Your modem can run several advanced self tests using the &T command to
perform these tests. Under normal use, you should never need to use these
functions. But you might be instructed by a technician to run one of these
tests if you have difficulty accessing another computer by modem.

The following chart summarizes the available tests:

Command   Function

&T0   Stops test in progress.
&T1   Start Local Analog Loopback Test.
&T3   Start Local Digital Loopback.
&T4   Enable Remote Digital Loopback Request.
&T5   Disable Remote Digital Loopback Request.
&T6*   Start Remote Digital Loopback Test.
&T7*   Start Remote Digital Loopback Test with automatic test pattern
            generation/checking.
&T8*   Start Local Analog Loopback Test with automatic test pattern
            generation/checking.

* Not available at 300 baud.

Test Timer:

Register S18 controls how many seconds any test runs. You can set this
register to any value from 0 to 255. If you set the value to 0 (default),
your modem performs the test until you manually halt the test with the
&T0 command.

To change the setting, enter AT S18=n <ENTER> where n=1-255.

&T0: Halt Test:

AT &T0 <ENTER> halts any test in progress. If your modem is running a remote
test with another modem, or if it is running an analog loopback test, you
must first enter the escape (+++) to enter the command mode. Examples of
using &T0 are included with each test.

&T1: Local Analog Loopback Test:

The local analog loopback test is the first test you should run if you think
your modem is not operating correctly. This test checks your computer's
communications port and your modem. This does not send information over the
phone line, so you do not need to dial another computer first.

To perform the test:

1. In your modem's command mode, type: AT &T1 <ENTER>
2. Now type. Everything you type should appear on the screen.
3. If you have not set the test timer, to end the test, enter: +++

Your modem responds with: OK

Then type: AT &T0 <ENTER>

Your modem again responds: OK

The test stops.

Otherwise, the test stops automatically after the timer elapses.

If what you typed appeared on the screen, you know that your modem and your computer are communicating with each other properly.

If there is a problem:

1. Before performing this test, unplug the phone line.
2. If you do not see anything on your computer screen or if you see incorrect characters when you type, be sure you have set your communications software to the correct port (default com 2) and speed (1200 or 2400 baud).
3. If you still have problems, contact your local Radio Shack store for further assistance or repair.

&T3: Remote Digital Loopback Test:

This tests a remote modem. You use this test with modems that do not themselves have a digital loopback test feature. This command makes your modem loopback (echo) everything it receives from a remote modem. You must be communicating with the other system when you start this test.

To run this test:

1. Escape to the command mode by typing +++
2. To start the test, type: AT &T3 <ENTER>
3. Now, everything the other computer sends loops back without ever displaying on your computer's screen.
4. If you have not set the test timer, stop the test by typing:
   AT &T0 <ENTER>.

Otherwise, your modem stops the test automatically when the test timer elapses.

Since this tests the remote modem, the person at that modem must determine whether their modem is operating, and take appropriate action.

&T4: Enable Remote Digital Loopback:

This commands your modem to respond to a request for a remote digital loopback test (&T6 or &T7 from the other modem). This feature is enabled by default, so you need only enter this command if you have disabled the feature with the &T5 command.

&T5: Disable Remote Digital Loopback:

This commands your modem to ignore any request for a remote digital loopback test.

&T6: Request Remote Digital Loopback:

This commands your modem to request a remote digital loopback test from the remote modem. You must be communicating with another system to use this

command, and the other system's modem must support remote digital loopback tests and have its remote digital loopback test enabled (&T4).

To perform this test:

1. Escape to the command mode by typing: +++

Your modem responds with: OK

2. To start the test, type: AT &T6 <ENTER>

If the remote modem does not support this test, or if the remote modem has this feature disabled, your modem responds with: ERROR

Otherwise, the test is underway.

3. Type anything. As you type, the characters are sent to the remote modem, then the loop back to your system. So, everything you type should appear on your computer.

4. If you have not set the test timer, to stop the test type: +++

Your modem responds with: OK

Then type: AT &T0 <ENTER>

The test stops.

If what you typed appears on your screen exactly as you typed it, your computer, your modem, the telephone line, and the remote modem are all working properly.

If there is a problem:

1. Be sure you have dialed and connected to the remote system.
2. Pick up an extension phone and confirm that you can hear the tones indicating a connection.
3. If the message does not come through, or if it comes back garbled, you might be having telephone line problems. Or, you might not have your communications program set to the correct baud rate.
4. If you cannot resolve the problem, contact your local Radio Shack store for assistance or service.

&T7: Request Remote Digital Loopback Test with Pattern Generation/Checking:

This test is like the &T6 command, but your modem automatically generates a test pattern and compares what it receives with what it sends, so you do not have to type a test message.

To run this test:

1. Connect to a remote system, then escape to the command mode by typing: +++

Your modem responds with: OK

2. To start the test, type: AT &T7 <ENTER>
3. If you have not set the test timer, to end the test type: AT &T0 <ENTER>

Otherwise, wait for the test timer to expire.

If everything is operating correctly, your modem responds with: 000 OK

If your modem responds with a number other than 000, this indicates how many errors your modem detected during the test. For example, 023 indicates your modem detected 23 errors. 255 indicates your modem detected 255 or more errors.

It is normal for you to occasionally get errors. If the number of errors is excessive, you might have connected through a noisy telephone line. If the number of errors is consistently high with different systems, you might have a problem with your modem.

&T8: Local Analog Loopback Test with Pattern Generation/Checking:

This commands your modem to test its internal functions. If automatically loops information through itself, and keeps track of any errors.

You should not have dialed another system when you run this test.

To run the test:

1. In your modem's command mode, type: AT &T <ENTER>

2. If you have not set the test timer, to stop the test type: AT &T0 <ENTER>

Otherwise, the test stops when the test timer expires.

Your modem responds with: 000 OK

If your modem responds with a number other than 000, this indicates how many errors your modem detected during the test. For example, 023 indicates your modem detected 23 errors. 255 indicates your modem detected 255 or more errors.

You might get occasional errors with this test, but they should not occur consistently. If you receive many errors on more than one occasion, contact your local Radio Shack store for assistance or service.

Advanced Programming Commands:

Repeating Commands:

To repeat the last command, enter A/. Do not enter AT before this command, and do not combine this command with any other.

Commands with Parameters:

Some of the commands have parameters. The parameter value, usually 0, 1, or 2, follows the command. When you do not select a command parameter, the modem assumes a value of 0. For example, command echo is disabled when you use the E command to select a parameter value of 0. Command echo is enabled when you designate a parameter value of 1. E used alone is the same as E0.

COMMAND	PARAMETERS	FUNCTION	

B	0	Selects CCITT V.22 operation when communicating at 1200 bps.
	1 (Default)	Selects BELL 212A operation when communicating at 1200 bps.
E	0	Commands are not echoed.
	1 (Default)	Commands are echoed.
H	0 (Default)	On hook (hang up).
	1	Go off hook.
I	0	Requests product identification code.
	1	Performs checksum on firmware ROM; returns checksum.
	2	Performs checksum on firmware ROM; return OK or ERROR.
	3	Performs firmware manufacturer identification and checksum.
	4	Reports product capabilities.
L	0	Low speaker volume.
	1	Low speaker volume.
	2 (Default)	Medium speaker volume.
	3	High speaker volume.
M	0	Speaker off.
	1 (Default)	Speaker on until carrier detected.
	2	Speaker always on.
	3	Speaker on until carrier detected, except during dialing.
O	0	Return to on-line state from command mode.
	1	Return to on-line state and retrain.
Q	0 (Default)	Modem returns result codes.
	1	Modem does not return result codes.
V	0	Numeric result codes.
	1 (Default)	Word result codes.
X	0	Result code Set 0.
	1	Result code Set 1.
	2	Result code Set 2.
	3	Result code Set 3.
	4 (Default)	Result code Set 4.
Y	0 (Default)	Long space disconnect disabled.
	1	Long space disconnect enabled.
Z	0 (Default)	Recall stored profile 0.
	1	Recall stored profile 1.

Bn   BELL/CCITT V.22 Mode Select:

```
        B0                      CITT V.22 operation at 1200 bps
        B1                      BELL 212A operation at 1200 bps (default)
```

Most 1200 bps modems in the United States operate using the BELL 212A
specification. To communicate with a 1200 bps modem conforming to the
international CCITT V.22 standard, enter B0 before dialing.

```
En      Echo Back Characters in Command Mode:
        E0                      no characters echoed back to the computer in
                                command mode.
        E1                      echoes back characters to the computer typed
                                in command mode (default)
```

This command controls the echoing back of commands to your computer. In most
personal computer applications, the default E1 is used so that you can see
what you just typed. When running in half-duplex mode, you should use the E0
command to avoid having two copies of each character displayed on the screen.

```
Hn      Activate Switch-Hook:
        H0                      go on hook (hang up) (default)
        H1                      go off hook (pick up the phone)
```

This command makes the modem pick up or hang up the phone in the same way as
a telephone handset is picked up to answer a call or placed back on the
switch hook to terminate a call.

You can use H0 to terminate a call.

```
In      Request Product Code and Rom Checksum:
        I0                      display product code
        I1                      display ROM checksum
        I2                      display ROM checksum as OK or ERROR
```

You use this command as a diagnostic tool when troubleshooting the modem.

```
Ln      Speaker Loudness:
        L0                      Low speaker volume
        L1                      Low speaker volume
        L2                      Medium speaker volume (default)
        L3                      High speaker volume
```

This command controls the volume of your modems built-in speaker.

```
Mn      Monitor Speaker Commands:
        M0                      speaker always off
        M1                      speaker on until carrier detected (default)
        M2                      speaker always on
        M3                      disables speaker while dialing and when
                                receiving  carrier
```

You use the M commands to control the speaker in your computer when you use
the modem. M0 turns the speaker off at all times. M1 lets you hear dial, ring,
and connection. The M2 command turns on the speaker at all times, which might
be useful in debugging transmission problems. M3 lets you monitor just the
ring and connection process.

```
On      Place Modem in the On-Line Data Mode:
```

```
        O0                      modem returns to on-line state
        O1                      modem returns to on-line state and initiates
                                an equalizer retrain sequence
```

When connected to another modem, you might need to go back into command mode
(using +++) to give the modem a command. After you complete the commands, an
AT0 or AT01 command returns the modem to the on-line condition.

Note: Retraining lets two 2400 bps modems resynchronize themselves. The modem
accomplish this by outputting a signal sequence which consists of a 0011
pattern. Depending on the parity/data bit configuration you are using at the
time, the retrain patterns are displayed as question marks or up arrows.

```
Qn          QUIET COMMAND
            Q0                      result codes sent (default)
            Q1                      no result codes sent
```

You use the Q commands to enable or disable result codes (such as OK,
CONNECT2400, ERROR, and so on). In the Q0 default mode the modem returns
result codes. In Q1 mode, the modem does not send result codes.

```
Vn          Verbal Result Codes:
            V0                      selects numeric result codes
            V1                      selects verbal result codes (default)
```

See "Command Results" for a list of command result codes.

```
Xn          Select Extended Result Code Set:
```

By using the X commands, you can enable and disable the following modem
functions: no dialtone detect, busy detect, blink dial capability, and send
only the CONNECT message. Refer to the table below.

X Command Functions:

Function	X0	X1	X2	X3	X4 (default)
Busy detected	No	No	No	Yes	Yes
Dial tone detected	No	No	Yes	No	Yes
Connect message only	Yes	No	No	No	No
Blind dial enabled	Yes	Yes	No	Yes	No

Sending only the CONNECT message complies with Hayes Smart-Modem 300
compatibility. When you select X1 through X4 the modem returns the full range
of connect messages.

When blind dialing, the modem dials regardless of the presence or absence of a
dial tone. The modem waits the number of seconds determined by Register S6,
which has a default of 2 seconds.

When you enable X2 or X4 the modem monitors the line for a dial tone instead
of blind dialing. The dial tone must last at least 2 seconds. If the modem
does not detect a dial tone (or not enough dial tone time) within 5 seconds,
it cancels the call and returns the NO DIALTONE result code.

```
Yn          Long Space Disconnect Option:
```

```
          Y0                         Long Space Disconnect Disabled (Default)
          Y1                         Long Space Disconnect Enabled
```

This option affects how your modem treats breaks in the carrier signal. If you enable this option, then your modem disconnects from the phone line whenever it loses the carrier.

```
Zn        Recall Stored Profile:
          Z0                         Recall stored profile 0 (Default)
          Z1                         Recall stored profile 1
```

Zn makes the modem load modem settings you stored using the &W0 command. You must wait at least 2 seconds after you send this command before you send another command. Your modem ignores any commands you place after the Z command on the command line.

Command	Parameters	Function
&C	0 (Default) 1	DCD (Data Carrier Detect) always on. DCD on indicates presence of data carrier.
&D	0 (Default) 1 2 3	Modem ignores DTR (Data Terminal Ready). Modem assumes command mode when on-to-off transition is detected on DTR. When on-line with a host system, modem goes on-hook and assumes command mode upon detecting an on-to-off transition on DTR. Modem initializes upon detecting an on-to-off transition on DTR.
&F	None	Resets the modem to the factory default values for all S registers and commands.
&G	0 (Default) 1 2	No guard tone. 550 Hz guard tone. 1800 Hz guard tone.
&J	0 (Default) 1	Selects dialup line. Selects leased line.
&P	0 (Default) 1	Pulse dial make:break ratio 39:61 (USA). Pulse dial make:break ratio 33:67 (UK/HK).
&R	0 (Default) 1	CTS follows RTS. CTS true when modem in data mode.
&S	0 (Default) 1	DSR (Data Set Ready) always on. DSR operates in accordance with EIA.
&T		See "Modem Test Commands"
&V		Display active ans stored profiles.
&W	0 (Default) 1	Store active profile as profile 0. Store active profile as profile 1.
&Y	0 (Default)	Select profile 0 on power up.

	1	Select profile 1 on power up.
&Z		Store telephone number in location 0 (default), 1, or 2. See details for example

(dtc-07/28/93)
(smm 08/25/93)