**.

***PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

**If you do not see your modem listed, the installation was unsuccessful. Please refer to “Troubleshooting” section on page 29.**

6. Next, click the **Diagnostics** tab at the top of the “Modems Properties” screen. Write down the COM setting for your modem below. (Your screen may show a different setting than that shown in the following screen.) You may need to know this setting when you install fax/data communications software. Click **OK**.

**COM Port** \_\_\_\_\_



## **NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

Plug and Play installations are not always successful. If you were directed to this section, Plug and Play installation failed to work properly. Follow these instructions to manually install your modem.

### **Removing the Modem from the Computer**

- 1.** Shut down and turn off your computer. Unplug it from its electrical outlet.
- 2.** Remove the computer's cover.
- 3.** Remove the modem from the expansion slot.

- 4.** Replace the computer's cover, plug the computer back in, and turn the computer back on.

### **Determining Available IRQs**

#### **If you are installing the modem in a Windows 95 or Windows 98 system**

- 1.** Click Windows **Start**. Point to **Settings** and click **Control Panel**. Double-click the **System** icon and then click the **Device Manager** tab.
- 2.** Double-click **Computer**. This displays a list of IRQs being used by your system. Write down an IRQ from the following

**NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

range that is not displayed (and is therefore available): 3, 4, or 5.

**Available IRQ** \_\_\_\_\_

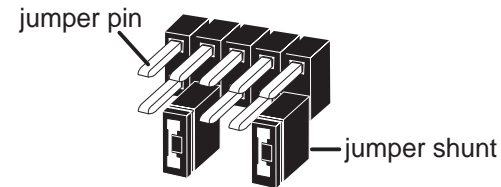
3. Turn to “Setting the Jumpers”.

**If you are installing the modem in a Windows NT system**

1. Click Windows **Start**. Point to **Programs** and then point to **Administrative Tools (Common)**. Click **Windows NT Diagnostics**.
2. Click the **Resources** tab and then click the **IRQ** button. This displays a list of the IRQs being used by your system. Write down an IRQ from the following range that is not displayed (and is therefore available): 3, 4, or 5.  
**Available IRQ** \_\_\_\_\_

## Setting the Jumpers

1. Touch an unpainted metal part of your computer (the back is usually unpainted) to discharge static electricity. Static can damage your modem.
2. Take the modem out of its plastic bag.
3. Find the jumper shunts (small black plastic pieces) on the COM port and IRQ jumper pins on your modem. They will resemble the following illustration.

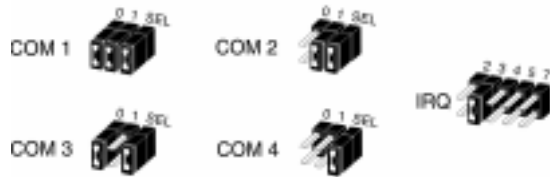


4. Set the jumper shunts on the modem’s IRQ and COM port jumpers to the IRQ and COM port settings suggested in the

**NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

following table. Use the following illustrations as a guide.

<u>Available IRQ</u>	<u>COM Port</u>
3	2
4	1
5	3



**If you need to move the jumper shunts, grasp them with tweezers or needle-nosed pliers. DO NOT grasp too firmly, however, or you may crush the jumper shunts. If a shunt seems stuck, try gently rocking it back and forth as you lift.**

## Re-installing the Modem

Reinstall the modem according to steps 1 through 15 beginning on page 6. Then return to these instructions.

**Windows NT 4.0 users turn to page 25.**

### Windows 95 and Windows 98 Users

1. From the Windows desktop, double-click **My Computer**.
2. Double-click **Control Panel**.
3. Double-click **Add New Hardware**.
4. Click **Next**.
5. Click **Yes** and then click **Next**. Click next again. Windows will begin searching your system for new devices.
6. When the search is completed, click the **Details** button. If the detection process

***NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

was successful, a COM port should be listed. Click **Finish**.

- 7.** In the Control panel, double-click the **Modem** icon.
- 8.** De-select the **Don't detect my modem...** option if it's selected (i.e. make sure there is not a check mark in the box next to the selection). Then click **Next**.
- 9.** Click **Change**.
- 10.** Click **Have Disk**.
- 11.** When you see the "Install From Disk" screen:
  - If you have a CD-ROM that contains your modem's drivers, insert the CD-ROM into your drive, type **D:\** in the text box, and click **OK**. (If your CD-ROM drive uses a letter other than **D**, use that letter instead.)

- If you have a floppy diskette that contains your modem's drivers, insert the diskette into your drive, type **A:\** in the text box, and click **OK**.

- 12.** When you see the "Install New Modem" screen, click the manufacturer of your modem in the first column and then click type of modem you have in the second column. Then click **OK**.
- 13.** Write the COM port setting here: \_\_\_\_\_. Click **Next**.
- 14.** Click **Finish**.
- 15.** Now you should verify that the modem installation was a success. When your desktop returns, click the Windows **Start** button and point to **Settings**. Then click **Control Panel**.
- 16.** Double-click the **Modems** icon.



***NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0***

- 17.** In the “Modems Properties” screen, you should see your modem listed. This means the installation was a success. Click **OK**.

**If you do not see your modem listed, the installation was unsuccessful. Please refer to “Troubleshooting” on page 29.**

**Windows NT 4.0 Users**

- 1.** From the Windows desktop, double-click **My Computer**.
- 2.** Double-click **Control Panel**.
- 3.** Double-click the **Ports** icon.
- 4.** Click **Add**.
- 5.** Fill in the **COM port #** and **IRQ** fields with the COM port and IRQ you wish to use with your new modem. The **Base I/O Port Address** field will be filled in with the correct default value. Click **OK**.
- 6.** The “Ports” screen will appear showing the COM port you just added. Click **OK**.
- 7.** Return to the **Control Panel** and double-click the **Modems** icon.
- 8.** Click **Add**.
- 9.** Click **Next**. Your computer will look for the modem.
- 10.** Once your computer finds the modem, you will see a screen showing that it has detected a “Standard Modem”. Click **Change**.
- 11.** Click **Have Disk**.
- 12.** When you see the “Install From Disk” screen:
  - If you have a CD-ROM that contains your modem’s drivers, insert the CD-

**NON-PLUG AND PLAY MODEM INSTALLATION WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

ROM into your drive, type **D:\** in the text box, and click **OK**. (If your CD-ROM drive uses a letter other than **D**, use that letter instead.)

- If you have a floppy diskette that contains your modem's drivers, insert the diskette into your drive, type **A:\** in the text box, and click **OK**.

**13.**When you see the “Install New Modem” screen, click the manufacturer of your modem in the first column and then click type of modem you have in the second column. Then click **OK**.

**14.**Write the COM port setting here: \_\_\_\_\_.  
Click **Next**.

**15.**Click **Finish**.

**16.**Now you should verify that the modem installation was a success. When your

desktop returns, click the Windows **Start** button and point to **Settings**. Then click **Control Panel**.

**17.**Double-click the **Modems** icon.

**18.**In the “Modems Properties” screen, you should see your modem listed. This means the installation was a success. Click **OK**.

**If you do not see your modem listed, the installation was unsuccessful. Please refer to “Troubleshooting” on page 29.**

## **UN-INSTALLING THE MODEM WITH WINDOWS<sup>®</sup> 95, WINDOWS 98, AND WINDOWS NT 4.0**

The process for removing your modem from your computer is the same whether your operating system is Windows 95, Windows 98, or Windows NT 4.0.

- 1.** Click Windows **Start**, point to **Settings** and click **Control Panel**.
- 2.** Double-click the **Modems** icon.
- 3.** Highlight the modem you wish to remove by clicking it.
- 4.** Click **Remove**.
- 5.** Shut down your system. Click **Start**. Click **Shut Down**. Click **Yes**.
- 6.** When your computer is shut down, turn it off.
- 7.** Unplug the computer's power cord from the computer.
- 8.** Remove the computer's cover.
- 9.** Remove the modem from its expansion slot.
- 10.** Plug your computer's power cord back into the computer.

***INTERNAL MODEM UN-INSTALLATION WITH WINDOWS® 95, WINDOWS 98, AND WINDOWS NT 4.0***

# TROUBLESHOOTING

## Read This First!

1. Click Windows **Start**, point to **Settings**, and click **Control Panel**.
2. Double-click the **Modems** icon.
3. Click the **Diagnostics** tab.
4. Click on the **COM port** that your modem is assigned to, so that it is highlighted. If you do not see your modem on this screen, you will need to shut down your computer and uninstall the modem. Reinstall the modem following the instructions in this guide.
5. Click **More Info**. You should see a list of the modem's ATI commands. Click **OK**. If you do not, your modem is not properly installed. Shut down your computer and uninstall the modem. Reinstall the modem following the instructions in this guide.

## **PROBLEM : The computer or software will not recognize the modem.**

### **POSSIBLE SOLUTION**

Make sure the modem turned on. An internal modem should turn on automatically when the computer is turned on.

### **POSSIBLE SOLUTION**

You may not be entering modem commands in the proper manner. Type using all upper case (AT) or all lower case (at).

## ***TROUBLESHOOTING***

### **POSSIBLE SOLUTION**

You may have a COM port/IRQ conflict. Right-click on the **My Computer** icon on your desktop. Click **Properties**. Click the **Device Manager** tab. If you see a yellow exclamation point over your modem, you have a resource conflict, and it is probably an IRQ conflict. Click the modem's name to select it. Then click **Remove**. You will be asked if you are sure you wish to remove the device. Click **OK**. When the modem has been removed, shut down and turn off your computer. Unplug the computer from its electrical outlet and remove the cover. Physically remove the modem from its expansion slot. Replace the cover, plug the computer back into the electrical outlet, and turn on the computer. When Windows restarts, once again right-click the **My Computer** icon on your desktop and click **Properties**. Click the **Device Manager** tab. Double-click **Computer**. Make sure the "Interrupt request (IRQ)" radio button at the top of the screen is checked. You can determine which IRQ settings are free on your system by looking for numbers that are not listed in the **Setting** column. One of the following IRQs needs to be free: 3, 4, 5, or 7.

If there are no IRQ settings free in this range, you need to move a device off of one of these IRQs in order to free it for use by your modem. We recommend removing other modems or disabling COM ports that may be using one of these IRQs. After you have made these changes, reinstall the modem using the instructions in this guide. Once your modem is properly installed, make sure you have the correct COM port and IRQ settings in your software and/or in the Windows Device Manager.


## ***TROUBLESHOOTING***

**PROBLEM : The modem will not go off hook to dial or does not answer the phone.**


### **POSSIBLE SOLUTION**

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.

### **POSSIBLE SOLUTION**

You may have plugged your modem's phone cord into the wrong jack on the modem. Make sure the phone cord is plugged into the jack labeled .

### **POSSIBLE SOLUTION**

You might have a bad phone cord connection to your modem. The phone cord should be plugged into the jack labeled  and the wall phone jack. The phone cord should be no longer than 12 feet in length. Use the phone cord included with your modem if possible.

### **POSSIBLE SOLUTION**

Your phone jack may have been wired incorrectly. Contact your telephone company. Ask them to make sure the tip and ring are on the inside pair of wires.

## ***TROUBLESHOOTING***

### **POSSIBLE SOLUTION**

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.

### **POSSIBLE SOLUTION**

You may have a poor line connection. Place the call again. Calls are routed differently each time.

### **POSSIBLE SOLUTION**

If you have voice mail, your dial tone may be altered because messages are waiting. Retrieve your voice mail messages to restore your normal dial tone.

### **POSSIBLE SOLUTION**

Your software may not have auto answer enabled. Enable the auto answer feature. In your communication software's terminal mode, type **ATS0=1** and press **ENTER**. You need to enable auto answer before every session unless you alter your software's initialization string to permanently enable auto answer.



## ***TROUBLESHOOTING***

**PROBLEM : Both modems sound like they are exchange carrier signals, but fail to establish a connection.**

### **POSSIBLE SOLUTION**

You may have a poor line connection. Place the call again. Calls are routed differently each time.

### **POSSIBLE SOLUTION**

Your phone jack may have been wired incorrectly. Contact your telephone company. Ask them to make sure the tip and ring are on the inside pair of wires.

**PROBLEM : Your 56K modem cannot achieve a 56K Internet connection.**

### **POSSIBLE SOLUTION**

56K modems are capable of receiving data at speeds up to 56 Kbps and sending data at speeds up to 31.2 Kbps. Due to FCC regulations, receiving speeds are limited to 53 Kbps. Actual speeds may vary. An analog phone line compatible with the ITU V.90 standard or 3Com 56K technology and an Internet provider or corporate host site with the ITU V.90 standard or 3Com 56K technology are necessary for these high-speed downloads. Check <http://www.3com.com/56k> for a list of ISPs that observe the ITU V.90 standard and/or offer 3Com 56K technology.

## ***TROUBLESHOOTING***

### **POSSIBLE SOLUTION**

The phone lines in your area may not be 56K compatible. Call your phone company to find out if your phone line is compatible with the ITU standard for 56K and/or is compatible with 3Com 56K technology.

### **POSSIBLE SOLUTION**

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.

### **PROBLEM : Errors are constantly occurring in your V.17 fax transmissions.**

### **POSSIBLE SOLUTION**

Your modem initialization string may be insufficient for fax transmissions. In terminal mode, type the following initialization string: **AT&F&H3&I2&R2S7=90** and then press **ENTER**. The standard string for faxing is **AT&F1S36=0**

### **POSSIBLE SOLUTION**

There may be a Terminate and Stay Resident (TSR) program (such as a screen saver or virus scanner) running in the background, disrupting data communications. Disable any Terminate and Stay Resident (TSR) programs running in the background. If you have software running as a TSR, check the software's manual for information about disabling its ability to operate as a TSR.

## ***TROUBLESHOOTING***

### **POSSIBLE SOLUTION**

Your baud rate may be set too high. In your communications software, lower the baud rate to 9600, 7200, or 4800.

### **POSSIBLE SOLUTION**

You may be trying to fax a compressed file. Decompress the file using the application with which it was compressed. Then open it in the application with which it was created. Select your fax software as the printer and then print the file.

### **PROBLEM: Your communications software fails to initialize the modem.**

### **POSSIBLE SOLUTION**

Your software's port settings may be incorrect. Make sure the software's port settings match those for your modem.

### **POSSIBLE SOLUTION**

Make sure the modem is turned on. An internal modem should turn on automatically when the computer is turned on.

## ***TROUBLESHOOTING***

### **PROBLEM : If Plug and Play does not detect your modem.**

#### **POSSIBLE SOLUTION**

The Plug and Play installation was not successful. Try the following:

- 1.** Click **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, follow the on-screen instruction to install the 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, please contact technical support. 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 **Remove**. Click **OK** when Windows asks if you wish to remove the device. Next, restart the computer and continue with the on-screen instructions. If the computer does not detect the modem after this second restart, please contact technical support.

## GLOSSARY

Cross references are printed in **boldface**. Cross references with items in the Command Summary, found in the Technical Quick Reference, are printed in *italics*.

### **analog loopback**

A modem self-test in which data from the keyboard or an internal test pattern is sent to the modem's transmitter, turned into analog form, looped back to the receiver, and converted back into digital form.

### **analog signals**

A variety of signals and wavelengths that can be transmitted over communications lines such as the sound of a voice over the phone line. Contrast with **digital signals**.

### **answer mode**

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

The transmit/receive frequencies are the reverse of the originating modem, which is in **originate mode**.

### **application**

A computer program designed to perform a specific function, such as word processing or organizing data into a spreadsheet.

### **ARQ**

Automatic Repeat reQuest. A general term for a function that automatically allows your modem to detect flawed data and retransmit it. See **MNP** and **V.42**.

### **ASCII**

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

## GLOSSARY

### **asynchronous transmission**

Data transmission in which the length of time between transmitted **characters** may vary. Because the time lapses between transmitted characters are not uniform, the receiving modem must be signaled as to when the data bits of a character begin and when they end. The addition of **start/stop bits** to each character serves this purpose.

### **Auto Answer**

Sets the modem to pick up the phone line when it detects a certain number of rings. See S-register S0 in the “Technical Quick Reference.”

### **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 to dial. 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 (only two digits). 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 telephone channel modems are established at set bit

## **GLOSSARY**

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 or Kbps.

### **buffer**

A memory area set aside to be used as temporary 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. In user documentation, the term usually refers to 8-bit units or **characters**. One kilobyte (KB) is equal to 1,024 bytes or characters; 640 KB indicates 655,360 bytes or characters.

### **carrier**

The basic tone or signal that the modem alters (modulates) to send data.

### **character**

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

### **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.

## **GLOSSARY**

### **class 1 and 2.0**

International standards used between 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**

Communications between computers utilizing 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 the **throughput**.

### **data mode**

The mode used by a faxmodem to send and receive data.

### **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 settings assumed, at installation, startup or reset, by the computer's software and attached devices. These settings remain



## GLOSSARY

in effect until changed by the user or other software.

### **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. Contrast with analog signals.

### **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

## GLOSSARY

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 in which the faxmodem is capable of sending and receiving files in a **facsimile** format. See definitions for **V.17**, **V.27ter**, **V.29**.

### **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**

Capable of signal flow in both directions simultaneously. In microcomputer communications, may refer to the suppression of the online **local echo**.

### **half duplex**

Capable of signal flow in both directions, but signals may flow 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 one cycle per second.

## GLOSSARY

### 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. The initials ITU-T represent the French name. In English it is known as the International Telegraph and Telephone Consultative Committee.

### 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 *Hn*.

### 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 erred **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.

## **GLOSSARY**

### **nonvolatile memory (NVRAM)**

User-programmable random access memory whose data is retained when power is turned off. Your modem's NVRAM 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 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

## **GLOSSARY**

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**

The sending system displays data sent to the remote system. 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 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, 9,600 bps, or 7,200 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.

## GLOSSARY

### **V.27**

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 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 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.

## **GLOSSARY**

### **Xmodem**

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

### 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**

<b>Dn</b>	<b>Dials the specified phone number. Includes the following:</b>	;	(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 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

### **Mn** Operates speaker.

**TECHNICAL REFERENCE**

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



***TECHNICAL REFERENCE***

\*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—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 *Prohibits Remote Digital Loopback*
- &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.**

	<b>\$N=0</b>	<b>&amp;N&gt;0</b>
<b>&amp;U=0</b>	Connects at best possible speed between your modem and the remote modem. NOTE: These factory default settings should be sufficient for most users.	Connects at a speed at or below &Nn.
<b>&amp;U&gt;0</b>	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

### S-Registers

To change a setting, use the `ATSr=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**

<b>Register</b>	<b>Default</b>	<b>Function</b>
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 U.S. Robotics modem.
S10	14	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. <b>Note:</b> If you set S10 = 255, the modem will not hang up when carrier is lost. Dropping DTR hangs up the modem.
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**

<b>Register</b>	<b>Default</b>	<b>Function</b>																											
S13	0	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, AT\$13 = 17 enables bit 0 (value is 1) and bit 4 (value is 16). <table border="1"><thead><tr><th><b>Bit</b></th><th><b>Value</b></th><th><b>Result</b></th></tr></thead><tbody><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></tbody></table>	<b>Bit</b>	<b>Value</b>	<b>Result</b>	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.
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\* 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**

<b>Register</b>	<b>Default</b>	<b>Function</b>
S14	0	Reserved
S15	0	Bit-mapped register setup. To set the register, see instructions for S13.
		<b>Bit Value Result</b>
		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.
		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])
S16	0	Reserved
S17	0	Reserved

**TECHNICAL REFERENCE**

<b>Register</b>	<b>Default</b>	<b>Function</b>
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**

<b>Register</b>	<b>Default</b>	<b>Function</b>																											
S27	0	Bit-mapped register setup. To set the register, see instructions for S13.																											
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**TECHNICAL REFERENCE**

<b>Register</b>	<b>Default</b>	<b>Function</b>																											
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.																											
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**TECHNICAL REFERENCE**

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S33	0	Bit-mapped register setup. To set the register, see the instructions for S13.																											
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**TECHNICAL REFERENCE**

<b>Register</b>	<b>Default</b>	<b>Function</b>																											
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	Bit-mapped register setup. To set registers, see instructions for S13. <table><thead><tr><th><b>Bit</b></th><th><b>Value</b></th><th><b>Result</b></th></tr></thead><tbody><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>Reserved.</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></tbody></table>	<b>Bit</b>	<b>Value</b>	<b>Result</b>	0	1	Distinctive ring enabled.	1	2	Speakerphone connect message override (voice products only).	2	4	Reserved.	3	8	Message waiting (voice products only).	4	16	Reserved.	5	32	Reserved.	6	64	Reserved.	7	128	Reserved.
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7	128	Reserved.																											
S42	0	Reserved																											

## TECHNICAL REFERENCE

### Fax Commands

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

#### **TECHNICAL REFERENCE**

- +FTM=*n***                    **Transmits data using the modulation specified by *n*.**  
(*n* = 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.
- +FRM=*n***                    **Receives data using the modulation specified by *n*.**  
(*n* = 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.
- +FTH=*n***                    **Transmits data framed in the HDLC protocol using the modulation specified by *n*.**  
(*n* = 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.
- +FRH=*n***                    **Receives data framed in the HDLC protocol using the modulation specified by *n*.**  
(*n* = 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, or 146)

### ***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.

## **Screen Messages**

<b>Numeric Message</b>	<b>Text Message</b>	<b>Description</b>
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.
5	NO DIAL TONE	(Optional) Dial tone was not received within the time-out period.
6	BUSY	(Optional) A busy signal was detected.
64	CONNECT/FAX	(Optional) The modem has established a fax connection. This response is used only when the fax mode is selected.

## REGULATORY INFORMATION

### **Manufacturer's Declaration of Conformity**

This product conforms to the FCC's specifications:

*Part 15; Subpart B Class B*

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.

*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).

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 uses the following USOC jacks: RJ-11C.

This equipment may not be used on coin service provided by the telephone company.

Connection to party lines is subject to state tariffs.

## **REGULATORY INFORMATION**

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.

### **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.

### **IC (Canada)**

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

### **UL Listing/CUL Listing**

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.

### **Connecting to the Telephone Company**

It is not necessary to notify the telephone company before installing the modem. However, the telephone company may request the telephone number(s) to which the U.S. Robotics modem is connected and the regulatory information printed in this section.

### **REGULATORY INFORMATION**

Be sure that the telephone line you are connecting the modem to is a standard analog line and not a digital (PBX), party, or coin telephone line.

If the modem is malfunctioning, it may affect the telephone lines. In this case, disconnect the modem until the source of the difficulty is traced.

#### **Fax Branding**

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent, an identification of the business or other entity, or other individual sending the message, and the telephone number of the

sending machine or of such business, other entity, or individual. (The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.)

In order to program this information into your U.S. Robotics modem, refer to the manual of your communications software program.

#### **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 the FCC rules,



#### **REGULATORY INFORMATION**

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

- Re-orient 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

***REGULATORY INFORMATION***

approved by U.S. Robotics, Inc. could void the user's authority to operate the equipment.

For service/repair issues, contact the system/PC manufacturer.

# TECHNICAL REFERENCE

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## TECHNICAL REFERENCE

### 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 do not 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 does not count the AT prefix, carriage returns, or spaces.

**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 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 redial. 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. 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:**

0-9	Numeric digits
#, *	Extended touch-tone pad tones
L	Dials the last dialed number
P	Pulse (rotary) dial
R	Originates call using answer (reverse) frequencies
Sn	Dials the phone number string stored in NVRAM at position n (n = 0–3); phone numbers are stored with the &Zn=s command
T	Tone dial
,	(Comma) Pause, See S8 definition; which it is linked to
;	(Semicolon) Return to Command mode after dialing
“	Dials the letters that follow (in an alphabetical phone number)
!	(Exclamation point) Flashes the switch hook
/	Delays for 125 ms. before proceeding with dial string
W	Wait for second dial tone (X2 or X4); linked to S6 register
@	Dials, waits for quiet answer, and continues (X3 or higher)
\$	Displays a list of Dial commands

### **En**    **Sets local echo**

E0	Echo OFF
E1	<i>Modem displays keyboard commands</i>

## TECHNICAL REFERENCE

### ***Fn*** Sets online local echo of transmitted data ON/OFF

- F0 Local echo ON, modem sends a copy of 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

## TECHNICAL REFERENCE

### **Ln** Controls speaker volume (internals only)

- L0 Low volume
- L1 Low volume
- L2 *Medium volume*
- L3 High volume

### **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 do not 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



## TECHNICAL REFERENCE

**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

**Xn** Sets result code displayed, default is X4

Result Codes	Xn Setting				
	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					

\*Requires @ in dial string; replaces NO CARRIER

**TECHNICAL REFERENCE**

Xn (Continued)	Xn Setting				
Result Codes (Continued)	X0	X1	X2	X3	X4
10/CONNECT 2400		•	•	•	•
11/RINGING					•
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		•	•	•	•
256/CONNECT 28000		•	•	•	•
260/CONNECT 29333		•	•	•	•
264/CONNECT 30666		•	•	•	•
268/CONNECT 32000		•	•	•	•
180/CONNECT 33333		•	•	•	•
272/CONNECT 34666		•	•	•	•

**TECHNICAL REFERENCE**

Xn (Continued)	Xn Setting					
	Result Codes (Continued)	X0	X1	X2	X3	X4
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 (@)					•	•

**TECHNICAL REFERENCE**

Fast Dial

- 
-

## 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)

## 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—*LAPM/MNP/NONE* (error control) and *V42bis/MNP5* (data compression)

## TECHNICAL REFERENCE

### **&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

### **&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

## TECHNICAL REFERENCE

- &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
- &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

## TECHNICAL REFERENCE

**&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.)

*&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  
&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



## TECHNICAL REFERENCE

**&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

**&Tn**    Begins test modes.

&T0    Ends testing

&T1    Analog Loopback

&T2    Reserved

&T3    Local Digital Loopback

&T4    Enables Remote Digital Loopback

&T5    *Prohibits Remote Digital Loopback*

&T6    Initiates Remote Digital Loopback

&T7    Remote Digital with self-test and error detector

&T8    Analog Loopback with self-test and error detector

### TECHNICAL REFERENCE

**&Un** Sets floor connect speed when set above 0. If the connection cannot be established above this speed, the modem will hang up. When **&Un** is used in conjunction with **&Nn** and **&Nn** is greater than 0, **&Nn** is the ceiling connect speed.

	<b>\$N=0</b>	<b>&amp;N&gt;0</b>
<b>&amp;U=0</b>	Connects at best possible speed between your modem and the remote modem. Note: These factory default settings should be sufficient for most users.	Connects at speed defined by <b>&amp;Nn</b> . If the connection cannot be made above this speed, the modem will hang up.
<b>&amp;U&gt;0</b>	Connects at any speed faster than the value of <b>&amp;Un</b>	Connects at any speed between <b>&amp;Nn</b> and <b>&amp;Un</b>

## TECHNICAL REFERENCE

### &Un (Continued)

&U0	<i>No restrictions on the minimum speed for the connection</i>	&U20	32000 bps
&U1	300 bps	&U21	33,333 bps
&U2	1200 bps	&U22	34666 bps
&U3	2400 bps	&U23	36000 bps
&U4	4800 bps	&U24	37,333 bps
&U5	7200 bps	&U25	38666 bps
&U6	9600 bps	&U26	40000 bps
&U7	12,000 bps	&U27	41,333 bps
&U8	14,400 bps	&U28	42,666 bps
&U9	16,800 bps	&U29	44,000 bps
&U10	19,200 bps	&U30	45,333 bps
&U11	21,600 bps	&U31	46666 bps
&U12	24,000 bps	&U32	48000 bps
&U13	26,400 bps	&U33	49333 bps
&U14	28,800 bps	&U34	50666 bps
&U15	31,200 bps	&U35	52000 bps
&U16	33,600 bps	&U36	53333 bps
&U17	28000 bps	&U37	54666 bps
&U18	29333 bps	&U38	56000 bps
&U19	30666 bps	&U39	57333 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

### 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.
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.

## TECHNICAL REFERENCE

Register	Default	Function																		
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 (+++).																		
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, AT S13 = 17 enables bit 0 (value is 1) and bit 4 (value is 16).</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Result</th> </tr> </thead> <tbody> <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, auto dial the number stored in NVRAM at position 0.</td> </tr> <tr> <td>4</td> <td>16</td> <td>At power on/reset, auto dial the number stored in NVRAM at position 0.</td> </tr> </tbody> </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, auto dial the number stored in NVRAM at position 0.	4	16	At power on/reset, auto dial the number stored in NVRAM at position 0.
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4	16	At power on/reset, auto dial the number stored in NVRAM at position 0.																		

## TECHNICAL REFERENCE

### Register Default Function

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S13 (Continued)

Bit	Value	Result
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 does not exceed the size of their screen. This is also very helpful in situations when a remote modem/printer application is losing characters.

S14        0        Reserved

S15        0        Bit-mapped register setup. To set the register, see instructions for S13.

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/V.32terbo.
3	8	Disable MNP handshake.
4	16	Disable MNP level 4.

## TECHNICAL REFERENCE

### Register Default Function

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S15 (Continued)

		<b>Bit</b>	<b>Value</b>	<b>Result</b>
		5	32	Disable MNP level 3.
		6	64	MNP incompatibility.
		7	128	Disable V.42 operation.
		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])		
S16	0	Reserved		
S17	0	Reserved		
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.		



## TECHNICAL REFERENCE

Register	Default	Function																								
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																								
S27	0	Bit-mapped register setup. To set the register, see instructions for S13.																								
		<table border="1"> <thead> <tr> <th>Bit</th> <th>Value</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>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)</td> </tr> <tr> <td>1</td> <td>2</td> <td>Enables unencoded (non-trellis coded) modulation in V.32 mode.</td> </tr> <tr> <td>2</td> <td>4</td> <td>Disables V.32 modulation.</td> </tr> <tr> <td>3</td> <td>8</td> <td>Disables 2100 Hz answer tone to allow two V.42 modems to connect faster.</td> </tr> <tr> <td>4</td> <td>16</td> <td>Enables V.23 fallback mode.</td> </tr> <tr> <td>5</td> <td>32</td> <td>Disables V.32<i>bis</i> mode.</td> </tr> <tr> <td>6</td> <td>64</td> <td>Disable V.42 selective reject.</td> </tr> </tbody> </table>	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.
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5	32	Disables V.32 <i>bis</i> mode.																								
6	64	Disable V.42 selective reject.																								

## TECHNICAL REFERENCE

### Register Default Function

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S27 (Continued)

		<b>Bit</b>	<b>Value</b>	<b>Result</b>
		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.
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

## TECHNICAL REFERENCE

Register	Default	Function																											
S32	2	Bit-mapped register setup. To set the register, see the instructions for S13.																											
		<table><thead><tr><th>Bit</th><th>Value</th><th>Result</th></tr></thead><tbody><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></tbody></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.																											
S33	0	Bit-mapped register setup. To set the register, see the instructions for S13.																											
		<table><thead><tr><th>Bit</th><th>Value</th><th>Result</th></tr></thead><tbody><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></tbody></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.																											

## TECHNICAL REFERENCE

Register	Default	Function																											
S34	0	Bit-mapped register setup. To set registers, see instructions for S13. <table><thead><tr><th>Bit</th><th>Value</th><th>Result</th></tr></thead><tbody><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><tr><td>7</td><td>128</td><td>Disable Pre-coding.</td></tr></tbody></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.	7	128	Disable Pre-coding.
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.																											
7	128	Disable Pre-coding.																											
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																												

## TECHNICAL REFERENCE

Register	Default	Function																											
S41	0	Bit-mapped register setup. To set registers, see instructions for S13.																											
		<table><thead><tr><th>Bit</th><th>Value</th><th>Result</th></tr></thead><tbody><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>Reserved.</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></tbody></table>	Bit	Value	Result	0	1	Distinctive ring enabled.	1	2	Speakerphone connect message override (voice products only).	2	4	Reserved.	3	8	Message waiting (voice products only).	4	16	Reserved.	5	32	Reserved.	6	64	Reserved.	7	128	Reserved.
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6	64	Reserved.																											
7	128	Reserved.																											
S42	0	Reserved																											

## TECHNICAL REFERENCE

### Fax Commands

- +FCLASS=*n***     **Sets the mode of operation**  
*FCLASS=0*     *Data mode*  
*FCLASS=1*     Group 3 Facsimile Service Class 1 mode
- FCLASS?**     Displays the current FCLASS mode (see mode descriptions above)
- +FCLASS=?**     Displays the FCLASS mode options (see mode descriptions above)
- +FTS=*n***     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. *n* is the number of 10 millisecond intervals that pass before **OK** appears. (*n=0-255*)
- +FRS=*n***     Makes the modem wait for a specified length of silence before sending **OK** to the screen. The pause is set in 10 millisecond intervals. *n* is the number of 10 millisecond intervals that pass before **OK** appears. (*n=0-255*)  
Note: This command terminates with **OK** when either the specified amount of silence is detected or when the user anything (which is ignored).
- +FTM=*n***     Transmits data using the modulation specified by *n*. (*n = 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.

## TECHNICAL REFERENCE

- +FRM=*n***      Receives data using the modulation specified by *n*. (*n* = 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.
- +FTH=*n***      Transmits data framed in the HDLC protocol using the modulation specified by *n*. (*n* = 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.
- +FRH=*n***      Receives data framed in the HDLC protocol using the modulation specified by *n*. (*n* = 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.

## TECHNICAL REFERENCE

### Screen Messages

Displayed as a number	Displayed in words	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.
5	NO DIAL TONE	(Optional) Dial tone was not received within the time-out period.
6	BUSY	(Optional) A busy signal was detected.
64	CONNECT/FAX	(Optional) The modem has established a connection. This response is used only when the fax mode is selected.





## REGULATORY INFORMATION

### Manufacturer's Declaration of Conformity

3Com Corporation  
7770 North Frontage Road  
Skokie, Illinois 60077-2690  
U.S.A.

declares that the product *U.S. Robotics® 56K Faxmodem* conforms to the FCC's specifications:

*Part 15; Subpart B Class B*

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.

*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). 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 uses the following USOC jacks: RJ-11C.

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

## REGULATORY INFORMATION

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.

### 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.

### IC (Canada)

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

### UL Listing/CUL Listing

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.

### Connecting to the Telephone Company

It is not necessary to notify the telephone company before installing the modem. However, the telephone company may request the telephone number(s) to which the U.S. Robotics modem is connected and the regulatory information printed in this section.

Be sure that the telephone line you are connecting the modem to is a standard analog line and not a digital (PBX), party, or coin telephone line.

If the modem is malfunctioning, it may affect the telephone lines. In this case, disconnect the modem until the source of the difficulty is traced.

## **REGULATORY INFORMATION**

### **Fax Branding**

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent, an identification of the business or other entity, or other individual sending the message, and the telephone number of the sending machine or of such business, other entity, or individual. (The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.)

In order to program this information into your U.S. Robotics modem, refer to the manual of your communications software program.

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

- Re-orient the receiving antenna (for televisions with antenna reception only) or cable input device.

## REGULATORY INFORMATION

- 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 U.S. Robotics, Inc. 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 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.

## REGULATORY INFORMATION

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.

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

**NOTICE:** The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

The Ringer Equivalence Number is located on the bottom of the modem's case (external modems) or on the modem's circuit board (internal modems).

**AVIS:** L'étiquette de Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. 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 ci-dessus n'empêche pas le dégradation du service dans certaines situations.

## REGULATORY INFORMATION

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie 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.

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.

**Avvertissement:** 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.

NOTICE: L'Indice d'Equivalence de la Sonnerie (IES) de chaque appareil donne une indication du nombre maximal de terminaux qui peut être branché à l'interface téléphonique. La termination d'une interface peut consister de n'importe quelle combinaison d'appareils sur le réseau, seulement si la somme des IES de tous les appareils n'excède pas 5.

L'Indice d'Equivalence de la Sonnerie (IES) est situé au revers du modem (modems externes), ou sur le circuit imprimé (modems internes).

## REGULATORY INFORMATION

### Limited Warranty

U.S. Robotics Access Corp., a subsidiary of 3Com Corporation, warrants to the original end-user purchaser that this product will be free from defects in materials and workmanship for the life of the modem. During the limited warranty period, and upon proof of purchase, the product will be repaired or replaced (with the same or a similar model, which may be a refurbished model) at U.S. Robotics' option, without charge for either parts or labor. This limited warranty shall not apply if the product is modified, tampered with, misused, or subjected to abnormal working conditions (including, but not limited to, lightning and water damage).

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THIS LIMITED WARRANTY DOES NOT GUARANTEE YOU UNINTERRUPTED SERVICE. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. U.S. ROBOTICS SHALL IN NO EVENT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, INCLUDING, WITHOUT LIMITATION, LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, LOSS OF DATA OR USE, DAMAGE TO EQUIPMENT, AND CLAIMS AGAINST THE PURCHASER BY ANY THIRD PERSON, EVEN IF U.S. ROBOTICS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

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#### **REGULATORY INFORMATION**

This limited warranty gives you specific legal rights. You may have others, which vary from state to state. Some states do not allow limitations on duration of an implied warranty, or the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you.