Courier™ V.Everything® Modem Command Reference

3Com ®

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ABOUT THIS GUIDE

Introduction

This guide is a command reference for the CourierV.Everything modem. It includes information about AT commands, S-Registers and troubleshooting

If the information in the release notes shipped with your product differs from the information in this guide, follow the instructions in the release notes.

Convention

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Important features or instructions
	Caution	Information to alert you to potential damage to a program, system, or device
	Warning	Information to alert you to potential personal injury

Table 2 Text Convention

Convention	Description
Syntax	The word "syntax" means you must evaluate the syntax provided and supply the appropriate values. Placeholders for values you must supply appear in angle brackets. Example:
	Enable RIPIP by using the following syntax:
	SETDefault !<port> -RIPIP CONTrol = Listen
	In this example, you must supply a port number for <port>.

Table 2 Text Conventions (continued)

Convention	Description
`Commands`	The word "command" means you must enter the command exactly as shown in text and press the Return or Enter key. Example:
	To remove the IP address, enter the following command:
	`SETDefault !0 -IP NETaddr = 0.0.0.0`
	This guide always gives the full form of a command in uppercase and lowercase letters. However, you can abbreviate commands by entering only the uppercase letters and the appropriate value. Commands are not case-sensitive.
`Screen displays`	This typeface represents information as it appears on the screen.
The words "enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
(continued)	
[Key] names	Key names appear in text in one of two ways:
	■ Referred to by their labels, such as "the Return key" or "the Escape key"
	■ Written with brackets, such as [Return] or [Esc].
	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example:
	Press [Ctrl]+[Alt]+[Del].
Menu commands and *buttons*	Menu commands or button names appear in italics. Example:
	From the *Help* menu, select *Contents*.
Words in *italicised* type	Italics emphasise a point or denote new terms at the place where they are defined in the text.
Words in **bold-face** type	Bold text denotes key features.

Related Documentation

The Courier V.Everything Getting Started Guide should be used for the installation of the Courier V.Everything modem.
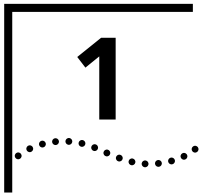
1 CONNECTING TO YOUR ISP

This chapter contains information about configuring your modem for various operating systems.

- Windows 95/98 operating system
- Windows NT 4.0 operating syste
- Other Operating Systems

Windows 95/98

The first time you start Windows 95/98 after you've installed the modem, Windows 95/98 will auto-detect your modem. Since Windows 95/98 supports Plug and Play, most installations are trouble-free.

You must power on your modem before you start Windows 95/98, or Windows 95/98 will not recognise your modem.

What You Need

You need Windows 95/98 with Dial-Up Networking installed to configure your modem for Windows 95/98.

Configuring Your modem with Plug and Play

Plug and Play mode allows Windows 95/98 to automatically detect your modem and determine which modem configuration file (called an INF file) to use.

Follow the steps below to install the INF file for Windows 95/98

1 Power on your computer and start Windows 95/98. Your computer will detect new hardware.

2 When the "New Hardware Found" window appears, select **Driver from disk provided by hardware manufacturer** and click **OK**.

This step will install the INF file that is provided on the *Connections*™ CD-ROM

3 When the following window appears, insert your *Connections* CD-ROM, change the default drive in **Copy Manufacturer's files from**: to D:\ (or the correct path of your CD-ROM) and click **OK** to install the INF file.
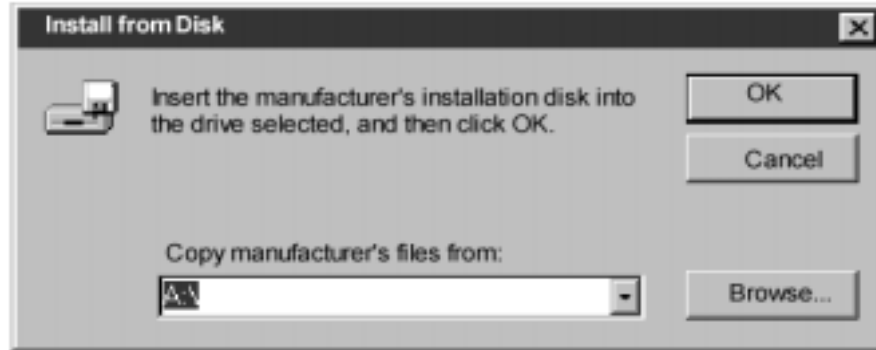
4 Windows 95/98 displays a window asking you to choose your modem type from the list. Select the your modem from the list and click **OK**.

Your modem is now ready to use!

Installing the Latest Softwar
See Chapter 3, *Upgrading your Mode* for information about upgradin your CourierV.Everything modem's software.

Accessing Your Internet Service Provide
This section explains how to set up your modem to access the Internet or remote Local Area Networks (LANs) using Windows 95/98 Dial-U Networking. To access Internet Service Providers (ISPs) or remote LANs you must do the following:

Step One: Determine if Dial-Up Networking is Installed

1 Click **Start | Settings | Control Pane** .

2 On the Control Panel, double-click **Network**. The "Network" window will appear

If Dial-Up Adapter	Do this
Is listed	Go to the section "Installing TCP/IP Support" to install Dial-Up Networking.
Is not listed	Go to Step 3 below.

3 Return to the Control Panel and double-click **Add/Remove Programs** to open the "Add/Remove Programs Properties" window.

4 Click the **Windows Setup** tab.

5 Double-click **Communications.** The following window appears
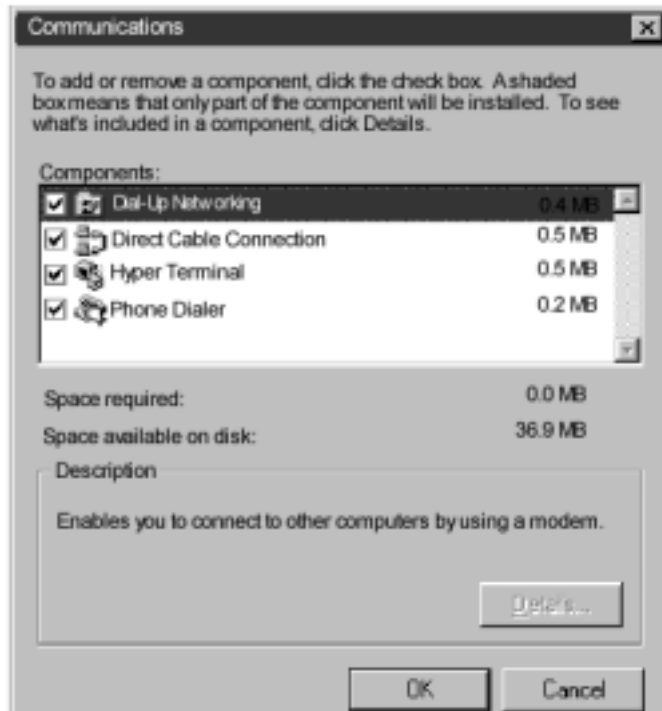
6 Click **Dial-Up Networking** to check the box.

7 Click **OK** | **OK**.

8 Insert your Windows 95/98 Setup diskette or CD-ROM when you are prompted, and Windows 95/98 installs Dial-Up Networking.

Step Two: Installing Dial-Up TCP/IP Support

1 Click **Start** | **Settings** | **Control Panel**.

2 On "Control Panel," double-click the **Network** to display the "Network" window:

3 Determine if the TCP/IP Dial-Up Adapter is installed:

IF TCP/IP -> Dial-Up Adapter	Do this
Is not listed	Click **Add**	**Protocol**	**Microsoft**	**TCP/IP**	**OK**. Insert your *Windows 95/98 Setup* diskette or CD-ROM when you are prompted, and Windows 95/98 installs TCP/IP protocol support.

IF TCP/IP -> Dial-Up Adapter	Do this
Is listed	Go to Step Three: Setting Up a Connection to Your ISP below.

Step Three: Setting Up a Connection to Your ISP

1 Click **Start** | **Programs** | **Accessories** | **Dial-Up Networking**.

2 Double-click **Make New Connection**.

3 Select the correct modem, if not already selected.

4 Type a name for the connection and click **Next**.

5 Type a phone number for the connection and click **Next**.

6 You should see a message indicating that a new connection was created successfully.

7 Click **Finish.**

8 A **New Connection** icon will be created in the "Dial-Up Networking" Window. Move your cursor to the new icon you have just created an click the right mouse button. Select **Properties** on the menu to display the following window:

The following screen may vary slightly depending on the version of Windows 95/98 you are using.
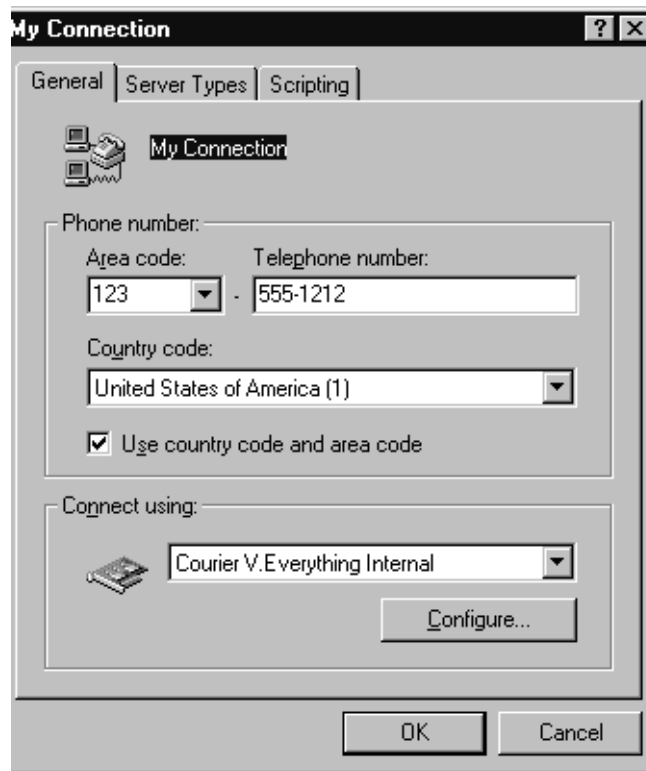
9 On the "My Connection" window, click the **ServerType** tab, and deselect the following:

- Log on to Network
- NetBEUI
- IPX/SPX Compatible

10 Click **OK**, and **OK**.

If your ISP	Do this
Gives you a specific IP or Domain Name server addresses	Go to *Step Four: Customising TCP/IP Settings*
Does not give you a specific IP or Domain Name server addresses	Double-click on the icon you just created to dial your ISP.

Step Four: Customising the TCP/IP Settings

Depending on the ISP you use, you may need to customise the TCP/IP settings. Follow steps 1-6 and if you still cannot connect to your ISP, you can contact your ISP for specific information such as an IP address or Domain Name Servers (DNS).

1 Double-click **My Computer** and double-click **Dial-Up Networking** to display all the connections you can customise.

2 Right-click the icon you created and select **Properties** to display the *My Connectio* properties window.

3 On the My Connection properties window, click the **ServerType** tab.

4 Click **TCP/IP Settings**.

TCP/IP Settings   ? X

○ <u>S</u>erver assigned IP address
○ S<u>p</u>ecify an IP address

    IP <u>a</u>ddress: 0 . 0 . 0 . 0

○ S<u>e</u>rver assigned name server addresses
● Specify <u>n</u>ame server addresses

    Primary <u>D</u>NS: 0 . 0 . 0 . 0

    Secondary D<u>N</u>S: 0 . 0 . 0 . 0

    Primary <u>W</u>INS: 0 . 0 . 0 . 0

    Secondary W<u>I</u>NS: 0 . 0 . 0 . 0

☑ Use IP header <u>c</u>ompression
☑ Use default <u>g</u>ateway on remote network

          OK   Cancel
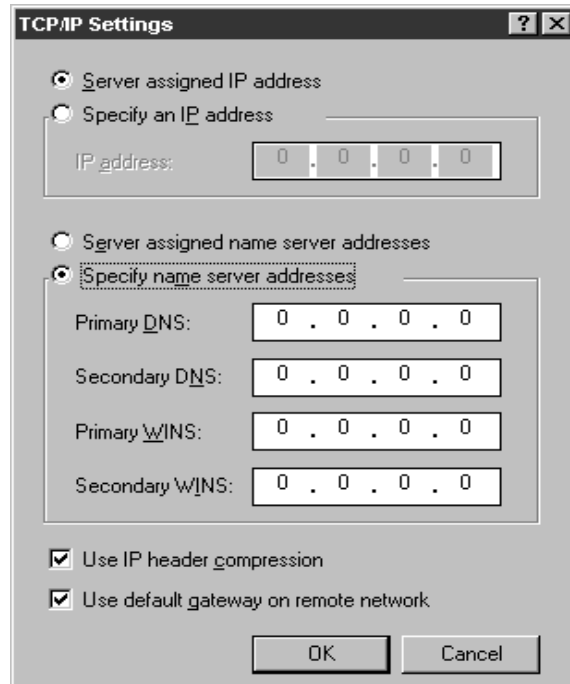
5 Specify an IP address, if needed:

If your ISP	Do this
Gives you a specific IP address	Click **Specify an IP address** and enter the IP address provided by your ISP
Does not give you a specific IP address	Click S**erver assigned IP address**

6 After you specify an IP Address, select which is appropriate:

If your ISP	Do this
Gives you specific name server addresses	Click **Specify name server addresses** and enter the server address(es) provided by your ISP
Does not give you specific name server addresses	Click **Server assigned server address**

7 Double-click your **New Connection** icon to connect!

Windows NT 4.0	TCP/IP is the main protocol used to transfer data via the Internet. To use TCP/IP with Windows NT 4.0, you must connect to your ISP using a PPP or SLIP connection

Each ISP has different requirements. Before using this chapter to configure Windows NT 4.0 to access your БP, contact your ISP to determine if they have special instructions for Windows NT 4.0 users

For you to	Use this connection
Use a dial-up connection to connect over the Internet. SLIP only allows you to connect using IP and does not allow for server assigned IP addresses or server assigned name server addresses.	Serial Line Internet Protocol (SLIP)
Use a dial-up connection to connect over the Internet. PPP allows you to connect using IPX, TCP/IP, Netbeui, and other protocols. PPP is a more recent development than SLIP and has become the standard way of connecting to the Internet.	Point-to-Point Protocol (PPP)

CAUTION: *Before you use these procedures, contact your ISP to determine if they have any special requirements.*

What you need	Before you begin, obtain the following information:

- Does your ISP have a SLIP or PPP account?
- Your ISP's telephone number
- Does your ISP supply a static or dynamic IP address?
- Your ISP's primary and secondary DNS servers
- INF file for Windows NT

Configuring Your modem	Since Windows NT is not Plug and Play compliant, it is necessary to install the modem in Modem Properties.

i *Your modem should already be installed. If you have not connected your CourierV.Everything modem to your computer, please refer to the Getting Started Manual for installation instructions.*

1 Go to **Start** | **Settings** | **Control Pane** | **Modems**.

2 Click **Add**.

3 Check **Don't detect my modem; I will select it from a list**.

4 Click **Next**.

5 Click **Have Disk**.

6 Place the 3.5-inch diskette or CD-ROM that was packaged with your Courier V.Everything modem into your 3.5-inch diskette or CD-ROM drive. Select the INF file found on the disk.

7 Select the COM port for your CourierV.Everything modem.

8 When the installation is complete, Windows NT will request that yo restart your computer. Select **Yes**.

Setting up RA

1 Right click the **Network Neighborhood** icon on your desktop and select **Properties**.

2 Click the **Services** tab.

3 Select **Remote Access Service** and click **Properties**.

4 Click **Add**.

5 Select your Courier V.Everything modem's COM port and click **OK**.

6 Highlight your Courier V.Everything modem and click **Configure**.

7 Select the function of your modem and click **OK**.

8 Click **Network**

9 Select the protocols required to dial in and out with your Courier V.Everything modem.

10 Set **Encryption Settings** to **Allow any authentication including clear text**.

11 Click **Continue** to complete RAS setup

Determining if TCP/IP is installed   TCP/IP must be installed before you can access the Internet. Although this is a standard configuration, double-check to make sure TCP/IP is installed.

To determine if TCP/IP is installed, perform the following actions:

1 Select **Start** | **Settings** | **Control Panel**.

2 Double-click **Network**.

3 On the **Protocol** tab, scan down the list of installed protocols to find **TCP/IP Protocol Adapter**.

4 If TCP/IP Protocol is listed, skip to section *Configuring a PPP Connection*.

  If TCP/IP Protocol is NOT listed, move to the next section

Installing TCP/I   To install TCP/IP, perform the following actions:

1 Select **Start** | **Settings** | **Control Panel**.

2 Double-click **Network**.

3 On the **Protocol** tab, click **Add**, and select the **TCP/IP protocol** from the list.

Configuring a PP
connection   To configure the CourierV.Everything modem for a PPP connection, perform the following actions:

1 Go to **Start** | **Programs** | **Accessories** | **Dial Up Networking**.

2 Click **New**.

3 Select the **Server tab** and select **PPP** in the Dial-up server type box.

4 Select **TCP/IP**.

5 Deselect **NetBEUI** and **IPX**.

6 If you are connecting to an ßP, uncheck **Enable PPP LCP Extensions**.

  If you are connecting to another Windows NT system, Check**Enable PPP LCP Extensions**.

7 Select **Enable software compression**.

8 Specify an IP address by clicking **TCP/IP settings**.

If your ISP	Do this
Gives you a specific IP address	Click **Specify an IP address** and enter the IP address provided by your ISP
Does not give you a specific IP address	Click **Server assigned IP address**

9 After you specify an IP Address, specify server assigned name server addresses, if needed

If your ISP	Do this
Gives you specific name server addresses	Click **Specify name server addresses** and enter the server address(es) provided by your ISP
Does not give you specific name server addresses	Click **Server assigned server addresses**

Configuring a SLI connection

The following steps explain how to configure Windows NT 4.0 for use with a SLIP connection.

1 Double-click **Dial-Up Networking**.

2 Click **New**.

3 Select the **Server tab** and select **SLIP** in the Dial-up server type box.

4 Click **TCP/IP settings**.

5 Enter the IP address provided by your ISP.

6 Enter the primary DNS and secondary DNS server IP addresses in the appropriate name server address boxes.

7 If your ISP requests that you use a specific frame size, select the desired frame size in the Frame Size box.

Troubleshooting RA

RAS is significantly easier to troubleshoot than Win95 Dial-U Networking, there are a finite number of problems that one runs into on a daily basis, and the majority of these are caused by misconfiguration Most connection problems can be solved by following these steps:

- In the **Basi** tab, make sure that the phone book entry settings are correct.

- Make sur **Use Telephony Dialing Properties** is unchecked

- Make sur **Use another port if busy** is unchecked.

- In the phone book settings, under security, select **Accept any authentication including clear text**.

- Make sure only the necessary network protocols are selected

- In the *Connect to* window, after you click **Dial**, there should be no domain set. This is only for logging into NT domains.

■ Make sure that the TCP/IP settings are correct.

i *This is a general setup for your CourierV.Everything modem using Windows NT. If you are having problems connecting to your ISP, configuring Dial-Up Networking, or receiving RAS errors, please contact Microsoft Technical support.*

Other Operating Systems	This sections explains how to configure your modem for:

■ Windows 3.x

■ MS-DOS

■ OS/2

■ UNIX, Linux, or AIX

If You Are Using Windows 3. Windows 3.x comes with a built-in communications software package, Windows Terminal. You can use Windows Terminal to test your modem or you can install the communications software package that is included on the *Connections* CD-ROM.

Because Windows Terminal only supports speeds up to 19200 bps, it is recommended that you use a third-party communications software package.

If You Are Using MS-DOS Because there is no communications software built in to MS-DOS, you must install and run a third-party communications software package to operate your modem.

You must choose the COM port to which your modem is attached in whatever communications software package you are using.

If You Are Using UNIX, Linux, or AI For instructions about how to set up your UNIX®, Linux, or AIX communications software package, see the software's installation procedure.

i *To set your CourierV.Everything modem to answer incoming calls, set DIP switch 3 OFF; set 4 and 8 ON.*

2

USING THE AT COMMAND SET

This chapter includes information about

- Basic AT commands
- Using S-Registers
- Understanding bit-mapped S-Registers

Overview

You can use AT commands to change your modem settings at any time.

To send AT commands to your modem, you need to put your communications software in Terminal Mode. In terminal mode, what you type is sent directly to the modem.

General rules for using AT commands

You must follow some general guidelines to send AT commands to your modem:

- Type AT before each command and press **Enter** after each command.

*The exceptions are A/, A> and +++, which require neither AT nor **Enter**.*

- Leave zeroes off the end of AT commands. A missing numeric parameter is assumed to be a zero. For example, ATE is equivalent t ATE0
- Create compound commands of up to 56 characters between AT and **Enter**. See the following example.

AT&K3X2DT5551234

AT	Attention; a command follows.
&K3	Disable MNP5 data compression; use only V.42 bis compression.
X2	Use the X2 result code subset.
DT	Dial the following number using tone dialing.

Hyphens and parentheses add to the count of 56 characters but spaces do not.

Basic AT commands   The command AT informs the modem that a command is coming. AT must precede all commands except A/, A> and +++.

To configure your modem to	Command
Re-execute the last-issued command.	**A/**
Repeat the last-issued command until canceled by pressing any key.	**A>**

Example: Sending **ATD5551234** will make the modem dial 555 1234. Now, if you send **A/** the modem will dial 555 1234 again.

Using S-Registers   S-Registers are addresses of places in memory where various timin parameters, redefinitions of selected ASCII characters, and other configuration settings are stored.

Initially, the S-Register settings for each of the NVRAM templates are the same. You can overwrite an S-Register's stored value. See the default values listed in Appendix A, *S-Registers*, for a complete listing of the initial settings.

Displaying S-Register settings
You can display S-Registers in a variety of ways. See the table below for more information.

To display	Command
Contents of ONE S-Register	**ATS***r***?**, where *r* is the register's number
S-Register settings in the NVRAM templates	**ATI5**
S-Register settings in RAM (the current configuration)	**ATI4**

Example: Sending **ATS0?**, displays the contents or setting for S-Register 0.

When using the commands ATI4 and ATI5, S-Register settings appear as a table seven columns wide, each entry of the form, "Smm=nnn" where mm is a register number between 0 and 70 and nnn is a decimal value between 0 and 255.

Setting an S-Register
You can configure each S-Register setting manually.

CAUTION: If you do not write an S-Register setting with **&w***, the setting will be retained only until the next reset or power off.*

To change	Command
Settings for a register in the current configuratio	**ATSr=n**

Example: Sending **ATS0=2**, changes the setting for S-Register 0 to 2. This setting will cause the Courier V.Everything modem to answer, in Auto Answer Mode, on the second ring.

In the command ATSr=n, r is the register's number and n is a decimal value from 0-255 (unless otherwise indicated) that specifies the setting.

Getting a list of S-Registers

To display	Command
A list of S-Registers	**ATS$**

In order to issue this command, you must be in Terminal Mode.

See Appendix A, S-Registers for a complete list of S-Registers.

Understanding bit-mapped S-Registers

A bit-mapped S-Register uses one number to describe a collection of settings. Bit-mapping allows us to pack a lot of information in a small space.

Bit-mapped registers are in the form of Sr.b=n, where r is the bit-mapped register; .b is the bit; n is 0 (off) or 1 (on)

See Appendix A, S-Registers to see how bits are mapped into decimal values and for information about setting bit-mapped S-Registers.

3

UPGRADING YOUR MODEM

This chapter contains information about:

- Checking your modem's software version
- Getting new operating software
- Sending new software to the modem
- If your modem doesn't respond
- Remote flash

Checking Your Courier V.Everything Modem's Software Version

Issuing the **ATI7** command produces the following information to appear on your terminal screen

```
ati7

3Com Courier V.Everything Configuration Profile...
Product type          US/Canada External
Product ID            XX345300
Options               HST,V32bis,Terbo,VFC,V34+,x2,V90
Fax Options           Class 1,Class 2.0
Clock Freq            25 Mhz
Flash ROM             1024k
Ram                   256k

Supervisor date       12/16/99
DSP date              12/14/99

Supervisor rev        9.9.9
DSP rev               9.9.9
DAA rev               0012

Serial Number         000000000001

OK
```

Check the Supervisor and Digital Signal Processor (DSP) dates found in the last two lines of the screen display. These dates will determine which version of the software your modem is using.

Getting New Operating Software

To get the newest version of the Courier V.Everything modem's operating software:

■ Go to the customer support web site at http://consumer.3com.com.

Sending New Software to your modem

To send the new code to your modem, all you need is a standard terminal program that can send files using the XMODEM protocol.

1 Start a communications software package. Adjust the settings, if necessary, so you can send AT to your modem and get an OK response.

2 Enter **ATXMODEM**. The modem should respond as follows:

```
atxmodem

Firmware Update
---------------
Options:
(1) Read firmware
(2) Write firmware
ESCape Exits
>
```

3 Select "2" to begin updating the code. The modem will respond with:

```
Ready to receive firmware update
```

4 Send the file to your modem using the XMODEM-Checksum or XMODEM-CRC protocol.

5 After the transfer is complete, you will see

```
SDL Xmodem file transfer completed.
Calculating CRC... OK
Resetting modem...OK
```

Once you see the OK response to the Calculating CRC and Resetting modem messages, your software upgrade is complete!

| **If Your Mode Doesn't Respond** | If your modem doesn't respond after the flash process, its memory may be corrupted. Follow these steps to force the new software to the modem. |

1 Power your modem on.

2 Start your communications software package. Set your port speed to 57,600 bps, type **AT** and press **Enter**.

   If the CourierV.Everything modem reports **.bootmodem.**, it is corrupt. Issue the **ATXMODEM** command and repeat the flash process found on the previous page.

3 Power your modem off

4 Set the DIP switches to their previous settings.

5 Power your modem on.

| **Remote Flash** | In order to upgrade the modem located at a remote site, you need to ensure that the remote modem is enabled for remote access (see Chapter 9). Call the remote modem from your local site and follow the steps outlined in that chapter. |

4

MODES OF OPERATION

This chapter contains information about

- Command and Online Modes
- Controlling Local Echo
- Data and Fax Modes

Command and Online Modes

If you want to	Set the modem to	Use this command
Control the modem using AT commands Depending on how DIP switch 9 is set, sending the escape code (**+++**) will return the Courier V.Everything modem to Command Mode or hang up. To be able to change operating modes without losing connections, set DIP switch 9 down.	Command Mode	**+++** (Escape Code)
Your modem set to revert to Command Mode when the Escape Code (+++) is used.		**DIP switch 9 DOWN**
Your modem to Disconnect when the Escape Code (+++) is used		**DIP switch 9 UP**
Return to your connection after an Online Command Mode session.	Online Mode	**ATO0**
Send the modem commands while you are on line with another device	Online Command Mode	**+++** (Escape Code)

DO NOT type **AT** *before* **+++** *or* **Enter** *after the command*

Entering Online Command Mod

When the modem is in Online Mode, the only command it recognises is an escape code, or +++.

Revert to Command Mode without losing connections by using settin DIP switch 9 down or sendin `ATS14.0=0` to the modem before establishing your connection.

6 Wait one second after sending the last item of data.

7 Type `+++`

8 Wait for OK to appear before typing any data.

You can change the characters used to revert to Command Mode or the wait time by resetting Register S2 or S12. For more information about resetting these S-Registers, see Appendix A, S-Registers.

Returning to Online Mode

There are two ways to return online using the ATOn command.

If you want to	Command
Return online	`ATO0`
Return online and retrain	`ATO1`

Example: Sending `ATO1`, will allow you to resynchronise if you experienced errors during a non-ARQ data transfer.

Controlling Local Echo

There are two local echo settings, one for Command Mode and one for Online Mode.

Command-Mod Local Echo

You can configure your modem to display the commands you type on screen by using the ATEn command

If you want the commands you type to	Command
NOT appear on screen (Command Mode echo OFF)	`ATE0`
Appear on your screen (Command Mode echo ON)	`ATE1`

Although you cannot see the command when you set ATE0, the modem is receiving them.

Online-Mode Local Echo   To configure your modem to display a copy of data that is bein transmitted on your screen you can use the ATFn command.

As the modem transmits data to a remote system	Command
The modem sends a copy of the data to the screen. Online local echo ON (half duplex).	**ATF0**
No copy of the data is displayed on screen. Online echo OFF (full duplex).	**ATF1** (default)

Example: Sendin **ATF0** will allow you to see what you are typing in the display window.

i *You may see the term duplex used in place of online local echoing, although the term is not technically accurate.*

Data and Fax Modes

Once you are in Command Mode, you can initialise the modem in Data or Fax mode.

Fax operations require facsimile-compatible communications software that can send or receive Group III faxes. Follow the instructions in your fax software manual.

i *The modems default operating mode is Data Mode. Most fax software automatically switches the device to Fax mode when you run the program, and resets the device to Data mode when you exit the progra*

If you want the modem prepared to	Mode	Command
Make calls to and receive calls from other modems	Data Mode	**AT+FCLASS=0**
Make calls to and receive calls from analogue facsimile devices, such as fax modems and fax machines	Fax Mode	**AT+FCLASS=1** (Class 1 Fax Mode) or **AT+FCLASS=2.0** (Class 2.0 Fax Mode)

Example: Sending **AT+FCLASS=1**, allows you to receive faxes from fax machines.

Class 1 and Class 2.0 Fax Modes refer to standards set by the Electronic Industries Association/Telecommunications Industry Association. Class 1 Fax Mode is the minimal standard for computer-faxmodem interface. Class 2.0 Fax Mode refers to the extended computer-faxmodem interface.

If you are not sure whether your modem is in Data or Fax mode, use the **AT+FCLASS?** command

If the modem returns a value of	This indicates
0	Data Mode
1	Class 1 Fax Mode
2.0	Class 2.0 Fax Mode.

Whenever the modem is reset using the ATZ command or by turning the power off and then on, it will reset to Data Mode

5

DIALING, ANSWERING, AND HANGING UP

This chapter explains how to use basic AT commands for:

- Dialing
- Carrier loss redial
- Answering calls
- Making International calls
- Call detection
- Caller ID functions
- Distinctive Ring support

Dialing

You can use your modem to dial the specified telephone number an execute dial options by using the following commands.

Dial options

For your modem to	Command
Dial the specified phone number and execute dial options (DO NOT use spaces or dashes).	**ATD** *phone number*
Tone dial.	**ATDT**
Pulse dial.	**ATDP**
Pause for the length of time specified by S-Register 8. The default is 2 seconds.	**ATD,** (Comma)
Pause for 125 milliseconds.	**ATD/** (Slash)
Wait for a second dial tone before continuing dialing. This command only works only if the X3 (or higher) command has been issued (see Chapter 7, *Controlling Result Code Displays* and Appendix D, *Result Code Meanings and Sets*). If the modem is set to X2 or lower, it interprets the W as a two-second pause, unless it detects a second dial tone within two seconds.	**ATDW**

For your modem to	Command
Wait for an answer (with X3 or higher).	`ATD@`
Some online services answer the phone and return a tape-recorded request for information before processing transactions.	
Use the AT@ command to tell the modem to detect at least one ring, wait for five seconds of silence at the other end of the call, and then continue.	
To use the AT@ command, set the modem to X3, X4 or X7.	
If set X2 or lower, the modem will return an ERROR message when it encounters the @ character. If set to X5 or X6, the modem hangs up when it detects a voice answer.	
Return to Command mode after dialing.	`ATD;` (Semicolon)
Dial the letters that follow (in an alphabetical phone number).	`ATD"`

If you are including another command after the phone number, use closing quotation marks before the additional command.

IMPORTANT: *With the exception of the above Dial options, your modem will ignore any commands issued after the D in the same command string.*

Call a device that can only originate calls. It forces the modem to dial out at the answer frequency or Reverse frequencies. You can put the R either before or after the number.	`ATDR`
Display different sets of result codes. See Chapter 7, *Controlling Result Code Displays* and Appendix D, *Result Code Meanings and Sets*.	`ATX2D..... X7D`
Dial the last-dialed number. Use ATDL instead of using A/ if you wish to send the modem non-Dial commands before dialing again.	`ATDL`
Display the last-dialed number.	`ATDL?`
Dial the number stored in nonvolatile random access memory at position *n*, where *n* = 0-9. See Chapter 6, *Working with Memory*, for instructions about saving phone numbers to memory.	`ATS`*n*
Digits 0 through 9, * and # are accepted.	
Stop dialing or stop repeating.	Type any key
Reissue the last command (Don't type `AT` or press `<ENTER>`).	`A/`

For your modem to	Command
Dial a number, wait 60 seconds for a connection, and then hang up. Wait two seconds, then redial. Make a maximum of 10 attempts. To stop the repeating, press any key during the pause between dial attempts. If you press any key while the modem is dialing, that dial attempt is canceled but the cycle will continue	**>**
Dial the last-dialed number and repeat it just as the > command does. Also can be used to repeat any command.	**A>**

Carrier Loss Redial   You can set the Courier V.Everything modem to redial the last-dialed number after it loses carrier (carrier is the signal maintained between two modems while they are on line). This feature is useful for dialed-lin connections that operate unattended.

For your modem to	Command
Disable carrier loss redial	**ATS69.1=0**
Enable carrier loss redial	**ATS69.1=1**
Wait *n* seconds between losing the connection and redialing. This command also defines the interval (in seconds) between dialing attempts if the first attempt is not successful.	**ATS44=*n***

Example: Sending **ATS44=20** sets a 20-second interval between losing the connection and redialing.

Answering Call   Your modem can be configured to answer calls. By default, your Courier V.Everything modem will not automatically answers calls

Force Answer Mode

For your modem to	Command
Go through the answer sequence when it hasn't received an incoming call Or Manually answer a call	**ATA**

Auto Answer   You can set your modem to Auto Answer using the ATS0 command

For all CourierV.Everything modems except the PC card version, DIP switch 5 overrides the ATS0=n setting.

For your modem to	Command
Receive calls unattended (Auto answer enabled) Remember to set your communications software to save incoming messages and/or files.	**ATS0=1** (this instructs the modem to answer on the first ring)
NOT receive calls unattended (Auto answer disabled)	**ATS0=0**

Example: Sending **ATS0=0** will not allow your modem to receive calls when you are not present.

See the S-Register summary in Appendix A, *S-Registers* for more information about instructing the modem to answer after more than 1 ring.

When your modem senses a call coming in, it sends the result code RING to your computer, goes off hook, and negotiates for a connection. If there is no response within 60 seconds, the Courier V.Everything mode hangs up

For more information about adjusting the 60-second wait-for-connectio time using S-Register 7, see Appendix A, *S-Registers.*

When a call is disconnected, the Courier V.Everything modem hangs up and returns the NO CARRIER result code.

If S0=0, Auto Answer is disabled. To determine if Auto Answer is NOT disabled send the comman **ATI4** *and be sure that S0=1-255.*

Hanging up If you want to end a connection with a remote device do the following:

1 Enter Online Command Mode by typing **+++**

2 Wait 1 second

3 Type **ATH**

Making International calls You can use the AT *n* and AT&G*n* commands for making analogue international calls above 1200 bps.

Handshaking options The ATB*n* command controls the handshake options.

If you want your modem	Command
To answer all V.34-type calls, as well as calls from abroad, use ITU-T (formerly CCITT) answer sequence.	**ATB0** (Default)
NOT to answer V.34-type calls. Use Bell answer tone. This setting selects HST modulation.	**ATB1**

Example: Sending **ATB1**, will allow your modem to use Bell answer tone (selecting HST modulation).

Guard ton The AT&G*n* command only applies to analogue international calls at 240 or 1200 bps.

To set your modem for	Command	Required in these countries
No guard tone	**AT&G0** (Default)	United States and Canada
550-Hz guard tone	**AT&G1**	Some European countries
1800-Hz guard tone	**AT&G2**	The U.K. and some Commonwealth countries

If you set &G2 you must also sen **ATB0** *to the modem. This setting allows the Courier V.Everything modem to answer all calls from overseas.*

Call Detectio

Call Detection allows the modem to recognise whether an incoming call is analogue data or fax.

Call Detection is an optional Service Class 2.0 feature and is also implemented by 3Com for Fax Class 1 applications.

Caller ID Functions

Caller ID is a service provided by local telephone companies. When you subscribe to Caller ID, your phone company begins providing you real-time information about incoming calls.

The Caller ID signal includes the date and time of the call, the phone number of the calling device, and, optionally, the name of the calling party. The signal is sent between the first and second rings and must be decoded and displayed by a device connected to your phone line. The Courier V.Everything modem has the ability to decode and display the Caller ID information.

Service Types

You can subscribe to Basic or Extended Caller ID service. Basic service offers you the date and time of the call and the calling party's telephone number. Extended service provides the billing name associated with the calling party's telephone number in addition to the Basic service information

The information the Courier V.Everything modem actually receives depends on the service type to which you've subscribed, the information that the calling party's telephone company provides, and whether the equipment in between supports Caller ID. At minimum, you will always receive the date and time that a call arrived.

If a call arrives without a Caller ID signal, the modem will send OUT OF AREA in place of the phone number and name. If the Caller ID information has been blocked by the user at the other end, the Courier V.Everything modem will send PRIVATE in place of the phone number and name.

Applications of Caller ID Technolog

You can use Caller ID to screen calls, keep a record of calls, or prevent unauthorised access to your network. Third-party database an telephony applications such as security, call logging, and black-listing applications exploit the Caller ID information provided by the Courier V.Everything modem.

How the Courier V.Everything Modem Handles Caller ID

When the modem receives the Caller ID signal, it stores the information i memory. You can access the information at any time by sendin `ATI15` to the modem.

```
ati15

3Com Courier V.Everything CID Status…

80 1E 01 08 31 30 31 35 32 30 33 38 02 0A 37 30

38 35 35 35 30 30 30 31 07 0C 55 2E 53 2E 52 4F

42 4F 54 49 43 53 22

DATE = 1015

TIME = 2038

NMBR = 8475550001

NAME = 3Com

OK
```

Using the #CID command (described below), you can have the Courier V.Everything modem send the information to your computer between the first and second RING messages. The Caller ID information is displayed only once.

```
RING

DATE = 1015

TIME = 2038

NMBR = 8475550001

NAME = 3Com

RING
```

The information remains in memory until either you reset the modem or until it receives another valid Caller ID signal.

To be sure that the Courier V.Everything modem receives the Caller ID signal when auto-answer is enabled, set S0=2 or higher or make sure your communications software is set to answer on 2 or more rings.

Presentation Formats   The Courier V.Everything modem sends the Caller ID information to your computer formatted or unformatted. Formatted presentation is a translation of the Caller ID signal into ASCII text. Unformatted presentation is a hexadecimal representation of the Caller ID signal

An Example of Formatted Caller ID presentation:

```
RING


DATE = 1015

TIME = 2038

NMBR = 8475550001

NAME = 3Com


RING
```

An Example of Unformatted Caller ID presentation

```
RING


801E0108313031353230333380200A3730383535353030303031070C552E532E
524F424F5449435322


RING
```

Commands   The following table describes the AT#CID=*n* settings.

Caller ID Action	Command
Disable Caller ID detection and reporting	**AT#CID=0** (Default)
Enable Caller ID with formatted output	**AT#CID=1**
Enable Caller ID with unformatted output	**AT#CID=2**

Caller ID Action	Command
Enable Caller ID with formatted output and name suppressed	`AT#CID=3`
Enable Caller ID but do not transmit the information to your computer—retain it in the Courier's memory	`AT#CID=4`
Display the current caller ID setting.	`AT#CID?`
Display the Caller ID settings that are available	`AT#CID=?`

References   For more information about Calling Number Delivery (CND), refer t
Bellcore documents TR-TSY-000030 andTR-TSY-000031. To obtai
Bellcore documents, contact:

Bellcore Customer Service
8 Corporate Place
Room 3A18
Piscataway, NJ 08854-4196
U.S.A.
(800)521-2673

U.K. Information:

Technical and Regulatory Standards Evolution Unit
PP 11.1, 207 Old Street
London EC1V 9NR
United Kingdom
Helpline: 0800 318601

Distinctive Ring Support

Distinctive ring is a service provided by local telephone companies that permits the assignment of multiple phone numbers to one line. Each phone number is associated with a different ring pattern, and devices that recognise distinctive ring, like the Courier V.Everything modem, can be set to answer only on certain incoming ring patterns.

For example, a fax machine, answering machine, telephone, and modem could all share the same line. Each device would have its own phone number and respond only to calls intended for that number.

There are four ring patterns in common use:

Ring	Description
A	1.2 to 2.0 seconds on, 4.0 seconds off.
B	0.8 second on, 0.4 second off, 0.8 second on, 4.0 seconds off.
C	0.4 second on, 0.2 second off, 0.4 second on, 0.2 second off, 0.8 second on, 4.0 seconds off.
D	0.3 second on, 0.2 second off, 1.0 second on, 0.2 second off, 0.3 second on, 4.0 seconds off.

Commands

For your modem to	Command
Enable recognition of Ring A	`ATS70.0=1`
Disable recognition of Ring A	`ATS70.0=0`
Enable recognition of Ring B	`ATS70.1=1`
Disable recognition of Ring B	`ATS70.1=0`
Enable recognition of Ring C	`ATS70.2=1`
Disable recognition of Ring C	`ATS70.2=0`
Enable recognition of Ring D	`ATS70.3=1`
Disable recognition of Ring D	`ATS70.3=0`

Example: Sending `ATS70.0=1.3=1` to your modem enables the recognition of ring types A and Donly.

When a call comes in with a ring type A or D, the Courier V.Everything modem will send the result code RING A or RING D, respectively. The Courier V.Everything modem will ignore other ring types.

If S70 is set to 0 (the default) the Courier V.Everything modem detects ring types A and B, sending the result code RING for either ring type. This function is identical to that of other 3Com modems that do not support distinctive ring.

If only one ring type is enabled, the CourierV.Everything modem will recognise only the enabled ring type and ignore all others. It will send the result code RING only when it detects the ring type that's enabled.

If more than one ring type is enabled, the Courier V.Everything modem will recognise only the enabled ring types and ignore the others. When a call arrives, the Courier V.Everything modem will send its ring type in the result code, for example, RING C.

Australia distinctive ring patterns:

Ring	Description
A (Telstra "DR0")	0.4 second on , 0.2 second off , 0.4 second on.
B (Telstra "DR3")	0.2 second on , 0.2 second off , 0.4 second on.
C (Telstra "DR6")	0.2 second on , 0.2 second off , 0.2 second on , 0.2 second off , 0.4 second on.
D (Telstra "DR7")	0.2 second on , 0.2 second off , 0.2 second on , 0.2 second off , 0.2 second on.

UK distinctive ring patterns:

Ring	Description
A	0.4 second on , 0.2 second off , 0.4 second on.
B	0.4 second on , 0.2 second off , 1.0 second on. OR 1.0 second on.
C	0.25 second on , 0.25 second off , 0.25 second on , 0.25 second off , 0.25 second on.
D	0.4 second on.
E	2.0 seconds on.

Result Codes

Verbal	Numeric
RING A	170
RING B	171
RING C	172
RING D	173
RING E	174

6

WORKING WITH MEMORY

This chapter contains information about:

- Saving a phone number to NVRAM
- Working with Flash Memory

You can upgrade the software held in Flash memory by performing a software download. See Chapter 3, *Upgrading your Software,* for more information about performing a software downloads.

Overview

Courier V.Everything modems contain three types of memory that you can interact with: random access memory (RAM), nonvolatile rando access memory (NVRAM), and Flash memory.

Memory type	Applies to	Loss of power will	Command
RAM	The current settings.	Cancel any changes you make. To save settings before resetting the modem, use &W. See the section *Working with RA* for more detailed information.	**ATI4**
NVRAM	Saved settings (any configurations you can store, retrieve, and change).	NOT affect your settings.	**ATI5**
Flash	Three templates of permanent settings (the Courier V.Everything mode 's operating software).	NOT affect your settings. You can retrieve the permanent settings, and save them to NVRAM, but you cannot alter them.	Not applicable.

Example: Sending **ATI5** will display NVRAM settings on your screen.

To see a complete listing of the permanent settings stored in Flas memory see Appendix *, Flow Control Templates.*

Working with RA and NVRAM

You can change any setting just for the current session. For example setting your Courier V.Everything modem to **AT&N8** will only allow a connection to a remote devices at a rate of 14400 bps or lower until the modem is reset. Once the modem is reset, the default variable connectio rate will be re-established.

If you want the new setting to be a default, write it to NVRAM at the same time. From the example above, you would send **AT&N8&W** to the modem. The new default setting for your CourierV.Everything modem will only allow a 14400 bps connection to a remote device.

To restore NVRAM factory defaults, use the AT&Fn command. See Appendix B, Alphabetic Command Summar *, for more information on setting &Fn.*

Saving a Phone Number to NVRA

For your modem to	Command
Write the phone number (*s*) to a position (*n*) in memory. You can store up to 10 phone numbers of up to 40 characters each in positions 0-9.	**AT&Z***n=s*
Display the number stored in the last-dialed number buffer	**ATDL?**
Display the phone number stored in NVRAM at position n, where n = 0-9.	**AT&Z***n***?**

CAUTION: Do not include modem commands in **AT&Z***n=s*.

Example: To store the phone number 555 6789 at position 2, type **AT&Z2=5556789**. If you want to dial the phone number you saved, type **ATDS2**.

If the call requires a special setting, insert it in the command before the DSn command. In this example, &M0 (no error control) comes before DS2. Type: **AT&M0DS2**

i *The AT&Zn=s command functions differently when Dial Security is enabled. See Chapter 11,* Dial Securit *, for more information.*

Displaying S-Register Value Information

For your modem to	Command
View the contents of a particular S-Register	**ATS***r***?** (where *r* is the number of the S-Register)

Example: Sendin **ATS0?** will allow you to view the contents of Register S0.

Saving a Command String to NVRAM

For your modem to	Command
Store a command string in NVRAM. The command string can be up to 30 characters long; spaces do not count. This command is used so that you can call another modem without loading your communications software.	**AT&ZC=***string*
Display the stored command string	**AT&ZC?**

i *Once the command is stored you can program the voice/data switch to send the stored command when pressed. See Appendix A, S-Registers for more information about S-Register 32 and assigning voice/data switch functions.*

Programming th Voice/Data switch

After storing a command to NVRAM, you can program the voice/data switch to execute the stored command string when pressed. The function of the voice/data switch is determined by the setting of S-Register 32.

1 Open your communications software program.

2 Store a command to NVRAM using the **AT&ZC=***strin*g command (see the table above).

3 Send **ATS32=9** to your modem. This command will set the voice/data switch function to execute the stored command string.

ℹ️ *You can reset the voice/data switch at any time (See Appendix A S-Registers for a complete list of S32 voice/data switch functions). Yo can also overwrite the stored command string with a new one at any time.*

4 Now, you can press the voice/data switch whenever you want the stored command string executed

Example: Issuin `AT&ZC=I6` to your modem stores the command string that displays the link diagnostic screen to NVRAM. Then issuing the `ATS32=9` command to your modem will allow you to display the link diagnostic screen whenever the voice/data switch is pressed.

Working with Flash Memory

The Courier V.Everything modem permanently stores three configuratio "templates," or prepared sets of commands, in Flash memory. You can use the &Fn command to load one of the three configuration templates from Flash memory into current memory.

To load this configuration template into current memory	Command
No flow control (low performance).	`AT&F0`
Hardware flow control.	`AT&F1`
Software flow control.	`AT&F2`

Example: Sending `AT&F1` to your modem will load the Hardware Flow ControlTemplate into RAM Memory.

ℹ️ *DIP switch settings override AT commands at power-on. You can set DIP switch 10 to ON and reset the Courier V.Everything modem to load the &F0 settings.*

All of the settings in each template are given in Appendix C, *Flow Control Templates.*

For more information about hardware and software flow control, See Chapter 12, *Flow Control*.

Saving RO Templates to NVRAM

To save one of the three ROM templates to NVRAM and have it serve as the reset default, enter `AT&F*n*&W`

i   *DIP switch settings override AT commands at power on. Make sure DIP switch 10 is OFF, or the &F0 template will be loaded*

Default Settings   When the CourierV.Everything modem is turned on, it loads the settings stored in NVRAM. By default, these settings are that same as the &F1 template.

You can save any of the three templates, or save modified versions of them, in NVRAM for use as power-on defaults.

For your modem to	Command	Example
Display NVRAM settings (&F1 settings)	**ATI5**	**ATI5**
Substitute a template (other than &F1)	**AT&F2&W**	**AT&F2&W**
Save modified versions of the settings to NVRAM	**AT**<settings>**&W**	**ATS10=40&A2&W**

See Appendix C *Flow Control Templates* for a complete listing of the default values.

7

CONTROLLING RESULT CODE DISPLAYS

This chapter contains information about:

- Result Code Display commands
- Additional Result Code subsets

Result Code Display Commands

The commands listed below control whether result codes are displayed, and in what format they are displaye

If you want the modem to	Command
Display result codes.	**ATQ0**
NOT display result codes.	**ATQ1**
NOT display result codes while in Answer mode. See Chapter 4, *Modes of Operation*, for a description of modes.	**ATQ2**
Display result codes in numeric form.	**ATV0**
Display result codes in verbal form.	**ATV1**
Display result codes when originating, answering, and retaining a call.	**ATS14.1=0**
Display result codes ONLY when originating a call	**ATS14.1=1**
Display sets of result codes. See Appendix D, *Result Code Sets and Meanings*.	**ATX***n* (Default ATX7)

For all CourierV.Everything modems, except the PC card version, DIP switch 3 overrides the Qn setting, DIP switch 2 overrides Vn setting, and DIP switch 7 overrides the S14.1=n setting.

Additional Result Code Subsets

ARQ (Automatic Repeat Request) is used in this manual to denote calls that use error control.

For your modem to	Command
NOT display ARQ result codes.	**AT&A0**
This setting pertains only to the display of codes and not to ARQ function.	
Display ARQ result codes.	**AT&A1**
If the CourierV.Everything modem is set to X0 and the connection rate is 1200 bps-56 Kbps, a result code is displayed.	
Display modulation indicators (HST, V32, VFC, V34, or DIGITAL). If your software cannot handle the added modulation information, select &A1 or &A0.	**AT&A2**
Display error control (LAPM, HST, MNP, or NONE) and data-compression type (V42 *bis*, MNP5) indicators.	**AT&A3** (Default)

The numeric identifiers for &A3 result codes are the same as those use for &A2. If you request numeric display (V0) and &A3, you won't be able to distinguish &A2 from &A3 codes. Also, &A3 result codes may not be compatible with some software.

8
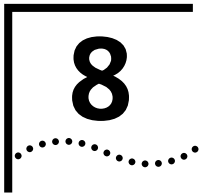
CONTROLLING EIA-232 SIGNALING

This chapter contains information about configuring the EIA-232[1] signalling between your computer and modem:

- Data Terminal Read
- Data Set Ready
- Carrier Detect

Data Terminal Ready

Your computer sends a DataTerminal Ready (DTR) signal to the Courier V.Everything modem when it is ready to send and receive data. The &Dn command tells the modem how to respond to the DTR signal.

For your modem to	Command
Ignore the state of DTR and act as if DTR is always present. Use this command with equipment that cannot provide DTR.	**AT&D0**
Enter online Command Mode during a call by dropping DTR, If issued *before connecting with another device*.	**AT&D1**
Most communications software packages have a method for toggling DTR. Refer to your software's manual for details.	
Respond normally to the DTR signal.	**AT&D2**
The CourierV.Everything modem will not accept commands until your computer sends a DTR signal. The call will end when the DTR signal is dropped.	
To change the DTR recognition time, set S-Register 25. See Appendix A, *S-Registers* for more information.	

1.The EIA-232 Standard was formerly known as RS-232 (RS stands for Recommended Standard).

For your modem to	Command
Respond normally to the DTR signal and reset on DTR drop.	**AT&D3**
The CourierV.Everything modem will not accept commands until your computer sends a DTR signal. The call will end when the DTR signal is dropped.	
To change the DTR recognition time, set S-Register 25. See Appendix A, *S-Registers* for more information.	

Example: Sending **AT&D1** before connecting with another device, dropping DTR will enter Command Mode.

DIP switch 1 overrides the &Dn setting at power on or reset.

Data Set Ready

Under normal conditions, the Courier V.Everything modem sends a Data Set Ready (DSR) signal to your computer when it is ready to send and receive data.

CAUTION: Do not change the default setting of &S0 unless you know that your installation requires a different setting. Few communications programs, if any, will require the Courier V.Everything modem to control DSR (&S1).

Use the following command to control how the modem sends the DSR signal.

For your modem	Command
To send the DSR signal at all times.	**AT&S0** (Default)
When originating a call, to send the DSR signal after dialing when the Courier V.Everything modem detects the remote analogue device's answer tone	**AT&S1**
When answering a call, to send DSR after the Courier V.Everything mode sends its answer tone.	**AT&S1**
After sending Carrier Detect (CD), to send a pulsed DSR signal, followed by a Clear to Send (CTS) signal. Use this option for specialised equipment such as automatic callback units.	**AT&S2**
After sending Carrier Detect (CD), to send a pulsed DSR signal.	**AT&S3**
To send a DSR signal to your computer at the same time the CourierV.Everything mode sends the CD signal.	**AT&S4**

For your modem	Command
To send DSR normally (with CTS) after sending CD.	**AT&S5**
In order to change the DSR pulse time (in 20-second increments), set S-Register 24. (See Appendix B, *Alphabetic Command Summary*).	

Example: Issuin **AT&S3** configures the Courier V.Everything modem to send a pulsed DSR signal after sending the Carrier Detect (CD) signal

Carrier Detect

Carrier means there is communication with the device on the other end of the connection. Under normal conditions, the CourierV.Everything modem sends a Carrier Detect (CD) signal in response to esablishing a connection with another modem. You can use the AT&C*n* command to control how the CourierV.Everything modem sends the CD signal.

For your modem to	Command
Have CD always ON.	**AT&C0**
Send CD normally (the Courier V.Everything modem sends a CD signal when it connects with another device, and drops the CD signal when it disconnects). (Default)	**AT&C1**

DIP switch 6 overrides the &Dn setting at power on or reset.

9

ACCESSING AND CONFIGURING THE COURIER V.EVERYTHING MODEM REMOTELY

This chapter contains information about:

- Setting up remote access
- Accessing the host
- Quitting a remote access session

Overview

You can set up the CourierV.Everything modem so other devices ca view or change its configuration remotely.

You should be familiar with these terms before you continue:

Local	The device that is directly connected to the computer you are using.
Remote	The device at the other end of a telephone connection.
Host	The CourierV.Everything mode that will be accessed and controlled by other devices.
Guest	The device that will access and control the host Courier V.Everything modem.

Setting Up Remote Acces

At the Host Courier V.Everything Modem

1 Prepare to send AT commands by putting your communications software in Terminal Mode.

2 Enable remote access

Set Register S41 for a value of 1 or greater. S41 sets the number of log-in attempts available to the remote user. A setting of zero allows no log-in attempts disabling remote access.

Example: Sending `ATS41=1&W` allows for 1 log-in attempt by a remote user.

i *This method will not work if the Courier V.Everything modem is attached to certain synchronous devices. Refer to Chapter 16, Dedicated/Leased Line and Synchronous Applications.*

3 Set one or two remote-access passwords.

You can set two passwords to allow different levels of access to eac Courier V.Everything modem.

To allow guest users to	Use this command to assign a remote-access password
View the CourierV.Everything modem's configuration.	`AT%P0=`*passwor*
View and *change* the CourierV.Everything modem's configuration.	`AT%P1=`*passwor*

Example: Sending `AT%P1= corn` will allow a remote user to log in wit the password *corn*. The user can view and change the Courier V.Everything modem's configuration.

i *Remote-access passwords can be up to eight alphanumeric character long, and are not case-sensitive*

Other Remote-Access Commands The table below is a list of remote-access configuration commands.

For your modem to	Command
Display a view-only password	`AT%P0?`
Display a view-and-change password	`AT%P1?`
Erase a view-only password	`AT%P0=`
Erase a view-and-change password	`AT%P1=`
Disable remote access entirely	`ATS41=0`

Example: Sending `AT%P1=` will erase the view and change password

WARNING: If you erase the%P1 password without disabling remote access (using `ATS41=0`), anyone could access the Courier V.Everything modem and change its configuration.

Accessing the Host

At the Guest Device The guest device requires no configuration to access the host. Follow these steps:

1 Be sure that the host device has enabled remote access and is set to auto-answer (`ATS0=1`). Know the password, if you will need one.

2 Call the host device (although it doesn't matter which device originates the call).

3 After a connection is established, do this:

 a Pause 4 seconds.

 b Type 4 tildes: ~~~~

 c Pause 4 seconds.

The administrator of the host device can change the remote-access character using S-Register 42, and the pause duration using S-Register 43. See Appendix A, S-Registers *for more information.*

4 You should see a display similar to this:

```
3Com Courier V.Everything Remote Access Session
Serial Number 000000A000000001


Password (Ctrl-C to cancel)?
```

There is a 3-minute time limit for entering the password. If the number of unsuccessful login attempts exceeds the set limit, the host device returns online and refuses any further login attempts during the remainder of the connection

When the host accepts the password, the following message and prompt will appear on your screen:

```
Remote Access granted
```

```
Remote->
```

You may not be prompted for a password. If you aren't, passwor security is not active. The following prompt appears on your screen after you type the four tildes

```
Remote Access granted (query only)
```

```
Remote->
```

During a remote-access session, the maximum number of characters between carriage returns is 40.

Viewing and Changing the Host's Configuration

Once you've gained guest access to a host, you can communicate wit the host just as if you were entering commands from its attache computer.

Depending on your access privileges, you can use the regular set of Courier V.Everything modem AT commands.

If you have this access privilege	You can use
View-only	Any of the inquiry (ATI) commands
View and Configure	Any of the CourierV.Everything mode commands, except those that cannot be used while online (for example, ATD or ATA). You can also use remote configuration commands.
	See the next section for examples.

CAUTION: Be careful not to send **ATZ** *or* **ATZ!** *or you will lose the connection!*

Remote Configuration Commands

There are special commands that can be used only during a remote-access session.

You can change the host Courier V.Everything modem's serial port rate by using the AT%B*n* command.

To change the host CourierV.Everything modem's serial port rate to	Command	To change the host Courier V.Everything modem's serial port rate to	Command
110 bps	**AT%B0**	9600 bps	**AT%B6**
300 bps	**AT%B1**	19200 bps	**AT%B7**
600 bps	**AT%B2**	38400 bps	**AT%B8**
1200 bps	**AT%B3**	57600 bps	**AT%B9**
2400 bps	**AT%B4**	115200 bps	**AT%B10**
4800 bps	**AT%B5**		

Example: Sending **AT%B6** will change the CourierV.Everything modem's serial port rate to 9600 bps.

You can use the AT%Fn command to control the data format.

To change the data format to	Command
No Parity (8 data bits)	**AT%F0**
Mark parity (7 data bits)	**AT%F1**
Odd Parity (7 data bits)	**AT%F2**
Even parity (7 data bits)	**AT%F3**

You can use the AT% *n* command t control whether and when to apply changes to the configuration

For your modem to	Command
Defer configuration changes to when the call ends.	**AT%C0** (Default)
Restore the original configuration. Use this command to cancel any changes made during remote access and restore the original configuration.	**AT%C1**
Force configuration changes. Use this command to make configuration changes take effect immediately. We do not recommend forcing changes unless it is absolutely necessary because an unreliable connection, or even a loss of connection, may result.	**AT%C2**

Example: Sending **AT%C1** will cancel any changes made to the modem during a remote access session and restore it to the original configuration.

Even though, by default (%C0), the changes you make do not take effect until the next connection, the new configuration is reflected immediately in inquiry responses (ATIn).

Commands that have been written to NVRAM (using &W) and forced configuration changes (%C2) will not be restored to their previous settings when you send the host AT%C1.

After you make changes to the host's configuration, the remote- access prompt changes from Remote-> to Remote+>.

If you restore the original configuration using the AT%C1 command, the first prompt is restored, assuring you the original configuration is intact.

Quitting a Remote-Access Session

If you want to quit the remote-access login *before* you have entered the password, return online by pressing <Ctrl>C or typing ATO.

After you've entered the password, you can quit by sending one of these commands:

To end the remote-access session	Command
And keep the connection.	**ATO**
And end the connection.	**ATH**
End the connection, and reset the host modem.	**ATZ**

Before you disconnect, issue the ATI5 command to the remote modem and check its S41 setting. Make sure S41 is set for a value of 1 or greater. If S41 is set to 0, when you disconnect you will not be able to access the remote modem again. To prevent this send ATS41=1&W before yo disconnect.

10
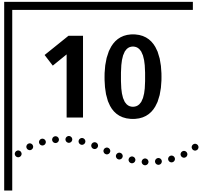
CONTROLLING DATA RATES

This chapter contains information about

- Serial port rates
- Connection rates
- Controlling Link Speeds with &N and &U
- Configuring the high speed LED
- Setting DTE Rate to 230 Kbps

Overview

You can set the Courier V.Everything modem to use fixed or variable serial port rates and fixed or variable connection rates. Serial port rates pertain to data transferred between your computer and the CourierV.Everything. Connection rates pertain to data transferred between the Courier V.Everything modem and the device at the other end of a connection.

Serial Port Rates

You set a fixed serial port rate to get the highest possible throughput an the best performance. Set a variable rate to allow the Courier V.Everything modem to match the connection rate.

Your software must support fixed or variable serial port rates.

Your software may use terms such as locked serial port (fixed rate) or autobaud (variable rate).

To allow your modem	Set the serial port rate as	Command
To change its serial port rate to match the connection rate.	Variable	**AT&B0**
To always communicate with an attached device at the rate at which you have set the terminal or software, regardless of the connection rate. For the greatest throughput, set the serial port to 230400, 115200, 57600, or 38400 bps for high-speed calls, and to at least 9600 bps for 2400-bps calls.	Fixed	**AT&B1** (Default)
To shift its serial port rate to a rate that you specify using your communications software (for example, 38.4 Kbps) when the Courier V.Everything modem connects in ARQ mode. If the connection is not under error control, the Courier V.Everything modem behaves as if it was set to &B0 and switches its serial port rates to match the connection rate of each call. To implement this feature, first set your software to the desired rate. Then send **AT&B2&W** to the modem. The CourierV.Everything modem stores the rate of the command in NVRA along with the current settings. The CourierV.Everything mode checks NVRAM for the specified serial port rate each time it makes an ARQ connection. When saving subsequent configurations to NVRAM, be sure your software is set to your selected serial port rate so the correct rate is maintained.	Fixed for ARQ calls and Variable for non-ARQ calls when answering only. See Chapter 13, *Handshaking, Data Compression, and Error Control, for more information about ARQ*	**AT&B2**

The serial port rate MUST be equal to or higher than the Connection rate (&Nn).

Connection Rates   You can set the Courier V.Everything modem to a fixed or variable
connection rate for data calls. Set a variable rate to have the Courier
V.Everything modem negotiate with the remote device for the highest
possible connection rate. Set a fixed rate to connect only at a specifie
rate. You might use a fixed rate to filter calls for security or other reasons.

To allow your modem to	Set connection rate as	Command
Negotiate for the highest possible rate.	Variable	**AT&N0**
Connect only if the remote device is operating at the rate you specify. See below.	Fixed	**AT&N1-AT&N16**

To connect at this rate	Command	To connect at this rate	Command
300 bps	**AT&N1**	33.333 Kbps	**AT&N21**
1200 bps	**AT&N2**	34.666 Kbps	**AT&N22**
2400 bps	**AT&N3**	36.0 Kbps	**AT&N23**
4800 bps	**AT&N4**	37.333 Kbps	**AT&N24**
7200 bps	**AT&N5**	38.666 Kbps	**AT&N25**
9600 bps	**AT&N6**	40.0 Kbps	**AT&N26**
12.0 Kbps	**AT&N7**	41.333 Kbps	**AT&N27**
14.4 Kbps	**AT&N8**	42.666 Kbps	**AT&N28**
16.8 Kbps	**AT&N9**	44.000 Kbps	**AT&N29**
19.2 Kbps	**AT&N10**	45.333 Kbps	**AT&N30**
21.6 Kbps	**AT&N11**	46.666 Kbps	**AT&N31**
24.0 Kbps	**AT&N12**	48.0 Kbps	**AT&N32**
26.4 Kbps	**AT&N13**	49.333 Kbps	**AT&N33**
28.8 Kbps	**AT&N14**	50.666 Kbps	**AT&N34**
31.2 Kbps	**AT&N15**	52.0 Kbps	**AT&N35**
33.6 Kbps	**AT&N16**	53.333 Kbps	**AT&N36**
28.0 Kbps	**AT&N17**	54.666 Kbps	**AT&N37**
29.333 Kbps	**AT&N18**	56.0 Kbps	**AT&N38**
30.666 Kbps	**AT&N19**	57.333 Kbps	**AT&N39**
32.0 Kbps	**AT&N20**		

Example: Sending **AT&N8** will only allow connections with remote devices that are operating at 14.4 Kbps.

Controlling Link Speeds with &N and &U

You can use the &N and &U commands to control link speeds

Controlling Lin Speeds

Use the following table to determine how to use &N and &U commands

To limit the	Use
Specific connect speed	**AT&N**
Range of possible connect speeds	**AT&N**
	and
	AT&U

The default values for &N and &U are 0. If you change these values, you will limit the speeds at which you can connect. 3Com recommends that you do not alter these values.

Specifying the Connect Speed

The &N command allows you to specify the connect speed. If a remote modem attempts to connect to your Courier V.Everything modem at a speed different from &N, your Courier V.Everything modem will not allow it to connect.

To limit the	Use this command	Where x is
Highest possible connect speed	**AT&N=x**	A value from 0 to 39

For a complete list of connect speeds, see the table in section &N and & Command Values.

Limiting a Range of Possible Connect Speeds

By setting &N and &U values, you can limit the range of speeds at which your CourierV.Everything modem connects. If a remote modem does not connect to your Courier V.Everything modem at a range between the speeds designated by the &N and &U commands, your Courier V.Everything modem will not allow it to connect

The link speed associated with the &U argument CANNOT be greater than the link speed associated with &N argument.

Use the following table to understand the relationship between &U and &N commands

If &U	And &N	Then your modem
Equals zero	Equals zero	Connects at the highest possible speed.
Equals zero	Is greater than zero	Connects at the &N speed only.
Is greater than zero	Is greater than zero and greater than &U	Connects at the highest possible speed in the range from &U to &N.
Is greater than zero	Equals zero	Not allowed.

&N and & Command Value

Use the following table for a complete list of &N and &U link speeds an their associated indexes:

Link Speed	Index
Highest	0
300	1
1200	2
2400	3
4800	4
7200	5
9600	6
12000	7
14400	8
16800	9
19200	10
21600	11
24000	12
26400	13
28800	14
31200	15
33600	16

Link Speed	Index
28000	17
29333	18
30666	19
32000	20
33333	21
34666	22
36000	23
37333	24
38666	25
40000	26
41333	27
42666	28
44000	29
45333	30
46666	31
48000	32
49333	33
50666	34
52000	35
53333	36
54666	37
56000	38
57333	39

Configuring the High Speed LED

You can configure your Courier V.Everything modem to alert you when it reaches 56K speeds. Use the following S69 setting to configure the HS (High Speed) LED:

To do this	Command
Configure the HS LED to turn red when your modem reaches speeds over 33.3 kbps.	**ATS69=12**

Setting DTE Rate to 230 Kbp

The DTE rate of your Courier V.Everything modem has been increased to 230 kbps to enhance throughput. Your modem must be attached to a serial port capable of this speed to achieve this rate.

This command is only supported with modems attached to high speed serial cards.
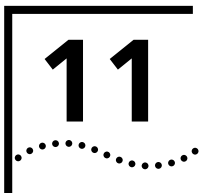
11 DIAL SECURITY

This chapter contains information about:

- Setting up Dial Security
- Maintaining security accounts
- What the guest user needs to do
- Configuring dial security remotely
- DTMF security

Overview

Dial Security is designed to protect networks and data centres from unauthorised access.

You should be familiar with these terms before you continue:

Local	The device that is directly connected to the computer you are using.
Remote	The device at the other end of a telephone connection.
Host	The CourierV.Everything mode that will be accessed and controlled by other devices.
Guest	The device that will access and control the host Courier V.Everything modem.

You can configure up to 10 accounts: one administrative account for you and nine accounts for guest users. The account profiles are stored in the host CourierV.Everything modem's nonvolatile random access memory (NVRAM).

There are two forms of Dial Security; each will be explained later in this chapter:

- Autopass
- Password Promptin

Setting up Dial Security

Here is a summary of the steps for setting up Dial Security:

- Set up an account for yourself.
- Identify your account as the Administrative Account.
- Set up guest-user accounts.
- Enable local (host) security.
- Choose a Dial Security method
- Enable Dial Security
- Activate the Dial Security settings

1 Set up an account for yourself.

Use any of the 10 available accounts (numbered 0-9) for your account.

Use the AT%A*n* command to set up user accounts. See the figure below for the five fields to concern yourself with.

The AT%An command is automatically written to NVRAM. It does not require you to send &W.
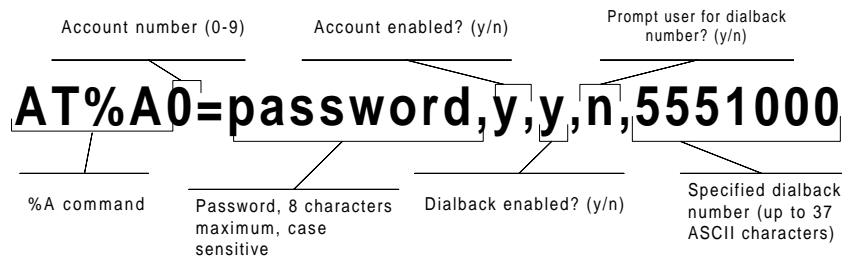
WARNING: *Do not insert spaces between commas or between fields and commas. Spaces will invalidate the command.*

Dialback options   You can set the Courier V.Everything modem to automatically dial back a certain number after a client modem dials in.

Count your commas! There should always be at least four commas in the %A command. Do not insert spaces between commas or between fields and commas. Spaces will invalidate the command.

To make the host Courier V.Everything modem	Command	Example
Hang up and then dial back a guest device at a specified number. Expect a pause of approximately 1.5 minutes before the modem dials back. You cannot alter the duration of the pause.	**AT%A0=***password***,y ,y,y,n,1** *area code and phone number*	**AT%A0=corn,y,y,n,1,8 475555555**
Prompt you to enter a number at which to dialback a device, and then have the CourierV.Everything mode dial back the device at that number	**AT%A0=**password**,y ,y,y,**	**AT%A0=corn,y,y,y,**
Disable dialback	**AT%A0=**password**,y ,n,,**	**AT%A0=corn,y,n,,**

To enable Dialback, you must enable Dial Security with Prompting. See step 6.

2 Identify your account as the Administrative Account

For your modem to	Command	Example
Identify your account as the Administrative Account	**AT%L**	**AT%L=PW0** This example sets account 0 as the Administrative Account.

Once you set the administrative password, you cannot view or modify the guest account profiles unless you enter the correct administrative password.

WARNING: *Be sure to remember your administrative password. If you enable Dial Security and then forget your administrative password, you will be locked out of the Courier V.Everything modem's dial security features. You will need to restore the factory defaults by setting DIP switch 10 ON. This will erase ALL passwords and you will have to reconfigure all your accounts.*

3 Set up guest-user accounts.

Use the AT%A*n* command to set up guest-user accounts in the same way you set up your administrative account. You can set up nine guest accounts. Refer to the figure in step 1 regarding information about formatting the AT%A*n* command.

After you have enabled the guest accounts, make sure the guest users know their passwords and the log-in procedure.

Modifying Accounts   After you have set up an account, you can modify each field independently. If a field is to remain unchanged from its original setting, just insert a comma, as shown: **AT%A1=,,,Y,**

The command above allows the guest user to supply a dialback number that is different from the one stored in the original account record.

4 Enable Local Security.

WARNING: *If you do not enable Local Security, the Dial Security settings will not be protected and other users will be able to change or erase them.*

For your modem to	Command
Protect the administrative password (local security enabled)	**ATS53.2=1**

You must use the &W command to save the settings in NVRAM. If you don't, the next time you reset or power off the Courier V.Everythin modem, Dial Security will be disabled.

5 Decide which Dial Security option to use.

You can choose from the two types of Dial Security: Autopass and Password Prompting.

Autopass Prompting   Autopass is the default form of password protection. Autopass
automates the process of logging in to the host modem, but it requires
the guest and host devices to be Courier V.Everything modems.

When a guest device attempts an Autopass connection, the guest
includes its password in itsV.42 error-control request. The host mode
checks all the enabled passwords in its security accounts for a match.

Password Prompting   Password Prompting allows connections with *any* guest device, as long as
the guest user knows the correct password.

When the host has Password Prompting enabled, it asks guest users for a
password. The host modem checks the received password against each of
its active Security accounts

i   *There is no Password Prompting capability in synchronous mode.*

The table below is a comparison between Autopass and Password
prompting.

When using Autopass Prompting	When using Password Prompting
Both the host and guest devices are made by 3Com and have Dial Security enabled.	Guest devices don't have to support 3Com Dial Security.
The connection between the Courier V.Everything modem or modems is under V.42 error control (See Appendix B, Alphabetic Command Summary for information about using **AT&M4** or **AT&M5**)	V.42 error-control connections aren't required
If the guest includes an invalid password, the host sends an INVALID PASSWORD message and hangs up.	If the guest sends an invalid password, the host prompts twice more before disconnecting. If the guest does not send a password after 60 seconds, the host disconnects.
If the guest includes a valid password, the host permits a secure connection.	The host will still always respond to a correct Autopass attempt.
If the guest did not enable Dial Security, the host will not accept the call unless prompting is enabled on the host Courier V.Everything mode .	

6 Enable Dial Security

⚠️ *WARNING:* Before you enable Dial Security, you must set up a administrative account and password. See Steps 1 & 2.

For your modem to enable	Command
Autopass Dial Security	`ATS53.0=1`
Dial Security with Password Prompting (this also enables Autopass)	`ATS53.0=1.1=1`
Dialback Security, enable Password Prompting and enable Dialback in each guest account	`AT%A`*n*`=`*password*`,y,y,y,`*phone number*
	where *n* is the account number
	See the figure in previous section, *Setting Up Dial Security* for more information.

Example: Issuin `AT%A3=corn,y,y,y,5551234` to your modem will enable Password Prompting and Dialback for account 3, which has the password *corn*.

ℹ️ *You must use the &W command to save the settings for Enablin Autopass Dial Security and Dial Security with Password Prompting. If yo don't, the next time you reset or power off the Courier V.Everythin modem, Dial Security will be disabled.*

If you need a reference when setting these command, you can use the ATI10 command. See Appendix B, Alphabetic Command Summary for more information about the ATI10 command.

7 Send `ATZ` or `ATZ!` to activate the Dial Security settings

ℹ️ *For all CourierV.Everything modems except the PC card version, make sure that DIP switch 10 is OFF, so the modem loads the settings stored in NVRAM.*

If DIP switch 10 is ON, the settings in ROM (&F0) are loaded, disabling dial security. You can retreive the dial security settings by setting DIP switch 10 OFF and resetting the CourierV.Everything modem using ATZ or by toggling the power of the modem.

Maintaining Security Accounts

Once the administrative password is set and Dial Security is enabled, the administrator is the only one who can access account information.

You can use the AT%S= and AT%E= commands to change and modify account information.

For your modem to	Command
Access accounts by disabling local security	**AT%S=***administrative password*
View account information, once access has been granted. Remote users may only use this command during remote-access sessions if local-access security is disabled.	**ATI10**
Erase local-access password	**AT%E=1**
Erase Autopass password	**AT%E=2**
Erase passwords in accounts 0-9	**AT%E=3**
Erase phone numbers in accounts 0-9	**AT%E=4**
Disable Account, Dialback, and New Number fields in accounts 0-9.	**AT%E=5**
Edit or overwrite an individual account or an individual account field	**AT%A***n*= where *n* is the account number. See the figure in previous section, *Setting Up Dial Security* for more information.

Example: Sending **AT%E=3** erases passwords for accounts 0-9

When using the AT%S= command, the device echoes the administrative password, which is case-sensitive. CourierV.Everything modems will accept an invalid password entry, but will lock out users from the security commands.

For example, if the password is Green, but you enter GREEN, an OK is displayed. However, if you try to type a security command (for example, ATI10 to view accounts), an [ACCESS DENIED] message is displayed.

Remote Configuration

Dial Security accounts may be configured remotely. (See *Configuring Dial Security Remotely* at the end of this chapter.)

What the Guest User Needs to Do	When guest users want to call in to the host (assuming you have enable Dial Security by entering **ATS53.0=1**),

- They must know the password.
- If you have enabled Dialback, they must set their device to auto-answer.

1 If the host has security enabled, get a password from the host's administrator. The password is case-sensitive, so be sure to copy it correctly.

If the host has prompting enabled and the host operator enables Dialback for your account, skip to Step 3.

2 For guest users with Courier V.Everything modems (or I-Modems) only:

a Create a security account using the password the host's administrator asked you to use. (See *Setting Up Dial Securit* , earlier in this chapter for instructions.

b You need to assign the password as your Autopass password

For your modem to	Command
Assign the password as your Autopass password	**AT%V=PW***n*, where *n* is the number of the account you set up.

Example: Sending **AT%V=PW3** will assign the password as an Autopass password for account 3.

c Check to see that you set your Autopass password correctly by using the ATI10 command.

Your Autopass password appears beside AUTOPASS PASSWORD, if you have done all the steps correctly.

d Once the Autopass password is set, enable your Courier V.Everythin modem's Dial Security.

For your modem to	Command
Enable Dial Security	**ATS53.0=1**

⚠ *CAUTION: If you do not follow an S-Register setting with &W, the setting will be retained only until the next reset or power off.*

3 If Dialback is enabled at the host CourierV.Everything modem's site, set your modem to answer the host CourierV.Everything modem when it dials back.

For your modem to be set	Command
To answer the Dialback call	**ATS0=1**

4 Call the host.

5 After the call ends you can disable Auto Answer.

For your modem to	Command
Disable Auto Answer	**ATS0=0**

Configuring Dial Security Remotely

The host administrator can configure the host's security settings remotely.

At the host device, you must have previously enabled remote access and assigned a remote-access password that allows view-and-change privileges (see Chapter 9, Accessing and Configuring the Courier V.Everything modem remotely). You may want to use your administrative password as your remote-access password.

Dialing In From the Remote Site

1 From the remote site, connect to the host using Dial Security. Once a connection is made, follow the instructions for beginning a remote-access session as described in Chapter 9, *Accessing an Configuring the Courier V.Everything modem remote* .

2 When remote access has been granted, use the AT%S= command t access the Dial Security accounts. See *Maintaining Security Accounts* section earlier in this chapter.

To view the security account information use **ATI10**.

3 Make any configuration changes and execute them immediately by entering **AT%C2**.

4 To end the remote session and reactivate Dial Security on the host, reset the host device by issuing **ATZ**.

WARNING: *If you do not use the ATZ command to end a remote-access session, Dial Security will remain disabled at the host, and anyone dialing in to the host for remote access will have access to the ATI10 screen and all Dial Security accounts.*

DTMF Security

DTMF (Dual Tone Multi-Frequency) Security requires a modem to go off hook when it receives a call but keep silent until it receives the valid DTMF password. After the modem receives the valid password, it will begin training. If the DTMF password is invalid, the modem will go on hook, and the DTE will never know there had been a call coming.

The DTMF security status and password are shown in the ati10 screen

DTMF security is enabled by setting the S53 bit 3, e.g. S53=8 or S53.3=1.

Using the %D command sets the DTMF security password (AT%D=PWn, n=0--39). Make sure to disable that account so no one can use the DTMF password as the Dial Security account. For example, to set local modem DTMF security password, you may use following command: AT%A0=123456,N,,, then AT%D=PW0. You can change that security account later, if you like.

The DTMF password can be the combination of 0123456789*ABCD; the # is used as the password end sign. The maximum length of the DTMF password is 8 character.

The remote modem dial string should look like this ATDT2625000@123456#. In this example, "123456" is the DTMF security password.

12

FLOW CONTROL

This chapter contains information about

- Hardware and software flow control
- Received-data flow control
- Transmit-data flow control

Overview

The Courier V.Everything modem has two buffers, one for data transmitted from your computer, and one for data received from the phone line.

Flow control provides a system for stopping and starting transmissio depending on how full the buffers are. Flow control's purpose is to prevent overfilling the buffers, which may cause data to be lost.

We recommend that you use hardware flow control. If you do, depending on your communications software, you will also need to enable hardware flow control in your communications software.

Hardware and Software Flow Control

There are two kinds of flow control: hardware and software. Courier V.Everything modems support both, but your computer and communications software must also support the kind of flow control you choose.

Hardware Flow Control

Courier V.Everything modems implement hardware flow control by detecting that a buffer is 90% full and then interrupting the Clear to Send (CTS) signal to stop the flow of data. When the buffer drops back to 50% full, the sends CTS to restart the flow of data.

Software Flow Control

Courier V.Everything modems implement software flow control by detecting that a buffer is 90% full and then sending special characters in the data stream to stop the flow of data. When the buffer drops back to 50% full, the CourierV.Everything modem sends special characters in the data stream to restart the flow of data.

The problem with software flow control is that the characters used to stop (<Ctrl>Q) and start (<Ctrl>S) the flow of data can occur naturally in the data flow. Enabling software flow control instructs the modem t recognise and act on these characters, even if they are not intended to control the data flow.

Using software flow control may prove satisfactory if you're transferring text files only.

The start command is called XON (for transmit on) and the stop command is called XOFF (transmit off). You can change the characters used. See Registers S22 and S23 in Appendix A, S-Registers.

Received Data Flow Control

Flow control settings are controlled by the AT&Rn and AT&In commands. The default settings are &R2&I0. Use the following table for more information about setting the flow control.

For your modem to	Command
Pause before sending CTS signal after receiving the Request to Send (RTS).	`AT&R0`
The delay is required by some synchronous mainframes and does not apply to asynchronous calls.	
Ignore the RTS signal.	`AT&R1`
&R1 is required if your computer or software does not support RTS	
Enable hardware flow control.	`AT&R2`
This sends data to your computer only upon receipt of the RTS signal.	
Disable software (XON/XOFF) flow control.	`AT&I0` (Default)
Recommended for non-ARQ (Normal mode) calls (see AT&I5). While the Courier V.Everything modem is online, the only characters it recognises are +++, the escape code.	
Enable software (XON/XOFF) flow control. Use in ARQ mode only.	`AT&I1`
Note: The XON/XOFF characters sent to the remote computer may interfere with XON/XOFF signaling between the remote computer and remote device (see AT&I2).	
Force the modem to act on your XON/XOFF commands, but remove them from the data stream instead of passing them to the remote computer.	`AT&I2`
This ensures that the remote computer does not confuse your XON/XOFF characters with those from its attached device. This is the recommended setting for ARQ mode.	

When using the AT&I2 command, if the call is not in ARQ mode, there is no flow control on the link. If you send an XOFF to your modem and it stops passing data, it has no way to tell the remote computer and modem to stop sending for a while, and the local's buffer may overflow. For more reliable control in non ARQ mode, see AT&I5.

For your modem to	Command
Enable Hewlett Packard-Host mode. Applies only to devices attached to an HP mainframe that uses the ENQ/ACK protocol. Use in ARQ mode only.	**AT&I3**
If you want to use software flow control to transfer non-text (binary) files, set serial port and connection rates equal using &B0 and & N0. See Chapter 9, *Controlling Data Rates* for more information about these commands.	
Enable Hewlett Packard-Terminal mode. Applies only to CourierV.Everything modems attached to terminals in an HP system that uses the ENQ/ACK protocol. Use in ARQ mode only.	**AT&I4**
Enable flow control when the connection is not under error control. For this to work, the remote device must also have AT&I5 capability. In ARQ mode, a modem set to AT&I5 operates the same as it does when set to &I2. It acts on your XON/XOFF commands, but does not pass them to the remote system. The error-control protocol enables the devices to control the flow of data on the phone link.	
In non-ARQ mode, a modem set to AT&I5 operates as though flow control were disabled (AT&I0); it does not look for your typed XON/XOFF commands. However, it does look for XON/XOFF characters coming in over the phone link. When the remote device sends XON/XOFF commands, the modem either resumes or stops transmitting data over the link and drops the characters from the data stream.	
If both devices are set to AT&I5, operators at each end can signal the remote device to stop sending. Thus, controlling the data flow on the phone link and preventing their own device's buffer from overflowing. At the computer/device interfaces, the devices independently control the flow of data through their Transmit Data (AT&H) settings.	**AT&I5**

Example: Sending **AT&I2** will remove XON/XOFF commands from the data stream instead of sending them to the remote computer. This will force the Courier V.Everything modem to act of the XON/XOFF commands.

Transmit-Data Flow Control

This type of flow control is for data transmitted to the Courier V.Everything modem by its attached computer.

For your modem to	Command
Disable transmit data flow control	**AT&H0**
Enable Hardware flow control.	**AT&H1**
Requires that your computer and software support Clear to Send (CTS) at the EIA-232 interface.	
Enable Software flow control.	**AT&H2**
Requires that your software support XON/XOFF signaling.	
Use both hardware and software flow control.	**AT&H3**
If you are unsure about what your equipment supports, select this option.	

13

HANDSHAKING, ERROR CONTROL, DATA COMPRESSION, AND THROUGHPUT

This chapter contains information about:

- Handshaking
- Selective Reject
- V.90 Capabilities
- Error Control
- Data compression
- Getting maximum throughput

Handshaking

With each call, CourierV.Everything modems go through a link negotiation process with the remote device. Another name for the negotiation process is "handshaking.

Courier V.Everything modems default to V.90 modulation and try for the highest possible speed when they attempt to connect with another modem: 56 Kbps. If the remote device is not V.34-capable, a connection is made using the highest compatible modulation scheme (x2,V.34, V.FC, V.32 *terbo*, V.32 *bis*, and so on, down to as low as Bell 103, or 300 bps).

Selective Reject

The Courier V.Everything modem supports Selective Reject for analogue calls. Selective Reject improves performance on noisy lines by reducing the amount of overhead incurred when the protocol must resend data due to errors

When Selective Reject is active, only the frame that contained the error is resent, instead of the frame plus all of the following unacknowledge frames.

Selective Reject is an optional part of the ITU-TV.42 (LAPM) standard

For your modem to	Command
Enable Selective Reject	`ATS51.6=0` (Default)
Disable Selective Reject	`ATS51.6=1`

Attaining Speeds Above 28.8 Kbps

V.34 connections at 21.6, 24, and 26.4 Kbps are common. To get connections of 28.8, 31.2, and 33.6 Kbps, line quality must be pristine end-to-end. In addition, 31.2 and 33.6 Kbps connection rates are possible only when the device to which you are connecting also runs software that supports speeds above 28.8 Kbps.

Attaining 56 K Connections

When a clientV.90 modem connects to a server V.90 modem, the path through the telephone network between the modems is subject to the following conditions for anV.90 connection to be made.

A digital connection at one end ISPs or other online services must have a digital connection to the public switched telephone network (PSTN). Most major online services have a digital connection to the PSTN.

Only one digital-to-analogue conversion There can be only one digital-to-analogue conversion in the telephone network between the V.90 server modem and the V.90 client modem.

Controlling the V.8 Call IndicateTone

The V.8 protocol speeds call negotiation and specifies a call indicate tone. Providing the call indicate tone is optional. For compatibility, we ship the Courier V.Everything modem with the call indicate tone disabled.

For your modem to	Command
Enable the call indicate tone	`ATS54.6=0`

If you enable the V.8 call indicate tone, expect to hear a sound like a fast ringing signal while the call is being connected.

V.34 If the remote device has V.34 capability, the Courier V.Everything mode uses a line probing technique to determine the highest speed possible under current line conditions, then they complete the connection. If the remote device does not have V.34 capability, the Courier listens to the device's answer tones to identify the standard rate at which the remote device is operating, and then adjusts to that rate.

When the Courier answers a call, it sends out a series of answer tone signals until both devices negotiate the best connection rate.

V.90 Capabilities

The Courier V.Everything modem has V.90 capabilities. The Courier V.Everything modem can dial into V.90 servers to establish speeds up to 56 K downstream.

For your modem to	Command
Enable V.90	**ATS58.5=0** (Default)
Disable V.90	**ATS58.5=1**

Other Protocols

x2 x2 client modems can receive data at speeds up to 56 kbps and send data at V.34 speeds. To use x2, the client x2 modem must connect to a server x2 modem. If clients attempt to connect to ISPs that do not use x2, the client modem will negotiate the next available modulation. For example, an x2 client modem calling into an ISP that only supports V.34, the modem will only negotiate the highest v.34 connection rate. The maximum V.34 connection speed is 33.6 kbps.

Fast Class (V.FC) Handshaking After trying V.34, the Courier V.Everything modem tries for the fastest possible V.Fast Class (28.8 Kbps) connection. In order to negotiate V.FC, V.8 has to be disabled. V.FC is not part of the ITU V.8 training sequence.

If the remote device is not V.FC capable, a connection is made using the highest compatible modulation scheme (V.32 *terbo*, V.32 *bis*, and so on, down to as low as Bell 103, or 300 bps)

If the remote device has V.FC capability, the Courier V.Everything mode uses a line probing technique to determine the highest speed possible under current line conditions, then completes the connection. If the remote analogue device does not have V.FC capability, the Courier V.Everything modem listens to the device's answer tones to identify what standard rate the remote analogue device is operating at, and adjusts t that rate.

When a Courier V.Everything modem answers a call, it sends out a series of answer tone signals until both devices negotiate the best connection rate.

HST We recommend that Courier V.Everything modems retain the default B and &N0 settings. This allows them to make analogue connections wit "V." protocol and HST modems in both Originate and Answer modes at a variety of speeds.

When originating an analogue call, the Courier V.Everything modem set to B1 sends out a Bell answer tone, which is the prevalent standard in the U.S. and Canada for connections at 2400 bps and lower. At higher speeds, the Courier V.Everything modem also recognises the ITU answer tones necessary for connecting with V. protocol modems, and adjusts to the answering device.

However, when answering a call, a Courier sending out the Bell answer tone (B1) won't be recognised by V. protocol modems. The calling modem, instead, will wait until it detects a tone it recognises (the V.22*bis* tone used at 2400 bps).

If you want to have your Courier connect with V. protocol modems at high speeds, make sure it is set to B0 for the ITU answer tones. It will als connect with HST modems at speeds up to 16.8 Kbps.

USR V.32 *terbo* to USR V.32 *terbo* On these analogue connections, Courier V.Everything modems have two features that result in outstanding performance: Quick Connect an Adaptive Speed Leveling (ASL).

- Quick Connect allows two Courier V.Everything modems to connect in approximately 7 seconds, a far shorter time than with most devices.

- ASL (described below in Other V.Protocol Operations) is used by Courier V.Everything modems operating in V.32 *terbo* and V.32 *bis* modes.

Lower-speed V. Protocols
Older, lower-speed "V." protocols do not employ line probing. Instead they use predefined answer tones to specify or identify speed capabilities. These protocols define the following maximum speeds:

- **V.32 *terbo*:** 16.8 and 19.2 Kbps, with an additional US device-to-USR device speed of 21.6 Kbps.
- **V.32 *bis*:** 14.4 Kbps.
- **V.32, V.22 *bis*, etc.:** 9600 bps and lower.

ASL (used in V.32 *terbo* and V.32 *bis* modes) is a technique that allows the Courier V.Everything modem's receivers and transmitters to act independently of each other. One transceiver may slow down and then speed up without affecting the data flow on the other. The result is more efficient line operation.

While most modems on the market now use higher speeds, there may be a problem in answering older, V.32 modems at 9600 bps. Use Register S28 to modify the duration of the extra tones used in V.32 negotiations, in the rare instance that this may be necessary. See Appendix A, S-Registers.

Error Control

Courier V.Everything modems can employ error-control techniques during data connections.

High-speed data calls are vulnerable to errors unless the data is protected by error control. If your Courier V.Everything modem connects with a remote device at a high speed, but without error control, and if you are not using an error control protocol for your call, you may lose data.

Automatic Repeat Request (ARQ) is a method used in many error-control protocols to ensure that any data that has been corrupted in transit is retransmitted. We use the term to designate a connection under error control.

Error-Control Commands
You can use Error-Control commands to enable ARQ (error control) or enable synchronous protocols. The Courier V.Everything modem and the remote device ***must*** use the same protocol.

For your modem to	Command
Have no error control (Normal Mode) Due to the nature of phone line channels, this is never recommended for analogue calls above 2400 bps	`AT&M0`
Enter Online Synchronous Mode without V.25 *bis*. External Courier V.Everything modems only	`AT&M1`
Operate in Normal mode if an ARQ connection can't be made (Normal/ARQ mode)	`AT&M4`
Hang up if it can't make an ARQ connection (ARQ Asynchronous Mode)	`AT&M5`
Start V.25 *bis* synchronous mode, using the BISYNC protocol.	`AT&M6`
Start V.25 *bis* synchronous mode, using the HDLC link protocol.	`AT&M7`

Example: Sendin `AT&M4` allows your modem to operate in Normal Mode if an ARQ connection can't be made.

Error control is available for calls at 1200 bps and above. It can be disabled, although high-speed calls (9600 bps or higher) should always be under error control. The operations defined in an error-control protocol include:

- Establishing compatibility.
- Formatting data frames.
- Detecting errors using Cyclic Redundancy Checking (CRC).
- Retransmitting corrupt data frames

The Courier V.Everything modem is set at the factory to try for a error-control connection and, if that isn't possible, to proceed with the call in Normal mode. This means that &M4 is set.

V.42 Error Control   The Courier V.Everything modem first tries for a V.42 connection, then a MNP connection. The following information is based on the Courier V.Everything modem's setting of &M4

This international standard includes a two-stage hand-shaking process:

■ A **Detection** phase that is based on an exchange of predefine characters.

■ A **Link Access Procedures for Modems (LAPM) Negotiation** phase, during which the devices identify their capabilities concernin maximum data block size and the number of outstanding data blocks allowed before an acknowledgment is required.

MNP Error Control   The Microcom Networking Protocol (MNP) is supported by the ITU-T V.42 Recommendation. MNP is based on special protocol frames. If the remote device doesn't recognize an MNP Link Request, error control isn't possible. (In HST asymmetrical mode, 3Com devices use a proprietary scheme similar to MNP.

Error Control and Flow Control   Flow control of data from the computer is required under error control for two reasons:

■ The transmitting device buffers a copy of each frame it transmits t the remote end until it is acknowledged by the receiving device.

■ If errors are encountered, retransmission activity can cause a steady stream of data from the computer to overflow the buffer.

Data Compression

Courier V.Everything modems employ different data compression techniques during data connections.

For the modem to	Command
Disable data compression	**AT&K0**
Auto-enable/disable data compression. The Courier V.Everything mode enables compression if the serial port rate is fixed (&B1) and disables compression if the serial port rate follows the connection rate (&B0).	**AT&K1** (Default)
Always enable data compression	**AT&K2**
Selective data compression. Use this setting to transfer compressed files. The CourierV.Everything modem negotiates only for V.42 *bis* compression, and disables MNP Level 5 (MNP5) compression.	**AT&K3**

Example: Sending **AT&K3** is used to transfer compressed files. The modem will only negotiate for V.4 *bis* compression. This command also will disable MNP Level 5 (MNP5) compression.

If a Courier V.Everything modem successfully establishesa V.42 error control connection with a remote device, it also negotiates for V.42*bis* data compression.

If a Courier V.Everything modem successfully establishes an MNP connection with a remote device, it also negotiates for MNP5 data compression.

The type of compression for a call, if any, is reported in the ATI6 display and in the CONNECT message if the modem is set to &A3

V.42 *bis* versus MNP5 Data Compression

Courier V.Everything modems using V.4 *bis* compression negotiate the following options and report them in the ATI6 display

- Dictionary size, that is, the amount of memory available for compression table entries. (Entries are codes devised for redundant data. The data is packed into shorter data units, called code words, and unpacked by the receiving device.)

Possible dictionary sizes:

Bits	Entries
9	512
10	1024
11	2048
12	4096

Your modem uses a 12-bit, or 4096-entry dictionary, but can reduce its size to accommodate a remote modem that uses a 9-, 10-, or 11-bit dictionary.

■ Maximum string length of each entry. As the dictionary fills, your modem deletes the oldest unused strings

V.42 *bis* compression is more efficient than MNP5 compression, in part because it dynamically deletes entries that are no longer used. In addition, it works better with files that are already compressed. These include .ZIP files and 8-bit binary files.

MNP5 compression should NOT be used with binary files because it adds data to the files, which lessens throughput. (The additional data is stripped when the file is decompressed by the remote modem.) When transferring such files, it's best to set the modem to &K3 (See the information in data compression). This allows V.42 *bis* compression to work dynamically with the compressed data, but disables MNP5.

Getting Maximum Throughput

The following guidelines should help you to make the most of the Courier V.Everything modem's advanced performance features. In many instances, experimentation and experience will indicate what works best for your applications

Maximum throughput results when:

■ The communications software allows fixing the serial port rate higher than the connection rate, by setting the software to 115200, 57600, or 38400 bps and setting the Courier to &B1.

If the software automatically switches serial port rates to follow the connection rate, the Courier V.Everything modem's serial port rate must be also set to follow the connection rate for each call, &B0, an throughput will be limited.

Installations with specialised software may want to enable a fixed serial port rate for ARQ calls and a variable serial port rate for non-ARQ calls. See the &B2 command in Appendix B, Alphabetic Command Summary.

- The call is under data compression.

- The data is made up of text files rather than binary files such as .EXE or .ZIP files

- MNP5 compression is disabled for files that are already compressed, and 8-bit binary files that appear to modems to be already compressed. Disable MNP5 compressing by sending the Courier V.Everything modem AT&K3.

- The file transfer is not slowed down by a file-transfer protocol. Many non-text files require a file transfer protocol, but the results vary.

For the best throughput on error-controlled connections only and with hardware flow control we recommend the most current version of ZMODEM file transfer protocol.

For example, certain public domain file transfer protocols have the following effects:

Public Domain	Effects
Kermit	Newer versions support packets up to 9K and a sliding window design to eliminate turnaround delay. With earlier versions, however, throughput may be severely reduced due to short block lengths (possibly under 128 bytes) and acknowledgment turnaround time.
XMODEM	Throughput may be reduced if your version uses short block lengths (128 bytes). Some versions use larger blocks (1K blocks). Throughput is also reduced by overhead (error control protocol information).
YMODEM	There is an improvement over XMODEM, due to larger block lengths (1K bytes), but throughput is still reduced by the protocol's error control overhead.

The protocols listed above further reduce throughput when an error control connection is established. The accuracy of the data is checke both by the file transfer protocol and the Courier V.Everything modem. To avoid redundancy, use the above protocols only for non-ARQ connections, and only at speeds of 2400 bps and below.

Overhead is minimal with ZMODEM, resulting in throughput that is almost equal to that obtained with no file-transfer protocol. ZMODEM should also be used for non-ARQ connections. Leave the Courier V.Everything modem at its &M4 and &K1 settings for both error control and data compression.

YMODEM-G is another good choice, but never use it unless both the local and remote devices are using error control: if YMODEM-G detects an error, it aborts the transfer. Do not use either protocol with software flow control (XON/XOFF signaling).

14

DISPLAYING QUERYING AND HELP SCREENS

This chapter contains information about:

- Querying
- Displaying hel

To view screen captures of the help screens in the following chapter, see Appendix B, Alphabetic Command Summary.

Overview

The Courier V.Everything modem can display information such as the current settings, product code, and call duration.

Common Inquiry Commands

For your modem to display	Command
Current settings	**ATI4**
NVRAM settings	**ATI5**
Link diagnostics summary	**ATI6**

Querying

Here is a complete list of ATI*n* commands.

For your modem to	Command
Display a four-digit product code.	**ATI0**
Perform a checksum of the modem's read-only memory (ROM) and display the results. (This function is used only in factory testing.)	**ATI1**
The CourierV.Everything modem should always display the same number.	

For your modem to	Command
Perform a test of the modem's random-access memory (RAM) and display either OK (0) or ERROR (4), followed by OK when the test is completed. You may want to use this command if the Courier V.Everything modem appears to be malfunctioning.	**ATI2**
Display the CourierV.Everything modem's banner, or product title.	**ATI3**
Display the CourierV.Everything modem's current configuration.	**ATI4**
Display the configuration saved in nonvolatile random access memory (NVRAM). If your Courier V.Everything mode connects to a device that has Dial Security and local access enabled, you cannot view the stored phone numbers.	**ATI5**
Display a diagnostic summary. During a connection, the CourierV.Everything mode monitors and stores information about link operations. When the call is ended, you can request a diagnostic summary. The duration of the last call or the real time is displayed, depending on the modem clock setting. For calls under data compression, the number of characters sent may be less than the number of octets sent, due to data compression operations.	**ATI6**
Display the product configuration.	**ATI7**
Lists phone numbers with redial instructions.	**ATI8**
Displays modem's Plug and Play ID.	**ATI9**
Display the Dial Security Account Status. For security administrators only, unless local security is disabled (S53=0 or S53.2=0)	**ATI10**
Display a connection report that 3Com Technical Support representatives use to help you solve problems.	**ATI11**
Display caller ID information from the current call (if in progress) or the last call (if between calls). The caller ID information remains until either the modem is reset or until the modem receives another valid caller ID signal.	**ATI15**
Display a connection report that 3Com Technical Support representatives use to help you solve problems.	**ATI16**

For your modem to	Command
Display a connection report that 3Com Technical Support representatives use to help you solve problems.	**ATI17**

Displaying Hel The Courier V.Everything modem provides six Help, or command summary, screens: basic AT command set, ampersand (&) command set, percent (%) command set, dial command options (D), S-Registers (S), and the octothorpe (#) command set.

> *Help screens are not available when an modem makes a synchronous connection using &M6 or &M7*

For your modem to display	Command
A partial summary of the basic command set	**AT$**
A partial summary of the ampersand command set	**AT&$**
A partial summary of S-Register functions	**ATS$**
A partial summary of percent command set	**AT%$**
A summary of the octothorpe command set	**AT#$**
Help screen for dial commands	**ATD$**

> *To see the remainder of the screen for any given command, press any key.*

15

TESTING THE CONNECTION

This chapter contains information about:

- Testing the Courier V.Everything modem using AT&T*n*
- Testing the Courier V.Everything modem using S-Register 16

Overview

Your modem can perform digital and remote digital loopback tests. You can use these tests to check the operations of the transmitter an receiver, or to locate a problem with a remote device or a telephone line.

Testing is done by sending the AT&T*n* command or by setting Register S16. Only one test can be performed at a given time. If you send a test command while the modem is in test mode, you will receive an ERROR message.

All loopback testing conforms to ITU-T Recommendation V.54.

If you are using synchronous mode (&M1, &M6, &M7), testing is not available.

Testing the Courier V.Everything Modem using AT&T*n*

To perform digital loopback and remote digital loopback testing use the AT&T*n* command. You can type in your own data during testing or use the modem's internal test pattern and error detector. See the following sections for more detailed information about each AT&T*n* command.

For your modem to	Command
End test	`AT&T0`
local digital loopback	`AT&T1`
local analogue loopback	`AT&T2`
not used (error)	`AT&T3`
Grant Remote Digital Loopback request	`AT&T4`
Deny Remote Digital Loopback request	`AT&T5`
Request Remote Digital Loopback	`AT&T6`
not used (error)	`AT&T7`
local digital loopback with test pattern	`AT&T8`
local analogue loopback with test pattern	`AT&T9`

Example: Sendin `AT&T5` will deny any requests from remote devices for a remote digital loopback test of your Courier V.Everything modem

Disable error control (using the &M0 command, see Appendix B, Alphabetic Command Summary*) before testing. If the modem is detecting errors and retransmitting the affected data, your results will be invalid.*

Analogue Loopbac Testing   Local loopback testing checks the operation of the Courier V.Everything transmitter and receiver.
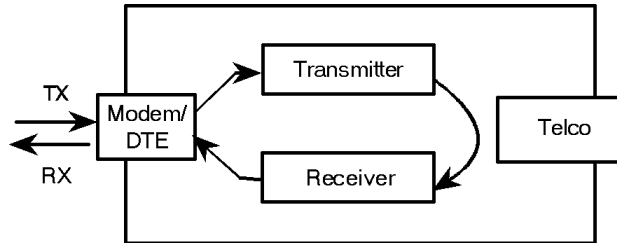
Using AT&T1

1 Send `AT&M0&N3S14.0=0` to prepare the modem for testing.

   This command disables error control, fixes the connection rate at 2400 bps, and makes the modem return to command mode when you type `+++`.

2 Send `AT&T1` to the modem so it enters analogue loopback mode. If yo are testing an external CourierV.Everything modem, the MR status light flashes.

3 It will be looped back by your modem's transmitter for verification o your screen

4 When the test is completed, send `+++` and then `AT&T0` to end the test.

   Alternatively, you can end the test by sendin `ATH`, or `ATZ.` Be careful, though, because ATZ resets the modem in addition to ending the test.

   In either case, the modem responds with OK. If the modem sends an ERROR message, you have issued an invalid command.

5 Send `AT&M4`, unless you used a reset command (ATZ).

If the CourierV.Everything modem is in online mode, still connected to a remote modem, and you send AT&T1 or AT&T8, it drops the call, enters analogue loopback mode, sends a CONNECT result, and waits for loopback characters.

Stopping aTest (AT&T0, ATS18)   To stop a test, send `AT&T0` to the modem, or set Register S18 to a specified number of seconds (for example, `ATS18=10`). When the 1 seconds are up, the modem will stop the test automatically and return to Command Mode. Send `ATH` to the modem to hang up, or send `ATZ` to hang up and reset the modem to its defaults.

If you use the S18 test timer, but in the process of testing you issue a ATZ command, S18 resets to zero and the timer is disabled. You cannot store a value for S18 in NVRAM; its power-on and reset default is always zero.

Using AT&T8

This analogue loopback option causes the CourierV.Everything modem to send an internal test pattern to its transmitter and loop it back to the receiver. An internal error detector counts any errors and, when the test is ended, sends the number of errors or 000 (no errors) to the screen.

Since you don't type anything during this test, and the Courier V.Everything modem does not send anything to the screen, this option verifies only the Courier V.Everything modem. If there are no errors but your problem continues, it may be at the computer interface.

1 Send `AT&M0&N3S14.0=0` to the modem prepare for testing.

This command disables error control, fixes the connection rate at 2400 bps, and makes the Courier V.Everything modem return to command mode when you type `+++`.

2 Send `AT&T8` to begin the test.

The Courier V.Everything modem enters analogue loopback (AL) mode, and sends a CONNECT message. The MR status light flashes. The V.Everything modem then sends its internal test pattern to the transmitter, and loops the pattern back to the receiver. You will not see any data on your screen.

3 Send the escape code, `+++`, and the `AT&T0` to end the test.

Alternatively, you can end the test by sending ATH or ATZ. Be careful because ATZ resets the modem in addition to ending the test

In any case, the Courier V.Everything modem hangs up and returns a three-digit code, followed by OK.

The code	Indicates
000	No errors were found
255	255 or more errors
An ERROR message indicates that you issued an invalid command.	

4 Send `AT&M4`, unless you used a reset command (ATZ or ATZ!).

Digital Loopback Testing (AT&T3)

This test can help you locate a problem with a remote device or with the telephone line. The figure below shows the data flow during Digital Loopback (DL) testing.
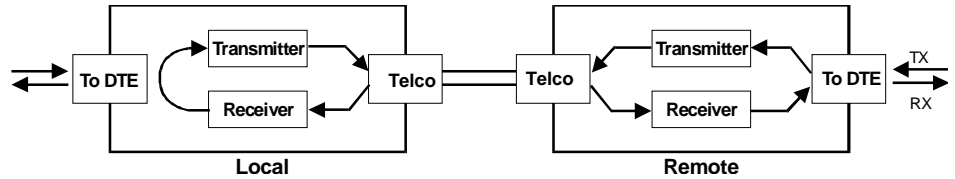
1 Send the command **AT&M0&N3S14.0=0** to the modem to prepare for testing.

This command disables error control, fixes the connection rate at 2400 bps, and makes the Courier return to command mode when you type +++.

2 Establish a connection with the remote device

3 Send the Courier V.Everything modem the escape code, **+++**, to bring it back to Command mode

4 Send **AT&T3** to the modem to enter Digital Loopback mode.

5 Have the remote user type a short message. It will be looped back by your Courier V.Everything modem's transmitter for verification on the remote user's screen. You will not see the message or any other data.

6 When the remote user has completed the test, send the escape code, **+++**, and then **AT&T0** to end the test.

Alternatively, you can end the test by sending ATH or ATZ. Be careful because ATZ resets the modem in addition to ending the test

In any case, the Courier V.Everything modem responds OK. If the modem sends an ERROR message, you have issued an invalid command.

7 Send **AT&M4**, unless you used ATZ.

Remote Digita Loopback Testing (AT&T6, AT&T7)

The remote digital loopback test, verifies the condition of both devices and of the phone line. Data flow is shown in the figure below.
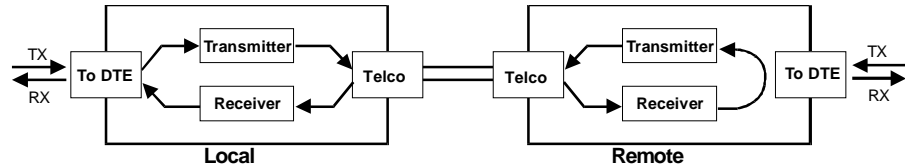
Data Flow During Remote Digital Loopback.

The request for and granting of remote digital loopback testing requires that both devices use ITU-T V.22 standard signaling. If the remote device does not have the capability or is not set to respond (with **AT&T4**), you will get an ERROR result code.

There are two remote digital loopback options.

If you want to	Command
Send keyboard data to the modem and verify it when it is returned over the phone lines and to your screen	**AT&T6**
Have the modem send its internal test pattern and return an error count to your screen	**AT&T7**

Example: Sending **AT&T6** will verify keyboard data sent to the modem by returning it over the phone lines and displaying it on your screen.

Granting a Digital LoopbackTest Request (AT&T4)

Using **AT&T4** causes the CourierV.Everything modem to grant a remote device's request for a remote digital loop-back test.

Canceling All Digital LoopbackTest Requests (&T5)

Using **AT&T5** cancels **AT&T4**, and the Courier V.Everything modem fails to acknowledge remote digital loopback test requests. This is the default so that your CourierV.Everything modem isn't subject to another user calling and tying up your Courier V.Everything modem without your permission.

**Testing Using
Keyboard Data
(AT&T6)**

1 Send `AT&M0&N3S14.0=0` to prepare the CourierV.Everything modem for testing.

This command disables error control, fixes the connection rate at 2400 bps, and makes the Courier V.Everything modem return to command mode when you type the escape code (`+++`).

2 Establish a connection with the remote device

3 If you haven't already done so, arrange with the remote user t cooperate with the test.

If necessary, set the remote device to acknowledge the remote digital loopback request. For example, older modems need to be set to S16=8.

4 Send `AT&T6` to the modem. The modem enters remote digital loopback mode, and, if the modem is an external model, the MR status light flashes.

5 Type a short message. It will be looped back to your modem by the remote device and to your screen for verification. (The remote user will not see your data.)

6 Send the escape code, `+++`, and the `AT&T0` to end the test.

Alternatively, you can end the test by sendin `ATH`, `ATZ`, or `ATZ!` Be careful, because ATZ and ATZ! reset the Courier V.Everything modem i addition to ending the test.

If you issue an invalid command, the Courier V.Everything modem sends an ERROR message. If you set Register S18, the CourierV.Everything modem automatically ends the test when the test timeout is reached. See the example in the previous section, *Stopping a Test* for an example of using S18.

Data errors indicate a problem with the remote device or with the phone link.

7 Send `AT&M4`, unless you used a reset command (ATZ or ATZ!).

Testing Using Built-in Test Pattern (AT&T7)

This test option causes the modem to perform a remote digital loopback test by sending a built-in test pattern. An internal error detector counts any errors and, when the test is ended, sends the number of errors or 00 (no errors) to the screen.

Follow the steps below. However, you don't need to type anything during this test. The modem sends only its final error count to your screen

1 Send **AT&M0&N3S14.0=0** to prepare the CourierV.Everything modem for testing.

This command disables error control, fixes the connection rate at 2400 bps, and makes the Courier V.Everything modem return to command mode when you type the escape code (**+++**).

2 Establish a connection with the remote device

3 If you haven't already done so, arrange with the remote user t cooperate with the test.

If necessary, set the remote device to acknowledge the remote digital loopback request. For example, older 3Com modems need to be set to S16=8.

4 Send **AT&T7** to the modem. The modem enters remote digital loopback mode, and, if the modem is an external model, the MR status light flashes.

The Courier V.Everything modem sends its built-in test pattern to the remote device, which loops it back to your Courier V.Everything modem. You will not see the data on your screen.

5 Send the escape code, **+++**, and then **AT&T0** to end the test. You can also end the test by sending **ATH**, **ATZ**, or **ATZ!** Be careful, though, because ATZ and ATZ! reset the Courier V.Everything modem in addition to ending the test.

If you issue an invalid command, the Courier V.Everything modem sends an ERROR message. If you set Register S18, the CourierV.Everything modem automatically ends the test when the test timeout is reached. See the example in the previous section, *Stopping a Test* for an example of using S18.

When the test ends, the Courier V.Everything modem returns a three-digit code, followed by OK. A code of 000 indicates no errors were found; a code of 255 indicates 255 or more errors.

Data errors indicate a problem with the remote device or with the phone link.

6 Send **AT&M4**, unless you used a reset command (ATZ or ATZ!).

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DEDICATED/LEASED LINE AND SYNCHRONOUS APPLICATIONS

This chapter contains information about:

- Requirements for Analogue Synchronous Applications
- Configuring the *Courier* V.Everything modem for Leased Line Operation
- Dialing Using V.25 *bis* Software
- Synchronous dialing using AT commands
- Auto-dialing

Overview

This chapter will apply when you want the modem to work with devices, that communicate using synchronous protocols (i.e., mainframe computers). The *Courier* V.Everything modem must be connected to a synchronous serial port.

There are two ways to operate your modem in analogue synchronous mode:

Dial Using	Means
V.25bis Software	Configuring the modem to enter synchronous mode when you power it on. Then, running communications software that uses the V.25 *bis* protocol to control the dialing process.
AT Commands	Configuring the modem to dial out using AT commands and then switching to synchronous mode once a connection is made.

Requirements   The information below describes device requirements.

Find out what hardware and software you need before proceeding.

A Device with a Synchronous Serial Port   You will probably have to purchase and install a synchronous adapter card. These cards provide:

■ A synchronous serial port

■ Support for one or more synchronous protocols.

■ Additional software functions. For example, the card may tell the mainframe what type of computer or terminal you are using. The card may also tell the mainframe what resources you want to use.

A Serial Cable   Obtain a shielded serial cable with a male DB-25 connector on one end and a connector on the other end that is appropriate for your synchronous serial port. Your modem provides an EIA-232 interface through its serial port.

Transmit and Receive synchronous timing pins are required at the EIA-232 interface, so pins 15 and 17 are required. The modem transmits timing signals through pin 15 and receives timing signals through pin 17

Note: The serial cable included with your modem only supports asynchronous mode.

Communications Softwar   The devices at both ends of the link must use the same synchronous protocol.

Ask your network administrator about the software support (for example a specific communications package) that you need to log into the network.

Synchronous Operations   During synchronous operations, transmit and receive clocks at both ends of the phone link control the precise timing of the data flow. The communications equipment at the remote device, your modem and computer must all handle the data at the same speed.

Your modem is usually the source of the transmit clock timing signals and sends them to your computer over the EIA-232 interface. Your computer's rate will follow the connection rates.

Configuring the Courier V.Everything Modem for Leased Line Operation	You can use the CourierV.Everything modem in either smart or dumb mode (determined by the position of DIP switch 8).

If you are using your modem on a leased or dedicated line, it is set to &L1, and the remote modem has a comparable setting, the modems automatically connect when they are powered on. They also reconnect, without any operator intervention, if a disturbance on the line is severe enough to break the connection.

1 Set your terminal or communications software to the rate at which you want the modems to communicate.

For example, use a terminal/software setting of 9600 bps and, if both modems have the capability, they will connect at 9600 bps.

2 Send `AT&B1&S2&H1&L1&W` to the modem

&B1	Fixes the Courier V.Everything modem's serial port rate at the same rate you selected when setting up your communications software.
&S2	Causes the Courier V.Everything modem to send a Clear to Send (CTS) signal only after it sends the Carrier Detect (CD) signal, that is, only after it connects with the remote modem.
&H1	Enables hardware (CTS) flow control.
&L1	Forces the modems off hook at power on and enables them to re-establish the connection should it be broken (for leased lines only).
&W	Writes the settings to nonvolatile memory (NVRAM) as power-on defaults.

We recommend using the &S2 setting to delay CTS until after the connection is made, as a precaution.

If the modems are in the process of connecting or reconnecting, the Courier V.Everything modem interprets any keyboard data entry, including an accidental key stroke, as a key-press abort, and hangs up. Delaying CTS until after carrier detection prevents this from happening. However, you have to set the Courier V.Everything modem for hardware flow control by sending `AT&H1`.

If your software or machine does not support Clear to Send (CTS), don't include &S2 and &H1 in the command string as suggested above. But keep in mind that if the modems fail to connect or reconnect, the reason could be a keypress abort.

3 Set DIP switch 10 OFF. This tells the Courier V.Everything modem to load NVRAM settings at power-on It does not matter whether the Courier V.Everything modem is in Dumb or Smart mode (DIP switch 8).

4 Decide which modem is to be the calling modem and which the answering modem.

5 Set the answering modem to Auto Answer, DIP switch5 OFF, and the calling modem to Auto Answer suppressed, DIP switch 5 ON.

6 Power off and power on the modems. This initiates the new DIP switch settings and loads the power-on defaults, including &L1. The modems go off hook and establish the connection.

If the modems cannot restore the connection and you did not set the CourierV.Everything modem to &S2, the reason could be a keypress abort. If the problem persists, however, you may need to call your telephone company to have them check your line.

Dial Using V.25 *bis* Software

To make synchronous connections using V.25 *bis* communications software, you must first configure your modem using AT commands. Once the modem is configured, run your communications software.

Configuring th CourierV.Everything Modem

Before you attempt to connect to a synchronous network, you must first configure your modem using an asynchronous device, such as a terminal or a computer running standard asynchronous communications software.

1 Find out the protocol being used for dialing and answering in your software and then set your modem to dial using it.

For your modem to	Command
Dial using the BISYNC protocol.	`AT&M6`
Your modem and the remote device must use the same 8-bit data format. The character length must be 7 bits and either ODD or EVEN parity (ODD is preferred), or 8 bits and NO parity.	
Dial using the High Level Data Link Control (HDLC) protocol.	`AT&M7`

Example: Sending `AT&M7&W` would select HDLC.

2 Set the offline clock speed, or the clock speed to be used (between your modem and the computer to which it is directly attached) when the modem is not engaged in a synchronous connection.

For an offline clock speed of	Command
1200 bps	**AT%N2**
2400 bps	**AT%N3**
4800 bps	**AT%N4**
7200 bps	**AT%N5**
9600 bps	**AT%N6** (Default)
12000bps	**AT%N7**
14400 bps	**AT%N8**
16800 bps	**AT%N9**
19200 bps	**AT%N10**

Example: Sendin **AT%N10&W** selects an offline clock speed of 19200 bps.

3 Choose a connection rate to be used (between the Courier V.Everything modem and the remote communications device) when the Courier V.Everything modem is online.

If &N*n* is set for 2-10, the Courier V.Everything modem ignores the %N rate and uses the &Nn rate as the online connection rate.

To set the connection rate to	Command
Variable	**AT&N0** (Default)
Reserved	**AT&N1**
1200 bps	**AT&N2**
2400 bps	**AT&N3**
4800 bps	**AT&N4**
7200 bps	**AT&N5**
9600 bps	**AT&N6**
12.0 Kbps	**AT&N7**
14.4 Kbps	**AT&N8**
16.8 Kbps	**AT&N9**
19.2 Kbps	**AT&N10**

To set the connection rate to	Command
21.6 Kbps	**AT&N11**
24.0 Kbps	**AT&N12**
26.4 Kbps	**AT&N13**
28.8 Kbps	**AT&N14**
31.2 Kbps	**AT&N15**
33.6 Kbps	**AT&N16**

Example: Sendin **AT&N10%N10&W** selects a connection rate and an offline clock speed of 19200 bps.

We recommend that you fix the rate between the computer or terminal and CourierV.Everything modem (%Nn) and that you set the connectio rate (&Nn) to match. This avoids dramatic changes in the rate produce when the connection rate adjusts to the offline clock speed.

4 Choose whether the modem should display normal or extended synchronous result codes.

Depending on the setting of the Xn command, the modem displays normal or extended synchronous result codes. Extended result codes provide more detailed information. Don't be concerned if synchronous result codes do not appear on your screen they are intended for your communications software.

By default, your modem is set to X1 for extended result codes. To change to normal result codes, send ATX0 to the modem.

Example: Sending **ATX1&W** selects extended result codes.

5 Your modem is able to answer calls automatically.

For your modem to	Command
Disable Auto Answer.	**ATS0=0** (Default)
Enable Auto Answer.	**ATS0=1**

Due to the nature of synchronous dial-up, if AA isn't set up in either the hardware or the software, the CourierV.Everything modem auto answers only on the fourth ring.

Alternatively, you can combine all the previous commands into a compound command, like this:

`AT&M7&N10%N10X1S0=1&W`

This tells the modem to use the HDLC protocol for dialing, an offline clock speed and connection rate of 19200 bps, display extended result codes, auto answer incoming calls, and write these settings to NVRAM.

6 Set DIP switch 10 OFF and then power the modem OFF, and then ON. Setting DIP switch 10 OFF causes the modem to read the settings you just made from NVRAM, enabling synchronous operation.

Dialing Using V.25 *bis* Your communications software, which must support V.25 *bis*, handles the dialing. Once the synchronous connection is made and the modem is in synchronous mode, V.2   *bis* commands are no longer necessary and are ignored. For dialing instructions, refer to the manual included with your communications software.

Hanging Up Since your modem cannot accept commands once it is connected in synchronous mode, you cannot use the **ATH** (hang-up) command or **+++** (the escape code)

The only way for the modem to disconnect is to drop its Data Terminal Ready (DTR) signal. Either power off the Courier V.Everything modem or use your communications software (check the software user's manual for instructions).

Returning to Asynchronous Mode Once you've completed a synchronous session, you can switch back to asynchronous mode by flipping DIP switch 10 ON and then turning the power of the Courier V.Everything modem back on. The Courier V.Everything modem cannot switch between synchronous an asynchronous modes while a call is connected

Synchronou Dialing Using AT Commands	To use AT commands to dial, you must set the modem to enter online synchronous mode after you dial. Then, you dial the remote device's number using AT commands. Once the remote device answers, the modem switches to synchronous mode and starts sending synchronous timing signals to your computer.

Because the modem will not accept commands when it is in synchronous mode, you must configure it in asynchronous mode before connecting t a synchronous network.

The Courier V.Everything modem always generates the Transmit clock-timing signals when in synchronous mode.

Data Terminal Ready (DTR) override must be OFF when using modem in online synchronous mode. Use &D1 or &D2. See Chapter 8, Controllin EIA-232 Signaling

Configuring th CourierV.Everything Modem

1 If your communications software isn't running, load the program and start Terminal mode (see your software user's guide for instructions).

2 Send `AT&F0B0&X0` to the modem.

The device you are calling should also be set to the equivalent of B0, which tells the modem to use the V.25 answer sequence, and &X0, which identifies the modem as the source of synchronous timing signals.

3 Set the connection rate to be used (between your modem and the remote communications device) when the modem is online.

First try a variable connection rate of &N0. If that doesn't work, try a fixed connection rate of &N6 (9600 bps) or &N3 (2400 bps)

- *If your modem is set to a fixed rate, and the remote device is not set to the same rate, the Courier V.Everything mode hangs up.*

- *Your modem cannot connect at 21.6 Kbps in synchronous mode.*

- *This modem does not support synchronous communications under HST, V.FC, x2, and V.90 modulations.*

4 Your modem is able to automatically answer calls.

For your modem to	Command
Disable automatic answering.	**ATS0=0** (Default)
Enable automatic answering.	**ATS0=1**

> *Due to the nature of synchronous dialup, the Courier V.Everythin modem auto answers only on the third or fourth ring.*

5 Send **AT&M1** to have your modem enter synchronous mode, followed by the number to dial **Dial** should be the last command before the Carriage Return.

Example: **AT&M1DT5551234**

Alternatively, you can combine all the previous commands into a compound command, like this:

AT&F0B0&X0&N0S0=1&M1*V2=4DT5551234

This tells your modem to load the "no flow control" factory template and then use the ITU answer sequence, making your modem the source of timing signals, set a variable connection rate, auto-answer incoming calls, switch to online synchronous mode after connection, and then dial 555 1234.

Dialing There are two methods of autodialing a stored telephone number: Yo can have the modem dial the stored number either when it receives the Data Terminal Ready (DTR) signal from your computer or at power-on/reset

1 Store a telephone number to memory position 0 using the **AT&Z0=***n* command.

For example, **AT&Z0=T18475551111,** stores the telephone number 847 555 1111, and tone dial.

2 Follow step a or b, depending on the dialing method you choose.

For the modem to dial when	Type
a) It receives the DTR signal from your computer	**ATS13.3=1&W**
b) Modem is reset	**ATS13.4=1&W**

3 Make sure DIP switch 10 is set to OFF to load settings from NVRAM.

Hanging Up Your modem remains online until the remote device disconnects, your software causes the DTE to drop the Data Terminal Ready signal (DTR), or you power off the modem. When one of these events occurs, the mode returns to asynchronous Command mode.

Auto-Dialing Because the CourierV.Everything modem will not accept commands when it is in synchronous mode, you must configure it in asynchronous mode before trying to connect to a synchronous network

Then you can set the Courier V.Everything modem to dial the remote device at power-on, when it receives the DTR signal from your computer, or when you press the Voice/Data switch.

Once the remote device answers, the Courier V.Everything mode switches to synchronous mode and starts sending synchronous timing signals to your computer

Configuring th CourierV.Everything Modem

1 If your communications software isn't running, load the program and start Terminal mode (see your software user's guide for instructions).

2 Send **AT&F0B0&W** to the modem.

The device that you are calling should also be set to the equivalent of B0, which tells it to use the ITU answer sequence.

3 Select a source of the synchronous timing signals. For example, send AT&X0&W to select the CourierV.Everything modem as the source of the synchronous transmit clock timing signals

For your modem to	Command
The Courier V.Everything modem sends transmit clock timing signals to the DTE over the serial interface. DTE rate follows the connection rate.	**AT&X0** (Default)
The DTE sends transmit clock timing signals to the Courier V.Everything modem over the serial interface. Typical use: multiplexed leased lines.	**AT&X1**

For your modem to	Command
The Courier V.Everything modem sends receiver clock timing signals, which are looped to the transmit clock and sent to the DTE over the serial interface. Typical use: systems that require synchronisation of data flowing in both directions.	**AT&X2**

4 Set the connection rate to be used (between the Courier V.Everythin modem and the remote communications device) when the Courier V.Everything modem is on line.

Try a variable connection rate first, AT&N0. If that doesn't work, try a fixed connection rate of &N10 (19.2 Kbps), &N6 (9600 bps), or &N3 (2400 bps).

Command	Rate	Command	Rate
AT&N0	Variable (default)	**AT&N8**	14.4 Kbps
AT&N1	Reserved	**AT&N9**	16.8 Kbps
AT&N2	1200 bps	**AT&N10**	19.2 Kbps
AT&N3	2400 bps	**AT&N11**	21.6 Kbps
AT&N4	4800 bps	**AT&N12**	24 Kbps
AT&N5	7200 bps	**AT&N13**	26.4 Kbps
AT&N6	9600 bps	**AT&N14**	28.8 Kbps
AT&N7	12 Kbps	**AT&N15**	31.2 Kbps
		AT&N16	33.6 Kbps

> - *If the CourierV.Everything modem is set to a fixed rate, and the remote device is not set to the same rate, the modem hangs up.*
> - *CourierV.Everything modems cannot connect at 21.6 Kbps or higher in synchronous mode.*
> - *HST and V.FC modulations do not support synchronous communications.*

5 If the CourierV.Everything modem is to answer calls, enable automatic answering by setting DIP switch 5 OFF.

6 Send `AT&M1&W` to the modem to enter synchronous mode.

7 Store a telephone number to memory position 0, using AT&Z0=*phone numbe* .

   For example, to store 847 555 1111, and tone dial, type
   AT&Z0=T18475551111

8 Select a method to use to autodial the stored number. You can have the Courier V.Everything modem dial the stored number when it receives the Data Terminal Ready (DTR) signal from your computer, at power on/reset, or when you press the Voice/Data switch.

   Use the following table to determine which command you need to send to your modem for the dialing method you choose

For your Courier V.Everything modem to dial	Command
When it receives the DTR signal from your computer	`ATS13.3=1&W`
When you power your modem on or reset it	`ATS13.4=1&W`
When you press the Voice/Data switch	`ATS32=4&W`

9 Make sure that DIP switch 10 is OFF, to load settings from NVRAM.

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TROUBLESHOOTING

This chapter explains how to troubleshoot the Courier V.Everything modem. This chapter is divided into these sections:

- Problems that occur before connecting.
- Problems that occur after connecting.
- What to do if you still have problems.

Problems That Occur Before Connecting

No response to AT

For Windows users, make sure that you set the correct COM port and IRQ in your communications software and, if applicable, in Windows' Control Panel - Ports.

- Make sure that your communications software is in Terminal mode.
- Be sure that your communications software is set to the correct bit rate and word length (7 bits with or without a parity bit, or 8 bits and no parity).
- Check that DIP switch 8 is ON, for "act on AT commands." If DIP switch 8 is OFF, power off the Courier V.Everything modem, set the switch ON, and power on the Courier V.Everything modem again. Then try typing A **Enter** again.

- Make sure that verbal result codes (status messages) are enabled. Send these commands to the Courier V.Everything modem

For your modem to	Command
Enable message display	**ATQ0**
Display verbal messages	**ATV1**

- Review your communications software manual to see what Carrier Detect (CD) operations your software requires. Then see the chapter about Controlling EIA-232 Signaling.

- Although it is a rare condition, check whether your computer is reversing the send/receive functions at the EIA-232 interface. Refer t your computer's documentation.

- Check your serial cable to make sure it is not a NULL modem cable.

The Courier V.Everything modem won't dial

- You may need to change the DTR setting at the Courier V.Everything modem. If so, see the chapter about Controlling EIA-232 Signaling.

- Make sure that the phone line from your wall jack connects to JACK port of the Courier V.Everything modem.

- Make sure the Courier V.Everything modem is connected to a standard analogue phone line and not to a digital system (typically found in offices and hotels)

- If the CourierV.Everything modem responds NO DIAL TONE when you attempt to dial, make sure that the phone line is connected to the JACK port on the back of the Courier V.Everything modem.

  If you hear a dial tone when the Courier V.Everything modem tries to dial but it quickly returns off hook and reports NO DIAL TONE, try adding X5 to the dial string. For example, send ATDTX5 5551212 t the modem. The CourierV.Everything modem will ignore dial tone detection.

Double characters are appearing on your monitor

This is a signal that both the CourierV.Everything modem's local echo and your software's local echo are on.

Type the command to turn off your online echo (ATF1) or turn your communications software's local echo off (refer to your software's documentation).

After you dial, the Courier V.Everything modem reports NO CARRIER and then hangs up

- Try increasing S7 and decreasing S9 to allow more time for the connection
- Try calling a different device. If you are trying to connect to an older modem at 2400 bps or less, it may not support error control. Try sending AT&M0, and then try the call again. Reset the Courier V.Everything modem (send ATZ) after you finish the call.

Hear ringing but the Courier V.Everything modem won't answer

- For external Courier V.Everything modems, look at the TR LED to make sure that your terminal or computer is sending a DTR signal via the EIA-232 interface.
- Send ATI4 to the Courier V.Everything modem and check that S0 is set to a value higher than 0. Also, check that DIP switch 5 is OFF.
- Set &F1 and S0=1, then try again.

The Courier V.Everything modem acts as though a data link has been established, but no call was received

Carrier Detect (CD) may be overridden (with &C0), but your system may require that the override be turned OFF (with &C1). Review your communications software manual to see what CD operations are required.

The Courier V.Everything modem behaves as if Enter were pressed when you don't press any keys

Your software may be misreading signals from the Courier V.Everythin modem when the Courier V.Everything modem sends a Carriage Return

and a Line Feed before and after the RING and CONNECT messages. Sending the Quiet mode command, ATQ1, should solve the problem

Problems that Occur After Connecting

Your screen displays random or "garbage" characters

Make sure that the Courier V.Everything modem is set to the same bit rate, word length, parity, and number of Stop bits as the device to which you are connecting.

If the settings are correct, the problem may be with the phone line. Try the following measures:

- Place the call again. The phone company routes even local calls differently each time you call.

- Call a different device to see if the problem persists. The problem may be with the device you first tried to call.

If the modem is set to a fixed serial port rate (&B1) and your software is fixed at 19.2K, 38.4K, 57.6K, or 115.2K bps, the reason may be one of the following:

- Your computer may not support the higher serial port rate. If this is the case, fix your software rate at 9600 bps.

- If you use memory-resident programs (TSRs-Terminate and Stay Resident programs) or disk-caching programs, they may be interfering. Try disabling them before you run your communications software

- Check that your software and the Courier V.Everything modem are set for the same kind of flow control, either hardware or software. Some communications programs also require that you disable the type you are not using

Many CRC errors
- Send AT&F1 to enable hardware flow control and other optimised settings.

- Try a different file transfer protocol (use ZMODEM if it's available t you).

- If you use memory-resident programs (TSRs-Terminate and Stay Resident programs) or disk-caching programs, they may be interfering. Try disabling them before you run your communications software

Mainframe computer keeps dropping your connection

You must turn off the Courier V.Everything modem's result codes and character echo (ATQ1E0). The modem at the mainframe also needs to be set to ATQ1E0.

Bad faxes or can't fax
- Make sure the fax software is set to use Class 1 fax. Refer to your fax software's manual.

- If you use memory-resident programs (TSRs-Terminate and Stay Resident programs) or disk-caching programs, they may be interfering. Try disabling them before you run your communications software

Both devices exchange carrier signals, but fail to establish a communications link

- Make sure the Courier V.Everything modem is in the correct mode, fax or data, depending on whether the connection is to be made with a facsimile device or a data device.

  See Chapter 2, Modes of Operation, for information on switching between Fax and Data modes.

- Make sure the proper bit rate, word length, parity and number of Sto bits have been selected.

- Synchronous operations: review the instructions in Chapter 12, Dedicated/Leased Line and Synchronous Applications. If you've configured the Courier V.Everything modem correctly, the problem may be with the synchronous adapter or with the system you're trying to call.

- Send ATI4 and check to see that your modem is at the correct B setting to connect with either an HST modem (B1 setting) or "V." modem (B0 setting).

- Make sure that your Courier V.Everything modem's connection rate setting, &Nn, is correct for the call. If the connection rate is locked at a speed (&N1-&N14) different from the calling modem's, the Courier V.Everything modem hangs up. The default setting of &N0, variable link operations, allows the two modems to negotiate the highest possible connection rate.

- If your modem is attempting to answer aV.32 call, you may need t lengthen the extra V.32 answer tones. See Appendix B, Alphabetic Command Summary, under S28

- If you are attempting to make a connection using HST modulation, make sure that the modem at the other end of the line is HST compatible, V.32 *terbo* compatible at 14.4 Kbps, V.32 compatible at 9600 bps,V.22 *bis* compatible at 2400 bps, Bell 212A-compatible at 1200 bps, or Bell 103-compatible at 300 bps.

- If none of the above corrects the problem, it's likely that the quality of the phone connection is poor. The variable quality of phone line connections may be due to any number of conditions in the phone service's equipment or the current environment. Try several calls, and if you still can't get through, try calling another device. If the second device accepts your call, the problem may lie with the device you first tried to call.

Errors during software download

Try performing the XMODEM file transfer, at a slower serial port rate. If your computer doesn't have a 16550UART, set your communications software to use a slower serial port.

If You Still Have Problems

The problems described above are by far the most common ones that users encounter. If the suggestions we've given don't clear up your difficulties, try the following:

1 Review the manual carefully to see if you've missed something.

2 Call or visit your dealer. Chances are that your dealer will be able to give you the assistance you need

3 If your dealer can't help you, call the 3Com technical support line

4 If you must return your Courier V.Everything modem to 3Com, the Service Representative you talk with will give you a User Service Order (USO) number. Products without an USO number will not be accepted.

5 If you do return the Courier V.Everything modem to us, please follow these procedures:

In the United States:

a Ship the unit, postage pre-paid, in its original container. If the original container is not available, pack the unit carefully in a strong box of corrugated cardboard with plenty of packing material.

b Be sure to include your SRO number inside the package, along with your name and address. Put your return address and your USO number on the shipping label as well.

c Ship the package to the following address:

3Com Corporation
Attn: Receiving Dock 15
USO# _____
1800 West Central
Mount Prospect, IL 6005

3Com will not accept packages sent COD, so be sure to send the modem postage paid

3Com will repair or replace your CourierV.Everything modem and return it to you via United Parcel Service.

Outside the United States:

Follow the instructions provided by the 3Com techncial support representative.
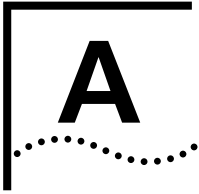
A | S-REGISTERS

Understanding Bit-Mapped S-Registers

A bit-mapped S-Register uses one number to describe a collection of settings. Bit-mapping allows us to pack a lot of information in a small space.

Bit-mapped registers are in the form of Sr.b=n, where r is the bit-mapped register;.b is the bit; n is 0 (off) or 1 (on).

The modem displays the value of an S-Register, as a decimal value between 0 and 255. The modem, however, understands the decimal value as a collection of binary digits (bits).

How bits are mapped to decimal values

Bits can be mapped into decimal values. Each bit can be either on (1) or off (0). Eight bits create 256 unique combinations of 1s and 0s. Each of the eight bits can be assigned a number corresponding to its position:

b b b b b b b b

7 6 5 4 3 2 1 0

Also, each bit can be assigned a value corresponding to its number:

Bit			Value
7	2^7	=	128
6	2^6	=	64
5	2^5	=	32
4	2^4	=	16
3	2^3	=	8
2	2^2	=	4
1	2^1	=	2
0	2^0	=	1

Converting Bits to Decimal Values

Starting with a string of eight bits, assign each "1" bit a value based o its position. Add the values to come up with the final decimal value.

Here's an example of how bits are converted to decimal values:

01001111

0	**1**	**0**	**0**	**1**	**1**	**1**	**1**
0	+ 64	+ 0	+ 0	+ 8	+ 4	+ 2	+ 1 = 79

Converting Decimal Values to Bit

Convert decimal values to bits by finding the largest decimal equivalent that is less than the decimal value. Subtract the decimal equivalent and mark the equivalent bit "1." Continue until the decimal value is zero. See the example below.

11

113 - 64 = 49

01

49 -32 = 17

01

17 -16 =

0111

1 -1 = 0

01110001

Setting Bit-Mappe S-Registers

You can set bit-mapped S-Registers using either bits or decimal values. While it may be simpler for you to set the bits individually, your mode displays the S-Register settings in decimal form.

Using Bits	Turning individual bits on and off is the more direct way to set bit-mapped S-Registers. To do this, specify the S-Register that you want to set and then indicate which bits you want to turn on (1) or off (0).

Example: **ATS13.0=1.4=1.5=1**, turns bits 0, 4, and 5 on for S-Register 13.

Using Decimal Values	An alternative way to set bit-mapped S-Registers is by adding the decimal values of the bits and entering the total.

This example, **ATS13=49**, sets the same value as the one in *Using Bits* above:

Default S-Register Settings

The table below lists all default values for S-Register settings.ψ

S-Registers	Function	NVRAM Default Setting
S0	Auto Answer	0
S1	Counts & stores rings from incoming calls	0
S2	Escape code character	43
S3	Carriage Return character	13
S4	Line Feed character	10
S5	Backspace character	8
S7	Carrier wait-time, sec	60
S8	Dial pause, sec	2
S9	Carrier Detect time, 100 ms	6
S10	Carrier loss wait-time, 100 ms	7
S11	Tone duration, spacing, ms	70
S12	Escape code guard time, 500 ms	50
S13	Bit-mapped functions*	0
S14	Bit-mapped functions*	0
S15	Bit-mapped functions*	0
S16	Test modes	0
S18	&T test timeout	0
S19	Inactivity/hang up timer	0

S-Registers	Function	NVRAM Default Setting
S21	Break length, 10 ms	10
S22	XON character	17
S23	XOFF character	19
S24	Pulsed DSR duration, 20 ms	150
S25	DTR recognition time, 10 ms	5
S26	RTS/CTS delay time, 10 ms	1
S27	Bit-mapped functions*	0
S28	V.32 handshake time, 100 ms	8
S29	V.21 handshake time, 100 ms	20
S32	Voice/data switch (external modems)	9
S33	Bit-mapped functions*	0
S34	Bit-mapped functions*	0
S38	Disconnect wait time, sec	0
S41	Allowable remote log-in attempts	0
S42	Remote Access ASCII character	126
S43	Remote guard time, 200 ms	200
S44	Leased line delay timer	15
S51	Bit-mapped functions*	0
S53	Bit-mapped functions*	0
S54	Bit-mapped functions*	0
S55	Bit-mapped functions*	0
S56	Bit-mapped functions*	0
S69	Bit-mapped functions*	0
S70	Bit-mapped functions*	0

Ψ These default settings are for the United States and Canada. If you are in another country, settings may be slightly different.

* Bit-mapped registers have up to eight functions.

A complete list of S-Registers

Register	Default	Function
S0	0	Sets the number of rings on which to answer in Auto Answer mode. S0=0 disables Auto Answer. S0=1 enables Auto Answer and the CourierV.Everything mode answers on the first ring.
S1	0	Counts and stores the number of rings from an incoming call.
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 decimal 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	0	Set the number of seconds the Courier V.Everything modem waits for a dial tone.
S7	60	Sets the number of seconds the CourierV.Everything modem waits for a carrier. May be set for much longer duration if, for example, the CourierV.Everything mode is originating an international connection.
S8	2	Sets the duration, in seconds, for the pause (,) option in the Dial command and the pause between command reexecutions (> and A> commands).
S9	6	Sets the required duration, in tenths of a second, of the remote device's carrier signal before recognition by the Courier V.Everything modem.
S10	14	Sets the duration, in tenths of a second, that the CourierV.Everything modem waits after loss of carrier before hanging up. This guard time allows the CourierV.Everything modem to distinguish between a line hit, or other disturbance that momentarily breaks the connection, from a true disconnect (hanging up) by the remote device
S11	70	Sets the duration and spacing, in milliseconds, of dialed tones.
S12	50	Sets the duration, in fiftieths of a second, of the guard time for the escape code (+++) sequence.
S13	0	Bit-mapped register. See the beginning of this appendix for information about setting bit-mapped registers.

Bit	Value	Result

Register	Default	Function		
		0	1	Reset when DTR drops.
		1	2	Reverse normal Auto Answer operation: On incoming RING, enter Originate Mode and look for an answer tone.
		2	4	Disable 250 ms pause before result code display.
		3	8	On DTR signal, autodial the number stored in NVRAM at position 0 (external CourierV.Everything modem only).
		4	16	At power-on/reset, autodial number stored in NVRAM at position 0.
		5	32	Disable HST (used for testing V.32terbo in Dual Standard CourierV.Everything modems).
		6	64	Disable MNP Level 3 (used for testing Level 2).
		7	128	Hardware reset (works like powering off and then on).
S14	1	Bit-mapped register (See the beginning of this appendix for information about setting bit-mapped registers).		
		Bit	**Value**	**Result**
		0	1	Disconnect on escape code.
S15	0	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers).		
		Bit	**Value**	**Result**
		0	1	Disable the CourierV.Everything modem's extra high-frequency equalisation if it causes problems on shorter-link calls for HST modulation only.
		1	2	Disable online fallback.
		2	4	Disable 450 bps back channel* HST only.
		3	8	Reset non-ARQ mode Transmit buffer from 1.5K bytes to 128.* (for the convenience of BBS operators taking calls from remote users of slower modems).
		4	16	Disable MNP Level 4; retransmitting the larger Level 4 data blocks may be a problem if you expect a great number of errors during a call.

Register	Default	Function		
		5	32	Set Backspace key to delete.
		6	64	Some earlier 2400 bps MNP Courier V.Everything modems, not made by 3Com or Microcom, were not fully compatible with the MNP protocol. If you have difficulty making a successful 2400 bps MNP connection with a remote MNP modem, it may be because of this incompatibility. Set S15 to 64 and try again to make the connection.
		7	128	Custom applications only.
				The default 1.5K byte non-ARQ buffer allows data transfer with X- and Y-modem type File Transfer Protocols without using flow control.
				The 128-byte option allows remote users with slower modems to stop your transmitted data from scrolling off their screens. When remote users send your computer an XOFF (<Ctrl-S>) and you stop transmitting, the data in transit doesn't exceed the size of their screen.
S16	0	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers). For testing, see Chapter 15, Testing.		
		Bit	**Value**	**Result**
		1	2	Dial Test
		2	4	Test pattern.
		3	8	Remote digital loopback.
S18	0	Test timer for software-initiated loopback testing (&Tn); disabled when S18 is set to 0. Used to set the duration of testing, in seconds, before the Courier V.Everything modem automatically times out and terminates the test.		
S19	0	Sets the duration, in minutes, for the Inactivity Timer. The timer activates when there is no data activity on the R232 interface, and at the timeout the CourierV.Everything mode hangs up. S19=0 disables the timer.		
S21	10	Sets, in 10-millisecond units, the length of breaks sent from the CourierV.Everything mode to the computer or terminal. Applies to ARQ mode only.		
S22	17	Stores the ASCII code for the XON character.		
S23	19	Stores the ASCII code for the XOFF character.		

Register	Default	Function
S24	150	Sets the duration, in 20-millisecond units, between pulsed DSR signals when the Courier V.Everything modem is set to &S2 or &S3. The default is 3 seconds.
S25	5	Sets DTR recognition time in 10-millisecond units.
S26	1	Sets duration, in 10-millisecond units, of the delay between RTS and the CTS in synchronous mode.
S27	0	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers).

Bit	Value	Result
0	1	Enable ITU-T V.21 modulation at 300 bps for overseas calls. In V.21 mode, the CourierV.Everything modem answers both Bell 103 and V.21 calls, but only originates V.21 calls.
1	2	Enable unencoded (non- trelliscoded) modulation in V.32 mode; this option is part of the ITU-T V.32 recommendation, but is rarely used.
2	4	Disable V.32 modulation; used for testing HST modulation.
3	8	Disable 2100 Hz answer tone to allow two V.42 devices to connect more quickly.
4	16	See next page.
5	32	See next page.
6	48	Disable V.42 Detect Phase
7	128	Unusual software incompatibility. Some software may not accept some result codes. This setting disables the codes and displays the 9600 code instead. The call's actual rate can be viewed on the ATI6 screen.

Error control handshaking options: Select the total value of bits 4 and 5

Bit 4	Bit 5	Result
0	0	Complete handshaking sequence: V.42 Detection, LAPM error control, MNP.
16	0	Disable MNP.
0	32	Disable V.42 Detection and LAPM.

Register	Default	Function		
		16	32	Disable Detection phase, if you know that the remote CourierV.Everything modem does LAPM, but not the Detection phase.
S28	8	Sets the duration in tenths of a second of the extra 3000/600 Hz answer tones sent during V.32 hand-shaking. This gives V.32 modems additional time to connect in V.32 mode before timing out.		
		If there is difficulty answering older, manually operated V.32 modems (for example, modems that require a button to be pushed in order to dial), try lengthening the duration of the extra tones.Setting S28 to zero eliminates the extra tones resulting in a faster connect time if, for example, the Courier V.Everything modem is set to use V.21 modulation (300 bps) or V.23 modulation (1200 bps).		
S29	20	Sets the duration, in tenths of a second, of the V.21 answer tone.		
S32	9	For External modems only: Assign Voice/Data switch function		
		Value	**Function**	
		0	Disabled	
		1	Voice/Data- originate mode	
		2	Voice/Data- answer mode	
		3	Redial last number	
		4	Dial number stored at position 0	
		5	Auto answer on/off toggle	
		6	Reset modem	
		7	Initiate remote digital loopback	
		8	Busy out the phone line toggle	
		9	Execute stored command	
S34	0	Bit-mapped register. See the beginning of this appendix for information about setting bit-mapped registers.		
		Bit	**Value**	**Result**
		0	1	Disable V.32 *bis*. Used for troubleshooting; 3Com Technical Support may ask you to disable V.32*bis* for testing purposes.
		1	2	Disable the CourierV.Everything modem's enhanced, proprietary V.32*bis* modulation. Used for troubleshooting.
		2	4	Disable the faster retrains that occur during proprietary V.32 *terbo* modulation. Used for troubleshooting.

Register	Default	Function		
		3	8	Enable V.23. Required for some British connections.
		4	16	Change MR to DSR
		6	64	Disable the remote-access busy message.
		7	128	Disable V.32 *terbo.*
S38	0	Sets the duration, in seconds, before a forced hang-up and clearing of the Transmit buffer when DTR drops during an ARQ call.		
		This is provided to allow time for a remote device to acknowledge receipt of all transmitted data. Default = 0: The CourierV.Everything modem immediately hangs up when DTR drops. If the Courier V.Everything mode receives the ATH command, it ignores S38 and immediately hangs up.		
S41	0	Sets the number of allowable remote-access login attempts, thus enabling or disabling remote access.		
		The default setting of zero allows no remote login attempts, disabling remote access. A value of 1 or greater enables remote access. If the number of unsuccessful login attempts exceeds the limit set by this register, the CourierV.Everything modem returns online and any further login attempts during the remainder of that connection are refused.		
S42	126	Stores the ASCII decimal code for the remote-access escape character. The default character is a tilde (~).		
S43	200	Sets the duration, in fiftieths of a second, of the guard time for the remote-access (~~~~) sequence.		
S44	15	Sets the duration, in seconds, of the interval between losing carrier and reestablishing a connection.		
S51	0	Bit-mapped register. See the beginning of this appendix for information about setting bit-mapped registers.		

		Bit	Value	Result
		0	1	Disable MNP/V.42 for V.22 (1200 bps)
		1	2	Disable MNP/V.42 for V.22 *bis* (2400 bps)
		2	4	Disable MNP/V.42 for V.32/V.32 *bis*/V.32 *terbo* (9600/14400/19200/21600 bps).
		6	64	Disable Selective Reject
S53	126	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers).		

		Bit	Value	Result
		0	1	Dial security enabled.

Register	Default	Function		
		1	2	Prompting enabled.
		2	4	Local-access password protection enabled.
		3	8	DTMF security enabled.

Enabling local-access password protection disables the &Zn=s command (which stores up to 10 phone numbers) because stored phone numbers occupy the same space in NVRAM as the dialback numbers for Dial Security accounts.

Register	Default	Function		
S54	64	Symbol rate bit-mapped register used primarily by 3Com Technical Support for debugging purposes.		
		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	Disable Call Indicate (CI).
		7	128	Disable V.8.
S55	0	Trellis code bit-mapped register used primarily by 3Com Technical Support for debugging purposes.		
		Bit	**Value**	**Result**
		0	1	Disable 8S-2D mapping.
		1	2	Disable 16S-4D mapping.
		2	4	Disable 32S-2D mapping.
		3	8	Disable 64S-4D mapping.
		7	128	Enable phase roll detection
S56	0	Bit-mapped register primarily used by 3Com Technical Support for debugging purposes.		
		Bit	**Value**	**Result**
		0	1	Disable non-linear coding.
		1	2	Disable TX level deviation.

Register	Default	Function		
		2	4	Disable preemphasis.
		3	8	Disable precoding.
		4	16	Disable shaping.
		5	32	Disable V.34+
		6	64	Disable V.34.
		7	128	Disable V.FC.

Register	Default	Function		
S58	0	Bit-mapped register. See the beginning of this appendix for information about setting bit-mapped registers.		
		Bit	**Value**	**Result**
		0	1	Disable x2
		1	2	Disable Bler Monitor
		5	32	Enables/Disables V.90

Register	Default	Function		
S59	0	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers).		
		Bit	**Value**	**Result**
		0	1	Enhanced V.42bis
		1	2	Alternate Caller ID timing
S69	0	Bit-mapped register. (See the beginning of this appendix for information about setting bit-mapped registers).		
		Bit	**Value**	**Result**
		0	1	External Plug and Play
		1	2	Auto Redial
		2	4	Reserved
		3	8	Reserved
		4	16	Reserved
		5	32	Digital Line Guard
		6	64	Loop Monitor
		12	4096	High Speed LED

Register	Default	Function		
S70	0	Bit-mapped Register. See the beginning of this appendix for information about setting bit-mapped registers.		
		Bit	**Value**	**Result**
		0	1	Enable recognition of Ring A
		1	2	Enable recognition of Ring B
		2	4	Enable recognition of Ring C
		3	8	Enable recognition of Ring D
		4	16	Enable recognition of Ring E

B

ALPHABETIC COMMAND SUMMARY

This appendix contains an alphabetic listing of the AT commands to which the modem will respond. Default settings are **bold**.

Basic Command Set

Command	Function
$	Display help for the Basic command set.
+++	Escape code. Once your modem is online with another device, the only command it recognises is an escape code of three typed plus signs, which forces the modem back to Command mode. Do the following when issuing the command: **1** Wait 1 second after sending the last item of data. **2** Type **+++** **3** Wait 1 second before typing any data. When you type +++, the modem will either hang up or stay on line, depending on how you set S14.
>	Repeat command. If you include the repeat command in the Dial string, the modem will dial the number and wait 60 seconds for a carrier. If the line is busy, the modem will pause for 2 seconds and then redial. The modem makes a maximum of 10 attempts.
A/	Reexecute the last-issued command. DO NOT type AT or press Enter.
A>	Repeat the last-issued command until canceled by pressing any key. DO NOT type AT or press Enter.
AT	Attention prefix: informs a modem that a command is coming. AT must precede all commands except A/, A>, and +++.
A	Force a modem to answer when it is not receiving an incoming call.

Command	Function	
Bn	Set handshaking options.	
	B0	ITU-T V.25 answer sequence; required to answer all V.34-type and overseas calls.
	B1	Bell answer tone. This setting selects HST modulation, but use it only if the modem is not required to answer V.34-type calls.
Cn	Enable or disable the transmitter.	
	C0	Transmitter disabled; for receiving only.
	C1	Transmitter enabled.

With the exception of the Dial options, modems ignore any commands issued after D in the same command string.

Command	Function	
Dn	Dial a phone number and issue other optional commands.	
	The numbers 0-9 are accepted. The maximum number of characters allowed is 36, including the AT prefix, punctuation, and spaces.	
	Optional parameters:	
	P	Dial using pulses. Accepted but ignored.
	T	Dial using tones. Accepted but ignored.
	,	(Comma) Pause for 2 seconds (or the time in S-Register 8). Accepted but ignored.
	;	(Semicolon) Remain in Command mode after dialing.
	"	Dial the letters that follow.
	W	Wait for a second dial tone before continuing to dial (with X3 or higher). Accepted but ignored.
	@	Wait for an answer (with X3, X4, or X7). Accepted but ignored.
	/	Pause for 125 milliseconds. Accepted but ignored.
	R	Reverse frequencies. Use this command when calling an originate-only modem. It forces the modem to dial out at the answer frequency.

	!	Flash the switchhook (off hook 0.5 seconds, on hook 0.5 seconds, then off hook). Use ! when other modems share the line.
	L?	Display the last-dialed number.
	L	Dial the last-dialed number.
Sn		Dial the number stored in memory at position n, where n = 0-9. Store the number in memory using the &Z command.
$		Display help for the dial commands.
En		Command mode echo. Enables or disables the display of your typed commands.
	E0	Command mode echo OFF. Your typing will not appear on the screen.
	E1	Command mode echo ON. Your typing will appear on the screen.

If double characters appear on the screen, both the modem's local echo and your software's local echo are on

.

Command	Function	
Fn	Online local echo. If ON, a modem displays on your screen the data that it is transmitting to another modem.	
	F0	Online echo ON. (Sometimes called half duplex.)
	F1	Online echo OFF. (Sometimes called full duplex.)
Hn	Go on or off hook.	
	H0	Go on hook (hang up).
	H1	Go off hook (pick up)
In	Query the modem.	
	I3	Displays the banner (product name).
	I4	Display current modem settings.
	I5	Display settings stored in NVRAM.
	I6	Display statistics for the last call.
	I7	Display product configuration.
	8	Lists phone numbers with redial restrictions.
	9	Displays modem's Plug and Play ID.
	I10	Display dial security account status information.

Command	Function	
	I11	Display connection report (contains symbol rates).
	I15	Display caller ID information.
	I16	Display connection report.
	I17	Display connection report.
Kn	Control the modem clock. ATI6 displays the time.	
	K0	If online, display current call duration. If offline, display last call's duration.
	K1	Display the actual time. Set the clock using ATI3=HH:MM:SS K1.
Ln	Internal modems only: Controls the speaker's volume.	
	L0	Quietest
	L1	Low
	L2	Medium
	L3	Loudest
Mn	Control when the speaker sounds	
	M0	The speaker is always off.
	M1	The speaker is on until the call is negotiated.
	M2	The speaker is always on.
	M3	The speaker turns on after the last digit is dialed and stays on until the call is negotiated.
On	Return online. Use with the escape code (+++) to toggle between command and online modes.	
	O0	Return online (normal).
	O1	Return online and retrain. Use O1 if there were errors in a non-ARQ data transfer.
Qn	Enable or disable the display of result codes.	
	Q0	Display result codes.
	Q1	Suppress result codes (quiet).
	Q2	Suppress result codes when answering.
S$	Display help screens for the S-Registers.	
Sr=n	Set S-Register value: r is any S-Register; n must be a decimal number between 0 and 255.	
Sr.b=n	Set a bit-mapped register: r is the S-register, b is the bit, and n is 0 (off) or 1 (on).	
Sr?	Query contents of S-register r.	

See Appendix A S-Registers *for a listing of all the S-Registers.*

Command	Function	
Vn	Display result codes in words or numbers.	
	V0	Display result codes in numeric form.
	V1	Display result codes in verbal form.
Xn	Control the amount of information displayed in the result codes. The default is **X7** (all codes except 12/VOICE).	
	For result codes in synchronous operations, see Chapter 16, Analogue Synchronous Applications. For more detailed information, see Appendix D, Result Code Meanings and Sets.	
	X3	Ignore Dial Tone
	X4	Microsoft default
	X7	Courier V.Everything modem default
Z	Software reset. If DIP Switch 1 is ON (factory setting), revert to the settings in NVRAM. If DIP switch 1 is OFF, reset to the &F0 configuration template (no flow control).	
Z!	Complete hardware reset	

Ampersand (&) Command Set

Command	Function	
&$	Display help for the ampersand (&) command set.	
&An	Enable or disable the display of additional result code subsets. (Also, see the Xn command.)	
	&A0	Do not display ARQ result codes.
	&A1	Display ARQ result codes.
	&A2	In addition to ARQ result codes, display HST, V.32, V.FC, V.34, or DIGITAL modulation indicator.
	&A3	In addition to ARQ and modulation indicators, display an error control indicator (LAPM, HST, MNP, SYNC, V.120, or NONE) and a data compression type (V42 *bis* or MNP5).
&Bn	Set the serial port rate to variable or fixed.	
	&B0	Variable: The serial port rate adapts to match the speed of the connection.
	&B1	Fixed: The modem always communicates with your computer at the rate at which you have set, regardless of the connection rate.

Command	Function
&B2	When answering calls, use the fixed rate for ARQ calls and variable rates for non-ARQ calls.

i *The serial port rate MUST be equal to or higher than the &Nn rate.*

Command	Function	
&Cn	Controls how the modem sends a Carrier Detect (CD) signal to your computer.	
	&C0	CD always ON, even if the modem is not on line.
	&C1	Normal operations. The modem sends a CD signal when it connects with another modem and drops the CD when it disconnects.
&Dn	Control how the modem responds to Data Terminal Ready (DTR) signals.	
	&D0	DTR is always ON (ignored).
	&D1	If issued before connecting with another device, the CourierV.Everything modem can enter online Command mode during a call by dropping DTR.
		&D1 functions similarly to the escape code (+++).
		Return online with the On command, or hang up with the Hn command.
	&D2	Normal DTR operations. The modem will not accept commands unless your computer sends a DTR signal. Dropping DTR ends a call.
	&D3	Modem resets with DTR toggle
&Fn	Load one of the three configuration templates that are stored permanently in read-only memory. Appendix C, *Flow Control Templates*, lists the settings for each template.	
	To load a template into current memory, enter AT&Fn. To write a template to NVRAM, enter AT&Fn&W.	
	If DIP switch 1 is OFF, &F0 is always loaded into memory at power-on or reset.	
	&F0	Load No Flow Control template settings.
	&F1	Load Hardware Flow Control template settings.
	&F2	Load Software Flow Control template settings.
&Gn	Set guard tones for international calls.	

Command	Function	
	&G0	No guard tone. Use this in the United States and Canada.
	&G1	This sets a 550 Hz guard tone, and is used in some European countries.
	&G2	This sets an 1800 Hz guard tone, and is used in the U.K. and some Commonwealth countries. &G2 requires the B0 setting.
&Hn	Transmit data flow control. Prevents the modem's buffer for data transmitted to the modem by its attached computer from overflowing.	
	&H0	Disable transmit data flow control.
	&H1	Use hardware flow control. Requires that your computer and software support Clear to Send (CTS) at the EIA-232 interface.
	&H2	Use software flow control. Requires that your software support XON/XOFF signaling.
	&H3	Use both hardware and software flow control. If you are unsure about what your equipment supports, select this option.
&In	Received data software flow (XON/OFF) control.	
	&I0	Disables XON/XOFF flow control of received data.
	&I1	The modem acts on your typed XON/XOFF commands, Ctrl-S or Ctrl-Q, and passes them to the remote device.
	&I2	The modem acts on your XON/XOFF commands, but removes them from the data stream instead of passing them to the remote device. This is the recommended setting for ARQ mode.
	&I3	Hewlett Packard-Host mode. Applies only to modems attached to an HP mainframe that uses the ENQ/ACK protocol. Use in ARQ mode only.
	&I4	Hewlett Packard-Terminal mode. Applies only to modems attached to terminals in an HP system that uses the ENQ/ACK protocol. Use in ARQ mode only.
	&I5	This setting is designed to enable flow control on the phone link when the connection is not under error control. For this to work, the remote device must have &I5 capability.
&Kn	Enable or disable data compression.	
	&K0	Disable data compression.

Command	Function	
	&K1	Use auto-enable/disable. The modem enables compression if the serial port rate is fixed (&B1) and disables compression if the serial port rate follows the connection rate (&B0) because compression offers no throughput advantage when the serial port and connection rates are equal; in fact, compression may degrade throughput.
	&K2	Always enable data compression.
	&K3	Selective data compression. The modem negotiates only for V.42 *bis* compression, and disables MNP Level 5 (MNP5) compression. Use this setting to transfer compressed files.
&Ln	Line type.	
	&L0	Normal.
	&L1	Dedicated or leased line.
&Mn	Enable ARQ (error control) or synchronous protocols. Both your modem and the remote device must use the same protocol.	
	&M0	Normal mode, no error control. Due to the nature of phone line channels, this is never recommended for calls above 2400 bps.
	&M1	Use for online synchronous mode without V.25 *bis*. This setting is exclusive of the modems' error control.
	&M4	Normal/ARQ mode. If an ARQ connection isn't made, the modem operates in Normal mode as though it were set to &M0.
	&M5	ARQ asynchronous mode. The modem hangs up if an ARQ connection cannot be made.
	&M6	V.25 *bis* synchronous mode using a character-oriented link protocol similar to BISYNC.
	&M7	V.25 *bis* synchronous mode using the HDLC link protocol.
&Nn	Sets fixed link speed.	
&Nn&UN	Sets highest and lowest link speeds	
	n=1	Variable rate. The modem negotiates with the remote device for the highest possible connection rate, depending on the capabilities of the remote device.

Command	Function		
	n = 1 -16	Fixed rate. The modem connects only if the remote device is operating at the same rate. You can use this feature to filter out calls at other than a specific rate for security or other reasons.	
		The connection rate must always be lower than or equal to the serial port rate.	
		n=1	300 bps
		n=2	1200 bps
		n=3	2400 bps
		n=4	4800 bps
		n=5	7200 bps
		n=6	9600 bps
		n=7	12000 bps
		n=8	14400 bps
		n=9	16800 bps
		n=10	19200 bps
		n=11	21600 bps
		n=12	24000 bps
		n=13	26400 bps
		n=14	28800 bps
		n=15	31200 bps
		n=16	33600 bps
		n=17	28000 bps
		n=18	29333 bps
		n=19	30666 bps
		n=20	32000 bps
		n=21	33333 bps
		n=22	34666 bps
		n=23	36000 bps
		n=24	37333 bps
		n=25	38666 bps
		n=26	40000 bps
		n=27	41333 bps
		n=28	42666 bps

Command	Function		
		n=29	44000 bps
		n=30	45333 bps
		n=31	46666 bps
		n=32	48000 bps
		n=33	49333 bps
		n=34	50666 bps
		n=35	52000 bps
		n=36	53333 bps
		n=37	54666 bps
		n=38	56000 bps
		n=39	57333 bps
&Rn	Received data (RTS) hardware flow control.		
	&R0	Delay Clear to Send (CTS) response after Request to Send (RTS).	
	&R1	Ignore RTS. This setting is required if your computer or terminal or software does not support RTS.	
	&R2	Enable hardware flow control of received data. The modem sends data to the computer only upon receipt of the RTS signal.	
&Sn	Send the computer a Data Set Ready (DSR) signal via the EIA-232 interface.		
	&S0	DSR is always ON (override).	
	&S1	In Originate mode: Send DSR after dialing, on detection of the remote device's answer tone. In Answer mode: Send DSR after sending an answer tone.	
	&S2	When Carrier is lost, send a pulsed DSR signal with Clear to Send (CTS) following Carrier Detect (CD). This option is for specialised equipment such as automatic callback units.	
	&S3	Same as &S2, but without the CTS signal.	
	&S4	Send the computer DSR at the same time as CD.	
	&S5	Send DSR normally, and follow CTS with CD.	
&Tn	Test the modem.		
	&T0	End testing.	

Command	Function	
	&T1	Local digital loopback
	&T2	Local analogue loopback
	&T3	Not used (error)
	&T4	Grant Remote Digital Loopback request
	&T5	Deny Remote Digital Loopback request
	&T6	Request Remote Digital Loopback
	&T7	Not used (error)
	&T8	Local digital loopback with test pattern
	&T9	Local analogue loopback with test pattern
&Wn	Write the current settings to NVRAM.	
&Xn	External modems only: Designate the source of synchronous transmit clock timing signals.	
	&X0	The Courier V.Everything modem sends transmit clock timing signals to the DTE over the serial interface. DTE rate follows the connection rate.
	&X1	The DTE sends transmit clock timing signals to the modem over the serial interface. Typical use: multiplexed leased lines.
	&X2	The Courier V.Everything modem sends receiver clock timing signals, which are looped to the transmit clock and sent to the DTE over the serial interface. Typical Use: Systems that require synchronisation of data flowing in both directions.
&Yn	Break handling. This command lets you send a break to stop data transfer without disconnecting.	
	&Y0	Destructive, don't send break.
	&Y1	Destructive, expedited.
	&Y2	Nondestructive, expedited.
	&Y3	Nondestructive, unexpedited; the modem sends a break-in-sequence with data received from your computer or terminal.

If the call is under MNP5 data compression, destructive breaks cause both modems to reset their data compression tables. When transmission

resumes, the modems build new tables, and the result is lower-than-normal throughput.

Command	Function
&Zn=s	Store up to 10 numbers in NVRAM, where n is the position 0-9 in NVRAM, and s is the phone number string. The number string may be up to 36 characters long, including any Dial command options.
	Example: **AT&Z2=555-6789**
	In the following example, &M0 (no error control) is inserted before the Dial command: **AT&M0 DS2**

i *This command functions differently when Dial Security is enabled*

Also, do not include modem settings in the &Zn string. If the call requires a special setting, insert it in the command string before the DS command

Command	Function
&Zn=L	Stores the last-dialed number in position n.
&Zn?	Display the phone number stored in NVRAM at position n (where n = 0-9).
&ZC=s	Store command string s in NVRAM. The command string can be up to 30 characters long; spaced do not count. This command is used so you can call another modem without loading your communications software.
&ZC?	Display the stored command string.

Percent (%) Command Set

Command	Function	
%$	Display the help panels for the percent (%) command set.	
%An	Create and configure security accounts.	
%Bn	Remotely configure a modem's serial port rate.	
	%B0	110 bps
	%B1	300 bps
	%B2	600 bps
	%B3	1200 bps
	%B4	2400 bps
	%B5	4800 bps
	%B6	9600 bps
	%B7	19200 bps

Command	Function	
	%B8	38400 bps
	%B9	57600 bps
	%B10	115200 bps
%Cn	Remote configuration control.	
	%C0	Defer configuration changes until the call is ended. Changes take effect for ensuing connections.
	%C1	Cancel configuration changes and restore the original configuration.

i *Using%C1 will not reverse any changes that you wrote to NVRAM (with &W) or forced (with%C2).*

	%C2	Force configuration changes to take effect immediately.

i *We recommend against forcing configuration changes unless it is absolutely necessary. An unreliable connection, or loss of connection, may result.*

Command	Function	
%D=	Set a DTMF password.	
%E=n	Erase security settings.	
	%E=1	Erase local-access password.
	%E=2	Erase Autopass password.
	%E=3	Erase passwords in accounts 0-9.
	%E=4	Erase phone numbers in accounts 0-9.
	%E=5	Disable Account, Dialback, and New Number fields in accounts 0-9.
%Fn	Remotely configure another device's data format.	
	%F0	No parity, 8 data bits.
	%F1	Mark parity, 7 data bits.
	%F2	Odd parity, 7 data bits.
	%F3	Even parity, 7 data bits.
%L=	Set a local-access password.	
%Nn	Set the offline clock speed for synchronous mode.	
	%N0	Reserved
	%N1	Reserved

Command	Function	
	%N2	1200 bps
	%N3	2400 bps
	%N4	4800 bps
	%N5	7200 bps
	%N6	9600 bps
	%N7	12000 bps
	%N8	14400 bps
	%N9	16800 bps
	%N10	19200 bps
%Pn=	Disable password security (n=0 or n=1) when no character follows the equal sign.	
%Pn=s	Set the following password (s) for viewing privileges only (n = 0), or view and configuration privileges (n= 1).	
%Pn?	Display password n.	
%S=n	Access the security accounts. Does not disable security.	
%T	Enable the recognition of tone frequencies of analogue dialing devices.%T is meant primarily for use with network applications, but may also be integrated into certain software programs. For example, %T could be used in a security program to identify incoming tone security codes.	
	To return the modem to Command mode, press any key or drop the computer's or terminal's DTR signal. The modem responds OK.	
%V=PWn	Assign the password in account *n* in your modem's security account as your Autopass password	

Octothorpe (#) Command Set

Command	Funtion	
#$	Display the help panels for the octothorpe (#) command set.	
#CID=n	Controls the caller ID settings.	
	#CID=0	Disable caller ID detection and reporting.
	#CID=1	Enable caller ID with formatted output.
	#CID=2	Enable caller ID with unformatted output.
	#CID=3	Enable caller ID with formatted output and name suppressed.

Command	Funtion	
	#CID=4	Enable caller ID but do not transmit the information to your computer- retain it in the modem's memory.
#CID?	Display the current caller ID settings.	
#CID=?	Display the caller ID actions that are available.	
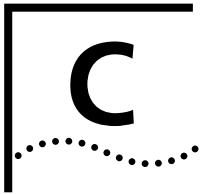
C FLOW CONTROL TEMPLATE

Hardware Flow Control

The table below lists the Hardware flow control template. To load this template send **AT&F1** to your modem.

NVRAM Options	Setting	Description
Handshake option	B0	ITU-T answer sequence
Transmitter	C1	Enabled
Command mode echo	E1	Enabled
Online local echo	F1	Disabled
Training tone volume	L2	Medium
Speaker control	M1	ON during dial through connect
Result codes	Q0	Enabled
Verbal or numeric result codes	V1	Verbal result codes
Result code subset	**X7**	**Extended. Includes all codes except VOICE**
Protocol response codes	&A3	Full protocol codes
Serial port rate select	&B1	Serial port rate fixed higher than connect rate
Carrier Detect	&C1	Normal operations
Data Terminal Ready	&D2	Normal operations
Guard tone	&G0	U.S./Canada
Transmit data hardware flow control	**&H1**	**Hardware flow control**
Record data software flow control	**&I0**	**Disabled**
Analogue data compression	&K1	Enabled
Normal or leased lines	&L0	Normal lines

NVRAM Options	Setting	Description
Error control/sync	&M4	Normal/error control
Link rate select	&N0	Variable
Pulse dialing type	&P0	U.S./Canada
Record data hardware flow control	**&R2**	**Enabled**
Data Set Ready	&S0	Always on
Remote Digital Loopback (RDL)	&T5	Deny RDL
Externals Only: Synchronous transmit clock source	&X0	Courier
Break handling	&Y1	Clear buffer, send immediately
Stored telephone number	&Z0-9=0	Blank
EXTERNALS ONLY: Synch Clock Speed	%N6	9600 bps
Caller ID	#CID=0	Caller ID disabled
Word length*	**8**	
Parity*	**0**	**None**
DTE rate* (Kbps)	**19.2**	_

* Detected by each modem from the AT prefix of the &W command that writes your defaults to NVRAM. Set your software to the desired word length, parity, and serial port rate defaults before sending the modem the AT... &W string.

Software Flow control

The table below lists the Software flow control template.To load this template send **AT&F2** to the modem.

NVRAM Options	Setting	Description
Handshake option	B0	ITU-T answer sequence
Transmitter	C1	Enabled
Command mode echo	E1	Enabled
Online local echo	F1	Disabled
Training tone volume	L2	Medium
Speaker control	M1	ON during dial through connect
Result codes	Q0	Enabled
Verbal or numeric result codes	V1	Verbal result codes
Result code subset	**X7**	**Extended. Includes all codes except VOICE**
Protocol response codes	&A3	Full protocol codes
Serial port rate select	&B1	Serial port rate fixed higher than connect rate
Carrier Detect	&C1	Normal operations
Guard tone	&G0	U.S./Canada
Transmit data hardware flow control	**&H2**	**Software flow control**
Record data software flow control	**&I2**	**Enabled**
Analogue data compression	&K1	Enabled
Normal or leased lines	&L0	Normal lines
Error control/sync	&M4	Normal/error control
Link rate select	&N0	Variable
Pulse dialing typE	&P0	U.S./Canada
Record data hardware flow control	&R2	Enabled
Data Set Ready	&S0	Always on
Remote Digital Loopback (RDL)	&T5	Deny RDL

NVRAM Options	Setting	Description
Synchronous transmit clock source	&X0	Courier
Break handling	&Y1	Clear buffer, send immediately
Stored telephone number	&Z0-9=0	Blank
Externals only: V.25 *bis* clock speed	%N6	9600 bps
Caller ID	#CID=0	Caller ID disabled
Word length*	**8**	
Parity*	**0**	**None**
DTE rate* (Kbps)	**19.2**	_

* Detected by each modem from the AT prefix of the &W command that writes your defaults to NVRAM. Set your software to the desired word length, parity, and serial port rate defaults before sending the modem the AT... &W string.

No Flow Control   The table below lists the No flow control template. To load this template send `AT&F0` to the modem.

NVRAM Options	Setting	Description
Handshake option	B0	ITU-T answer sequence
Transmitter	C1	Enabled
Command mode echo	E1	Enabled
Online local echo	F1	Disabled
Training tone volume	L2	Medium
Speaker control	M1	ON during dial through connect
Result codes	Q0	Enabled
Verbal or numeric result codes	V1	Verbal result codes
Result code subset	**X1**	**Basic**
Protocol response codes	&A3	Full protocol codes
Serial port rate select	&B1	Serial port rate fixed higher than connect rate

NVRAM Options	Setting	Description
Carrier Detect	&C1	Normal operations
Guard tone	&G0	U.S./Canada
Transmit data hardware flow control	**&H0**	**Disabled**
Record data software flow control	**&I0**	**Disabled**
Analogue data compression	&K1	Enabled
Normal or leased lines	&L0	Normal lines
Error control/sync	&M4	Normal/error control
Link rate select	&N0	Variable
Record data hardware flow control	**&R1**	**Disabled**
Data Set Ready	&S0	Always on
Remote Digital Loopback (RDL)	&T5	Deny RDL
Break handling	&Y1	Clear buffer, send immediately
Stored telephone number	&Z0-9=0	Blank
V.25 *bis* clock speed	%N6	9600 bps
Word length*	**7**	
Parity*	**1**	**Even**
DTE rate* (Kbps)	**9600**	_

* Detected by each modem from the AT prefix of the &W command that writes your defaults to NVRAM. Set your software to the desired word length, parity, and serial port rate defaults before sending the modem the AT... &W string.
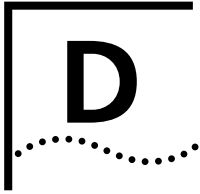
D

RESULT CODE MEANINGS AND SETS

Result Code Meaning

Result Code	Meaning
0/OK	Command has been executed.
1/CONNECT	Connection with another device.
2/RING	Incoming ring detected.
3/NO CARRIER	Carrier Detect has failed, or carrier has been dropped due to disconnect.
4/ERROR	Command is invalid.
5/CONNECT 1200	Connection at reported rate. Same meaning for results of 2400 (10), 4800 (18), 7200 (20), 9600 (13), 12000 (21), 14400 (25), 16800 (43), 19200 (85), 21600 (91), 24000 (99), 26400 (103), 28800 (107), 31200 (151), 33600 (155), 56000 (162), or 64000 (165) bps.
6/NO DIAL TONE	Dial tone not detected during the default 2 seconds, set in Register S6.
7/BUSY	Busy signal detect; modem hangs up.
8/NO ANSWER	After waiting 5 seconds for an answer, modem hangs up; returned instead of NO CARRIER when the @ option is used.
11/RINGING	The modem has dialed; remote phone line is ringing.
12/VOICE	Voice answer at remote site; modem hangs up.
170/RING A	Incoming distinctive ring detected.
171/RING B	Incoming distinctive ring detected.
172/RING C	Incoming distinctive ring detected.
173/RING D	Incoming distinctive ring detected.
174/RING E	Incoming distinctive ring detected.
Wait for another Dial Tone (W)	Courier V.Everything modem continues diaing as soon as it detects another dial tone. Requires X3 or higher.
Wait for an answer (@)	Courier V.Everything modem continues dialing when it detects 5 seconds of silence on the line. Requires X3 or higher.

Result Codes Sets for X*n* Values

Result Codes	X0	X1	X2	X3	X4	X5	X6	X7
0/OK	●	●	●	●	●	●	●	●
1/CONNECT	●	●	●	●	●	●	●	●
2/RING	●	●	●	●	●	●	●	●
3/NO CARRIER	●	●	●	●	●	●	●	●
4/ERROR	●	●	●	●	●	●	●	●
5/CONNECT 1200		●	●	●	●	●	●	●
6/NO DIAL TONE			●		●		●	●
7/BUSY				●	●	●	●	●
8/NO ANSWER				●	●	●	●	●
10/CONNECT 2400		●	●	●	●	●	●	●
11/RINGING						●	●	●
12/VOICE						●	●	
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		●	●	●	●	●	●	●
170/RING A		●	●	●	●	●	●	●
171/RING B		●	●	●	●	●	●	●
172/RING C		●	●	●	●	●	●	●
173/RING D		●	●	●	●	●	●	●
174/RING E		●	●	●	●	●	●	●
Functions								
Wait for 2nd Dial Tone (W)				●	●	●	●	●
Wait for Answer (@)				●	●	●	●	●

New Connect Message

The table below includes all new connect messages.

Message	#	Message	#
28000	256	38666/ARQ/V90	283
28000/ARQ	257	40000	284
28000/V90	258	40000/ARQ	285
28000/ARQ/V90	259	40000/V90	286
29333	260	40000/ARQ/V90	287
29333/ARQ	261	33333/V90	288
29333/V90	262	33333/ARQ/V90	289
29333/ARQ/V90	263	37333/V90	290
30666	264	37333/ARQ/V90	291
30666/ARQ	265	41333/V90	292
30666/V90	266	41333/ARQ/V90	293
30666/ARQ/V90	267	42666/V90	294
32000	268	42666/ARQ/V90	295
32000/ARQ	269	44000/V90	296
32000/V90	270	44000/ARQ/V90	297
32000/ARQ/V90	271	45333/V90	298
34666	272	45333/ARQ/V90	299
34666/ARQ	273	46666/V90	300
34666/V90	274	46666/ARQ/V90	301
34666/ARQ/V90	275	48000/V90	302
36000	276	48000/ARQ/V90	303
36000/ARQ	277	49333/V90	304
36000/V90	278	49333/ARQ/V90	305
36000/ARQ/V90	279	50666/V90	306
38666	280	50666/ARQ/V90	307
38666/ARQ	281	52000/V90	308
38666/V90	282	52000/ARQ/V90	309
53333/V90	310	60000/ARQ	323
53333/ARQ/V90	311	60000/V90	324

Message	#	Message	#
54666/V90	312	60000/ARQ/V90	325
54666/ARQ/V90	313	61333	326
56000/V90	314	61333/ARQ	327
56000/ARQ/V90	315	61333/V90	328
57333/V90	316	61333/ARQ/V90	329
57333/ARQ/V90	317	62666	330
58666	318	62666/ARQ	331
58666/ARQ	319	62666/V90	332
58666/V90	320	62666/ARQ/V90	333
58666/ARQ/V90	321	64000/V90	334
60000	322	64000/ARQ/V90	335
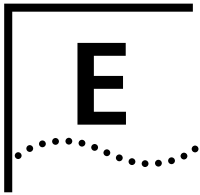
E
V.25 *BIS* REFERENCE

The commands and result codes described in this section are sent and recognized by your V.25 bis communications software. You are not expected to send them to the modem the way you do with A commands.

Commands

CIC	Connect incoming call	Instructs the Courier V.Everything mode to answer an incoming call.
CRN	Call request using number provided	Instructs the Courier V.Everything mode to dial the number following this command. Example: CRN18005551234
CRS	Call Request with memory location	Instructs the Courier V.Everything mode to dial a number stored in memory. Example: CRS3
DIC	Disregard incoming call	Instructs the Courier V.Everything mode to disregard an incoming call overrides auto answer for this call.
PRNn	Program number	Stores a number in NVRAM. Example: PRN3; 18005551234
RFN	Request list of forbidden numbers	Instructs the Courier V.Everything mode to list the numbers with which the CourierV.Everything mode is unable to connect.
RLN	Request list of stored numbers	Instructs the Courier V.Everything mode to list the numbers previously stored in NVRAM.

Dial Options

0-9	Digits
&	Flash
:	Wait for dial tone
>	(Greater Than) separator
<	Pause
=	(Equal Sign) separator
P	Pulse
T	Tone
.	(Period) separator
-	(Minus) separator

Result Codes   These are the normal (X0) result codes. For a complete list of result codes see Appendix D, *Result Code Meanings and Sets*.

CFI	Call failed
CFRT	Ringing
CNX	Connect
INC	Incoming call
INV	Invalid action
LS	List of numbers
LSF	List of forbidden numbers
LSN	List of stored numbers
VAL	Valid

These are the extended result codes (X1) that replace CFI and INV.

CFAB	Call aborted
CFCB	Local Courier V.Everything modem busy
CFET	Remote device busy
CFFC	Forbidden call
CFNS	Number not stored
CFNT	Answer tone not detected
INVCU	Command unknown
INVMS	Message syntax error
INVPS	Parameter syntax error
INVPV	Parameter value error

Commands and Result Codes NO Supported

CRI	Call request with identification number
PRI	Program identifier
RLD	List of delayed call numbers
RLI	Request list of identification numbers
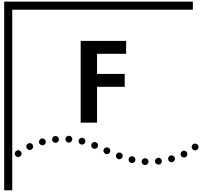
ASCII CHART

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
00	00	NUL	32	20	SP	64	40	@	96	60	`
01	01	SOH	33	21	!	65	41	A	97	61	a
02	02	STX	34	22	"	66	42	B	98	62	b
03	03	ETX	35	23	#	67	43	C	99	63	c
04	04	EOT	36	24	$	68	44	D	100	64	d
05	05	ENQ	37	25	%	69	45	E	101	65	e
06	06	ACK	38	26	&	70	46	F	102	66	f
07	07	BEL	39	27	ë	71	47	G	103	67	g
08	08	BS	40	28	(	72	48	H	104	68	h
09	09	HT	41	29	)	73	49	I	105	69	I
10	0A	LF	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	48	30	0	80	50	P	112	70	p
17	11	XON	49	31	1	81	51	Q	113	71	q
18	12	DC2	50	32	2	82	52	R	114	72	r
19	13	XOFF	51	33	3	83	53	S	115	73	s
20	14	DC4	52	34	4	84	54	T	116	74	t
21	15	NAK	53	35	5	85	55	U	117	75	u
22	16	SYN	54	36	6	86	56	V	118	76	v
23	17	ETB	55	37	7	87	57	W	119	77	w

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
24	18	CAN	56	38	8	88	58	X	120	78	x
25	19	EM	57	39	9	89	59	Y	121	79	y
26	1A	SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	60	3C	<	92	5C	\	124	7C		
29	1D	GS	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	62	3E	>	94	5E	à	126	7E	~
31	1F	US	63	3F	?	95	5F	_	127	7F	DEL

G
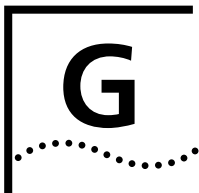
FAX INFORMATION FOR PROGRAMMERS

Fax Service Class 1 Commands

+FCLASS?	What mode is in use Data or Fax?
+FCLASS=n (0,1,2.0)	Class identification and control.
+FCLASS=?	What Fax class is in use?
+FTS=n (0,255)	Stop transmission and pause, 10 ms.
+FRS=n (0,255)	Wait for silence, 10 ms.
+FTM=n (3,24,48,72,73,74,96,121,122,145,146)	Transmit data with carrier.
+FRM=n (3,24,48,72,73,74,96,121,122,145,146)	Receive data with carrier.
+FTH=n (3,24,48,72,73,74,96,121,122,145,146)	Transmit HDLC data with carrier.
+FRH=n (3,24,48,72,73,74,96,121,122,145,146)	Receive HDLC data with carrier.

FAX Service Class 2.0 Command

In addition to the standard Class 2.0 fax commands, 3Com implements the following optional Class 2.0 fax commands:

+FNS=0,1	Pass-through, non-standard negotiation byte string
+FCR=0,1	Capability to receive.
+FAA=0,1	Adaptive Answer mode.
+FCT=0-255 sec.	Phase C Timeout
+FHS=0-255	Hangup Status Code, read only.
+FMS=0-3	Minimum Phase C Speed.
+FBS?=500,100	Buffer size, read only.

Fax Mode Flow Control Setting

Many facsimile software products use software flow control when the modem is in Fax mode. Throughout our documentation, we recommend that you use hardware flow control for Data mode (factory setting). However, to allow compatibility with software products that use software flow control by default, 3Com fax modems automatically change t software flow control when entering Fax mode

FCC Notice

FCC part 68, rules regarding fax operation, has been amended as follows

Telephone facsimile machines identification of the sender of the message It shall be unlawful for any person within the United States to use a computer or other electronic device to send any message via a telephone facsimile machine unless such a 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 and an identification of the business, other entity, or individual sending the message and the telephone number of the sending machine or of such business, other entity, or individual.Telephone facsimile machines manufactured on and after December 20, 1992 must clearly mark such identifying informatio on each transmitted page.

Notes

If you want to know more about the supported Class 1 fax commands refer to the standard for the Service Class 1 fax protocol:

ANSI/EIA/TIA-578-1990 (EIA-578)

Asynchronous Facsimile DCE Control Standard

November, 1990   Approved: October 22, 1990

For more information on Class 2.0, refer to the standard for the Service Class 2.0 fax protocol:

ANSI/EIA/TIA-592-1993 (EIA-592)

Asynchronous Facsimile DCE Control Standard

May, 1993

You can obtain copies of these standards by contacting Global Engineering Documents at 1-800-854-7179.

GLOSSARY

16550 UART   The fastest type of UART that is currently available.

Adaptive Speed Leveling (ASL)   Courier V.Everything V.32 *bis* and V.3 *terbo* modems detect improved line conditions and shift upward again to the next higher speed. The modems at both ends of the connection adapt independently, eac detecting and adjusting to line conditions. ASL keeps the modems online, always operating at the highest possible speed, and constantly ensuring data integrity.

analogue signals   Continuous, varying waveforms such as the voice tones carried over phone lines. Contrast with digital signals.

answer mode   A state in which the modem transmits at the predefined high frequency of the communications channel and receives at the low frequency. The transmit/receive frequencies are the reverse of the calling modem which is in originate mode

application (application program)   A computer program designed to perform a specific function, such as a word processor or a spreadsheet.

ARQ   See Automatic Repeat Request.

ASCII   American Standard Code for Information Interchange. A 7-bit binary code (0's, 1's) used to represent letters, numbers, and special characters such as $,!, and /. Supported by almost every computer and terminal manufacturer.

ASL   See Adaptive Speed Leveling.

asymmetrical modulation   A transmission technique that splits the communications channel int one high speed channel and one slower channel. During a call under asymmetrical modulation, the modem with the greatest amount of data to transmit is allocated the high speed channel. The modem with less data is allocated the slow, or back channel (450 bps). The modems

dynamically reverse the channels during a call if the volume of data transfer changes.

asynchronous transmission
Data transmission in which the length of time between transmitte 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 an stop bits to each character serves this purpose.

auto answer
A feature in modems enabling them to answer incoming calls over the phone lines without the use of a telephone receiver.

auto dial
A feature in modems enabling them to dial phone numbers over the phone system without the use of a telephone transmitter.

Automatic Repea Request (ARQ)
A general term for error control protocols which feature error detectio and automatic retransmission of defective blocks of data. See HST, MNP, and V.42.

baud rat
The number of discrete signal events per second occurring on a communications channel. Although not technically accurate, baud rate is commonly used to mean bit rate.

binary digit (bit)
A 0 or 1, reflecting the use of a binary numbering system (only tw digits). Used because the computer recognises either of two states, OFF or ON. Shortened form of binary digit is bit.

BISYNC
Binary Synchronous Control. A protocol developed by IBM for software applications and communicating devices operating in synchronous environments. The protocol defines operations at the link level of communications, for example, the format of data frames exchange between modems over a phone line. See Protocol, HDLC, SDLC.

bit
See binary digit.

bit-mapping
A technique that lets one decimal number (in this case, a number between 0 and 255) stand for up to 8 separate binary settings.

bit rat
The number of binary digits, or bits, transmitted per second (bps). Communications channels using telephone channel modems are established at set bit rates, commonly 300, 1200, 2400, 4800, 9600, 14400, and 28800.

bps   The bits (binary digits) per second rate.

buffer   A memory area used as temporary storage during input and output operations. An example is the modem's command buffer. Another is the Transmit Data flow control buffer used for flow control and to store copies of transmitted frames until they are positively acknowledged by the receiving modem.

byte   A group of binary digits stored and operated upon as a unit. A byte may have a coded value equal to a character in the ASCII code (letters, numbers), or have some other value meaningful to the computer. In user documentation, the term usually refers to 8-bit units or characters. 1 kilobyte (K) is equal to 1,024 bytes or characters; 64K indicates 65,536 bytes or characters.

call indicate   A call originating tone defined by ITU-T recommendation V.8.

carrier   A continuous frequency capable of being either modulated or impressed with another information carrying signal. Carriers are generated and maintained by modems via the transmission lines of the telephone companies

CCITT   Formerly, an international organisation that defined standards for telegraphic and telephone equipment. It has been incorporated into its parent organisation, International Telecommunication Union (ITU). Telecommunication standards are now covered under Telecommunications Standards Sector (TSS). ITU-T replaces CCITT. For example, the Bell 212A standard for 1200 bps communication in North America was referred to as CCITT V.22. It is now referred to as ITU-T V.22.

central office (CO)   The facility to which devices, such as telephones, fax machines, and modems within a specific geographic area of a public telephone network are connected.

central office switch   A device, located at the telephone company's central office, to which devices, such as telephones, fax machines, and modems are connected

characte   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 and 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 USR HST and MNP, employ advanced techniques such as longer transmission frames and data compression to increase cps.

Class 1/EIA-57   An American standard used between facsimile application programs and facsimile modems for sending and receiving Class 1 faxes.

Class 2.0/EIA-59   An American standard used between facsimile application programs and facsimile modems for sending and receiving Class 2.0 faxes.

CO   See central office.

COM port   See serial port, EIA-232.

cps   See characters per second.

CPU   Central processing unit.

CRC   See cyclic redundancy check.

cyclic redundanc check (CRC)   An error-detection technique consisting of a cyclic algorithm performed on each block or frame of data by both sending and receiving modems. The sending modem inserts the results of its computation in each data block in the form of a CRC code. The receiving mode compares its results with the received CRC code and responds with either a positive or negative acknowledgment. In the ARQ protocol implemented in 3Com high speed modems, the receiving modem accepts no more data until a defective block is received correctly.

data communications   A type of communications in which computers and terminals are able to exchange data over an electronic medium.

data compression   When the transmitting modem detects redundant units of data, it recodes them into shorter units of fewer bits. The receiving mode then decompresses the redundant data units before passing them to the receiving computer.

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

If a destructive Break is sent during a call (see the &Y command), causing the modems to reset the compression tables, you can expect diminished throughput.

data communication equipment (DCE) In this manual, the term applies to modems that establish and control the data link via the telephone network

data mode The mode in which the fax modem is capable of sending and receiving data files. A standard modem without fax capabilities is always in Data mode.

data set Another way of saying "modem.

data terminal equipment (DTE) The device that generates or is the final destination of data.

DCE See data communication equipment.

default Any setting assumed, at startup or reset, by the computer's software and attached devices, and operational until changed by the user.

digital loopbac A test that checks the modem's EIA-232 interface and the cable that connects the terminal or computer and the modem. The mode 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.

DIP switch DIP stands for dual in-line package.

DSR See data set ready

DTE See Data Terminal Equipment.

DTMF security A form of dial-up security.

duplex Indicates a communications channel capable of carrying signals in both directions. See Half Duplex, Full Duplex.

echo See local echo

EIA Electronic Industries Association, which defines electronic standards in the U.S.

EIA-23	A technical specification published by the Electronic Industries Association that establishes mechanical and electrical interface requirements between computers, terminals, modems, an communication lines. EIA-232 was formerly known as RS-232.
equalisation	A compensation circuit designed into modems to counteract certain distortions introduced by the telephone channel. Two types are used: fixed (compromise) equalisers and those that adapt to channel conditions. 3Com high speed modems use adaptive equalisation.
error control	Various techniques which check the reliability of characters (parity) or blocks of data. V.42, MNP and HST error control protocols use error detection (CRC) and retransmission of errored frames (ARQ).
expansion bus	A series of slots inside a computer that allow for adding feature cards.
facsimile (fax)	A method for transmitting the image on a printed page from one point to another.
fax mode	The mode in which the fax modem is capable of sending and receiving files in a facsimile format.
Flash memory	A form of memory that can be electrically erased and reprogrammed without the need to remove it from the circuit board.
flow control	A mechanism that compensates for differences in the flow of data input to and output from a modem or other device.
fram	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/En indicators.
file transfer protocol (FTP)	A TCP/IP application that allows users of an internet to send (put) and receive (get) files.
FTP	See file transfer protocol.
full duplex	Signal flow in both directions at the same time. In microcomputer communications, may refer to the suppression of the online Local Echo.
half duplex	Signal flow in both directions, but only one way at a time. In microcomputer communications, may refer to activation of the online Local Echo, which causes the modem to send a copy of the transmitted data to the screen of the sending computer.

handshaking   A sequence that two modems undertake while connecting to agree o the parameters of the conversation that will ensue. During handshaking, the modems negotiate the speed of the connection, whether error control and data compression will be used and in what form, and so forth.

hardware flow control   A form of flow control that uses electronic signals to start and stop the flow of data.

HDLC   See High Level Data Link Control.

High Level Data Link Control (HDLC)   A standard protocol developed by the International Standards Organisation for software applications and communicating devices operating in synchronous environments. The protocol defines operations at the link level of communications, for example, the format of data frames exchanged between modems over a phone line. See Bisync, Protocol, SDLC.

High Speed Technology (HST)   3Com' proprietary signaling scheme, design and error control protocol for high-speed modems. HST incorporates trellis-coded modulation, for greater immunity from variable phone line conditions, and asymmetrical modulation for more efficient use of the phone channel at speeds of 4800 bps and above. HST also incorporates MNP-compatible error control procedures adapted to asymmetrical modulation.

Hz (Hertz)   A frequency measurement unit used internationally to indicate one cycle per second.

Industry Standard Architecture (ISA)   The most common type of computer expansion bus. Other types include Extended Industry Standard Architecture (EISA) and Microchannel Architecture (MCA).

interrupt request (IRQ)   A number that must be assigned to devices that plug in to your computer's expansion bus.

IP   Internet Protocol.

IPX   Novell's Internet Packet Exchange protocol.

IRQ   See interrupt request.

ISA   See Industry Standard Architecture.

ITU-T   International Telecommunication Union-Telecommunication sector. Formerly referred to as CCITT. An international organisation 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-TV.22. For 2400 bps communication, most U.S. manufacturers observe V.22 *bis*.

jumper A switch composed of pins and a shunt. The shunt's position on the pins determines the jumper setting.

Kbps Kilobits per second, or thousand bits per second.

LAPM See Link Access Procedure for Modems.

Link Access Procedure for Modems (LAPM) Link Access Procedure for Modems, an error control protocol incorporated in ITU-T Recommendation V.42. Like the MNP and HST 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 send copies of keyboard commands and transmitted data to the screen. When the modem is i Command mode (not online to another system) the local echo is invoked through the ATE1 command. The command causes the modem to display your typed commands. When the modem is online to another system, the local echo is invoked through the ATF0 command This command causes the modem to display the data it transmits to the remote system.

MB Megabyte. One million bytes.

Microcom Networking Protocol (MNP) An asynchronous error control protocol developed by Microcom, Inc. and now in the public domain. The protocol ensures error-free transmission through error detection (CRC) and retransmission of errored frames. 3Com modems use MNP Levels 1-4 and Level 5 data compression. MNP Levels 1-4 have been incorporated into ITU-T Recommendation V.42. Compare HST.

MNP See Microcom Networking Protocol.

modem A device that transmits/receives computer data through a communications channel such as radio or telephone lines. The Courier V.Everything modem is a telephone channel modem that modulates, or transforms, digital signals from a computer into the analogue form that can be carried successfully on a phone line. It also demodulates signals received from the phone line back to digital signals before passing them to the receiving computer

Nonvolatile Random Access Memory (NVRAM)
User-programmable random access memory whose data is retained when modem power is turned off. Used in Courier V.Everything modems to store a user-defined default configuration loaded into random access memory (RAM) at power on

NVRAM
See Non-volatile Random Access Memory.

online fallbac
A feature that allows high speed error-control modems to monitor line quality and fall back to the next lower speed if line quality degrades. The modems fall forward as line quality improves.

originate mode
A state in which the modem transmits at the predefined low frequency of the communications channel and receives at the high frequency. The transmit/receive frequencies are the reverse of the called modem which is in Answer mode.

parallel transmission
The transfer of data characters using parallel electrical paths for each bit of the character, for example, 8 paths for 8-bit characters. Data is stored in computers in parallel form, but may be converted to serial form for certain operations. See Serial Transmission

parity
An error-detection method that checks the validity of a transmitted character. Character checking has been surpassed by more reliable and efficient forms of block-checking, including Xmodem-type protocols and the ARQ protocol implemented in Courier V.Everything modems.

The same type of parity must be used by two communicating computers, or both may omit parity. When parity is used, a parity bit is added to each transmitted character. The bit's value is 0 or 1, to make the total number of 1's in the character even or odd, depending on which type of parity is used.

Point-to-Point Protocol (PPP)
A protocol used to send data over serial lines. PPP provides error checking, link control, and authentication, and can be used to carry IP, IPX, and other protocols. PPP is superseding SLIP as the leading dial-in protocol.

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

provisioning
Another way of saying "setting up telephone lines."

RAM   See Random Access Memory.

Random Access Memory (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.

Read-Only Memory (ROM)   Permanent memory, not user-programmable. The Courier V.Everything modem's factory settings are stored in ROM and can be read (loaded) into RAM as an operational configuration if DIP switch S10 is ON at power on.

remote access   A feature that allows a remotely-located user to view the Courier V.Everything modem's configuration screens and change the Courier V.Everything modem's configuration. Password protection is available.

remote digital loopback   A test that checks the phone link and a remote modem's transmitter and receiver. Data entered from the keyboard is transmitted from the initiating modem, received by the remote modem's receiver, looped through its transmitter, and returned to the local screen for verification.

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

result code   Another way of saying "status message." The Courier V.Everything modem sends result codes to your terminal, for example, to indicate the status of a connection.

RJ11   The Universal Standard Order Code (USOC) standard for wiring a single-line, two-wire phone network interface, passing tip and rin signals, typically, from the public switched network.

ROM   See Read-Only Memory.

Serial Line Internet Protocol (SLIP)   A simple protocol that permits sending IP data over a serial line. SLIP is being superseded by the Point-to-Point Protocol (PPP).

serial port   A computer port that enables the transmission of data characters one bit at a time, using a single electrical path. Also known as a communications port, or COM port. On PC-compatible machines, this is a port for asynchronous, serial data transmission and, in the case of modems, for data reception. Data is transmitted one bit at a time (serially) to devices such as a modem, a serial mouse, or a serial printer.

serial transmission   The transfer of data characters one bit at a time, sequentially, using a single electrical path. See Parallel Transmission.

software flow control   A form of flow control that uses XON and XOFF characters to start and stop the flow of data.

start bit   The signaling bit attached to the beginning of each character before characters are transmitted during Asynchronous Transmission.

stop bit   The signaling bit attached to the end of each character before characters are transmitted during Asynchronous Transmission.

SDLC   See Synchronous Data Link Control

S-register   An area of NVRAM that is used to store a setting.

switch   See central office switch.

Synchronous Data Link Control (SDLC)   A protocol developed by IBM for software applications and communicating devices operating in IBM's Systems Network Architecture (SNA). The protocol defines operations at the link level of communications, for example, the format of data frames exchange between modems over a phone line. See BISYNC, Protocol, HDLC.

synchronous transmission

A form of transmission in which blocks of data are sent at strictly timed intervals. Because the timing is uniform, no Start or Stop bits are required. Compare Asynchronous Transmission.

Some mainframes only support synchronous communications unless their owners have installed a synchronous adapter and appropriate software.

terminal   A device whose keyboard and display are used for sending and receiving data over a communications link. Differs from a microcomputer in that it has no internal processing capabilities. Used to enter data into or retrieve processed data from a system or network.

terminal mode   An operational mode required for microcomputers to transmit data. In Terminal mode the computer acts as if it were a standard terminal such as a teletypewriter, rather than a data processor. Keyboard entries go directly to the modem, whether the entry is a modem command or data to be transmitted over the phone lines. Received data is output directly to the screen. The more popular communications software

products control Terminal mode as well as enable more complex operations, including file transmission and saving received files.

throughput The amount of actual user data transmitted per second without the overhead of protocol information such as Start and Stop bits or frame headers and trailers. Compare characters per second.

transmission rat See bit rate.

UART See Universal Asynchronous Receiver/Transmitter.

Universal Asynchronous Receiver/Transmitter (UART) A computer chip that controls the signaling that goes on through a computer's serial port.

UTP (Unshielded Twisted Pair) Twisted insulated copper wires bundled into an unshielded cable, commonly used in telephone wiring systems. Grades of UTP include DTP (Datagrade Twisted Pair) and DIW (Distributed Inside Wire).

V.8 ITU-T recommendation that defines procedures for starting and endin sessions of data transmission.

V.17 An ITU-T standard for facsimile operations that specifies modulation at 14.4 Kbps, with fallback to 12 Kbps.

V.21-Fax An ITU-T standard for facsimile operations at 300 bps.

V.21-Modem An ITU-T standard for modem communications at 300 bps. Modems made in the U.S. or Canada follow the Bell 103 standard. However, the modem can be set to answer V.21 calls from overseas

V.22 A ITU-T standard for modem communications at 1200 bps, compatible with the Bell 212A standard observed in the U.S. and Canada.

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

V.23 An ITU-T standard for modem communications at 1200 bps with a 75 bps back channel. Used in the U.K

V.25 An ITU-T standard for modem communications. Among other things, V.25 specifies an answer tone different from the Bell answer tone. All

3Com modems can be set with the B0 command so that they use the V.25 2100 Hz tone when answering overseas calls

V.25 *bis*   An ITU-T standard for synchronous communications between th mainframe or host and the modem using the HDLC or character-oriented protocol. Modulation depends on the serial port rate and setting of the transmitting clock source, &X.

V.27*ter*   An ITU-T standard for facsimile operations that specifies modulation at 4800 bps, with fallback to 2400 bps.

V.29   An ITU-T standard for facsimile operations that specifies modulation at 9600 bps, with fallback to 7200 bps.

V.32   An ITU-T standard for modem communications at 9600 bps and 480 bps.V.32 modems fall back to 4800 bps when line quality is impaired, and fall forward again to 9600 bps when line quality improves.

V.32 *bis*   An ITU-T standard that extends theV.32 connection range: 4800, 7200, 9600, 12K and 14.4 Kbps. V.32 *bis* modems fall back to the next lower speed when line quality is impaired, and fall back further as necessary. They fall forward to the next higher speed when line quality improves.

V.32 *terbo*   Modulation scheme that extends the V.32 connection range: 4800, 7200, 9600, 12K, 14.4K, 16.8K, 19.2K, and 21.6 Kbps. V.32 *terbo* modems fall back to the next lower speed when line quality is impaired, and fall back further as necessary. They fall forward to the next higher speed when line quality improves.

V.34   An ITU-T standard that allows data rates as high as 28.8 Kbps.

V.42   An ITU-T standard for modem communications that defines a two-stage process of detection for LAPM error control.

V.42 *bis*   An extension of ITU-TV.42 that defines a specific data compressio scheme for use with V.42 error control

V.Fast Class (V.FC)   Proprietary modulation scheme developed by Rockwell International for data communication speeds up to 28.8 Kbps.

word length   The number of bits in a data character without parity, start or stop bits.

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 a device to stop/resume transmitting data. In most systems typing <Ctrl>-S sends the XOFF character. Some devices, including the CourierV.Everything modem, understand <Ctrl>-Q as XON; others interpret the pressing of any key after <Ctrl>-S as XON.

YMODEM   An error-correcting file transfer protocol that is related to, but faster than, XMODEM.

ZMODEM   An error-correcting file transfer protocol that is related to, but faster than, XMODEM or YMODEM.