x2 AT Command Reference

for TelePort 56 modems

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Contents

Entering AT Commands.....4

AT Command Reference.....6

S-Registers.....25

Result Codes.....32

Glossary.....40

Commonly Used Commands:

Dialing a Number (Dn command).....8
Disabling Call Waiting.....11
Answering an Incoming Call
Manually (A command).....6
Automatically (S0 register).....25
Disconnecting (Hn command).....13
Setting the Connection Speed (&Nn command).....16
Changing the Speaker
Setting the Volume (Ln command).....15
Turning the Speaker Off (Mn command).....16
Displaying Modem Information (In command).....14
Setting an S-Register (Sn=x command).....19
Controlling Result Code Display
Displaying Result Codes (Qn command).....18
Setting Verbose or Numeric Result Codes (Vn command).....21
Using Extended Result Codes (Xn command).....21
Specifying Connection Result Codes (&An command).....7
Resetting the Modem (Zn command).....23
Loading Factory Settings (&Fn command).....13

Entering AT Commands

To enter an AT command, you must be using a terminal emulation application that provides you with a text area for entering commands and receiving command feedback. ProComm, ZTerm, and Microphone II are examples of this type of application.

Typing an AT Command

All AT commands, except for +++ and A/, must be preceded by the characters “AT” and followed by a carriage return (produced by pressing the Return key). “AT” signals the modem to come to attention; the carriage return indicates that the command is finished.

For example, to answer an incoming call using the A (answer) command, you type

```
ATA
```

and then press the Return key.

Using Command Parameters

Many commands require a parameter, which is usually a single digit that determines the command’s behavior. For example, the parameter ***n*** in the Hn command is either 0 (to hang up) or 1 (to go off-hook). To hang up using this command, you type

```
ATH0
```

and then press the Return key.

Some commands require parameters that are not single digits. For example, the Dn command accepts one or more single-character dialing modifiers, plus a telephone number. To use touch-tone dialing (T) to dial the telephone number 123-4567, you type

```
ATDT1234567
```

and then press the Return key.

Entering More Than One Command

You can enter multiple AT commands on the same line, as long as the line begins with “AT” and ends with a carriage return.

You usually use multiple commands on the same line to configure your modem. For example, to request that the modem use the factory default settings (&F command) and turn the modem speaker off (M command), you type

```
AT&F1M0
```

and then press the Return key.

Entering and Exiting Command Mode

Before you enter an AT command, the modem must be in the command state. If you are already connected to another modem, you can use the +++ command to switch to command state. (You can later return to your connection using the On command.)

For example, to enter an AT command when a connection is active, you type

+++

to enter command mode; then type the AT command and press the Return key; and finally type

ATO

to return to your connection.

AT Command Reference

AT commands control your modem's settings and operation. This section provides detailed information on all AT commands supported by the Global Village Teleport 56 (x2 Technology) modem.

$ (getting modem online help)

The $ command sends a list of commands to the computer. (To see this response, you must be using a terminal emulation application.)

The $ command can also be used with certain commands to display additional information:

- With the D command, it displays a list of dialing commands.
- With the S command, it displays a list of S-registers.

EXAMPLE **ATS$**
This command displays a list of S-registers.

+++ (switching to command mode)

The +++ command forces a modem that is already connected to enter the command state, so you can send commands to your modem without breaking its connection with the remote modem.

Unlike other AT commands, the +++ command is not preceded by the "AT" prefix. The command is accepted when the "+++" is typed, so you do not follow this command with a carriage return.

In order to prevent the modem from responding to "+++" in transmitted data, the escape sequence must be surrounded by a one-second pause.

You can change the escape code sequence from +++ to another string of characters by setting the S2 register. You can change the pause time required for the escape code sequence by setting the S12 register.

A (answering an incoming call)

The A command forces the modem to go off-hook in answer mode. Use this command to manually answer an incoming call when you know that another modem is calling.

When the modem detects an incoming call, it sends the RING result code to your computer. If a terminal emulation application is active, the result code appears on your screen.

EXAMPLE **ATA**
This command answers an incoming call.

A/ (repeating the last command)

The A/ command repeats the previous command. This command is especially useful for re-issuing a dial command that failed because of a busy line or no answer.

Unlike other AT commands, the A/ command is not preceded with the “AT” prefix. The command is accepted as soon as the “A/” is typed, so you do not follow this command with a carriage return.

&An (specifying connection result codes)

The &An command determines which result codes are used to describe the type of connection and protocol that results from handshaking and negotiation.

&A0
Disables display of /ARQ in the result code.

&A1
Enables display of /ARQ in the result code.

&A2
Enables display of /ARQ and modulation (V.32, V.FC, V.34, or x2) in the result code.

&A3 (the default)
Enables display of /ARQ, modulation, and error-correction mode in the result code.

EXAMPLE **AT&A3**
This command instructs the modem to display the most expansive result codes when it makes a connection.

Bn (specifying protocol for 300 or 1200 bps)

The Bn command configures the modem to answer using either a US answer tone or the ITU-T answer sequence.

B0 (the default)
Uses ITU-T answer sequence when answering a call.

B1
Uses a US answer tone when answering a call.

EXAMPLE **ATB0**
This command instructs the modem to use the ITU-T answer sequence.

&Bn (selecting variable or fixed DTE speed)

You use the &Bn command to set the DTE speed (the speed at which the modem communicates with your computer).

&B0
Allows the DTE speed to change according to the connection speed.

&B1 (the default)
Sets the DTE speed to be the same as the computer’s port speed.

&B2
Sets the DTE speed to a fixed rate when the modem connects in ARQ mode. In non-ARQ mode, the DTE speed follows the connection speed.

EXAMPLE **AT&B1**
This command instructs the modem to communicate with your computer at a fixed speed, regardless of the connection speed.

&Cn (modifying the carrier detection response)

The &Cn command controls whether the modem attempts to detect the carrier during a connection. (A lost carrier indicates that the connection has been terminated.)

It is recommended that you leave carrier detection on (&C1).

&C0
The carrier is always assumed to be on.

&C1 (the default)
The modem attempts to detect the carrier; the carrier indicator is turned off if the carrier is lost.

EXAMPLE **AT&C1**
This command instructs the modem to continuously check for the carrier signal and to drop the connection if a carrier signal is not present.

Dn (entering a dialing string)

The Dn command causes the modem to dial a telephone number.

n is the telephone number you want to dial. The telephone number can include the characters 0–9; dashes, parentheses, and spaces are ignored.

EXAMPLE **ATD 123-4567**
This command dials the telephone number 123-4567. The space and dash in the telephone number are ignored.

Dialing Modifiers

You can also include a number of dialing modifiers in the ***n*** parameter to change the way dialing is handled. The following dialing modifiers can be used with the Dn command:

! (flash on-hook)
The ! (flash) dialing modifier instructs the modem to go on-hook for one-half second, then back off-hook for one-half second, as if the switch-hook button on the telephone had been pressed and released.

This modifier can be placed anywhere in the dialing string.

EXAMPLE **ATDT!123-4567**
This command instructs the modem to go on-hook and back off-hook, and then use touch-tone dialing to dial the telephone number 123-4567.

@ (wait for quiet answer)

The @ dialing modifier instructs the modem to wait for five seconds of silence after it dials and detects rings. This period of silence, called “quiet answer,” confirms that the call has been answered.

If the five seconds of silence are detected, the modem dials the remaining numbers in the command line. The remaining numbers might be a security code, another telephone number, or an extension.

If ringing does not stop within the number of seconds specified in the S7 register, the modem returns the NO ANSWER result code. (The @ modifier has no effect if the Xn command is set to 0, 1, or 2.)

Rings are detected reliably only when you are calling within the same country.

EXAMPLE **ATD1234567@5555**
This command dials the telephone number 123-4567, waits for the call to be answered, and then dials the extension 5555.

, (pause during dial sequence)

The , dialing modifier instructs the modem to pause for the number of seconds specified by the S8 register.

To increase the pause time, you can use multiple commas or change the value of the S8 register. The default is 2 seconds.

EXAMPLE **ATDT123-4567,,,555**
This command uses touch-tone dialing to dial the telephone number 123-4567. It then pauses for six seconds before dialing the telephone extension 555.

/ (short pause during dial sequence)

The / dialing modifier instructs the modem to pause for 125 milliseconds (one-eighth second).

EXAMPLE **ATDT123-4567//555**
This command uses touch-tone dialing to dial the telephone number 123-4567. It then pauses for one-fourth second before dialing the telephone extension 555.

" (dial an alphabetical phone number)

The " dialing modifier encloses a phone number that is spelled out in letters instead of numbers.

The letters, which can be found on most telephone keypads, correspond to numbers as follows:

2	*A, B, C*	6	*M, N, O*
3	*D, E, F*	7	*P, R, S*
4	*G, H, I*	8	*T, U, V*
5	*J, K, L*	9	*W, X, Y*

EXAMPLE **ATD1-555"GLITTER"**
This command instructs the modem to dial the number 1-555-454-8837.

; (return to command mode after dialing)

The ; dialing modifier instructs the modem to return to command state after dialing a number.

You can use this modifier to issue additional AT commands while remaining off-hook. The semicolon must be placed at the end of the dial command, but can then be followed by other commands.

EXAMPLE **ATD1234567;X1DT,3**
This command instructs the modem to dial the telephone number 123-4567 and then return to command state. Once the modem is in command state, it pauses (indicated by the comma) and then dials the number 3, without checking for a dial tone (X1).

L (redial the last telephone number)

The L dialing modifier instructs the modem to redial the last telephone number dialed.

The L modifier must be placed immediately after the D in the Dn command. The modem ignores any characters placed after the L modifier.

To display the last-dialed number (with a terminal emulation application), use the following command:

ATDL?

EXAMPLE **ATDT1234567**
ATDL
The first command dials the telephone number 123-4567. The second command redials the telephone number.

P (pulse dial)

The P dialing modifier instructs the modem to use pulse dialing.

If you use P between the digits of a telephone number, the digits following P are pulse-dialed.

EXAMPLE **ATDP123-4567**
This command uses pulse dialing to dial the telephone number 123-4567.

R (originate call in answer mode)

The R dialing modifier instructs the modem to originate the call in answer mode, reversing the originate and answer frequencies.

EXAMPLE **ATD1234567R**
This command instructs the modem to dial the number 123-4567 in answer mode.

S=n (dial a stored telephone number)

The S=n dialing modifier instructs the modem to dial the stored telephone number specified by ***n***.

n is the location — 0, 1, 2, or 3 — of one of four telephone numbers that were stored with the &Zn=x command.

EXAMPLE **ATDS=0**
This command uses touch-tone dialing to dial the telephone number stored in the first location.

T (touch-tone dial)

The T dialing modifier instructs the modem to use touch-tone dialing. The tone duration and the time between digits is specified by the S11 register.

EXAMPLE **ATDT123-4567**
This command uses touch-tone dialing to dial the telephone number 123-4567.

W (wait for a dial tone)

The W dialing modifier instructs the modem to wait for a dial tone before sending the next digit in the dialing string.

If the Xn command is set to 0, 1, or 2, the modem interprets the W as a comma, pausing for the number of seconds in the S8 register, instead of waiting for a dial tone.

EXAMPLE **ATDT9W123-4567**
This command instructs the modem to dial 9, then wait for a dial tone before dialing the telephone number 123-4567.

Disabling call waiting

In most of North America, you can disable call waiting for an outgoing call by adding *70W to your dialing string. (The W modifier ensures that the modem waits for a dial tone before dialing the telephone number.)

If you are not in North America, or if *70W does not work, contact your local telephone company for more information.

EXAMPLE **ATDT*70W123-4567**
This command string instructs the modem to disable call waiting, then wait for a dial tone before dialing the telephone number 123-4567.

&Dn (disconnecting using DTR signaling)

The &Dn command specifies what action should be taken when the DTR signal from the computer to the modem switches from ON to OFF. (The most common use for the command is to enable hardware hangups.)

Your modem can use DTR signaling and hardware handshaking at the same time.

&D0 (the default for Macintosh)
The modem ignores the actual DTR state and always assumes DTR is on. This allows operation with computers that don't provide DTR signaling.

&D1
When DTR drops, the modem returns to command mode without disconnecting, as if the +++ escape sequence had been entered.

&D2 (the default for PC)
When DTR drops, the modem hangs up.

&D3
When DTR drops, the modem performs a soft reset (as if the Zn command had been received). The Yn setting determines which profile is loaded.

EXAMPLE **AT&D0**
This command instructs the modem to ignore the DTR state.

En (turning command echo on and off)

The En command controls whether commands that you type are echoed back to your computer while the modem is in command mode.

E0
Disables echoing commands to the computer in command mode.

E1 (the default)
Enables echoing commands to the computer in command mode.

EXAMPLE **ATE1**
This command instructs the modem to echo characters it receives from the computer while in command mode.

Fn (turning data echo on and off)

The Fn command controls whether data that the modem sends is echoed back to your computer while the modem is in on-line mode.

F0
Enables echoing data to the computer in on-line mode.

F1 (the default)
Disables echoing data to the computer in on-line mode.

EXAMPLE **ATF1**
This command instructs the modem not to echo back a copy of any data it transmits in on-line mode.

&Fn (loading a factory configuration)

The &Fn command returns the modem to a set of factory settings.

&F0
Loads generic settings.

&F1 (the default)
Loads settings for use with hardware flow control.

&F2
Loads settings for use with software flow control

EXAMPLE **AT&F1**
This command instructs the modem to restore factory configuration 1 (the recommended factory settings).

&Gn (selecting the guard tone)

The &Gn command determines whether the modem transmits a guard tone when answering.

&G0
Disables guard tones (US default).

&G1
Selects 550 Hz guard tone (used in some parts of Europe).

&G2
Selects 1800 Hz guard tone (used in the United Kingdom).

EXAMPLE **AT&G0**
This command prevents the modem from sending a guard tone when answering. You should use this setting whenever you are in the US.

Hn (disconnecting)

You use the Hn command to place the modem on-hook (hang up) or take the modem off-hook (equivalent to lifting the telephone receiver).

H0
Places the modem on-hook (hangs up).

H1
Takes the modem off-hook and places it in command mode.

EXAMPLE **+++**

ATH0
Suppose that you want to end a connection that you have established with another modem. This example uses the +++ command to enter command mode, then uses H0 to hang up.

&Hn (setting the flow control method for transmission)

You use the &Hn command to select the flow control method used when the modem is transmitting data.

&H0
Disables flow control.

&H1 (the default)
Enables hardware flow control (CTS).

&H2
Enables software flow control (XON/XOFF).

&H3
Enables both hardware and software flow control.

EXAMPLE **AT&H1**
This command sets the modem to its default handshaking setting by enabling hardware flow control (RTS/CTS).

In (displaying information about the modem)

The In command instructs the modem to provide information about itself.

I0
Reports the product code.

I1
Reports OK if ROM checksum is valid; otherwise, reports ERROR.

I2
Reports OK if RAM checksum is valid; otherwise, reports ERROR.

I3
Reports the modem type.

I4
Reports current modem settings.

I5
Reports current settings of non-volatile RAM.

I6
Reports the link diagnostics.

I7
Reports the product configuration.

EXAMPLE **ATI3**
This command instructs the modem to report its modem type.

&In (setting software flow control for receiving data)

You use the &In command to set software flow control when your computer is receiving data.

&I0 (the default)
Disables receive software flow control; the modem will disregard XON/XOFF signals from your computer.

&I1
Enables receive software flow control; the modem will obey XON/XOFF signals from your computer and pass them to the remote modem.

&I2
Enables receive software flow control; the modem will obey XON/XOFF signals from your computer, but will not pass them to the remote modem.

EXAMPLE **AT&I0**
This command instructs the modem to ignore XON and XOFF signals when the modem is receiving data.

&Kn (selecting data-compression settings)

You use the &Kn command to enable or disable data compression.

&K0
Disables all data compression.

&K1 (the default)
Enables automatic negotiation of data compression with the remote modem.

&K2
Requires data compression (reliable mode).

&K3
Disables MNP 5 data compression; allows the modem to negotiate V.42bis compression or MNP 4 (no compression).

EXAMPLE **AT&K1**
This command instructs the modem to attempt to use data compression if the remote modem supports it, and otherwise to make a connection without data compression.

Ln (adjusting the speaker volume)

You use the Ln command to adjust the modem speaker volume. (If you want to turn the modem speaker on or off, see the Mn command.)

The parameter value, if valid, is written to bits 0 and 1 of the S22 register.

L0
Low speaker volume (same as L1).

L1
Low speaker volume (same as L0).

L2 (the default)
Medium speaker volume.

L3
High speaker volume.

EXAMPLE **ATL2**
This command sets the speaker to a moderate volume.

Mn (turning the speaker on or off)

You use the Mn command to turn the modem speaker on or off. (If you want to change the speaker volume, see the Ln command.)

M0
Speaker is always off.

M1 (the default)
Speaker is on until the modem detects a carrier tone.

M2
Speaker is always on.

M3
Speaker is off during dialing, then on until the modem detects a carrier tone.

EXAMPLE **ATM1**
This command instructs the modem to turn on the speaker while a connection is being made, then turn it off for the remainder of the call.

&Nn (setting the connection speed)

You use the &Nn command to set the speed at which the modem will connect to the remote modem.

The setting of the &Un command determines whether &N specifies the top connection speed or the only permitted speed. If &Un is 0, the modem is forced to connect only at the speed set by &Nn; otherwise, &Nn sets the maximum speed, and &Un sets the minimum.

If the modem is unable to connect at the specified maximum speed or less, it hangs up instead of completing the connection.

Command	Maximum speed	Protocol
&N0 (the default)	Allows the modem to connect at the highest speed supported by both modems, without setting a maximum speed.	
&N1	300 bps	
&N2	1200 bps	
&N3	2400 bps	
&N4	4800 bps	V.34 or V.32/V.32bis
&N5	7200 bps	V.34 or V.32/V.32bis
&N6	9600 bps	V.34 or V.32/V.32bis
&N7	12,000 bps	V.34 or V.32/V.32bis
&N8	14,400 bps	V.34, V.FC, or V.32/V.32bis
&N9	16,800 bps	V.34 or V.FC
&N10	19,200 bps	V.34 or V.FC

&N11	21,600 bps	V.34 or V.FC
&N12	24,000 bps	V.34 or V.FC
&N13	26,400 bps	V.34 or V.FC
&N14	28,800 bps	V.34 or V.FC
&N15	31,200 bps	V.34
&N16	33,600 bps	V.34
&N17	33,333 bps	x2
&N18	37,333 bps	x2
&N19	41,333 bps	x2
&N20	42,666 bps	x2
&N21	44,000 bps	x2
&N22	45,333 bps	x2
&N23	46,666 bps	x2
&N24	48,000 bps	x2
&N25	49,333 bps	x2
&N26	50,666 bps	x2
&N27	52,000 bps	x2
&N28	53,333 bps	x2
&N29	54,666 bps	x2
&N30	56,000 bps	x2
&N31	57,333 bps	x2

EXAMPLE **AT&U14&N31**
This command forces the modem to connect at a speed between 28,800 bps and 57,333 bps. If the modem cannot make a connection within this speed range, it hangs up.

On (switching to on-line mode)

The On command returns the modem to the on-line state from the command state.

If the modem is not connected to another modem, the command returns the ERROR result code.

O0
Returns the modem to the on-line state without retraining.

O1
Returns the modem to the on-line state after retraining.

EXAMPLE **AT01**
This command returns the modem to the on-line state and requests retraining.

P (using pulse dialing)

The P command makes pulse dialing the default dialing method.

You can override the P command for a specific dial attempt by adding the T modifier to the dialing string.

EXAMPLE **ATP**
ATD123-4567
This example sets the default dialing method to pulse dialing and then dials the telephone number 123-4567.

&Pn (selecting the pulse mode make/break ratio)

You use the &Pn command to specify the make/break ratio used for pulse dialing.

&P0 (the default)
Make = 39% and Break = 61% at 10 pulses per second (for US and Canada).

&P1
Make = 33% and Break = 67% (for UK, Hong Kong, and Japan).

EXAMPLE **AT&P0**
This command instructs the modem to use the US values for the make/break ratio.

Qn (displaying result codes)

The Qn command determines whether the modem sends a result code back to the computer after performing each AT command. (The format of the result codes is determined by the Vn command.)

Q0 (the default)
Result codes enabled.

Q1
Result codes disabled.

Q2
Result codes enabled in originate mode and disabled in answer mode.

EXAMPLE **ATQ0**
This command sets the modem to display result codes after each AT command.

&Rn (setting hardware flow control for receiving)

You use the &Rn command to select the flow control method used when the modem is receiving data.

&R1 (the default)
Disables receive hardware flow control (the modem ignores the RTS state).

&R2
Enables receive hardware flow control (the modem sends data it receives to your computer only when RTS is high).

EXAMPLE **AT&R1**

This command instructs the modem to send received data to your computer only when the computer indicates (by raising the RTS line) that it is ready to receive.

Sn=x (setting an S-register)

The Sn=x command selects S-register ***n*** and sets it to the value ***x***.

The ***n*** parameter is the number of the S-register.Valid S-registers are numbered from 0 to 42. The ***x*** parameter is the value to which you want to set the S-register, within the range 0–255.

Setting a single bit

You can change one bit of an S-register by specifying, as the ***n*** parameter, the S-register number, a dot (.), and the number of the bit you want to change. The following example clears bit 3 of S-register 15:

```
ATS15.3=0
```

If you are changing a single bit,, the ***x*** parameter is 0 (to clear the bit) or 1 (to set it).

EXAMPLE **ATS0=2**

This command sets the S0 register to the value 2. This instructs the modem to answer a call after the second ring.

Sn? (reading an S-register)

The Sn? command displays the current value of S-register ***n***.

The ***n*** parameter is the number of the S-register, within the range 0–42.

If you attempt to read the value of an S-register that is unreadable, or one that is not implemented in this modem, this command returns an error.

EXAMPLE **ATS0?**

This command instructs the modem to display the value of the S0 register. If the modem is set to answer a call after the third ring, the result of this command string will be “003”.

T (using touch-tone dialing)

The T command makes touch-tone dialing the default dialing method.

You can override the T command for a specific dial attempt by adding the P modifier to the dialing string.

EXAMPLE **ATT**
ATD123-4567
This example sets the default dialing method to touch-tone and then dials the telephone number 123-4567.

&Un (setting the minimum connection speed)

You use the &Un command to set the minimum speed at which the modem will connect to the remote modem. (See also the **&Nn** command.)

If the modem is unable to connect at the specified speed or more, it hangs up instead of completing the connection.

Command	Minimum speed	Protocol
&U0 (the default)	Allows the modem to connect at the highest speed supported by both modems, without setting a minimum speed.	
&U1	300 bps	
&U2	1200 bps	
&U3	2400 bps	
&U4	4800 bps	V.34 or V.32/V.32bis
&U5	7200 bps	V.34 or V.32/V.32bis
&U6	9600 bps	V.34 or V.32/V.32bis
&U7	12,000 bps	V.34 or V.32/V.32bis
&U8	14,400 bps	V.34, V.FC, or V.32/V.32bis
&U9	16,800 bps	V.34 or V.FC
&U10	19,200 bps	V.34 or V.FC
&U11	21,600 bps	V.34 or V.FC
&U12	24,000 bps	V.34 or V.FC
&U13	26,400 bps	V.34 or V.FC
&U14	28,800 bps	V.34 or V.FC
&U15	31,200 bps	V.34
&U16	33,600 bps	V.34
&U17	33,333 bps	x2
&U18	37,333 bps	x2
&U19	41,333 bps	x2
&U20	42,666 bps	x2
&U21	44,000 bps	x2
&U22	45,333 bps	x2
&U23	46,666 bps	x2
&U24	48,000 bps	x2
&U25	49,333 bps	x2
&U26	50,666 bps	x2
&U27	52,000 bps	x2
&U28	53,333 bps	x2
&U29	54,666 bps	x2
&U30	56,000 bps	x2
&U31	57,333 bps	x2

EXAMPLE **AT&U14**
This command forces a speed of at least 28,800 bps. If the modem cannot make a connection that's at least this fast, it hangs up.

Vn (setting the result code format)

The Vn command determines whether result codes are displayed as numbers (numeric form) or words (verbose form).

Result codes in verbose form include “ERROR”, “RING”, “CONNECT”, and “OK”.

V0
Switches to numeric form. (No line feed character is issued following the code.)

V1 (the default)
Switches to verbose form. (A line feed character is issued following the code.)

EXAMPLE **ATV1**
This command instructs the modem to display result codes as words.

&Wn (storing settings for a user profile)

The &Wn command saves the current configuration, including commands and S-register settings, in one of two user profiles.

&W0
Saves the current configuration as User Profile 0 (which can be retrieved with the Y0 command).

&W1
Saves the current configuration as User Profile 1 (which can be retrieved with the Y1 command).

EXAMPLE **AT&W1**
This command instructs the modem to save the current configuration as User Profile 1.

Xn (using extended result codes)

You use the Xn command to set which result codes the modem can return. (See the Result Codes section later in this guide for a list of result codes.) This command also enables or disables busy-tone and dial-tone detection during the dialing process.

(The &A command determines how connection result codes are displayed.)

X0
Enables result codes 0–4; disables busy- and dial-tone detection.

X1 (the default)
Enables result codes 0–5, 10, 13–239; disables busy- and dial-tone detection.

X2
Enables result codes 0–6, 10, 13–239; disables busy-tone detection; enables dial-tone detection.

X3
Enables result codes 0–5, 7–8, 10, 13–239; enables busy-tone detection; disables dial-tone detection.

X4 (the default)
Enables all result codes 0–8, 10–239, busy-tone detection, and dial-tone detection.

X5
Enables result codes 0–5, 7–8, 10, 13–239 and busy-tone detection, and disables dial-tone detection.

X6
Enables all result codes 0–8, 10–239, busy-tone detection, and dial-tone detection.

EXAMPLE **ATX1DT5551212**
This command disables busy-tone and dial-tone detection, enables all result codes, and dials the number 555-1212.

This can be a useful addition to a dial string when the modem is failing to make a connection because it is misinterpreting the ring as a busy tone or not recognizing the dial tone.

Yn (specifying the startup user profile)

The Yn command selects the user profile that will be used after a hard reset. (A hard reset occurs when the modem is powered off and then on again.)

Y0 (the default)
Selects User Profile 0 as the startup profile.

Y1
Selects User Profile 1 as the startup profile.

EXAMPLE **ATY1**
This command instructs the modem to use the settings stored in User Profile 1 when the modem is reset.

&Yn (handling break signals)

The &Yn command determines what the modem does when it receives a break signal from your computer.

&Y0
Clears the modem's data buffers, but does not pass the break signal to the remote modem.

&Y1(the default)
Clears the modem's data buffers and sends a break signal to the remote modem.

&Y2
Sends a break signal to the remote modem, without clearing your modem's data buffers.

EXAMPLE **AT&Y1**
This command instructs the modem to pass break signals it receives to the remote modem and to clear its data buffers when it receives a break signal.

Zn (resetting the modem)

The Zn command instructs the modem to perform a software reset, causing the modem to drop any active connection. After reset, the modem uses the parameter profile specified in the command line, if one is provided.

Z0 (the default)
Resets the modem and loads the user profile selected by the Y command as the active profile.

Z1
Resets the modem and loads saved User Profile 0 as the active profile.

Z2
Resets the modem and loads saved User Profile 1 as the active profile.

Z3
Resets the modem and loads Factory Default Profile 0 as the active profile.

Z4
Resets the modem and loads Factory Default Profile 1 as the active profile.

Z5
Resets the modem and loads Factory Default Profile 2 as the active profile.

EXAMPLE **ATZ0**
This command instructs the modem to reset itself and then use the settings specified by the Y command.

&Zn=x (storing a telephone number)

The &Zn=x command stores a dialing string ***x*** in location ***n***.

&Zn=x must be the last command on the command line. The dialing string is not validated before being saved, so you should be sure that the dialing string contains a valid telephone number.

The location ***n*** at which you want to store the telephone number can be one of the following numbers: 0, 1, 2, 3.

x can be any dialing string with fewer than 36 characters. To store the last dialing string in location ***n***, use the letter L in place of the dialing string, as in the following example:

AT&Z2=L

Stored telephone numbers can be dialed using the Dn command with the S=n modifier.

EXAMPLE **AT&Z0=123-4567**
This command stores the telephone number 123-4567 in the first location (location 0).

&Zn? (reading stored phone numbers)

The &Zn? command displays the dialing string stored at location ***n***. (To see this response, you must be using a terminal emulation application.)

n can be one of the following numbers: 0, 1, 2, or 3.

You use the &Zn=x command to store a dialing string.

EXAMPLE **AT&Z2?**
This command instructs the modem to display the phone number stored in location 2.

&ZL? (displaying the last number dialed)

The &ZL? command displays the last dialing string that was executed with the Dn command. (To see this response, you must be using a terminal emulation application.)

EXAMPLE **AT&ZL?**
This command instructs the modem to display the last-dialed telephone number.

S-Registers

S-registers store configuration options for your modem. You use the Sn=x command to change the value of an S-register, and the Sn? command to see an S-register's current setting.

Some S-registers use each bit of the S-register's value to control a different option. To set a specific bit in an S-register, use the form Sn.m=x, where ***n*** is the number of the S-register, ***m*** is the number of the bit, and ***x*** is either 0 or 1.

Reserved bits are reserved for use by the modem manufacturer. Do not try to change reserved bits; doing so may cause your modem to misbehave.

S0 register (Number of rings before answering)

The S0 register specifies the number of the ring (between 1 and 255) on which the modem automatically answers an incoming call. The default value is 0, which disables automatic answering of incoming calls.

S1 register (Ring count)

The S1 register counts the number of incoming rings. When S0 and S1 are equal, the modem answers the call (unless both registers are set to zero). The S1 register is reset to zero when the modem answers or if no rings occur over a five-second interval.

S2 register (Escape character)

The S2 register specifies the ASCII value of the character used in the escape code sequence. (You use the escape code sequence to return to the command state after creating an active connection with another modem.) The default is S2=43, where 43 is the ASCII value of the + character.

S3 register (Carriage return character)

The S3 register specifies the ASCII value of the character that you send to terminate a command line. The default is S3=13, where 13 is the ASCII value of the Return character.

S4 register (Line feed character)

The S4 register specifies the ASCII value of the character the modem sends after at the end of a result code. (This character is only sent when V1 has been set — that is, when your modem returns a word result code, rather than a number.) The default is S4=10, where 10 is the ASCII value of the line feed character.

S5 register (Backspace character)

The S5 register specifies the ASCII value of the backspace — or delete — character. The default is S5=8, where 8 is the ASCII value of the backspace character. If a value between 128 and 255 is specified, the backspace is nondestructive (does not delete the previous character).

S6 register (Time to wait before blind dialing)

The S6 register specifies the amount of time (in seconds) that the modem should wait between going off-hook and dialing the telephone number of a remote modem. The default is 2.

If Xn is set to 2 or 4, the modem waits the specified time for a dial tone before giving up. Otherwise, the modem "blind dials" — that is, it waits the specified number of seconds and then begins dialing without checking for a dial tone first.

S7 register (Time to wait for carrier)

The S7 register specifies the amount of time (in seconds) that the modem should wait for a carrier signal from a remote modem after dialing. If your modem does not receive a carrier signal within the time limit, it hangs up. The default is 60.

S8 register (Pause time for comma)

The S8 register defines the pause time (in seconds) for the comma dialing modifier. The default is 2.

S9 register (Carrier recovery time)

The S9 register specifies the amount of time (in tenths of a second) that the modem should listen to a remote modem's carrier signal before recognizing it as a valid carrier signal. The default is 6.

If a connection at speeds above 2400 bps is being made, the modem ignores this setting (due to the length of the handshaking sequence for high-speed connections).

S10 register (Lost-carrier hang-up delay)

The S10 register specifies the amount of time (in tenths of a second) that the modem should wait between losing the carrier signal and hanging up. The default is 7.

A setting of 255 disables lost-carrier hang-up and the modem will not hang up even if the connection is lost.

S11 register (Touch-tone dialing speed)

The S11 register specifies the duration (in milliseconds) of dialing tones used in touch-tone dialing. (This register applies only to touch-tone dialing.) The default is 70.

S12 register (Guard time)

The S12 register specifies the maximum time (in fiftieths of a second) between the last data received and the return of the OK result code in response to the escape code sequence. This time, called the guard time, gives the modem time to recognize the escape sequence and determine that it is not data. The default is 50 (one second).

S13 register (General options)

The S14 register indicates the status of command options. The default is 0.

Bit 0
Resets modem if DTR is dropped.

Bit 1
0: Sets non-MNP transmit buffer to 1.5KB.
1: Sets non-MNP transmit buffer to 128 bytes.

Bit 2
Sets backspace key to delete.

Bit 3
Instructs modem to dial the number stored in location 0 when DTR is raised. (You use the &Zn=x command to store telephone numbers.)

Bit 4
Instructs modem to dial the number stored in location 0 when the modem is reset or turned on.

Bit 5
Reserved.

Bit 6
0: Enables quick retrains.
1: Disables quick retrains.

Bit 7
Instructs modem to break the connection on receiving the escape sequence.

S15 register (Error correction options)

The S15 register indicates the status of error correction options. The default is 0.

Bit 0
0: Enables ARQ/MNP for V.22.
1: Disables ARQ/MNP for V.22.

Bit 1
0: Enables ARQ/MNP for V.22bis.
1: Disables ARQ/MNP for V.22bis.

Bit 2
0: Enables ARQ/MNP for V.32, V.32bis, and V.32terbo.
1: Disables ARQ/MNP for V.32, V.32bis, and V.32terbo.

Bit 3
0: Enables MNP handshake.
1: Disables MNP handshake.

Bit 4
0: Enables MNP4.
1: Disables MNP4.

Bit 5
0: Enables MNP3.
1: Disables MNP3.

Bit 6
0: Uses USR-standard MNP5.
1: Uses generic (more widely-compatible) MNP5 protocol.

Bit 7
0: Enables V.42.
1: Disables V.42.

S19 register (Disconnect inactivity timer)
The S19 register sets the length of time, in minutes, that the modem will stay on-line before disconnecting when no data is sent or received. Any data transmitted will reset the timer.

If S19 equals 0, the function is disabled; this is the default setting.

S21 register (Break length)
The S21 register specifies the length, in units of 10 milliseconds) of break signals sent from the modem to your computer. The default setting is 10 (1/10 second).

S22 register (XON character)
The S32 register specifies the ASCII code of the character used for XON signaling. The range of values for this register is 0–255. The default is 17.

S23 register (XOFF character)
The S33 register specifies the ASCII code of the character used for XOFF signaling. The range of values for this register is 0–255. The default is 19.

S25 register (Delay to DTR)
The S25 register sets the length of time that the modem will ignore DTR before taking the action specified by &Dn, in hundredths of seconds for other modes.

The range of values for this S-register is 0–255. The default value is 20.

S27 register (Connection options)
The S27 register indicates the status of connection options. The default is 0.

Bit 0
0: Bell 103 protocol for 300 bps connections.
1: ITU-T V.21 protocol for 300 bps connections.

Bit 1
0: Disables unencoded modulations in V.32 mode.
1: Enables unencoded modulations in V.32 mode.

Bit 2
0: Enables V.32.
1: Disables V.32.

Bit 3
0: Enables 2100 Hz answer tone for V.42.
1: Disables 2100 Hz answer tone for V.42.

Bit 4
0: Disables V.23 fallback mode.
1: Enables V.23 fallback mode.

Bit 5
0: Enables V.32bis.
1: Disables V.32bis.

Bit 6
Reserved.

Bit 7
0: Displays true connection rate for connections above 9600 bps.
1: Displays CONNECT 9600 result code for connections made at higher speeds. Used for compatibility with older software that cannot recognize higher connect speeds.

S28 register (V.32 handshaking time)
The S28 register specifies the length of time, in tenths of a second, for V.32 handshaking. The range of values for this register is 0–255. The default is 8.

Setting S28 to 0 eliminates the V.32 answer tones for a faster connection. Setting this register to 255 forces the modem to connect only with V.32 at 9600 bps.

S29 register (V.21 fallback timer)
The S29 register specifies the length of time, in tenths of a second, for the V.21 answer mode fallback timer. The default is 20.

S32 register (Modulation options)
The S32 register indicates the status of modulation and call control options. The default is 2 (bit 1 on, all others off).

Bit 0
0: Disables V.8 Call Indicate.
1: Enables V.8 Call Indicate.

Bit 1
0: Disables V.8 mode.
1: Enables V.8 mode.

Bit 2
Reserved.

Bit 3
0: Enables V.34.
1: Disables V.34.

Bit 4
0: Enables V.34+.
1: Disables V.34+.

Bit 5
0: Enables x2.
1: Disables x2.

Bits 6, 7
Reserved.

S33 register (V.34 options)
The S33 register indicates the status of options for V.34 and V.34+. The default is 0.

Bit 0
0: Enables 2400 symbol rate.
1: Disables 2400 symbol rate.

Bit 1
0: Enables 2743 symbol rate.
1: Disables 2743 symbol rate.

Bit 2
0: Enables 2800 symbol rate.
1: Disables 2800 symbol rate.

Bit 3
0: Enables 3000 symbol rate.
1: Disables 3000 symbol rate.

Bit 4
0: Enables 3200 symbol rate.
1: Disables 3200 symbol rate.

Bit 5
0: Enables 3429 symbol rate.
1: Disables 3429 symbol rate.

Bit 6
Reserved.

Bit 7
0: Enables shaping.
1: Disables shaping.

S34 register (More V.34 options)
The S34 register indicates the status of additional options for V.34 and V.34+. The default is 0.

Bit 0
0: Enables 8S-2D trellis encoding.
1: Disables 8S-2D trellis encoding.

Bit 1
0: Enables 16S-4D trellis encoding.
1: Disables 16S-4D trellis encoding.

Bit 2
0: Enables 32S-2D trellis encoding.
1: Disables 32S-2D trellis encoding.

Bit 3
0: Enables 64S-4D trellis encoding.
1: Disables 64S-4D trellis encoding.

Bit 4
0: Enables non-linear coding.
1: Disables non-linear coding.

Bit 5
0: Enables TX level deviation.
1: Disables TX level deviation.

Bit 6
0: Enables Pre-emphasis.
1: Disables Pre-emphasis.

Bit 7
0: Enables Pre-coding.
1: Disables Pre-coding.

S38 register (Delay before hangup)

If DTR drops during an ARQ (error-correcting) call but data remains to be transmitted, the modem will attempt to transmit the remaining data before hanging up.

The S38 register specifies the delay the modem will allow between the time DTR drops and the actual disconnection. The default is 0.

S41 register (Distinctive ring Enable)

The S41 register indicates the status of the distinctive ring option. The default is 0 (distinctive ring disabled).

Result Codes

When the modem receives and processes an AT command, it sends a result code to your computer. Telecommunications programs that send AT commands to the modem interpret the result codes to determine whether or not the command was successful.

The modem sends either the number or the phrase corresponding to the result code, depending on the setting of the Vn command. The Xn and &An commands affect which result codes are displayed, and in particular how much detail is provided in the result code when a connection is made.

0 **OK**
The command line executed with no errors.

1 **CONNECT**
A connection has been established.

2 **RING**
A ringing signal has been detected.

3 **NO CARRIER**
The carrier has been lost or was never present.

4 **ERROR**
Invalid command, error in the command line, or command line exceeds 58 characters.

5 **CONNECT 1200**
The connection has been made at 1200 bps.

6 **NO DIALTONE**
No dial tone was detected within the S7 register time limit.

7 **BUSY**
A busy signal has been detected.

8 **NO ANSWER**
Ringing did not stop, indicating that the remote modem did not answer.

10 **CONNECT 2400**
A connection has been made at 2400 bps.

11 **RINGING**
The remote line is ringing.

13 **CONNECT 9600**
A connection has been made at 9600 bps.

14 **CONNECT/ARQ**
An error-correcting connection has been established.

15 **CONNECT 1200/ARQ**
An error-correcting connection has been made at 1200 bps.

16 **CONNECT 2400/ARQ**
An error-correcting connection has been made at 2400 bps.

17 **CONNECT 9600/ARQ**
An error-correcting connection has been made at 9600 bps.

18 **CONNECT 4800**
A connection has been made at 4800 bps.

19 **CONNECT 4800/ARQ**
An error-correcting connection has been made at 4800 bps.

20 **CONNECT 7200**
A connection has been made at 7200 bps.

21 **CONNECT 12000**
A connection has been made at 12,000 bps.

22 **CONNECT 12000/ARQ**
An error-correcting connection has been made at 12,000 bps.

24 **CONNECT 7200/ARQ**
An error-correcting connection has been made at 7200 bps.

25 **CONNECT 14400**
A connection has been made at 14,400 bps.

26 **CONNECT 14400/ARQ**
An error-correcting connection has been made at 14,400 bps.

33 **CONNECT 9600/V32**
A connection has been made at 9600 bps using V.32.

37 **CONNECT 9600/ARQ/V32**
An error-correcting connection has been made at 9600 bps using V.32.

38 **CONNECT 4800/V32**
A connection has been made at 4800 bps using V.32.

39 **CONNECT 4800/ARQ/V32**
An error-correcting connection has been made at 4800 bps using V.32.

40 **CONNECT 7200/V32**
A connection has been made at 7200 bps using V.32.

41 **CONNECT 12000/V32**
A connection has been made at 12,000 bps using V.32.

42 **CONNECT 12000/ARQ/V32**
An error-correcting connection has been made at 12,000 bps using V.32.

43 **CONNECT 16800**
A connection has been made at 16,800 bps.

44 **CONNECT 7200/ARQ/V32**
An error-correcting connection has been made at 7200 bps using V.32.

45 **CONNECT 14400/V32**
A connection has been made at 14,400 bps using V.32.

46 **CONNECT 14400/ARQ/V32**
An error-correcting connection has been made at 14,400 bps using V.32.

47 **CONNECT 16800/ARQ**
An error-correcting connection has been made at 16,800 bps.

85 **CONNECT 19200**
A connection has been made at 19,200 bps.

88 **CONNECT 19200/ARQ**
An error-correcting connection has been made at 19,200 bps.

91 CONNECT 21600
A connection has been made at 21,600 bps.

94 CONNECT 21600/ARQ
An error-correcting connection has been made at 21,600 bps.

97 CONNECT 21600/VFC
A connection has been made at 21,600 bps using V.FC.

98 CONNECT 21600/ARQ/VFC
An error-correcting connection has been made at 21,600 bps using V.FC.

99 CONNECT 24000
A connection has been made at 24,000 bps.

100 CONNECT 24000/ARQ
An error-correcting connection has been made at 24,000 bps.

101 CONNECT 24000/VFC
A connection has been made at 24,000 bps using V.FC.

102 CONNECT 24000/ARQ/VFC
An error-correcting connection has been made at 24,000 bps using V.FC.

103 CONNECT 26400
A connection has been made at 26,400 bps.

104 CONNECT 26400/ARQ
An error-correcting connection has been made at 26,400 bps.

105 CONNECT 26400/VFC
A connection has been made at 26,400 bps using V.FC.

106 CONNECT 26400/ARQ/VFC
An error-correcting connection has been made at 26,400 bps using V.FC.

107 CONNECT 28800
A connection has been made at 28,800 bps.

108 CONNECT 28800/ARQ
An error-correcting connection has been made at 28,800 bps.

109 CONNECT 28800/VFC
A connection has been made at 28,800 bps using V.FC.

110 CONNECT 28800/ARQ/VFC
An error-correcting connection has been made at 28,800 bps using V.FC.

111 CONNECT 21600/V34
A connection has been made at 21,600 bps using V.34.

112 CONNECT 21600/ARQ/V34
An error-correcting connection has been made at 21,600 bps using V.34.

113 CONNECT 24000/V34
A connection has been made at 24,000 bps using V.34.

114 CONNECT 24000/ARQ/V34
An error-correcting connection has been made at 24,000 bps using V.34.

115 CONNECT 26400/V34
A connection has been made at 26,400 bps using V.34.

116 CONNECT 26400/ARQ/V34
An error-correcting connection has been made at 26,400 bps using V.34.

117 CONNECT 28800/V34
A connection has been made at 28,800 bps using V.34.

118 CONNECT 28800/ARQ/V34
An error-correcting connection has been made at 28,800 bps using V.34.

120 CONNECT 2400/V34
A connection has been made at 2400 bps using V.34.

122 CONNECT 2400/ARQ/V34
An error-correcting connection has been made at 2400 bps using V.34.

124 CONNECT 4800/V34
A connection has been made at 4800 bps using V.34.

126 CONNECT 4800/ARQ/V34
An error-correcting connection has been made at 4800 bps using V.34.

128 CONNECT 7200/V34
A connection has been made at 7200 bps using V.34.

130 CONNECT 7200/ARQ/V34
An error-correcting connection has been made at 7200 bps using V.34.

132 CONNECT 9600/V34
A connection has been made at 9600 bps using V.34.

134 CONNECT 9600/ARQ/V34
An error-correcting connection has been made at 9600 bps using V.34.

136 CONNECT 12000/V34
A connection has been made at 12,000 bps using V.34.

138 CONNECT 12000/ARQ/V34
An error-correcting connection has been made at 12,000 bps using V.34.

139 CONNECT 14400/VFC
A connection has been made at 14,400 bps using V.FC.

140 CONNECT 14400/V34
A connection has been made at 14,400 bps using V.34.

141 CONNECT 14400/ARQ/VFC
An error-correcting connection has been made at 14,400 bps using V.FC.

142 CONNECT 14400/ARQ/V34
An error-correcting connection has been made at 14,400 bps using V.34.

143 CONNECT 16800/VFC
A connection has been made at 16,800 bps using V.FC.

144 CONNECT 16800/V34
A connection has been made at 16,800 bps using V.34.

145 CONNECT 16800/ARQ/VFC
An error-correcting connection has been made at 16,800 bps using V.FC.

146 CONNECT 16800/ARQ/V34
An error-correcting connection has been made at 16,800 bps using V.34.

147 CONNECT 19200/VFC
A connection has been made at 19,200 bps using V.FC.

148 CONNECT 19200/V34
A connection has been made at 19,200 bps using V.34.

149 CONNECT 19200/ARQ/VFC
An error-correcting connection has been made at 19,200 bps using V.FC.

150 CONNECT 19200/ARQ/V34
An error-correcting connection has been made at 19,200 bps using V.34.

151 CONNECT 31200
A connection has been made at 31,200 bps.

152 CONNECT 31200/ARQ
An error-correcting connection has been made at 31,200 bps.

153 CONNECT 31200/V34
A connection has been made at 31,200 bps using V.34.

154 CONNECT 31200/ARQ/V34
An error-correcting connection has been made at 31,200 bps using V.34.

155 CONNECT 33600
A connection has been made at 33,600 bps.

156 CONNECT 33600/ARQ
An error-correcting connection has been made at 33,600 bps.

157 CONNECT 33600/V34
A connection has been made at 33,600 bps using V.34.

158 CONNECT 33600/ARQ/V34
An error-correcting connection has been made at 33,600 bps using V.34.

180 CONNECT 32000
A connection has been made at 32,000 bps.

181 CONNECT 32000/ARQ
An error-correcting connection has been made at 32,000 bps.

182 CONNECT 32000/x2
A connection has been made at 32,000 bps using x2.

183 CONNECT 32000/ARQ/x2
An error-correcting connection has been made at 32,000 bps using x2.

184 CONNECT 36000
A connection has been made at 36,000 bps.

185 CONNECT 36000/ARQ
An error-correcting connection has been made at 36,000 bps.

186 CONNECT 36000/x2
A connection has been made at 36,000 bps using x2.

187 CONNECT 36000/ARQ/x2
An error-correcting connection has been made at 36,000 bps using x2.

188 CONNECT 40000
A connection has been made at 40,000 bps.

189 CONNECT 40000/ARQ
An error-correcting connection has been made at 40,000 bps.

190 CONNECT 40000/x2
A connection has been made at 40,000 bps using x2.

191 CONNECT 40000/ARQ/x2
An error-correcting connection has been made at 40,000 bps using x2.

192 CONNECT 44000
A connection has been made at 44,000 bps.

193 CONNECT 44000/ARQ
An error-correcting connection has been made at 44,000 bps.

194 CONNECT 44000/x2
A connection has been made at 44,000 bps using x2.

195 CONNECT 44000/ARQ/x2
An error-correcting connection has been made at 44,000 bps using x2.

196 CONNECT 48000
A connection has been made at 48,000 bps.

197 CONNECT 48000/ARQ
An error-correcting connection has been made at 48,000 bps.

198 CONNECT 48000/x2
A connection has been made at 48,000 bps using x2.

199 CONNECT 48000/ARQ/x2
An error-correcting connection has been made at 48,000 bps using x2.

200 CONNECT 49333
A connection has been made at 49,333 bps.

201 CONNECT 49333/ARQ
An error-correcting connection has been made at 49,333 bps.

202 CONNECT 49333/x2
A connection has been made at 49,333 bps using x2.

203 CONNECT 49333/ARQ/x2
An error-correcting connection has been made at 49,333 bps using x2.

204 CONNECT 50666
A connection has been made at 50,666 bps.

205 CONNECT 50666/ARQ
An error-correcting connection has been made at 50,666 bps.

206 CONNECT 50666/x2
A connection has been made at 50,666 bps using x2.

207 CONNECT 50666/ARQ/x2
An error-correcting connection has been made at 50,666 bps using x2.

208 CONNECT 52000
A connection has been made at 52,000 bps.

209 CONNECT 52000/ARQ
An error-correcting connection has been made at 52,000 bps.

210 CONNECT 52000/x2
A connection has been made at 52,000 bps using x2.

211 CONNECT 52000/ARQ/x2
An error-correcting connection has been made at 52,000 bps using x2.

212 CONNECT 53333
A connection has been made at 53,333 bps.

213 CONNECT 53333/ARQ
An error-correcting connection has been made at 53,333 bps.

214 CONNECT 53333/x2
A connection has been made at 53,333 bps using x2.

215 CONNECT 53333/ARQ/x2
An error-correcting connection has been made at 53,333 bps using x2.

216 CONNECT 54666
A connection has been made at 53,666 bps.

217 CONNECT 54666/ARQ
An error-correcting connection has been made at 54,666 bps.

218 CONNECT 54666/x2
A connection has been made at 54,666 bps using x2.

219 CONNECT 54666/ARQ/x2
An error-correcting connection has been made at 54,666 bps using x2.

220 CONNECT 56000
A connection has been made at 56,000 bps.

221 CONNECT 56000/ARQ
An error-correcting connection has been made at 56,000 bps.

222 CONNECT 56000/x2
A connection has been made at 56,000 bps using x2.

223 CONNECT 56000/ARQ/x2
An error-correcting connection has been made at 56,000 bps using x2.

224 CONNECT 57333
A connection has been made at 57,333 bps.

225 CONNECT 57333/ARQ
An error-correcting connection has been made at 57,333 bps.

226 CONNECT 57333/x2
A connection has been made at 57,333 bps using x2.

227 CONNECT 57333/ARQ/x2
An error-correcting connection has been made at 57,333 bps using x2.

228 CONNECT 58666
A connection has been made at 58,666 bps.

229 CONNECT 58666/ARQ
An error-correcting connection has been made at 58,666 bps.

230 CONNECT 58666/x2
A connection has been made at 58,666 bps using x2.

231 CONNECT 58666/ARQ/x2
An error-correcting connection has been made at 58,666 bps using x2.

232 CONNECT 60000
A connection has been made at 60,000 bps.

233 CONNECT 60000/ARQ
An error-correcting connection has been made at 60,000 bps.

234 CONNECT 60000/x2
A connection has been made at 60,000 bps using x2.

235 CONNECT 60000/ARQ/x2
An error-correcting connection has been made at 60,000 bps using x2.

236 CONNECT 61333
A connection has been made at 61,333 bps.

237 CONNECT 61333/ARQ
An error-correcting connection has been made at 61,333 bps.

238 CONNECT 61333/x2
A connection has been made at 61,333 bps using x2.

239 CONNECT 61333/ARQ/x2
An error-correcting connection has been made at 61,333 bps using x2.

Glossary

ARQ protocol

ARQ is an error-correction protocol, providing a standard way of correcting errors that can occur as data is transmitted or received.

asynchronous & synchronous modes

Two connected modems can communicate in either asynchronous or synchronous mode.

In asynchronous mode, both modems can send data at the same time and pause at any time. To ensure that data is not lost, extra bits — called start and stop bits — are used to frame each character sent.

In synchronous mode, only one modem can send data at a time. The modem sends a continuous stream and does not stop until it is finished; the other modem cannot send until the first modem is finished. No extra bits are used to frame characters.

Bell protocols

Bell 103 and Bell 212 are communications protocols that provide a US standard for communicating at specific speeds.

Bell 103 can be used for communicating at 300 bps.

Bell 212 can be used for communicating at 1200 bps.

bps (bits per second)

Bits per second (bps) is a measure of the speed of a connection, expressed as the number of bits that can be transferred per second. The higher the number, the faster the connection.

break signal

A break signal is a pause in the data flow that lasts longer than the amount of time required to send one character (including its start and stop bits).

calling tone

A calling tone is a high-pitched, intermittent sound that can be produced by a modem that is originating a data call.

Some international telephone agencies require that your modem emit a calling tone so that a person answering your modem's call can immediately identify your modem as a machine and not a human caller.

carrier

The carrier is the telephone line signal used to transfer data between two connected modems. The sound you hear through the modem's speaker when it connects is the carrier signal.

CCITT

The CCITT (International Telegraph and Telephone Consultative Committee) is an international organization which studies telecommunications technology and recommends international telecommunications standards. (See **ITU**.)

command mode

In command mode, the modem interprets data from the computer as AT commands, instead of transmitting the data to the remote modem.

When you first open a telecommunications application, the modem is automatically placed in command mode.

When you establish a connection with another modem, your modem switches to on-line mode. Before entering an AT command, you must use the +++ command to return the modem to command mode.

data compression

Data compression is the process by which data is reduced in size when it is sent from your computer to your modem, and then expanded to its original size by the receiving modem. Since the transmitted data has been compressed, it takes less time to send.

DCE (Data Communication Equipment)

Data Communication Equipment (DCE) is the modem connected to your computer.

The DCE speed is the speed of data transfer between the modem and the telephone line. The DCE speed is also called the line speed.

DTE (Data Terminal Equipment)

Data Terminal Equipment (DTE) is the computer to which your modem is connected.

The DTE speed is the speed of data transfer between your computer and your modem.

DTR (Data Terminal Ready)

A Data Terminal Ready (DTR) signal is sent by the computer to the modem to indicate that the computer (the “data terminal”) is ready to communicate with the modem.

DTR can also be used for other purposes, such as signaling the modem to hang up the phone (called “hardware hangup”).

echoing

When the modem is in command mode, it can transmit characters it receives back to the computer. This is called command echoing. For example, if you enter a modem command in a telecommunications application, your keystrokes appear in the application window if echoing is turned on.

When the modem is in on-line mode and transmitting data to another modem, it can also send a copy back to your computer. This is called data echoing.

You use the En command to turn command echoing on and off, and the Fn command to turn data echoing on and off.

error correction

Error correction is the process by which errors that occur during data transfer are detected and, if possible, corrected.

Modems use error-correction protocols to correct errors. These protocols monitor the received data and request the retransmission of faulty data.

guard tone

A guard tone is a tone emitted by the modem when it detects a carrier.

Different countries use guard tones of different frequencies. For instance, the default guard tone for the United Kingdom is 1800 Hz.

handshaking

Handshaking is a method of controlling the speed of data transfer by signaling when each side of the connection is ready to receive data. This ensures that both sides can keep up and no data is lost.

In hardware handshaking, the modem and computer exchange RTS and CTS signals over the connecting cable. In software handshaking, the modem and computer exchange XON and XOFF characters to start and stop data transfer.

ITU

The ITU (International Telecommunications Union), formerly known as CCITT, is an international organization which studies telecommunications technology and recommends international telecommunications standards. These standards enable different devices from different manufacturers to communicate with each other.

make/break ratio

The make/break ratio is used in pulse dialing. It specifies the ratio of off-hook (make) time to on-hook (break) time for each pulse. You use the &Pn command to set the make/break ratio.

Phone systems in different countries require different make/break ratios.

MNP 4 protocol

MNP 4 is an error-correction protocol, providing a standard way of correcting errors that can occur as data is transmitted or received.

MNP 4 provides less efficient error correction than V.42.

MNP 5 protocol

MNP 5 is an error-correction and data-compression protocol, providing a standard way of correcting errors in transmitted data and of compressing data for transmission in order to save transfer time.

MNP 5 provides less efficient error correction and data compression than V.42bis.

off-hook

When a modem goes off-hook, it claims the telephone line to which it is connected. Taking a modem off-hook is equivalent to picking up a telephone to make or answer a call.

on-hook

When a modem goes on-hook, it releases the telephone line to which it is connected, freeing the telephone line for other uses. This action, which is equivalent to hanging up a telephone, terminates the current data connection.

on-line mode

In on-line mode, data sent from the computer to the modem is transmitted to the remote modem, instead of being interpreted as AT commands.

When you establish a connection with another modem, the modem is automatically placed in on-line mode.

parameter

A parameter is an additional value that you must provide along with a command.

For example, in the Hn command, the letter ***n*** stands for a parameter whose value can be either 0 or 1. You type the actual command as either "H0" or "H1".

Most AT commands require at least one parameter, denoted in command descriptions by the letter ***n***. When you enter an AT command, you must substitute a valid parameter value for ***n***. (A few commands require a second parameter, denoted by ***x***.)

pulse dialing

Pulse dialing is a method of dialing in which the modem sends a set of pulses for each number (one pulse for the number 1, two pulses for 2, and so on).

result codes

A result code is a message the modem sends to the computer, indicating the result of an AT command or the status of a connection. If a telecommunications application is active on your computer, the result code appears on your screen.

Result codes are reported either as numbers (numeric) or as words (verbose). You use the Vn command to switch between these modes.

RTS (Request to Send) & CTS (Clear to Send)

Request to Send (RTS) and Clear to Send (CTS) are hardware-handshaking signals.

The computer sends a Request to Send (RTS) signal to the modem to determine whether the modem is ready to receive data. When the modem is ready to receive data, it sends a Clear to Send (CTS) signal to the computer.

space

A space is a long period of silence encountered during a modem connection.

S-registers

S-registers are memory locations in the modem where modem settings are stored.

You use the Sn=x command to change the setting in an S-register.

touch-tone dialing

Touch-tone dialing is a method of dialing in which each character (0–9, *, #, A, B, C, D) is represented by a different tone.

V.21 protocol

V.21 is a communications protocol that provides a standard way of transferring data at 300 bps.

V.22 protocol

V.22 is a communications protocol that provides a standard way of transferring data at 1200 bps.

V.22bis protocol

V.22bis is a communications protocol that provides a standard way of transferring data at 1200 bps or 2400 bps.

V.32 protocol

V.32 is a communications protocol that provides a standard way of transferring data at 4800 bps or 9600 bps.

V.32bis protocol

V.32bis is a communications protocol that provides a standard way of transferring data at speeds of 4800 bps to 14,400 bps.

V.34 protocol

V.34 is an error-correction and data-compression protocol that provides a standard way of transferring data at speeds of 2400 bps to 28,800 bps.

As an error-correction protocol, V.34 provides a standard way of correcting errors that can occur as data is transmitted or received. As a data-compression protocol, V.34 provides a standard way of compressing data before it is transmitted and decompressing data before it is received.

V.34 annex 12 protocol

V.34 annex 12 is a communications protocol that provides a standard way of transferring data at speeds of 2400 bps to 33,600 bps.

V.42 protocol

V.42 is an error-correction protocol that provides a standard way of correcting errors that can occur as data is transmitted or received. V.42 provides more efficient error correction than MNP 4.

V.42bis protocol

V.42bis is an error-correction and data-compression protocol.

As an error-correction protocol, V.42bis provides a standard way of correcting errors that can occur as data is transmitted or received. As a data-compression protocol, V.42bis provides a standard way of compressing data before it is transmitted and decompressing data after it is received.

V.42bis provides more efficient error correction and data compression than MNP 5.

V.FC protocol

V.FC is a communications protocol that provides a standard way of transmitting and receiving data at 14,400 bps to 28,800 bps.

x2 protocol

X2 is a communications protocol that provides a standard way of transferring data at speeds from 32,000 bps to 61,333 bps.

XON & XOFF

XON and XOFF are characters used in software handshaking.

When the computer is ready to receive data, it sends an XON character. To request a pause in the data flow, it sends XOFF.