



<b>PRIORITY:</b>	Normal
<b>DATE:</b>	August 26, 2004
<b>TITLE:</b>	US Robotics 56k modem setup for AlphaEclipse and Alpha signs
<b>ECO REFERENCE:</b>	n/a
<b>PRODUCT(S) AFFECTED:</b>	AlphaEclipse and Alpha signs. See "Alpha and AlphaEclipse sign data formats" on page 13 for a list of signs.
<b>SUMMARY:</b>	<p>These instructions show how to set up a US Robotics V.90 or V.92 56K Faxmodem as either a transmitting or a receiving modem in order to send messages to signs. This TechMemo replaces TechMemo #01-0011 and #97-0012.</p> <ul style="list-style-type: none"><li>• For AlphaEclipse sign modem setup, see page 1.</li><li>• For Alpha sign modem setup, see page 5.</li></ul>

## Modems covered in this TechMemo



US Robotics V.90 56K Faxmodem



US Robotics V.92 56K Faxmodem

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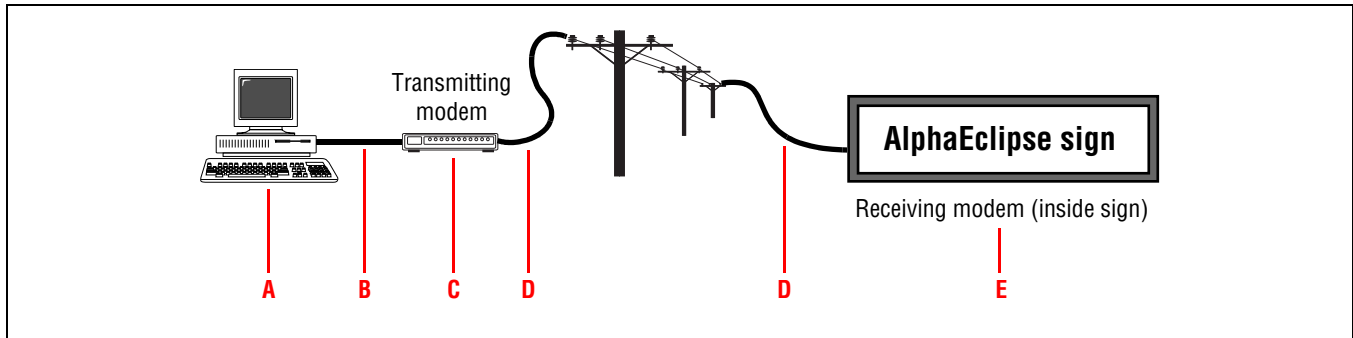
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# AlphaEclipse outdoor sign modem setup

## Overview



Item	Part #	Description
A	—	Computer running AlphaNET software (version 3.0 or greater).
B	—	Modem-to-computer DB9-to-DB25 cable (included with modem). A Belkin F2L088-06 6-foot DB9-to-DB25 cable can also be used.
C	1088-9301	Transmitting modem.
D	—	Phone line.
E	1088-9301	Receiving modem.

## Transmitting modem setup for AlphaEclipse outdoor signs

1. Set the DIP switches on the back of the modem to the following:

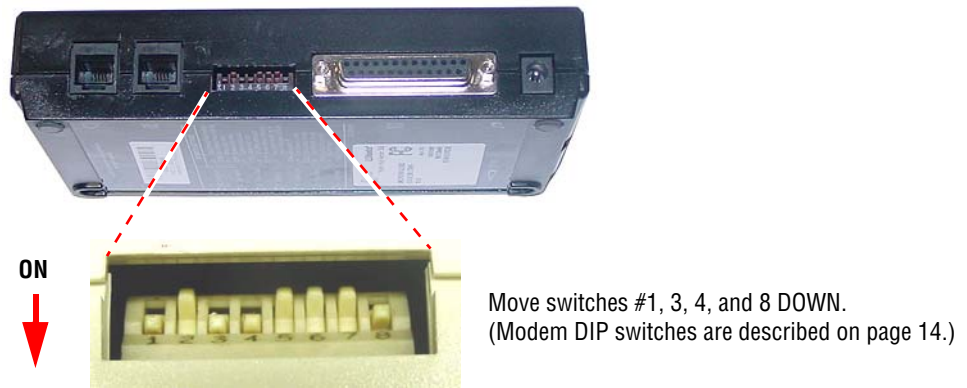


Figure 1: US Robotics 56K modem DIP switch settings

2. Attach the transmitting modem to a computer that has AlphaNET version 3 or greater software installed.

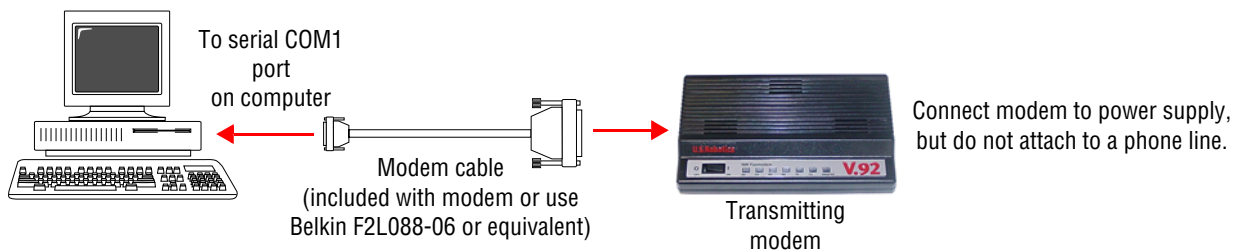
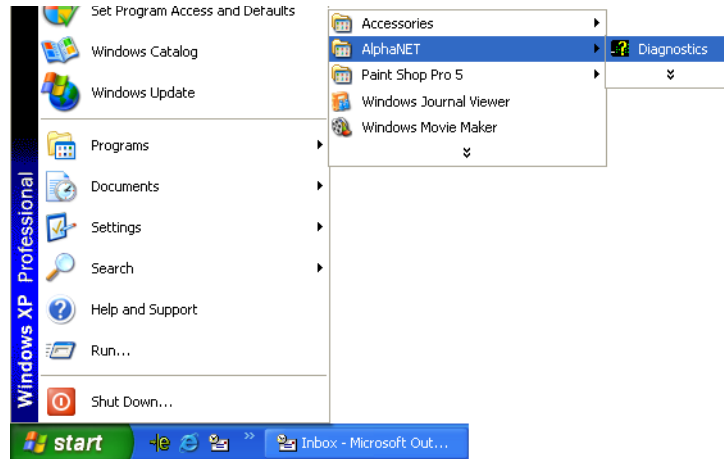


Figure 2: Modem-to-computer connection

3. Start AlphaNET Diagnostics software:



4. When the Diagnostics screen appears, click *Modem*. Then make the following selections:

*Com Port Connected to Modem* = the computer COM port where the modem is connected.

*Baud Rate* = 9600.

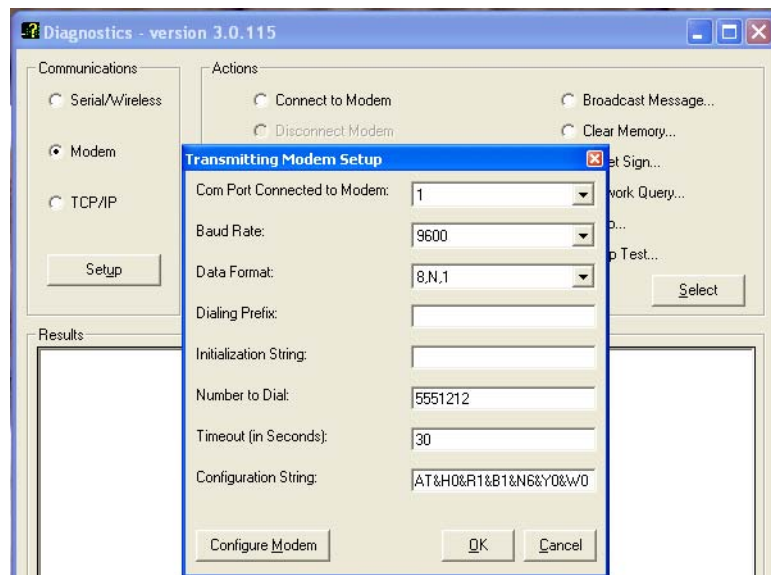
*Data Format* = 8,N,1.

*Dialing Prefix* = if a number, like 9, is needed to get to an outside phone line, enter the number here.

*Number to Dial* = the receiving modem's phone number.

*Timeout (in Seconds)* = 30

*Configuration String* = AT&H0&R1&B1&N6&Y0&W0 (see "Modem setup configuration string" on page 24 for more information)



**Figure 3: AlphaNET modem setup**

5. Click *Configure Modem*. One of the following two messages will appear:

- *Modem Configured Properly* — The transmitting modem is ready for use. It can now be connected to a phone line. If the *receiving* modem inside the sign has been set up and connected to a phone line, go to "Modem test" on page 7. Otherwise, go to "Receiving modem setup for AlphaEclipse outdoor signs" on page 4.
- *Modem Failed To Configure* — Make sure that the modem is on and is connected to the correct COM port on the computer. Repeat step 4, but this time watch the RD and SD lights on the modem. These lights should flash when you click *Configure Modem*. If the "Modem Configured Properly" message still does not appear, contact Adaptive Technical Support (800-719-2838).

## Receiving modem setup for AlphaEclipse outdoor signs

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The receiving modem inside a sign was set up at the factory. However, if you are having problems sending messages to the sign and suspect the receiving modem, follow these steps:

1. Remove power from the sign.



2. Remove the receiving modem from the sign. (See “Related documentation” on page 13 for information on a specific sign type.)

NOTE: If your transmitting and receiving modems are the *same* model, then you can attach the receiving modem to the transmitting modem’s power supply. Otherwise, also remove the receiving modem’s power supply from the sign.

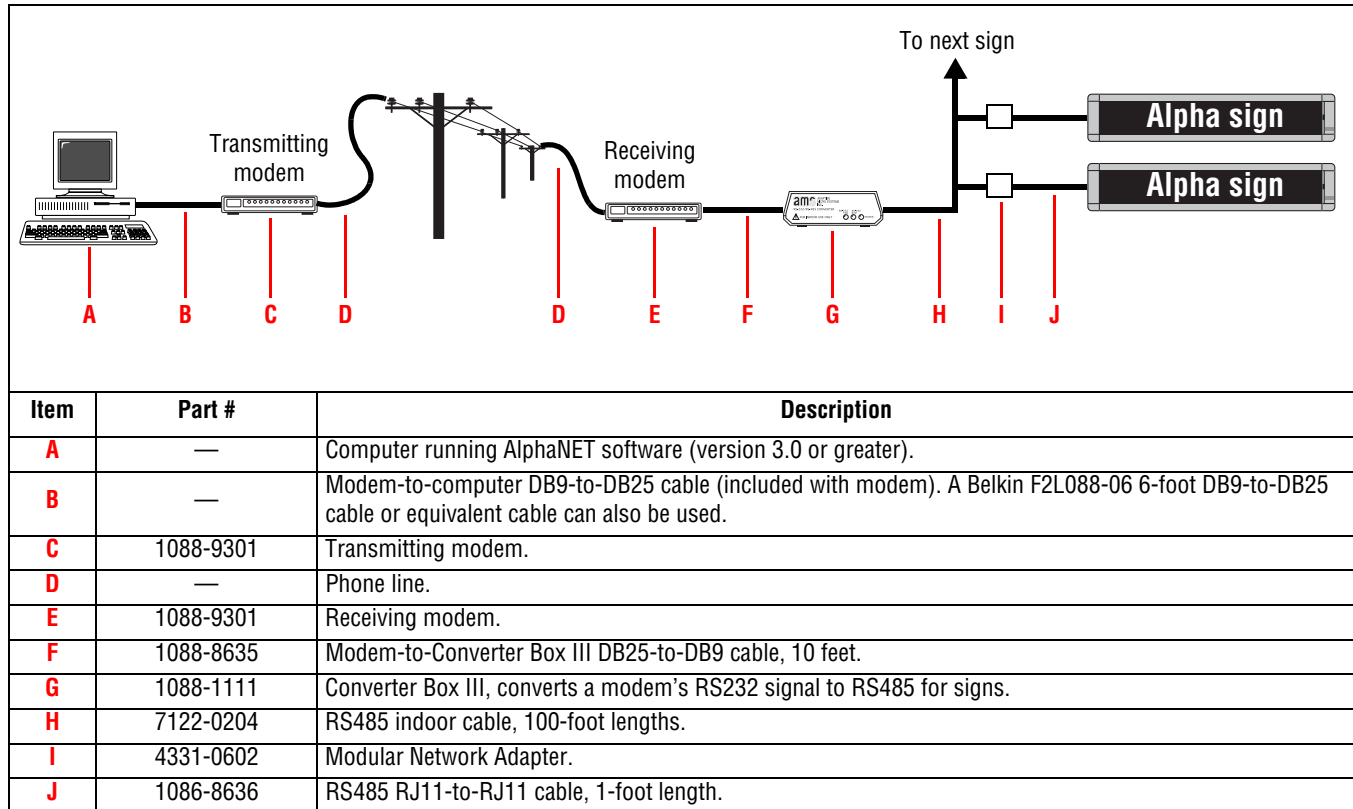
3. Set the receiving modem DIP switches (see Figure 1 on page 2).
4. Connect the receiving modem to a computer (see Figure 2 on page 2).
5. Configure the receiving modem as shown in Figure 3 on page 3.

NOTE: For the receiving modem, it is *not* necessary to enter a phone number after *Number To Dial*.

6. Click *Configure Modem*. One of the following two messages will appear:
  - *Modem Configured Properly* — The receiving modem is ready for use. It can now be put back into the sign. If the *transmitting* modem has been set up and connected to a phone line, go to “Modem test” on page 7. Otherwise, go to “Transmitting modem setup for AlphaEclipse outdoor signs” on page 2.
  - *Modem Failed To Configure* — Make sure that the modem is on and is connected to the correct COM port on the computer. Repeat step 4, but this time watch the RD and SD lights on the modem. These lights should flash when you click *Configure Modem*. If the “Modem Configured Properly” message still does not appear, contact Adaptive Technical Support (800-719-2838).

## Alpha indoor sign modem setup

### Overview



### Transmitting modem setup for Alpha signs

1. Set the DIP switches on the back of the transmitting modem as shown in Figure 1 on page 2.
2. Attach the transmitting modem to a computer that has AlphaNET version 3 or greater software installed (see Figure 2 on page 2).
3. Start AlphaNET Diagnostics software.
4. When the Diagnostics screen appears, click *Modem*. Then make the selections as shown in Figure 3 on page 3.
5. Click *Configure Modem*. One of the following two messages will appear:
  - *Modem Configured Properly* — The transmitting modem is ready for use. It can now be connected to a phone line. If the *receiving* modem has been set up and connected to a phone line, go to “Modem test” on page 7. Otherwise, go to “Receiving modem setup for Alpha indoor signs” on page 6.
  - *Modem Failed To Configure* — Make sure that the modem is on and is connected to the correct COM port on the computer. Repeat step 4, but this time watch the RD and SD lights on the modem. These lights should flash when you click *Configure Modem*. If the “Modem Configured Properly” message still does not appear, contact Adaptive Technical Support (800-719-2838).

## Receiving modem setup for Alpha indoor signs

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1. Set the DIP switches on the back of the receiving modem as shown in Figure 1 on page 2.
2. Attach the receiving modem to a computer that has AlphaNET version 3 or greater software installed (see Figure 2 on page 2).
3. Start AlphaNET Diagnostics software.
4. When the Diagnostics screen appears, click *Modem*. Then make the selections as shown in Figure 3 on page 3.
5. Click *Configure Modem*. One of the following two messages will appear:
  - *Modem Configured Properly* — The receiving modem is ready for use. It can now be connected to a phone line. If the *transmitting* modem has been set up and connected to a phone line, go to “Modem test” on page 7. Otherwise, go to “Transmitting modem setup for Alpha signs” on page 5.
  - *Modem Failed To Configure* — Make sure that the modem is on and is connected to the correct COM port on the computer. Repeat step 4, but this time watch the RD and SD lights on the modem. These lights should flash when you click *Configure Modem*. If the “Modem Configured Properly” message still does not appear, contact Adaptive Technical Support (800-719-2838).

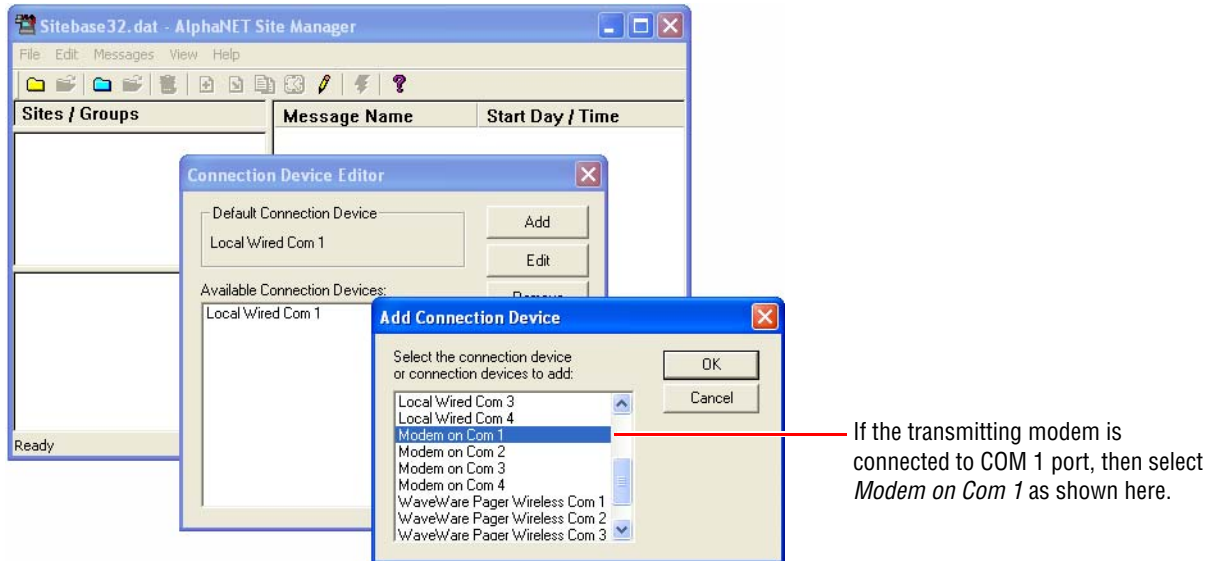
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## Modem test

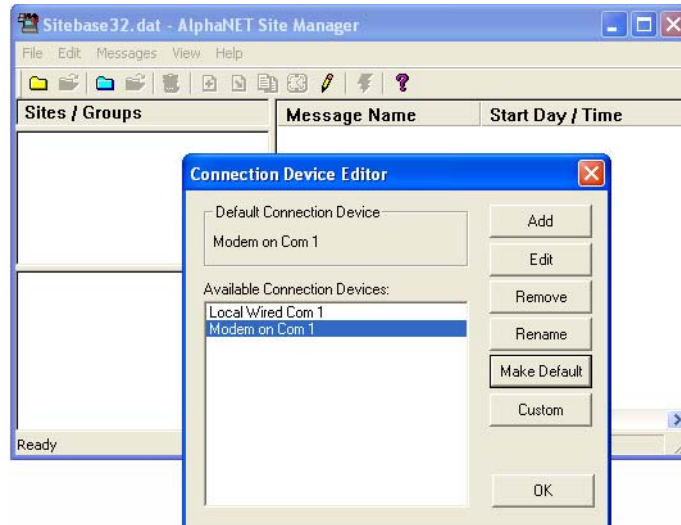
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The following procedure tests to see if the transmitting and receiving modems are working correctly.

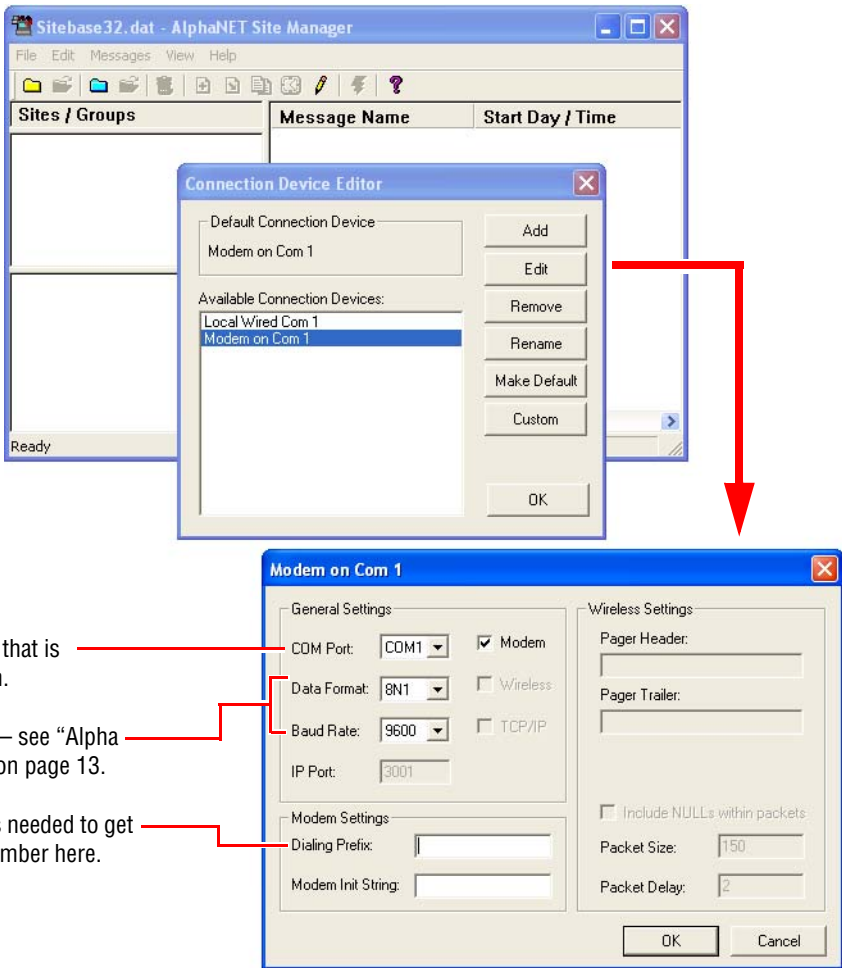
1. Start AlphaNET Site Manager software and click *Edit > Connection Device > Add*. Then select the appropriate connection device for the transmitting modem attached to your computer and click *OK*:



2. Select *Modem on Com 1* and click *Make Default*.



3. Click *Edit* and set up the modem device as shown below:



The screenshot shows the 'Sitebase32.dat - AlphaNET Site Manager' application window. A 'Connection Device Editor' dialog box is open, showing 'Modem on Com 1' as the default connection device. Below it, 'Available Connection Devices' includes 'Local Wired Com 1' and 'Modem on Com 1'. A red arrow points from the 'Modem on Com 1' entry in the list to the 'Modem on Com 1' dialog box. This dialog box has several sections: 'General Settings' with 'COM Port' set to 'COM1', 'Data Format' set to '8N1', and 'Baud Rate' set to '9600'; 'Modem Settings' with 'Dialing Prefix' and 'Modem Init String' fields; and 'Wireless Settings' with 'Modem', 'Wireless', and 'TCP/IP' checkboxes, and 'Packet Size' and 'Packet Delay' fields. Red lines connect text instructions to these specific fields.

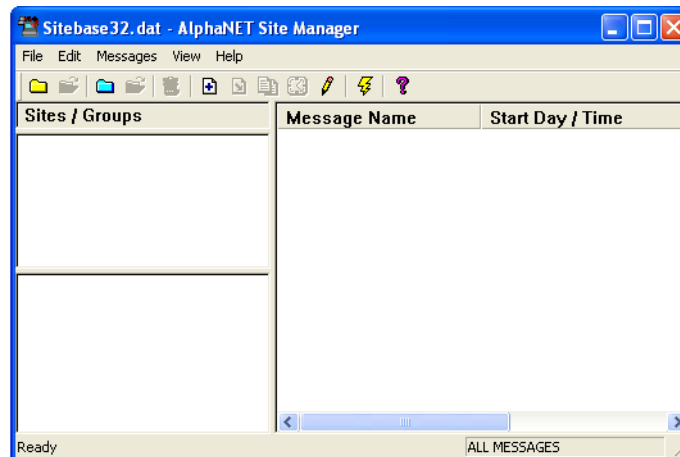
Set *COM Port* = to the computer port that is connected to the transmitting modem.

Select a *Data format* and *Baud Rate* — see “Alpha and AlphaEclipse sign data formats” on page 13.

*Dialing Prefix* — if a number, like 9, is needed to get to an outside phone line, enter the number here.

Figure 4: Modem connection device setup

4. Click *OK* until just the Site Manager screen appears:





5. From the Site Manager screen, click *File > New Site*. Set up the new site as shown below. Then click *OK*:

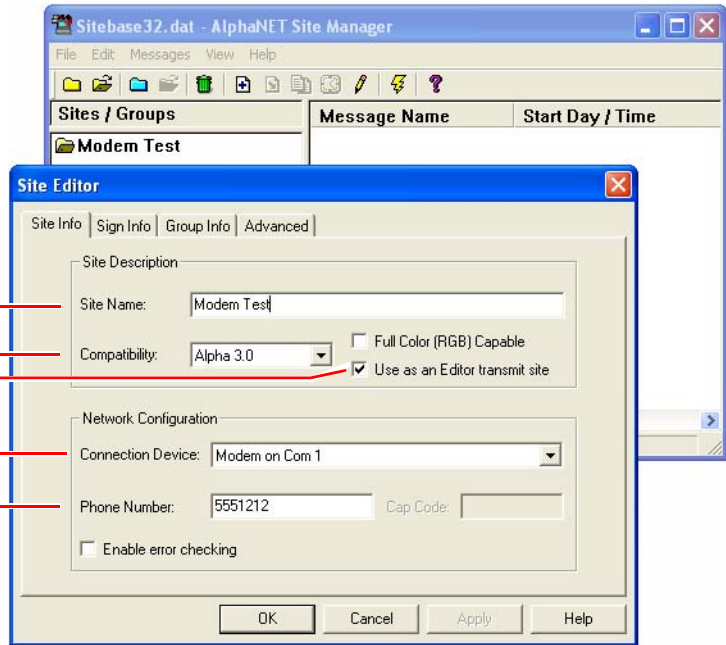
*Site Name* — name this new site  
*Modem Test*.

*Compatibility* — see “Alpha and  
AlphaEclipse sign data formats” on  
page 13.

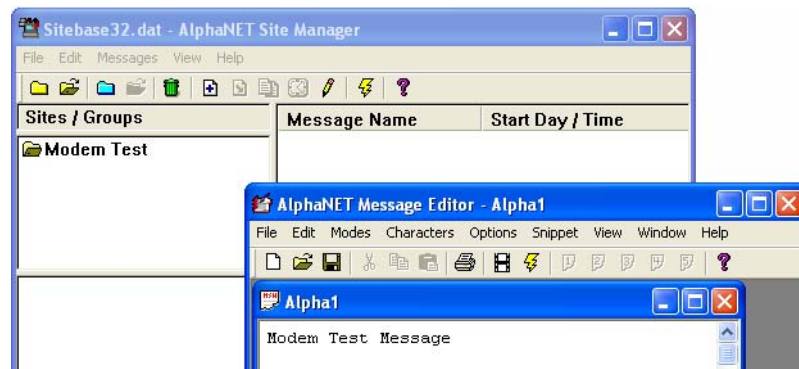
*Use an Editor transmit site* — check  
this.

*Connection Device* = the modem  
connection device you previously  
created.

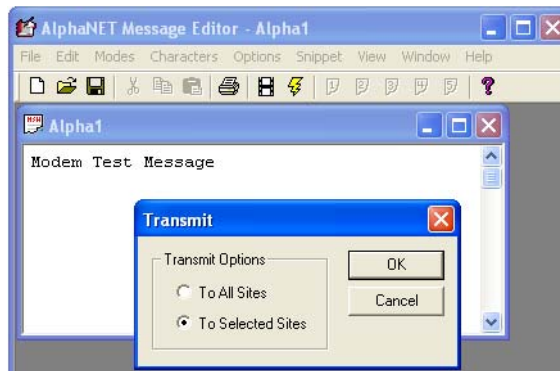
*Phone Number* — the telephone  
number of the receiving modem. This  
can include “9” and an area code if  
necessary.



6. With the *Modem Test* site selected, click *Messages > Edit*. Then type a short message in the AlphaNET Message Editor window that appears:



7. Send the test message to the sign by clicking *File > Transmit > To Selected Sites > OK*:



8. If the test message does not appear on the sign, make sure the transmitting modem is on and connected to the appropriate COM port on your computer. Also, try turning the sign off and then on again.

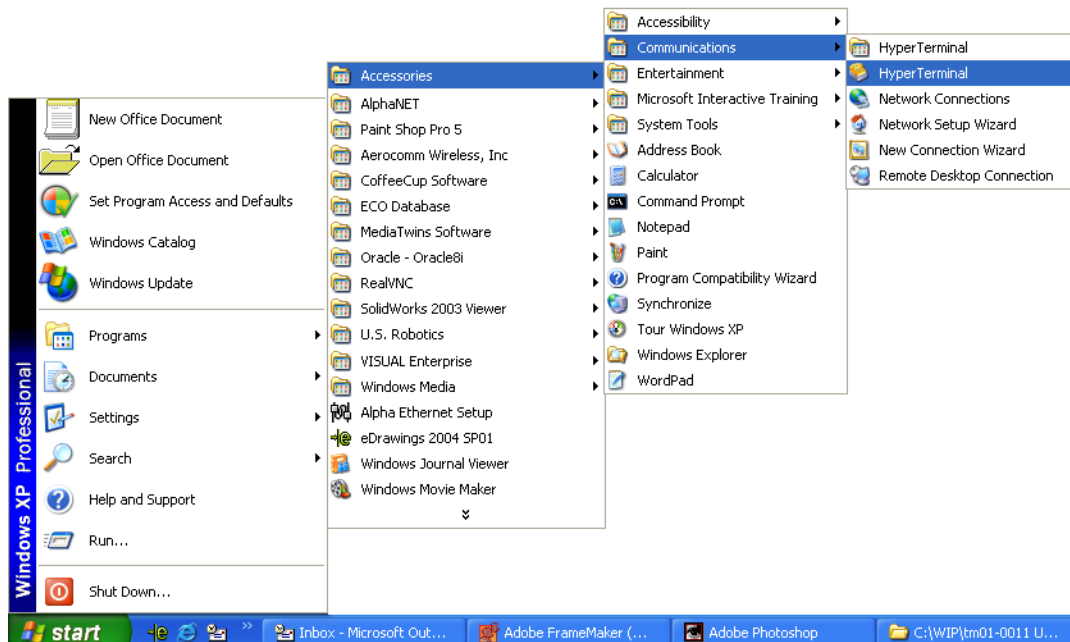
## Advanced modem setup using Hyperterminal

Use this section when AlphaNET Diagnostics software is *not* available for modem setup or when greater control is needed for modem setup.

NOTE: The AT commands used in this section only apply to US Robotics 56K V.90 and V.92 Faxmodems. Though some of the AT commands used below *might* work with other modems, consult your modem's documentation for a list of AT commands specific to your modem.

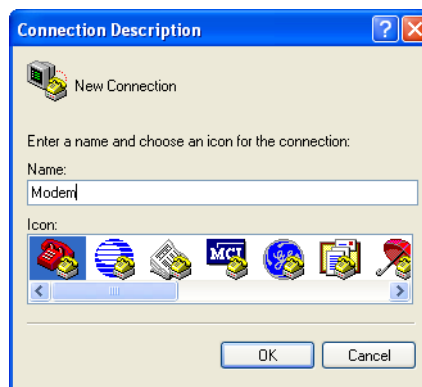
### Set up Hyperterminal

1. Set the DIP switches on a US Robotics 56K Faxmodem as shown in Figure 1 on page 2.
2. Connect the modem to your computer as shown in Figure 2 on page 2. Then turn the modem on.
3. Start Hyperterminal:



4. A "New Connection" must be created the first time Hyperterminal is used with a modem. When the *Connection Description* window appears, type "Modem" after *Name*. Then click *OK*:

NOTE: Next time you open Hyperterminal, click *Cancel* at this window. Then click *File > Open* and select *Modem.ht*.

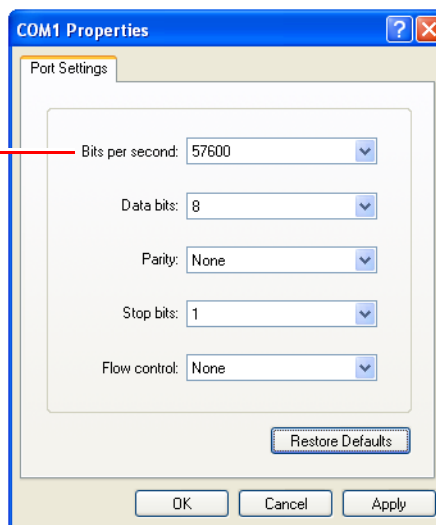


5. Select *COM1* from the next screen and click *OK*:



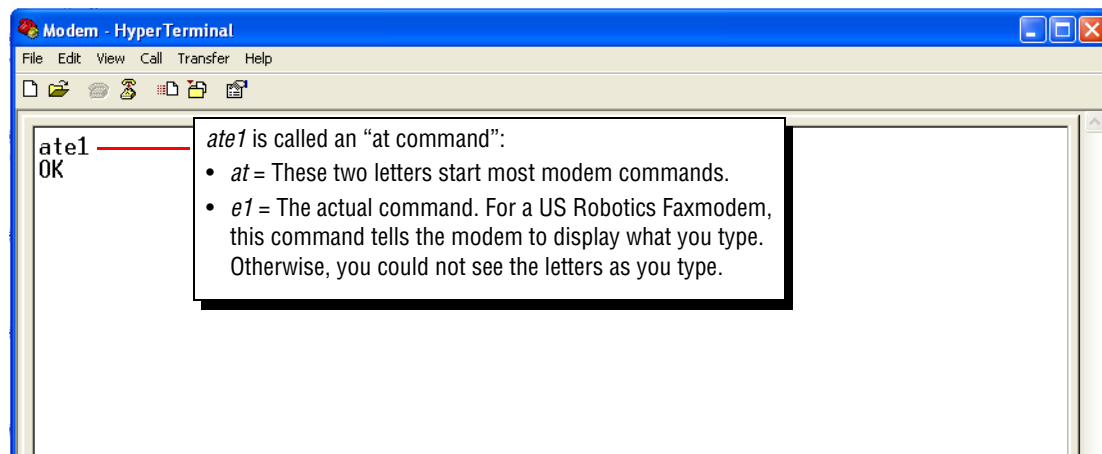
6. When the next window appears, set the communication parameters as shown below. Then click *OK*.

The baud rate (*Bits per second*) is set high (57600) because the modem will be communicating with a computer not a sign.



7. In the terminal window, type the command "ate1" (all lowercase) and then press the ENTER key:

NOTE: When typing commands, either use all lowercase (as above) or all uppercase letters. Mixing lower- and uppercase letters in a command may cause an error.



## Configure the modem

8. Configure the user-defined Y0 modem template by typing "at&h0&r1&b1&n6&y0&w0". (Use either uppercase or lowercase letters. Do not mix both.)
9. Check the modem's Y0 settings. Type "ati5" and press ENTER. A screen similar to the following will appear:

Template Y0 = user-defined values.  
The values in rectangles in this screen are all correct because they match this command:

AT&H0&R1&B1&N6&Y0&W0 (see "Modem setup configuration string" on page 24 for more information)

```

Modem - HyperTerminal
File Edit View Call Transfer Help
[Icons]
ati5
U.S. Robotics 56K FAX EXT NVRAM Settings...

Template Y0
DIAL=TONE B1 F0 M0 X0
BAUD=9600 PARITY=N WORDLEN=8

&A0 &B1 &G0 &H0 &I0 &K0 &M0 &N6
&P0 &R1 &S0 &T5 &U0 &Y0

S00=001 S02=043 S03=013 S04=010 S05=008 S06=004 S07=060
S08=002 S09=006 S10=014 S11=070 S12=050 S13=000 S15=000
S19=000 S21=010 S22=017 S23=019 S25=005 S27=000 S28=008
S29=020 S30=000 S31=128 S32=002 S33=000 S34=000 S35=000
S36=014 S38=000 S39=000 S40=001 S41=000 S42=000

Strike a key when ready . . .

Connected 0:00:15 Auto detect 57600 8-N-1 SCROLL CAPS NUM Capture Print echo

```

10. Use an AT command to change any other values in template Y0. Remember to end the command with &W0 so your settings are saved.
11. Review the changes you made by typing "ati5".
12. Finally, type "aty0". This tells the modem to use template Y0 when the modem is powered on or is reset.

## Appendix

### Related documentation

Part #	Manual title
9711-7001	AlphaEclipse 2500/2600 Series Sign Installation Manual
9711-6015	AlphaEclipse 3500 Series B Sign Installation Manual
9711-8001	AlphaEclipse 3600 Sign Installation Manual
9705-1002	Alpha Solar Installation and Operation Manual
9711-4201	AlphaPremiere 9000 Series Sign Installation Instructions
9702-2005	Director Sign User Manual
9708-8061	Alpha Sign Communications Protocol

### Alpha and AlphaEclipse sign data formats

Model	Compatibility (If there is more than one selection for a sign, choose the rightmost one.)				Data Format (Data bits, parity, stop bits)		Baud rate					
	EZ KEY II	Alpha 1 (EZ95)	Alpha 2.0	Alpha 3.0	7E2	8N1	1200	2400	4800	9600	19200	38400
Alpha 200 series (215R, 215C)	✓	✓			✓	✓	✓	✓	✓	✓		
Alpha 220C	✓	✓			✓	✓	✓	✓	✓	✓		
Alpha 300 series (320C, 330C)	✓	✓			✓	✓	✓	✓	✓	✓		
Alpha 420C	✓				✓		✓	✓	✓			
Alpha 430i, 440i, 460i, 790i	✓				✓		✓	✓	✓			
Alpha 4000 series (4080R, 4120R, 4160R, 4200R, 4080C, 4120C, 4160C, 4200C)	✓	✓			✓	✓	✓	✓	✓	✓		
Alpha 7000 series (7080C, 7120C, 7160C, 7200C)	✓	✓			✓	✓	✓	✓	✓	✓		
AlphaEclipse 2500	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
AlphaEclipse 2600	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
AlphaEclipse 3500	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
AlphaEclipse 3600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AlphaPremiere	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
AlphaVision (full matrix)	✓	✓			✓	✓	✓	✓	✓	✓		
AlphaVision (character matrix)	✓	✓			✓	✓	✓	✓	✓	✓		
Betabrite	✓	✓			✓	✓	✓	✓	✓	✓		
BigDot	✓	✓			✓	✓	✓	✓	✓	✓		
Director	✓	✓			✓	✓	✓	✓	✓	✓		
PPD (Personal Priority Display)	✓	✓			✓	✓	✓	✓	✓	✓		
Solar	✓	✓			✓	✓	✓	✓	✓	✓		

## US Robotics V.90 and V.92 modem reference

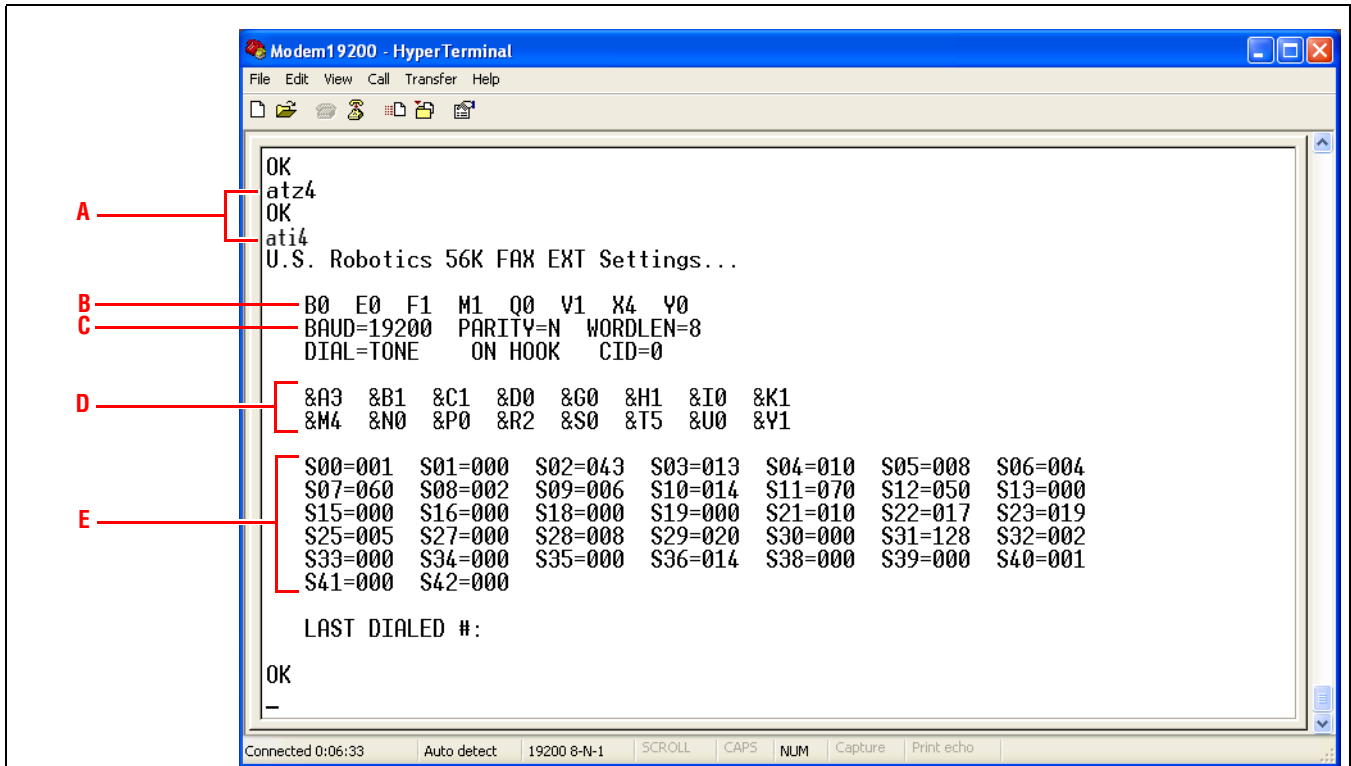
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### DIP switches

DIP switch	Setting (UP = off, DOWN = on)	AT command equivalent	Function  (US Robotics settings in italics. Adaptive settings in bold.)
1	UP	<i>&amp;D0</i>	<i>Normal DTR (Data Terminal Ready) operations — computer must provide DTR signal for the modem to accept commands. Dropping the DTR terminates a call.</i>
	<b>DOWN</b>	<b>&amp;D1</b>	<b>DTR override — modem ignores DTR signal.</b>
2	<b>UP</b>	<b>V1</b>	<b>Use verbal result codes.</b>
	DOWN	V0	Use numeric result codes.
3	UP	Q1	Suppress result codes.
	<b>DOWN</b>	<b>Q0</b>	<b>Enable result codes.</b>
4	UP	<i>E1</i>	<i>Local echo on — display keyboard commands.</i>
	<b>DOWN</b>	<b>E0</b>	<b>Local echo off</b>
5	<b>UP</b>	<b>S0 = 1 (or greater)</b>	<b>Auto answer on — modem will answer calls on the first ring (or the number of rings set in register S0). Also, modem AA LED will be on.</b>
	DOWN	<i>S0 = 0</i>	<i>Auto answer off — modem will not answer calls. Modem AA LED will be off.</i>
6	<b>UP</b>	<b>&amp;C1</b>	<b>Normal CD (Carrier Detect) operations — modem sends CD signal when it connects with another modem. Modem drops CD on disconnect.</b>
	DOWN	&C0	Carrier detect override — CD always on. Modem CD LED will always be on.
7	<b>UP</b>	—	<b>On modem powerup, load Yn template (default = Y0).</b>
	DOWN	—	On modem powerup, load &F0 generic template settings.
8	UP	—	Modem will not recognize AT commands (dumb mode).
	<b>DOWN</b>	—	<b>Modem will recognize AT commands (smart mode).</b>

## Default modem settings

These are the default or factory settings loaded into US Robotics 56K V.90 and V.90 Faxmodems:



Item	Name	Description
A	atz4 ati4	<ul style="list-style-type: none"> <li>atz4 — an AT command that resets the current modem settings to the factory hardware settings. However, the atz4 command does <i>not</i> change the user-defined Y0 through Y4 settings.</li> <li>ati4 — an AT command that displays the modem’s current settings.</li> </ul>
B	B0 E0 F1 M1 Q0 V1 X4 Y0	<p>Basic command settings — see “AT commands” on page 16 for more information.</p> <p>These basic commands can be set using either an AT command or by changing a DIP switch (see “DIP switches” on page 14):</p> <ul style="list-style-type: none"> <li>E0 (DIP switch #4)</li> <li>Q0 (DIP switch #3)</li> <li>V1 (DIP switch #2)</li> </ul> <p>A command set by a DIP switch can be changed using an AT command. However, when the modem is powered off and on, the DIP switch setting is used.</p>
C	BAUD=19200 PARITY=N WORDLEN=8	Baud rate, parity, data format — these values are determined by the settings of the COM port connected to the modem.
D	&A3, &B1, . . . &Y1	Ampersand (&) command settings — see “AT commands” on page 16 for more information.
E	S00=001 . . . S40=001	S registers — memory locations that contain various modem parameters — see “S registers” on page 21.

## AT commands

The AT commands used in this section only apply to US Robotics 56K V.90 and V.92 Faxmodems.

Though some of the AT commands used below *might* work with other modems, consult your modem's documentation for a list of AT commands specific to your modem.

NOTE: Modem default settings are in *italics*.

Command	Function
<b>BASIC COMMANDS</b>	
\$	Used with D, S, or & commands (or just AT) to display a basic command list.
A	Manual answer — goes off hook in answer mode. Pressing any key before a connection stops the operation.
A/	Re-executes the last command. Used mainly to redial. Does not require the AT prefix or a carriage return.
A>	Re-executes the last command continuously until a user intervenes. Otherwise, the command will execute forever. Does not require the AT prefix or a carriage return.
+++	Escapes to online-command mode.
AT	Required prefix for most modem commands except A/, +++, and A>. Use AT alone to test for OK result code.
Bn	US/ITU-T answer sequence: <ul style="list-style-type: none"> <li>• B0 — <i>ITU-T answer sequence</i>.</li> <li>• B1 — US answer tone.</li> </ul>
Dn	Dials the specified phone number (for example, ATDT9,5551212). Includes the following: <ul style="list-style-type: none"> <li>• 0 - 9 — numeric digits.</li> <li>• #, * — extended touch-pad tones.</li> <li>• L — dials the last number dialed.</li> <li>• P — pulse (rotary) dial.</li> <li>• R — originates call using answer (reverse) frequencies.</li> <li>• Sn — dials the phone number string stored in NVRAM at position n. Phone numbers are stored with the &amp;Zn=s command.</li> <li>• T — tone dial.</li> <li>• ,(comma) — pause. Linked to S8 register.</li> <li>• ; (semicolon) — return to command mode after dialing.</li> <li>• “ (quotes) — dials the letters that follow (in an alphabetical phone number).</li> <li>• ! (exclamation point) — flashes the switch hook.</li> <li>• / (backslash) — delays for 125 ms before proceeding with dial string.</li> <li>• W — wait for second dial tone (X2 or X4). Linked to S6 register.</li> <li>• @ — dials, waits for quiet answer, and continues (X3 or higher).</li> <li>• \$ — displays a list of dial commands.</li> </ul>
En	Sets command mode echo (also controlled by DIP switch #4): <ul style="list-style-type: none"> <li>• E0 — echo off. Your typing will not appear on the screen.</li> <li>• E1 — <i>modem displays keyboard commands. Your typing will appear on the screen.</i></li> </ul>
Fn	Sets online local echo — if on, a modem displays on your screen the data it is transmitting to another modem: <ul style="list-style-type: none"> <li>• F0 — online echo on. (Sometimes called half duplex.)</li> <li>• F1 — <i>online echo off. (Sometimes called full duplex.)</i></li> </ul>
Hn	Goes on/off hook: <ul style="list-style-type: none"> <li>• H0 — hangs up (goes on hook)</li> <li>• H1 — picks up (goes off hook).</li> </ul>



Command	Function
In	<p>Displays modem information:</p> <ul style="list-style-type: none"> <li>• I0 — 4-digit product code.</li> <li>• I1 — results of ROM checksum.</li> <li>• I2 — results of RAM checksum.</li> <li>• I3 — product type and firmware revision (for example, U.S. Robotics 56K FAX EXT V5.2.9).</li> <li>• I4 — current modem settings.</li> <li>• I5 — NVRAM settings for templates Y0 and Y1.</li> <li>• I6 — link diagnostics.</li> <li>• I7 — product configuration (see example below):</li> </ul> <pre> Product type      US/Canada External Product ID:      00568604 Options          V32bis,V.80,V.34+,x2,V.90,V.92 Fax Options      Class 1/Class 2.0 Line Options     Caller ID, Distinctive Ring Clock Freq       92.0Mhz EPROM            256k RAM              32k  FLASH date       2/16/2001 FLASH rev        5.2.9  DSP date         2/16/2001 DSP rev          5.2.9 </pre> <ul style="list-style-type: none"> <li>• I9 — plug-and-play information.</li> <li>• I11 — extended link diagnostics.</li> </ul>
Ln	<p>Sets speaker volume (internal modems only):</p> <ul style="list-style-type: none"> <li>• L0 — low volume.</li> <li>• L1 — low volume.</li> <li>• L2 — <i>medium volume</i>.</li> <li>• L3 — high volume.</li> </ul>
Mn	<p>Operates modem speaker:</p> <ul style="list-style-type: none"> <li>• M0 — speaker always off.</li> <li>• M1 — <i>speaker on until connect</i>.</li> <li>• M2 — speaker always on.</li> <li>• M3 — speaker on after dial until connect.</li> </ul>
On	<p>Returns online. Use with the escape code +++ to toggle between command and online modes:</p> <ul style="list-style-type: none"> <li>• O0 — return online (normal).</li> <li>• O1 — return online and retrain.</li> </ul>
Qn	<p>Enables or disables the display of result codes (also controlled by DIP switch #3):</p> <ul style="list-style-type: none"> <li>• Q0 — <i>display result codes</i>.</li> <li>• Q1 — suppress results codes.</li> </ul>
Vn	<p>Displays result codes in words or numbers (also controlled by DIP switch #2):</p> <ul style="list-style-type: none"> <li>• V0 — use numeric codes.</li> <li>• V1 — <i>use words</i>.</li> </ul>
Xn	<p>Controls the amount of information displayed in a result code:</p> <ul style="list-style-type: none"> <li>• X0 — basic result codes: only use result codes 0 through 4 which are OK, CONNECT, RING, NO CARRIER, and ERROR. Does not look for dial tone or busy signal.</li> <li>• X1 — extended result codes (CONNECT speed codes). Does not look for dial tone or busy signal.</li> <li>• X2 — extended result codes with NO DIAL TONE. Does not look for busy signal.</li> <li>• X3 — extended result codes with BUSY. Does not check for dial tone.</li> <li>• X4 — <i>extended result codes with NO DIAL TONE and BUSY</i>.</li> </ul>
Yn	<p>Selects power up/reset modem configuration. This works with DIP switch #7:</p> <ul style="list-style-type: none"> <li>• Y0 — <i>user-defined template 0</i>.</li> <li>• Y1 — user-defined template 1.</li> <li>• Y2 — factory template 0 (generic). See also the &amp;F0 command.</li> <li>• Y3 — factory template 1 (hardware). See also the &amp;F1 command.</li> <li>• Y4 — factory template 2 (software). See also the &amp;F2 command.</li> </ul>

Command	Function
Zn	Resets modem. This works with DIP switch #7: <ul style="list-style-type: none"> <li>• Z0 — reset modem to Yn. If DIP switch #7 = UP (off), then Y0, Y1, Y2, or Y4 is selected based on the current value of Y. If DIP switch #7 = DOWN (on), then Y3 settings are used.</li> <li>• Z1 — reset modem to Y0 settings.</li> <li>• Z2 — reset modem to Y1 settings.</li> <li>• Z3 — reset modem to Y2 (factory generic settings). See also the &amp;F0 command.</li> <li>• Z4 — reset modem to Y3 (factory hardware settings). See also the &amp;F1 command.</li> <li>• Z5 — reset modem to Y4 (factory software settings). See also the &amp;F2 command.</li> </ul>

AMPERSAND (&) COMMANDS	
&An	Enables/disables additional result code subsets (see Xn): <ul style="list-style-type: none"> <li>• &amp;A0 — ARQ result codes disabled.</li> <li>• &amp;A1 — ARQ result codes enabled.</li> <li>• &amp;A2 — V.32 modulation indicator added.</li> <li>• &amp;A3 — <i>Protocol indicators added (LAPM/MNP/NONE and V42bis/MNP5).</i></li> </ul>
&Bn	Sets modem serial port rate: <ul style="list-style-type: none"> <li>• &amp;B0 — <i>variable: the serial port rate adapts to match the connection speed.</i></li> <li>• &amp;B1 — <i>fixed: the modem always communicates with the computer at the rate which you have set regardless of the connection speed.</i></li> </ul>
&Cn	Controls Carrier Detect (CD) signal (also controlled by DIP switch #6): <ul style="list-style-type: none"> <li>• &amp;C0 — CD signal override. Modem ignores the true status of the CD signal and responds as if it is always present. The modem's CD light will always be on.</li> <li>• &amp;C1 — <i>normal operation. Modem sends CD signal when it connects with another modem.</i></li> </ul>
&Dn	Controls Data Terminal Ready (DTR) signal (also controlled by DIP switch #1): <ul style="list-style-type: none"> <li>• &amp;D0 — DTR signal override. Modem ignores the true status of the DTR signal and responds as if it is always on.</li> <li>• &amp;D1 — if DTR signal drops while in online data mode, the modem enters command mode, issues an OK, and remains connected.</li> <li>• &amp;D2 — <i>normal operation. If DTR signal drops while in online data mode, the modem hangs up. If the DTR signal is not present, the modem will not answer or dial.</i></li> <li>• &amp;D3 — If DTR signal drops, the modem hangs up and resets as if an ATZ command were issued.</li> </ul>
&Fn	Loads a factory setting: <ul style="list-style-type: none"> <li>• &amp;F0 — generic.</li> <li>• &amp;F1 — <i>hardware flow control.</i></li> <li>• &amp;F2 — <i>software flow control.</i></li> </ul>
&Gn	Sets guard tone: <ul style="list-style-type: none"> <li>• &amp;G0 — <i>no guard tone (US and Canada)</i></li> <li>• &amp;G1 — 550 Hz guard tone (some European countries). Requires B0 setting.</li> <li>• &amp;G2 — 1800 Hz guard tone (UK). Requires B0 setting.</li> </ul>
&Hn	Sets Transmit Data (TD) flow control (see also &Rn): <ul style="list-style-type: none"> <li>• &amp;H0 — flow control disabled.</li> <li>• &amp;H1 — <i>hardware flow control: requires that your computer and software support the CTS signal.</i></li> <li>• &amp;H2 — <i>software flow control: requires that your software supports XON/XOFF signaling.</i></li> <li>• &amp;H3 — <i>hardware and software flow control.</i></li> </ul>
&In	Sets Receive Data (RD) software flow control (see also &Rn): <ul style="list-style-type: none"> <li>• &amp;I0 — <i>software flow control disabled.</i></li> <li>• &amp;I1 — <i>XON/XOFF signals to your modem and remote system.</i></li> <li>• &amp;I2 — <i>XON/XOFF signals to your modem only.</i></li> </ul>

Command	Function																																													
&Kn	Enables or disables data compression: <ul style="list-style-type: none"> <li>• &amp;K0 — data compression disabled.</li> <li>• &amp;K1 — <i>auto enable/disable</i>.</li> <li>• &amp;K2 — data compression enabled.</li> <li>• &amp;K3 — MNP5 compression disabled.</li> </ul>																																													
&Mn	Sets error control (ARQ) for connection 1200 bps and higher: <ul style="list-style-type: none"> <li>• &amp;M0 — normal mode, error controlled.</li> <li>• &amp;M1 — reserved.</li> <li>• &amp;M2 — reserved.</li> <li>• &amp;M3 — reserved.</li> <li>• &amp;M4 — <i>normal/ARQ</i>.</li> <li>• &amp;M5 — ARQ mode.</li> </ul>																																													
&Nn	Sets connect speed. If connection cannot be made at this speed, the modem will hang up. When used with &Un, and &Un is greater than 0, &Nn sets the ceiling connect speed. &Un sets the floor connect speed: <p style="text-align: center;">(See NOTE 2 for &amp;N17 through &amp;N38)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><i>&amp;N0 (see NOTE 1)</i></td> <td style="width: 15%;">&amp;N8 — 14,400 bps</td> <td style="width: 15%;">&amp;N17 — 28,800 bps</td> <td style="width: 15%;">&amp;N24 — 37,333 bps</td> <td style="width: 15%;">&amp;N31 — 46,666 bps</td> </tr> <tr> <td>&amp;N1 — 300 bps</td> <td>&amp;N9 — 16,800 bps</td> <td>&amp;N18 — 29,333 bps</td> <td>&amp;N25 — 38,666 bps</td> <td>&amp;N32 — 48,000 bps</td> </tr> <tr> <td>&amp;N2 — 1200 bps</td> <td>&amp;N10 — 19,200 bps</td> <td>&amp;N19 — 30,666 bps</td> <td>&amp;N26 — 40,000 bps</td> <td>&amp;N33 — 49,333 bps</td> </tr> <tr> <td>&amp;N3 — 2400 bps</td> <td>&amp;N11 — 21,600 bps</td> <td>&amp;N20 — 32,000 bps</td> <td>&amp;N27 — 41,333 bps</td> <td>&amp;N34 — 50,666 bps</td> </tr> <tr> <td>&amp;N4 — 4800 bps</td> <td>&amp;N12 — 24,000 bps</td> <td>&amp;N21 — 33,333 bps</td> <td>&amp;N28 — 42,666 bps</td> <td>&amp;N35 — 52,000 bps</td> </tr> <tr> <td>&amp;N5 — 7200 bps</td> <td>&amp;N13 — 26,400 bps</td> <td>&amp;N22 — 34,666 bps</td> <td>&amp;N29 — 44,000 bps</td> <td>&amp;N36 — 53,333 bps</td> </tr> <tr> <td>&amp;N6 — 9600 bps</td> <td>&amp;N14 — 28,800 bps</td> <td>&amp;N23 — 36,000 bps</td> <td>&amp;N30 — 45,333 bps</td> <td>&amp;N37 — 54,666 bps</td> </tr> <tr> <td>&amp;N7 — 12,000 bps</td> <td>&amp;N15 — 31,200 bps</td> <td></td> <td></td> <td>&amp;N38 — 56,000 bps</td> </tr> <tr> <td></td> <td>&amp;N16 — 33,600 bps</td> <td></td> <td></td> <td></td> </tr> </table> <p>NOTES:  1 — Variable rate. Connection speed determined by remote modem.  2 — &amp;N17 through &amp;N39 only apply to V.90 and V.92 modems.</p>	<i>&amp;N0 (see NOTE 1)</i>	&N8 — 14,400 bps	&N17 — 28,800 bps	&N24 — 37,333 bps	&N31 — 46,666 bps	&N1 — 300 bps	&N9 — 16,800 bps	&N18 — 29,333 bps	&N25 — 38,666 bps	&N32 — 48,000 bps	&N2 — 1200 bps	&N10 — 19,200 bps	&N19 — 30,666 bps	&N26 — 40,000 bps	&N33 — 49,333 bps	&N3 — 2400 bps	&N11 — 21,600 bps	&N20 — 32,000 bps	&N27 — 41,333 bps	&N34 — 50,666 bps	&N4 — 4800 bps	&N12 — 24,000 bps	&N21 — 33,333 bps	&N28 — 42,666 bps	&N35 — 52,000 bps	&N5 — 7200 bps	&N13 — 26,400 bps	&N22 — 34,666 bps	&N29 — 44,000 bps	&N36 — 53,333 bps	&N6 — 9600 bps	&N14 — 28,800 bps	&N23 — 36,000 bps	&N30 — 45,333 bps	&N37 — 54,666 bps	&N7 — 12,000 bps	&N15 — 31,200 bps			&N38 — 56,000 bps		&N16 — 33,600 bps			
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&Pn	Sets pulse (rotary) dial make/break ratio: <ul style="list-style-type: none"> <li>• &amp;P0 — <i>US/Canada ratio, 39%/61%</i>.</li> <li>• &amp;P1 — <i>UK ratio, 33%/67%</i>.</li> </ul>																																													
&Rn	Sets Receive Data (RD) hardware flow control Request To Send (RTS) (see also &Hn): <ul style="list-style-type: none"> <li>• &amp;R0 — reserved.</li> <li>• &amp;R1 — modem ignores RTS.</li> <li>• &amp;R2 — <i>received data to computer only on RTS</i>.</li> </ul>																																													
&Sn	Controls Data Set Ready (DSR) operation: <ul style="list-style-type: none"> <li>• &amp;S0 — <i>DSR override. DSR signal is always on</i>.</li> <li>• &amp;S1 — DSR signal only comes on during a connection.</li> </ul>																																													
&Tn	Loopback test commands: <ul style="list-style-type: none"> <li>• &amp;T0 — ends testing.</li> <li>• &amp;T1 — analog loopback. If a connection exists when this command is issued, the modem hangs up. When the test starts, a CONNECT message is displayed.</li> <li>• &amp;T2 — reserved.</li> <li>• &amp;T3 — local digital loopback. If no connection exists, ERROR is returned.</li> <li>• &amp;T4 — enables remote digital loopback.</li> <li>• &amp;T5 — <i>prohibits remote digital loopback</i>.</li> <li>• &amp;T6 — starts remote digital loopback. If no connection exists, ERROR is returned.</li> <li>• &amp;T7 — remote digital loopback with self test and error detector.</li> <li>• &amp;T8 — analog loopback with self test and error detector.</li> </ul>																																													

Command	Function																																													
&Un	<p>With n &gt; 0, sets the floor connect speed, lowest acceptable connection speed. &amp;Nn is the ceiling connect speed (&amp;N=0 &amp;U=0 connects at highest speed available):</p> <p>If your modem cannot connect to the remote modem at or above the speed set with this command, the modem will hang up.</p> <p style="text-align: center;">(See NOTE 2 for &amp;U17 through &amp;U38)</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><i>&amp;U0</i> (see NOTE 1)</td> <td style="width: 15%;">&amp;U8 — 14,400 bps</td> <td style="width: 15%;">&amp;U17 — 28,800 bps</td> <td style="width: 15%;">&amp;U24 — 37,333 bps</td> <td style="width: 15%;">&amp;U31 — 46,666 bps</td> </tr> <tr> <td>&amp;U1 — 300 bps</td> <td>&amp;U9 — 16,800 bps</td> <td>&amp;U18 — 29,333 bps</td> <td>&amp;U25 — 38,666 bps</td> <td>&amp;U32 — 48,000 bps</td> </tr> <tr> <td>&amp;U2 — 1200 bps</td> <td>&amp;U10 — 19,200 bps</td> <td>&amp;U19 — 30,666 bps</td> <td>&amp;U26 — 40,000 bps</td> <td>&amp;U33 — 49,333 bps</td> </tr> <tr> <td>&amp;U3 — 2400 bps</td> <td>&amp;U11 — 21,600 bps</td> <td>&amp;U20 — 32,000 bps</td> <td>&amp;U27 — 41,333 bps</td> <td>&amp;U34 — 50,666 bps</td> </tr> <tr> <td>&amp;U4 — 4800 bps</td> <td>&amp;U12 — 24,000 bps</td> <td>&amp;U21 — 33,333 bps</td> <td>&amp;U28 — 42,666 bps</td> <td>&amp;U35 — 52,000 bps</td> </tr> <tr> <td>&amp;U5 — 7200 bps</td> <td>&amp;U13 — 26,400 bps</td> <td>&amp;U22 — 34,666 bps</td> <td>&amp;U29 — 44,000 bps</td> <td>&amp;U36 — 53,333 bps</td> </tr> <tr> <td>&amp;U6 — 9600 bps</td> <td>&amp;U14 — 28,800 bps</td> <td>&amp;U23 — 36,000 bps</td> <td>&amp;U30 — 45,333 bps</td> <td>&amp;U37 — 54,666 bps</td> </tr> <tr> <td>&amp;U7 — 12,000 bps</td> <td>&amp;U15 — 31,200 bps</td> <td></td> <td></td> <td>&amp;U38 — 56,000 bps</td> </tr> <tr> <td></td> <td>&amp;U16 — 33,600 bps</td> <td></td> <td></td> <td></td> </tr> </table> <p>NOTES:                      1 — No minimum connection speed.                      2 — &amp;U17 through &amp;U39 only apply to V.90 modems.</p>	<i>&amp;U0</i> (see NOTE 1)	&U8 — 14,400 bps	&U17 — 28,800 bps	&U24 — 37,333 bps	&U31 — 46,666 bps	&U1 — 300 bps	&U9 — 16,800 bps	&U18 — 29,333 bps	&U25 — 38,666 bps	&U32 — 48,000 bps	&U2 — 1200 bps	&U10 — 19,200 bps	&U19 — 30,666 bps	&U26 — 40,000 bps	&U33 — 49,333 bps	&U3 — 2400 bps	&U11 — 21,600 bps	&U20 — 32,000 bps	&U27 — 41,333 bps	&U34 — 50,666 bps	&U4 — 4800 bps	&U12 — 24,000 bps	&U21 — 33,333 bps	&U28 — 42,666 bps	&U35 — 52,000 bps	&U5 — 7200 bps	&U13 — 26,400 bps	&U22 — 34,666 bps	&U29 — 44,000 bps	&U36 — 53,333 bps	&U6 — 9600 bps	&U14 — 28,800 bps	&U23 — 36,000 bps	&U30 — 45,333 bps	&U37 — 54,666 bps	&U7 — 12,000 bps	&U15 — 31,200 bps			&U38 — 56,000 bps		&U16 — 33,600 bps			
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&Wn	<p>Modifies user-defined NVRAM settings:</p> <ul style="list-style-type: none"> <li>• &amp;W0 — modifies Y0 settings.</li> <li>• &amp;W1 — modifies Y1 settings.</li> </ul>																																													
&Yn	<p>Determines how a modem responds when a break signal is received:</p> <ul style="list-style-type: none"> <li>• &amp;Y0 — destructive, non-expedited: data being processed by modem receiving break is destroyed, break is not sent to other modem.</li> <li>• &amp;Y1 — <i>destructive, expedited: data being processed by both modems is destroyed, break is sent to other modem.</i></li> <li>• &amp;Y2 — non-destructive, expedited: data being processed in both modems is not affected, break is sent to other modem.</li> <li>• &amp;Y3 — non-destructive, non-expedited: data being processed in both modems is not affected, break is not sent to other modem.</li> </ul>																																													
&Zn=s	Writes phone number s to user-defined NVRAM where n = 0 through 3.																																													
&Zn?	Displays phone number in user-defined NVRAM at position n where n = 0 through 3.																																													

## S registers

The S registers used in this section only apply to US Robotics 56K V.90 and V.92 Faxmodems.

Register	Default value	Function
S0	0	Sets the number of rings on which to answer in auto answer mode. When S0 = 0, auto answer is disabled (also controlled by DIP switch #5).
S1	0	Counts and stores the number of rings from an incoming call. S0 must be greater than 0.
S2	43 ("+ character)	Stores the ASCII decimal code for the escape code character. A value of 128 to 255 disables the escape code.
S3	13	Stores ASCII decimal value for the carriage return character. Valid range is 0 through 127.
S4	10	Stores ASCII decimal value for the line feed character. Valid range is 0 through 127.
S5	8	Stores the ASCII decimal code for the backspace character. A value of 128 to 255 disables the backspace delete function.
S6	2	Sets number of seconds a modem waits before dialing. If Xn is set to X2 or X4, then this is the timeout length if there is no dial tone.
S7	60	Sets the number of seconds that the modem waits for a carrier signal. For international connections, this number should be increased.
S8	2	Sets duration, in seconds, for pause (,) option in the dial command. Valid range is 0 through 32.
S9	6	Sets required duration, in tenths of a second, of remote modem's carrier signal before your modem recognizes this signal.
S10	7	Sets duration, in tenths of a second, that modem waits to hang up after loss of carrier. This guard time allows your modem to distinguish a line disturbance from a true disconnect (hang up) by the remote modem.
S11	55	Sets duration and spacing, in milliseconds, for tone dialing.
S12	50	Sets duration, in fiftieths of a second, of guard time for escape code sequence (+++).
S13	0	Bit-mapped register (see "Settings for S13" on page 22). Select the bit(s) you want on and set S13 to the total of the values in the Value column. For example, ATS13 = 17 enables bit 0 (value is 1) and bit 4 (value is 16).
S14	0	Reserved.
S15	0	Bit-mapped register setup. To set the register, see instructions for S13. See "Settings for S15" on page 22.
S16	0	Reserved.
S17	0	Reserved.
S18	0	Test timer for &T loopback testing. Sets the time in seconds of testing before the modem automatically times out and terminates the test. When set to 0, the timer is disabled. Valid range is 1-255.
S19	0	Sets duration, in minutes, for inactivity timer. This timer activates when there is no data activity on the phone line. At time-out the modem hangs up. S19 = 0 disables the timer.
S20	0	Reserved.
S21	10	Sets length, in 10-millisecond units, of breaks sent from the modem to the computer. This applies to MNP or V.42 mode only.
S22	17	Stores ASCII decimal code for the XON character.
S23	19	Stores ASCII decimal code for the XOFF character.
S24	0	Reserved.
S25	5	Sets duration, in hundredths of a second, of a true DTR drop. Prevents modem from interpreting random glitches as DTR loss. (Most users will use the default. This register is useful for compatibility with older systems and operating software.)
S26	0	Reserved.
S27	0	Bit-mapped register setup. See "Settings for S27" on page 23.

Register	Default value	Function
S28	0	Eliminates the V.32 answer tones for a faster connection.
	8	Default item, all times are in tenths of seconds.
	255	Disables all connections except V.32 at 9600 bps.
S29	20	Sets the duration, in tenths of a second, of the V.21 answer mode fallback timer.
S30	0	Reserved.
S31	128	Reserved.
S32	2	Bit-mapped register setup. To set this register, see the instructions for S13 ("Settings for S13" on page 22).
S33	0	Bit-mapped register setup. To set this register, see the instructions for S13 ("Settings for S13" on page 22).
S34	0	Reserved.
S35	0	Reserved.
S36	0	Reserved.
S37	0	Reserved.
S38	0	Sets an optional delay, in seconds, before a forced hang-up and clearing of the Transmit buffer when DTR drops during an ARQ call. This allows time for a remote modem to acknowledge receipt of all transmitted data before it is disconnected. The modem immediately hangs up when DTR drops. This option only applies to connections terminated by dropping DTR. If the modem receives the ATH command, it ignores S38 and immediately hangs up.
S39	0	Reserved.
S40	0	Reserved.
S41	0	Bit-mapped register setup. To set registers, see the instructions for S13 ("Settings for S13" on page 22).
S42	0	Reserved.

## Bit-mapped registers

To set a bit-mapped register, select the bit(s) you want on and set the register (for example, S13) to the total of the values in the Value column. For example,  $ATS13 = 17$  enables bit 0 (value is 1) plus bit 4 (value is 16) =  $1 + 16$ .

### Settings for S13

Bit	Value	Result
0	1	Reset when DTR drops.
1	2	Reset non-MNP transmit buffer from 1.5K to 128 bytes.
2	4	Set backspace key to delete.
3	8	On DTR signal, autodial the number stored in NVRAM at position 0.
4	16	At power on/reset, autodial the number stored in NVRAM at position 0.
5	32	Reserved.
6	64	Disable quick retrains.
7	128	Disconnect on escape code.

### Settings for S15

Bit	Value	Result
0	1	Disable ARQ/MNP for V.22.
1	2	Disable ARQ/MNP for V.22bis.
2	4	Disable ARQ/MNP V.32/V.32bis.

3	8	Disable MNP handshake.
4	16	Disable MNP level 4.
5	32	Disable MNP level 3.
6	64	MNP incompatibility.
7	128	Disable V.42 operation. To disable V.42 detect phase, select the sum of bits 3 and 7 (in other words S15 = 136 [8 + 128]).

**Settings for S27**

Bit	Value	Result
0	1	Enables ITU-T V.21 modulation at 300 bps for overseas calls. In V.21 mode, the modem answers both overseas and domestic (US and Canada) calls, but only originates V.21 calls (default Bell 103).
1	2	Enables unencoded (non-trellis coded) modulation in V.32 mode.
2	4	Disables V.32 modulation.
3	8	Disables 2100 Hz answer tone to allow two V.42 modems to connect faster.
4	16	Enables V.23 fallback mode.
5	32	Disables V.32bis mode.
6	64	Disable V.42 selective reject.
7	128	Software compatibility mode. This setting disables the codes and displays the 9600 code instead. The actual rate of the call can be viewed on the AT16 screen. Used for unusual software incompatibilities. Some software may not accept 7200, 12,000, and 14,400 bps or greater result codes.

**Settings for S32**

Bit	Value	Result
0	1	V.8 Call Indicate enabled.
1	2	Enables V.8 mode.
2	4	Reserved.
3	8	Disable V.34, V.90, and V.92 modulation.
4	16	Disable V.34+ modulation.
5	32	Disable x2 modulation (select models only).
6	64	Disable V.90 modulation.
7	128	Disable V.92 modulation (select models only).

**Settings for S33**

Bit	Value	Result
0	1	Disable 2400 symbol rate.
1	2	Disable 2743 symbol rate.
2	4	Disable 2800 symbol rate.
3	8	Disable 3000 symbol rate.
4	16	Disable 3200 symbol rate.
5	32	Disable 3429 symbol rate.
6	64	Reserved.
7	128	Disable shaping.

**Settings for S41**

Bit	Value	Result
0	1	Distinctive ring enabled.
1	2	Speakerphone connect message override (voice products only).
2	4	Disable Digital Line Guard (56K internal faxmodems only).
3	8	Message waiting (voice products only).
4	16	Reserved.
5	32	Reserved.
6	64	Reserved.
7	128	Reserved.

**Modem setup configuration string**

The following AT commands are used to set up a US Robotics 56k modem as either a transmitting modem (attached to a PC) or a receiving modem (inside a sign):

<b>AT&amp;H0&amp;R1&amp;B1&amp;N6&amp;Y0&amp;W0</b>						
AT	&H0	&R1	&B1	&N6	&Y0	&W0
Prefix for the rest of the commands	Disable flow control	Modem will ignore RTS signal.	Set the modem serial port rate to fixed.	Set the connect speed to 9600 baud.	Destructive, non-expedited break handling. (This means that when a break is received, data being processed by the modem receiving the break is destroyed. However, the break is not sent to the other modem.)	The previous settings are written to NVRAM (template Y0).