



Upgrading the Initialization String in a VT-MODEM

Abstract: This technical note describes differences between the AT commands supported in current and previous revisions of the VT-MODEM-1, -2 and -3 and SiteTRAK -1T. This Technical Note is intended to aid existing customers in identifying and dealing with potential issues in converting to the newer revision products.

Note: New or modem wizard users (those not specifying their own init or AT strings) will find complete information in the product documentation and should have no need for the information in this document.

Equipment affected:

- VT-MODEM-1
- VT-MODEM-2
- VT-MODEM-3
- SR-4160-1T-1 Telephone SiteTRAK (Users that will be affected are only those that are manually typing the commands noted in this document in the SiteTRAKs init string field).

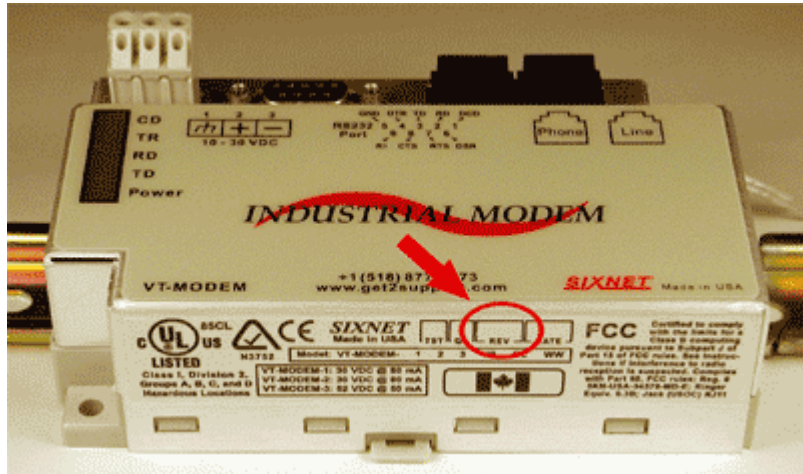
Software used:

- SIXNET VT-MODEM Wizard v2.07 or greater
- Windows HyperTerminal

Identifying the modem you have:

This section will show how to identify what revision of modem you have.

1. The SIXNET VT-MODEM Wizard will also detect the version of the modem you have. Open the wizard and detect the modem you are connected to by selecting the COM port your modem is connected to and clicking the red Detect Modem button on most configuration screens. The firmware version of your modem is indicated as Rev 1, Rev 2 or Rev 3, otherwise the difference is seamless to the typical Wizard user (See Appendix A).
2. On the back of the modem there is a white sticker called the back label that indicates among other things the revision number (Rev) and modem models. Please see the tables below to see how to interpret this number.



3. You can also detect the modem type using HyperTerminal. Please see the last section of this technical note for pointers on how to configure HyperTerminal to send AT commands to modem. To query the firmware version enter the **ati3<enter>**. Please see the tables below for information on how to interpret this firmware rev number.

VT-MODEM-1

VT-MODEM Wizard	Rev 1	Rev 2	Rev 3
Back Label	1.00-1.08, 1.10-2.02	1.09	3.00 and above
HyperTerminal (ati3)	V2.100-V34_2M_DLS	P2109-V90	CX81802-V34

VT-MODEM-2

VT-MODEM Wizard	Rev 1	Rev 2	Rev 3
Back Label	1.00-1.04, 1.06-1.08	1.04/1.05	2.00
HyperTerminal (ati3)	V2.100-V34_2M_DLS	P2109-V90	CX81802-V34

VT-MODEM-3

VT-MODEM Wizard	Rev 1	Rev 2	Rev 3
Back Label	1.00-1.02, 1.04-1.06	1.02/1.03, 1.07	2.00
HyperTerminal (ati3)	V2.100-V34_2M_DLS	P2109-V90	CX81802-V34

SR-4160-1T-1

Firmware Designation	Rev 1	Rev 2	Rev 3
Back Label	1.02-1.06	1.00-1.01	2.00
Firmware in modem	V2.100-V34_2M_DLS	P2109-V90	CX81802-V34

The command format is:

+MS= <mod>,<automode>,<min_rate>,<max_rate>

<mod>	Modulation	<min_rate>,<max_rate> Possible Rates (bps)
0	V.21	300
1	V.22	1200
2	V.22 bis	2400 or 1200
3	V.23	1200
9	V.32	9600 or 4800
10	V.32 bis	14400, 12000, 9600, 7200, or 4800
11	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400
56	K56flex	56000, 54000, 52000, 50000, 48000, 46000, 40000, 38000, 36000, 34000, 32000
64	Bell 103	300
69	Bell 212	1200

<automode>	Option Selected
0	Automode disabled. Sets fixed speed. The modem will only try to connect at that speed.
1	Automode enabled without V.8 (except for V.34). Sets Auto-Detect speed. The will first try to connect at the highest speed defined in the string, then step down until it is successful in negotiating a speed.
2	Automode enabled with V.8 for any applicable modulation. Sets Auto-Detect speed. Same as N1. Not typically used.

Example: AT+MS=11,0,9600,9600<enter> is the equivalent to ATS37=9N0<enter> command.

The table below has a complete list of all the modem-to-modem speed settings in auto-detect and fixed modes For the Rev 1 modems. These settings can be set through the SIXNET set modem wizard by simply clicking a radio button and selecting a speed or the string can be manually typed using HyperTerminal (See the last section in this document about using HyperTerminal).

Auto-Detect Speed Settings	Commands listed below should all include an AT+MS= at the beginning	Fixed Speed Settings	Commands listed below should all include an AT+MS= at the beginning
300	0,1,300,300	300	0,0,300,300
1200	2,1,300,1200	1200	2,0,1200,1200
2400	11,1,300,2400	2400	11,0,2400,2400
4800	11,1,300,4800	4800	11,0,4800,4800
9600	11,1,300,9600	9600	11,0,9600,9600
14400	11,1,300,14400	14400	11,0,14400,14400
19200	11,1,300,19200	19200	11,0,19200,19200
28800	11,1,300,28800	28800	11,0,28800,28800
33600	11,1,300,33600	33600	11,0,33600,33600

Important Note: While using HyperTerminal or an initialization string to enter the modem-to-modem speed settings to the modem's memory an AT&W0<enter> must be entered after the +MS command. The AT&W0 command cannot be entered in the same line as the +MS command.

Example: AT+MS=11,0,9600,9600&W0<enter> is not a valid AT command, but AT+MS=11,0,9600,9600<enter> and AT&W0<enter> are valid.

Rev 2 modem: In place of S37 and N the Rev 2 modem uses only the +MS command. The +MS command is defined as:

+MS=<mod>,<automode>,<Min TX and RX rate>,<Max TX and RX rate>

The only difference between the Rev 1 and Rev 2 is the way the modulation is applied. Instead of the Rev 1's numeric modulation the Rev 2 uses an alpha numeric modulation. Compare the <mod> field definition table below with the Rev 1 table.

<mod>	Modulation	<Min TX and RX rate>, <Max TX and RX rate> Possible Rates (bps)
B103	Bell 103	300
B212	Bell 212	1200 Rx/75 Tx or 75 Rx/1200 Tx
V21	V.21	300
V22	V.22	1200
V22B	V.22 bis	2400 or 1200
V23C	V.23	1200
V32	V.32	9600 or 4800
V32B	V.32 bis	14400, 12000, 9600, 7200, or 4800
V34	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400

Example: AT+MS=V34,0,9600,9600 is equivalent to the Rev 1's AT+MS=11,0,9600,9600 and ATS37=9N0 string.

The table below has a complete list of all the modem-to-modem speed settings in auto-detect and fixed modes used for the Rev 2 modem. These settings can be set through the SIXNET set modem wizard by simply clicking a radio button and selecting a speed or the string can be manually typed using HyperTerminal (See the last section in this document about using HyperTerminal).

Auto-Detect Speed Settings	Commands listed below should all include an AT+MS= at the beginning	Fixed Speed Settings	Commands listed below should all include an AT+MS= at the beginning
300	V21,1,300,300	300	V21,0,300,300
1200	V22B,1,300,1200	1200	V22B,0,1200,1200
2400	V34,1,300,2400	2400	V34,0,2400,2400
4800	V34,1,300,4800	4800	V34,0,4800,4800
9600	V34,1,300,9600	9600	V34,0,9600,9600
14400	V34,1,300,14400	14400	V34,0,14400,14400
19200	V34,1,300,19200	19200	V34,0,19200,19200
28800	V34,1,300,28800	28800	V34,0,28800,28800
33600	V34,1,300,33600	33600	V34,0,33600,33600

Rev 3 modem: Is almost implemented exactly the same as the Rev 2 modem with two exceptions. There are now separate TX and RX speed settings and the automode field no longer fixes the phone line speed. The +MS command is defined as:

+MS=<mod>,<automode>,<Min TX rate>,<Max TX rate>,<Min RX rate>,<Max RX rate>

The modem's line speed is fixed by setting all the rate fields the same, and not by the automode field. To send the command to lock the speed in at 9600 with V.32 modulation you should enter:

AT+MS=V32,0,9600,9600,9600,9600<enter>

Example: +MS=V32,0,9600,9600,9600,9600 is equivalent to the Rev 1's AT+MS=11,0,9600,9600 and the Rev 2's AT+MS=V34,0,9600,9600.

The table below has a complete list of all the modem-to-modem speed settings in auto-detect and fixed modes used for the Rev 3 modem. These settings can be set through the SIXNET set modem wizard by simply clicking a radio button and selecting a speed or the string can be manually typed using HyperTerminal (See the last section in this document about using HyperTerminal).

Auto-detect speed Settings	Commands listed below should all include an AT+MS= at the beginning	Fixed Speed Settings	Commands listed below should all include an AT+MS= at the beginning
300	V21,0,300,300,300,300	300	V21,0,300,300,300,300
1200	V22B,0,300,1200,300,1200	1200	V22B,0,1200,1200,1200,1200
2400	V22B,0,300,2400,300,2400	2400	V22B,0,2400,2400,2400,2400
4800	V32,0,300,4800,300,4800	4800	V32,0,4800,4800,4800,4800
9600	V32,0,300,9600,300,9600	9600	V32,0,9600,9600,9600,9600
14400	V32B,0,300,14400,300,14400	14400	V32B,0,14400,14400,14400,14400
19200	V34,0,300,19200,300,19200	19200	V34,0,19200,19200,19200,19200
28800	V34,0,300,28800,300,28800	28800	V34,0,28800,28800,28800,28800
33600	V34,0,300,33600,300,33600	33600	V34,0,33600,33600,33600,33600

2. The +H command to enable/disable RPI (Rockwell Protocol Interface)

Rev 1 modem: If you are a long time customer of the Rev 1 modem you may already be accustomed to using the +H command. This command is used to enable/disable Rockwell Protocol Interface and set the DTE (modem serial port) speed. This command is defined as:

- +H0 Disable protocol interface and video ready mode.
- +H1 Enable RPI mode and set DTE speed to 19200 bps.
- +H2 Enable RPI mode and set DTE speed to 38400 bps.
- +H3 Enable RPI mode and set DTE speed to 57600 bps.
- +H11 Enable RPI+ mode. When in RPI+ mode, a link is established between the modem and the WinRPI or WinRPI95 host PC software driver to allow the modem to support protocol (V.42bis/LAP-M/MNP2-5) connections with a remote modem. This command should only be used when the WinRPI or WinRPI95 driver software is installed in the PC.
- +H16 Enable video ready mode

The website www.TheFreeDictionary.com by Farlex defines Rockwell Interface Protocol (RPI) as, “a cutting edge feature of some modems allowing data compression and error correction (e.g. ITU-T V.42bis, V.42) to be provided in software instead of hardware.”

“Usually an RPI modem comes with RPI-aware software (e.g. the low-end RPI models of Supra come with the COMit which supports RPI, providing MNP 2,4,5,7, V.42 and V.42bis). RPI is not supported by many commercial packages nor by current releases of popular shareware communication programs (Telix v3.22 and Telemate v4.12). ProComm Plus for Windows 2.0 will support RPI.”

SIXNET does not provide “RPI-aware” software, and does not support the RPI feature in the VT-MODEM product line. In fact, most applications that use this command probably use it only to disable RPI (AT+H0). To set the DTE parameters use AT<enter> or AT&W0<enter>. Using the AT attention commands the modem will automatically detect the baud rate, data bits, parity and stop bits of the AT command sent. When just AT<enter> is sent the modem will use the detected parameters until power is cycled or until another AT<enter> or AT&W0<enter> is sent at different parameters. When AT&W0<enter> is sent the modem will use the detected parameter until another AT<enter> or AT&W0<enter> is sent at different parameters.

Rev 2 and 3 modems: The Rev 2 and 3 modems do not support the RPI feature at all, so there is no need to use this command in any AT command strings for this modem. Do not include the +H command in AT commands sent to the Rev 2 and 3 modems because the modems will return an ERROR.

3. The #BDR command sets the modems serial (DTE) speed and automode

Rev 1 modem: The #BDR command forces the modem to select a specific DTE/modem baud rate without further speed sensing on the interface. When a valid #BDR=n command is entered, the OK result code is sent at the current assumed speed. After the OK has been sent, the modem switches to the speed indicated by the #BDR=n command it has just received.

Parameters:

n = 0 – 48 (New baud rate is n*2400 bps)

Default:

0

Result Codes:

OK For the supported speeds.

ERROR Otherwise.

Command options:

#BDR? Returns the current setting of the #BDR command as an ASCII decimal value in result code format.

#BDR=? Returns a message indicating the speeds that are supported.

#BDR=0 Enables autobaud detection on the DTE interface.

#BDR=n Where 1<n<48. Sends OK message at current speed, then switches to the new speed defined by n*2400 bps unless and until another #BDR=n command is received. Autobaud is disabled, and the character format is maintained at the format most recently detected.

Example: AT#BDR=4<enter> sets the DTE speed to 9600 and auto baud is disabled.

Rev 2 and Rev 3 modems: The #BDR command has changed to the +VPR in the Rev 2 and Rev 3 modems. The +VPR command is implemented exactly the same way as the #BDR command. If you are using #BDR in your modem simply replace '#BDR' for '+VPR.'

Valid commands are:

0 = Autobaud

1 = 2400 bps

2 = 4800 bps

3 = 7200 bps

4 = 9600 bps

8 = 19200 bps

16 = 38400 bps

24 = 57600 bps

48 = 115200 bps

96 = 230400 bps

Example: AT+VPR=4<enter> is equivalent the Rev 1 modem's AT#BDR=4<enter> to set the DTE speed to 9600 and disable automode.

4. The S23 register sets the serial (DTE) parameters

Rev 1 modem: The S23 General bit mapped register could optional be used to set the serial port parameters (baud rate, parity, and stop bits) the Rev 1 modem. The more common way, however, is to set the serial (DTE) parameters using AT<enter> or AT&W0<enter>. With the AT (attention) commands the modem will automatically detect the baud rate, data bits, parity and stop bits. When just AT<enter> is sent the modem will use the detected parameters until power is cycled or until another AT<enter> or AT&W0<enter> is sent at different parameters. When AT&W0<enter> is sent the modem will use the detected parameter until another AT<enter> or AT&W0<enter> is sent at different parameters, and will save these even after a power cycle.

Rev 2 and Rev 3 modem: The Rev 2 and Rev 3 modems do not support the S23 register. The serial port parameters are always set by sending AT<enter> or AT&W0<enter> (See Rev 1 modem above).

If your current AT command string has S23 in it for the purpose of setting the serial port parameters simply take it out and add an &W0 on the end of the string, if necessary.

5. The &Zn=# command to store a telephone number in the modems flash memory

Rev 1 and 2 modems: This command is used by all modems to store up to four telephone numbers in flash memory. Each telephone number dial string can contain up to 34 digits, but the wizard allows only 32 digits. The telephone number dial string can be recalled using the S=n dial modifier (ATDS=0 uses stored number 0 for the number to dial with). This number is used by the SIXNET set modem wizard in the Modem Parameter window and the Self-Dialing Parameters window for the VT-MODEM-2.

SIXNET VT-MODEM Wizard
Modem Parameters
Please specify the required modem parameters.

VT-MODEM-1 (Industrial Modem), Rev 1

Basic Modem Parameters:

Phone Number 1:

Enable Auto-Answer Ignore Carrier Detect

Ignore DTR (assume UN)

Advanced Modem Parameters:

SIXNET VT-MODEM Wizard
Self-Dial Parameters
Select the appropriate Self-Dial parameters for your modem.

VT-MODEM-2 (PLC Self-Dialing Modem), Rev 1, Firmware

Enable Self-Dial Transmit an ID

First Phone #: ID Message:

Second Phone #: Send ID Delay:

ACK Message:

Rev 3 modem: Is implemented the same way as the Rev 1 and 2 modems with the exception of the number of characters allowed in the telephone number string. Each telephone number dial string can contain up to 31 digits as opposed to 34 digits in the Rev 1 and Rev 2.

This may cause a problem particularly in VT-MODEM-2 applications where the VT-MODEM-2 is configured to send a string to a beeper (See TN627.pdf on www.sixnetio.com). To get around this you can increase the time of the commas used in your AT command string using the S8 register (the default value is 2 sec.). For example, the string entered in the Self-Dialing Parameters window may be '5554444,,1,,,911', where the commas indicate the pauses necessary to wait for the operator prompt in your paging service. If you change the S8 register to 4 sec. (ATS8=4), then you can cut the amount of commas in half (5554444,1,,911) decreasing the amount characters necessary in your string.

Of course, our technical staff is ready and willing to help you out with any modem application or question you have. Please contact us.

Phone: +1 (518) 877-5173
Fax: + 1 (518) 877-8346
Email: support@sixnetio.com
Web: www.get2support.com

Appendix A

Using the SIXNET set modem wizard instead of an init string:

The SIXNET set modem wizard is specifically designed to save the most essential AT commands into the modems flash memory. The modem will configure itself according to whatever is configured in this reliable method of storage after a power cycle or soft reset (ATZ0<enter>). When the modem has been configured through the set modem wizard there is no need to repeatedly send AT commands via an initialization string in a PLC or controller. In other words when the modem is set through the wizard the configuration is permanently stored.

Benefits of using the set modem wizard:

- **Easy standardization.** The SIXNET set modem wizard allows the user to save a configuration file (*.6ms) for easy integration and standardization of the configuration process.
- **The set modem wizard is easy to use.** Intuitive wizard format and well-labeled features makes it easy for anyone to select the essential AT commands that affect modem communication.
- **Easy AT command customization.** If the set modem wizard does not include an AT command that you need to use there is an easy-to-use text box that allows any string to be sent and saved into the modem's rugged flash memory.
- **Excellent help files.** Set modem wizard help is accessible from any wizard window and shows the equivalent AT commands for every feature in set modem wizard. This will help the user convert any initialization sting into a set modem configuration file (*.6ms).

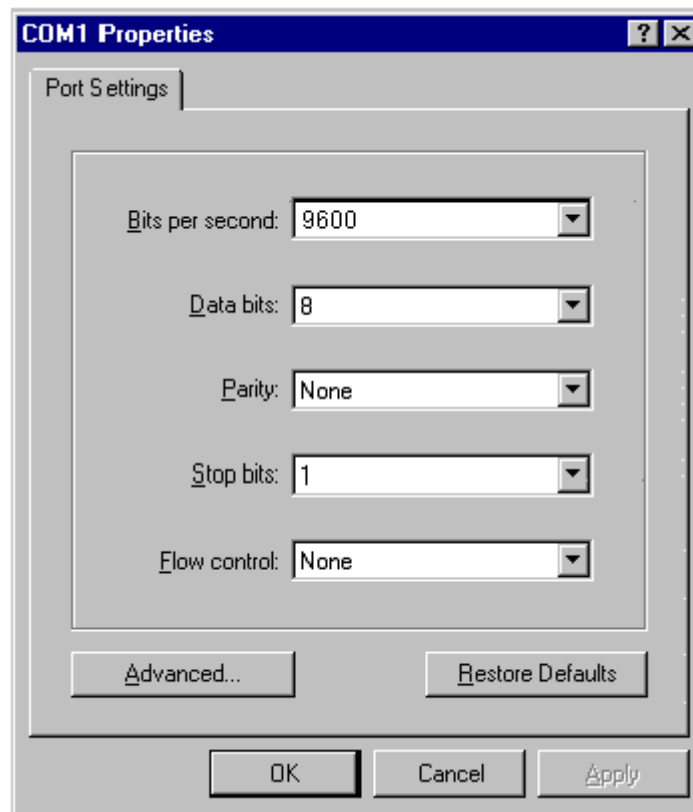
Appendix B

Using HyperTerminal to send AT commands to the modem:

Windows HyperTerminal steps

Step 1: Connect your Industrial Modem to your computer using the VT-CABLE-MDM (or an equivalent cable). Open Windows HyperTerminal. (This program is included with all Windows versions. Refer to the VTMODEM on-line manual for more details.) Enter a name for your connection.

Step 2: Under “Connect Using” select **Direct to Com “X”**, where “X” is the COM port the modem is connected to. Another window will appear. Enter the following settings, where **Bits per second** is the desired PLC baud rate, then press OK:



Choose the baud rate that matches the PLC or other device that will be connected to the modem. Anytime a setting is saved using &W0 or &W1, the RS232 baud rate is memorized by the VT-Modem. The saved baud rate will be used for future communications with any attached device that does not initiate communications with the modem (such as most PLCs).

Step 3: You should be at a blank screen. Test that you are connected by typing **at** <enter>. The modem should respond with an **OK** if you are connected. Now enter these commands. (Press <enter> after each.)

- To dial a number in HyperTerminal, you can use the command: **atdt<number>**. When you have successfully connected to another modem, it will show the baud rate at which you are connected. **Example: atdt15188778346**
- To check whether your Industrial Modem is communicating, look at the “TD” and “RD” LED's on the modem. They will light up when communicating.
- To Hang-up the connection Open the HyperTerminal session saved from the previous steps. Type +++, you should get an **OK** back, then type **ath** <enter>. The resulting **OK** indicates that the modem-to-modem connection is terminated.
- If you are using a terminal program other than HyperTerminal, the steps may be different. However, the commands will remain the same.