Dialing and Answering with the AT Command Set

This chapter describes your modem's command and communications modes, and
the guidelines you need to follow to manually give your modem commands.

To send commands to your modem, you must be running a communications
program.

Switching From The Communications To The Command Mode

Escape Code

The escape code is a code you send to your modem to make it switch from
the communications mode (where you can communicate with a remote service)
to the command mode where you can issue commands to your modem). The
escape code is a single character you send three times, surrounded by a
designated period of time. When you switch modes, the modem does not
disconnect from the phone line. It merely suspends the transfer of
information.

The default escape code sequence is:

    Wait at least 1 second without typing a character.

    Type: +++

    Wait at least 1 second for the modem to acknowledge.

Your modem acknowledges by sending OK (or 0 if you turn
off word result codes - see "Command Results").

The reason for the 1 second wait before and after sending the escape code
is to prevent accidentally switching modes. If you type anything within 1
second (the escape code guard time) of the escape code, your modem ignores
the escape code.

You can change the values of the escape code (default is +) and the escape
code guard time (default is 1 second). Refer to "Internal Modem Registers,"
Registers S2 and S12, to change the default values.

Command Syntax

Attention

All commands (except repeat last command) must begin with
the letters AT. AT is short for "Attention." You can enter
AT and all other commands in either upper- or lower-case.

Repeat Last Command (A/)

This command repeats the last command line. You do not
precede this command with AT, and you do not press [ENTER]
after the command. This is very useful for redialing a
number.

Line Length Limits

You can type one or more commands after the AT. Your modem
performs the commands in the order given. The combination
of commands you give cannot exceed 42 characters. Your
modem does not count control characters and spaces, but it
does count punctuation marks such as dashes or commas.

Carriage Return

[ENTER] denotes a carriage return. This ends the command;
your modem does not process the command until it sees
[ENTER].

Line Editing

After you enter a command (before you press [ENTER] you can
edit the command using the backspace key, which deletes the
last character you entered.

Note: If you backspace over a space, your modem ignores the
       space and erases the next character. In this case, your
       computer does not display the command properly. Also, you
       cannot backspace over the "AT" at the beginning of a command
       line.

Parameters

Most commands consist of a single letter followed by a
single-digit parameter, or option. If you do not follow the
command with a parameter, your modem assumes a parameter
of 0.

Example Commands

The following are two examples of valid modem commands.

     AT X4 V1 DT (408) 555-3438 [ENTER]
     ATXVDT4085553438 [ENTER]

Note that you do not need to enter any spaces. But, spaces
make the command easier to read although, as noted earlier,
harder to edit).

Command Results

After you enter the command, your modem executes the command
line and returns a result code after processing the line.
Your modem can express this result code as a word or a
number. Also, you can select which result codes your modem uses, and
even turn result codes on and off. The V, X, and Q commands
control these options, and are discussed later in this
chapter.

The result codes and their meanings are given in the chart
below.

Number	Word	Description
0	OK	The modem successfully processed the command line.
1	CONNECT	The computer is communicating with the modem at 300 bps.
2	RING	The phone is ringing.
3	NO CARRIER	Carrier not detected within time limit, or carrier lost.
4	ERROR	The modem could not process the command line (entry error).
5	CONNECT 1200	The computer is communicating with the modem at 1200 bps.
6	NO DIALTONE	The modem could not detect a dial tone when dialing.
7	BUSY	Modem detected a busy signal.
8	NO ANSWER	Modem never detected silence (@ command only).
9	Not Used	
10	CONNECT 2400	The computer is communicating with the modem at 2400 bps.
12	CONNECT 9600	The computer is communicating with the modem at 9600 bps.
40	CARRIER 300	The modem detected a 300 bps carrier.
46	CARRIER 1200	The modem detected a 1200 bps carrier.
47	CARRIER 2400	The modem detected a 2400 bps carrier.
66	COMPRESSION: CLASS 5	The modem has established an error-corrected link using MNP-5 data compression.
67	COMPRESSION: V.42BIS	The modem has established an error-corrected link using V.42BIS data compression.
69	COMPRESSION: NONE	No data compression protocol established.
70	PROTOCOL:NONE	No error-corrected link established.

77	PROTOCOL:LAPM	An error-corrected V.42LAP-M link has been established.
80	PROTOCOL:ALT	An error-corrected MNP link has been established with the remote modem.

Transmission Speed

When you want to communicate at the highest possible speed,
set your communications software for 9600 bps. When you
connect to another computer either by dialing or auto-answer,
your modem connects at the other computer's highest
speed not greater than the AT command speed, then returns a
CONNECT result code. The CONNECT result code reports the
speed at which your computer communicates internally to the
modem. If you set the W command to 1, the modem also
returns the CARRIER result code and returns the result of
protocol negotiation. The CARRIER result codes report the
speed at which your modem communicates across the phone
line to the other computer's modem. The protocol
negotiation result codes tell you which error-correction and
data compression methods were established, if any.

To force the computer to use a speed slower than 2400 bps,
set your communications software to the slower speed. Since
data compression (using either MNP or V.42bis) can give your
modem an effective speed faster than 2400 bps, a setting of
9600 bps is usually best.

Data Compression and Error Correction

Your modem tries to establish an error-corrected, compressed
communications channel with the remote modem. However, the
remote modem must support these features. There are several
reasons you might want to disable data compression or error
correction. These are:

*   The modem fails to establish communications with the
     remote computer.

*   The instructions for the remote service direct you to
     turn off these features.

Send the following commands to the modem, either by
including them in your communication software's modem
initialization string option or by directly sending the
command to the modem (see your communications software's
user's guide).

     &Q6 Turn off data compression and error correction.

     %C   Turn off only data compression.

     &Q5 Turn on data compression and error correction.

You must issue the command before dialing and connecting to
the remote service.

Dialing Command and Options

This section describes the dialing command and its options.

Note: Registers S6 through S11 control the timing of the
        dialing commands. Refer to Internal Modem Registers" for
        complete information about these registers.

Dial Command (D)

D is the dial command. You can enter several other
associated commands as part of a dial sequence. In its
simplest form, you follow the dial command with the number
you want the number modem to dial.

Command Line: AT D (817) 555-8900 [ENTER]
Explanation: The modem dials 817-555-8900.

Note: Your modem ignores the spaces, the parenthesis, and
        the "-".

Your modem dials the number and waits 30 seconds (default)
for a response from the called modem. If your modem does
not hear another modem, it returns a NO CARRIER or BUSY
result code. Otherwise, it returns a CONNECT and CARRIER
result code.

Pause(,)

A comma in the dial sequence tells your modem to pause two
seconds, then continue. You might want to use this if you
dial from a system where you have to access an outside line,
then dial the outside number.

Command Line: AT D 9, 555-8912 [ENTER]
Explanation: Dial 9, pause for 2 seconds, then dial 555-
8912.

Note: You can use more than one comma to increase the pause
        time, or change the time by setting Register S8.

Wait for Dial Tone (W)

A W in the dial sequence tells your modem to wait for a dial
tone. You could use this if you use an alternate long-
distance carrier, or if you dial from a system that
requires an access code for a long-distance number:

Command Line: AT D 23 W555-1893 [ENTER]
Explanation: Dial 23, wait for a dial tone, dial 555-
                1893.

The X command and the contents of Register S7 determine how
long the modem waits for the dial tone. If you set X2 or
X4, your modem waits for 5 seconds. Otherwise, your modem
waits for the time set by Register S7. If your modem does

not hear a dial tone within the specified time, it returns
NO DIALTONE.

Wait for Silence (@)

An @ in the dial sequence causes your modem to wait for 5
seconds of silence after one or more rings. You could use
this if you dial a long-distance service that does not
produce a second dial tone. Your modem waits the length of
time specified in Register S7 (default 30 seconds) for the
period of silence. If the modem does not detect silence, it
returns the NO ANSWER or BUSY result code.

Command Line: AT DT 555-1212@23 [ENTER]
Explanation: Dial 555-1212, wait for silence, dial 23.

Hookswitch Flash(!)

An (!) causes the modem to perform a flash. This makes the
modem hang up the phone line for about 1/2 second (like
pressing and releasing the switchhook on your telephone).
Some phone systems use this function to transfer calls.

Command Line: AT DT 555-3439! [ENTER]
Explanation: Dial 555-3439, flash.

Touch Tone Dialing (T)
Pulse Dialing (P)

The T and P dial modifiers select the dialing method your
modem uses. Your modem defaults to using pulse dialing.
You could use this to use alternate long-distance services
from a pulse-dial line.

Command Line: AT D 9 WT 555-2322 [ENTER]
Explanation: Dial 9 pulse mode, wait for a dial tone,
                dial 555-2322 in tone mode.

Your modem dials using the last method used, so, in the
above example, any additional dial commands use touch tone
unless you specify pulse.

Return to Command Mode (;)

A ; in the dial sequence tells your modem to return to the
command mode as soon as it finishes dialing. The modem does
not try to detect a carrier. As soon as you send the modem
any character, it disconnects from the phone line. You
would use this command when you use the modem to dial a
voice call.

Command Line: AT D 555-8373; [ENTER]
Explanation: Dial 555-8373.

Repeat Last Dial String (L)

At D L [ENTER] tells the modem to repeat the last dial

string.

Calling Tone (^)

Used primarily outside the U.S., the ^ modifier makes the
modem sound a 1300 Hz tone periodically until a remote modem
establishes communications.

Dialed Stored Number (S=n)

Dials the string you have stored in dialing memory n (n can
be a number from 0-3). Use the &Z command to store the dial
string. See "Advanced Programming Commands."

Command Line: AT D S=1 [ENTER]
Explanation: Dial the dial string in dialing memory 1.

Auto-Dialing Voice Calls

You can have your modem dial any telephone number, even if a
computer is not connected to the other phone. Lift your
telephone handset, send the dialing command, and listen for
the other party to answer. At any time after the dialing
stops, you can press any key to disconnect your modem and
proceed with your conversation.

Command Line: AT DT 555-1281; [ENTER]
Explanation: Dial 555-1281. When the person answers,
                press any key to disconnect the modem.

Auto Answer Operation

You can set your modem to automatically answer calls. This
is useful if you need to access your computer from another
computer. As set at the factory, the modem does not
automatically answer calls. You control the auto answer
feature using register S0. This register determines the
number of rings before your modem answers. If you set the
register to O (default) the modem does not automatically
answer the phone. Otherwise, the modem waits the number of
rings you specify (1-255).

     AT S0=1 [ENTER] The modem answers after one ring.

     AT S0=5 [ENTER] The modem answers after five rings.

     AT S0=23 [ENTER] The modem answers after 23 rings.

Note: Registers S0,S7, and S9 control the answer mode
       timing. See "internal Modem Registers."

After the modem answers, it sends an answer tone and waits
for an original tone. If the modem hears an originate tone,
it returns a CONNECT result code to the computer it is
connected to.

If the modem does not detect the carrier in 30 seconds, it

returns a NO CARRIER result code, hangs up, and returns to
the command state.

If your telephone rings when auto answer is disabled, your
modem returns a RING result code and does not answer. Use
the Immediate Answer command (A) to have your modem pick up
the phone line.

Immediate Answer (A)

You can force your modem to pick up the phone line, even if
the phone does not ring. You might use this feature if you
called someone on a voice line, then wanted to switch to
communication with their computer, or if your telephone
rings and you want your modem to answer. To do so, enter
the immediate answer command.

Command Line: AT A [ENTER]
Explanation: Your modem immediately picks up the phone
                line and sends an answer tone over the line.

If you are switching from a voice call to a data call, the
other party must send AT D [ENTER] to their modem.

Note: In some situations, the AT D command will generate a
       NO DIAL-TONE error message. In the case above, the call has
       already been completed, so the switching system (which
       generates the dialtone) is already off the line. Similarly,
       if two modems are connected directly ("Back-to-back") with a
       phone cord, no dialtone will be detected. In such cases use
       the prefix X3 with the AT D command:

Command Line: AT X3D (ENTER)

Explanation: The X3 prefix causes the modem to ignore the
                absence of a dialtone.

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