



VT-MODEM Interfaces with a SIEMENS S7-200 series PLC

Abstract: This document explains the procedure of dialing and establishing communications between a local PC running SIEMENS STEP 7 SIMATIC Micro/WIN 32 V3.1 software and a Siemens S7-200 series PLC via a pair of SIXNET industrial modems (VT-MODEM-#). Information in this document was prepared by SIXNET.

The SIEMENS S7-200 CPU 212 PLC can be controlled remotely via the telephone wiring using SIXNET industrial modems. The SIEMENS S7-200 CPU 212 PLC can be programmed through the phone connection. Although a CPU 212 was used in this application any CPU 21X and 22X in 11-bit mode will communicate in the same manner. This technical note was completed with the assistance of J & J Electronics in Irvine California and Richard Equipment in Cincinnati Ohio.

Software Used:

- Windows 98 OS
- SIEMENS STEP 7 SIMATIC Micro/WIN 32 V3.1

Hardware Used:

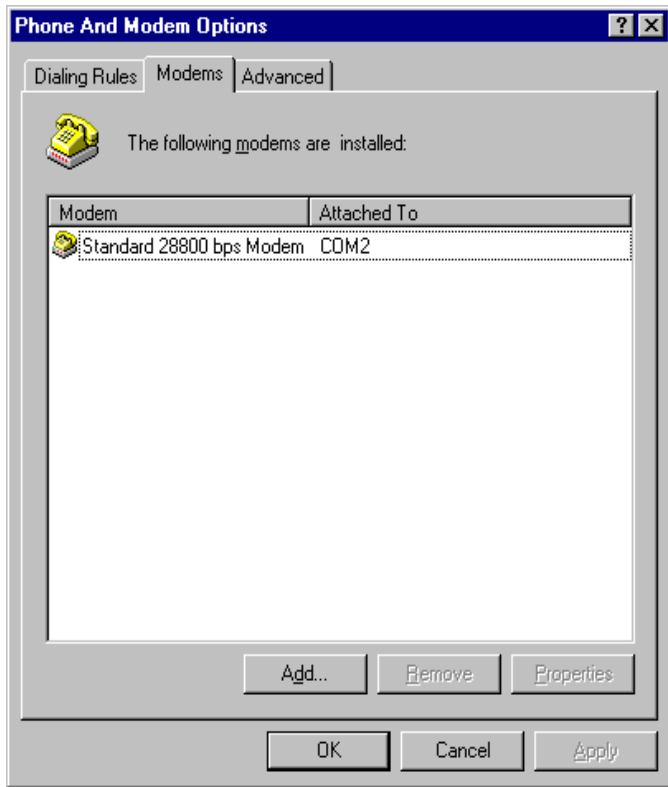
- (1) SIXNET VT-MODEM-1
- (1) SIXNET VT-MODEM-2
- (1) SIXNET VT-CABLE-MDM (Supplied with modems)
- (1) SIEMENS S7-200 CPU 212
- (1) SIEMENS 4-switch PC/PPI cable part number is 6ES7901-3BF00-0XA0 (SIEMENS 5-switch PC/PPI cable part number 6ES7901-3BF20-0XA0 can be used in place of the 4-switch PC/PPI cable and the null modem cable)
- (1) Male-to-Male Null modem cable (Only needed if using the 4-switch PC/PPI cable)

Pin-outs of the null modem cable				
DB9 male to modem			DB9 male to PC/PPI cable	
RD in	2	←	3	TD out
TD out	3	→	2	RD in
GND	5	-	5	GND
Pins 1, 4, and 6 should be tied together on both sides				
Pins 7 and 8 should be tied together on both sides				

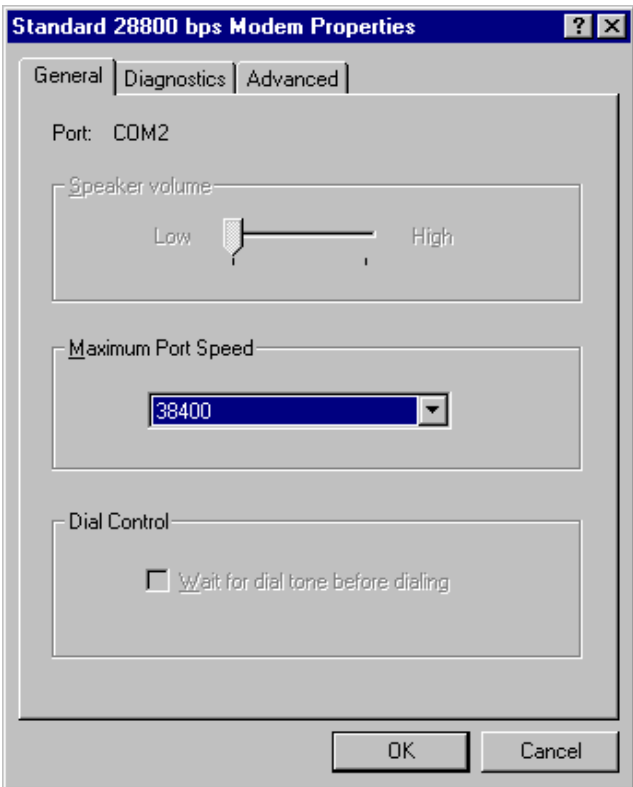
Installing VT-MODEM driver to Windows PC:

To configure Windows to recognize the VT-MODEM, go to Start → Settings → Control Panel → Phone and Modem options. Next, go to the Modems tab in the Phone and Modem options window, and then click on Add... Next, check the “Don’t detect my modem; I will select it from list” box and

manually select “Standard 28800 bps Modem” from the modem type list. Refer to screen shots 1 and 2 below for details of how the modems were configured.



Screen Shot 1



Screen Shot 2

Configuring the Hardware and Software:

- **SIEMENS 4-Switch PC/PPI cable (modem-to-PLC cable)-** In this application a 4-switch PC/PPI cable was used. The position of the DIP switches determines what rate data can be passed. The DIP switches in cables should be set to the following:

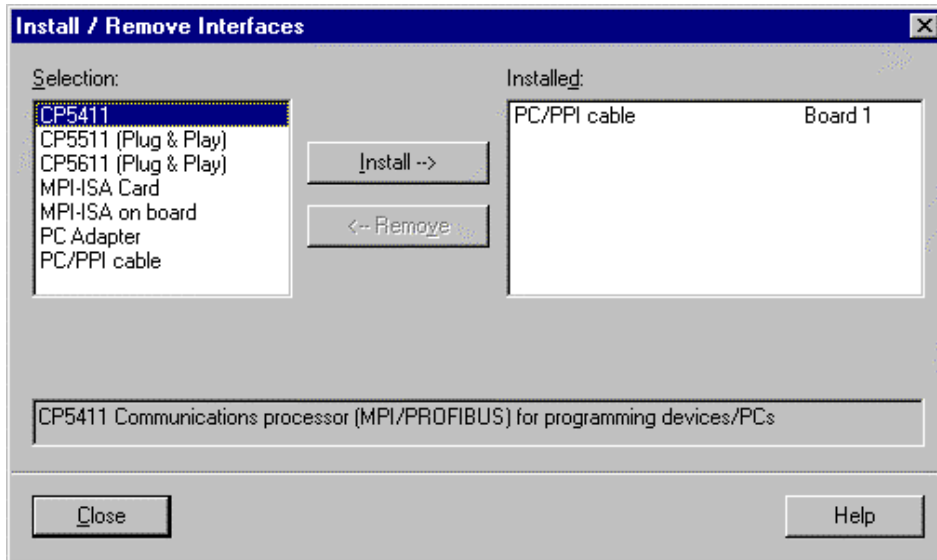
DIP Switch setting for the 4-Switch PC/PPI cable in 9600 bps	
1	OFF
2	OFF
3	ON
4	OFF

(Optional) SIEMENS 5-Switch PC/PPI cable (modem-to PLC cable)- The 5-Switch PC/PPI cable can be used in place of the 4-Switch PC/PPI cable, and eliminates the need for the null

modem cable. The position of the DIP switches will determine the baud rate and the communication mode. Adjust the DIP Switches according to the chart below.

DIP Switch settings for the 5-Switch PC/PPI cable in 9600 bps (11-bit)	
1	OFF
2	ON
3	OFF
4	OFF
5	ON

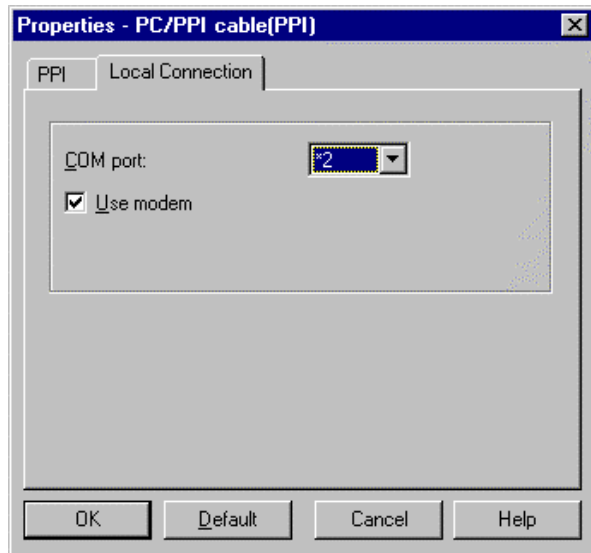
- SIEMENS STEP 7 Micro/WIN 32 Software**- First it is necessary to install the PC/PPI cable in the Micro/WIN software. Go to the “Communications” Button in the “View” column. Double-click on the PC/PPI cable icon, then in the “Interfaces” box click on the Select button. Select the PC/PPI cable in the “Selection” box, then click on the “Install” button to transfer the PC/PPI to the “Installed” box (See Screen Shot 3).



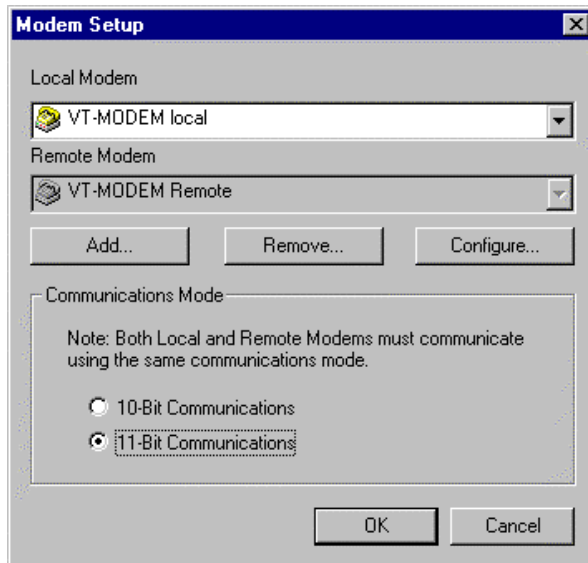
Screen Shot 3

Next, Go back to the Set PG/PC Interface window and click on the Properties button. In the Local Connection tab select the “Use Modem” check box and “COM port” used (In this case COM 2 was used) on the local computer (See Screen Shot 4). Configure the protocol for 11-bit modem data format by selecting the 11-bit radio button in the “Modem Setup” window (See Screen Shot 5)

Note: To ensure proper addressing, verify that the PLC will communicate to the Micro/WIN software in the local PC through a direct connection via the PC/PPI cable.



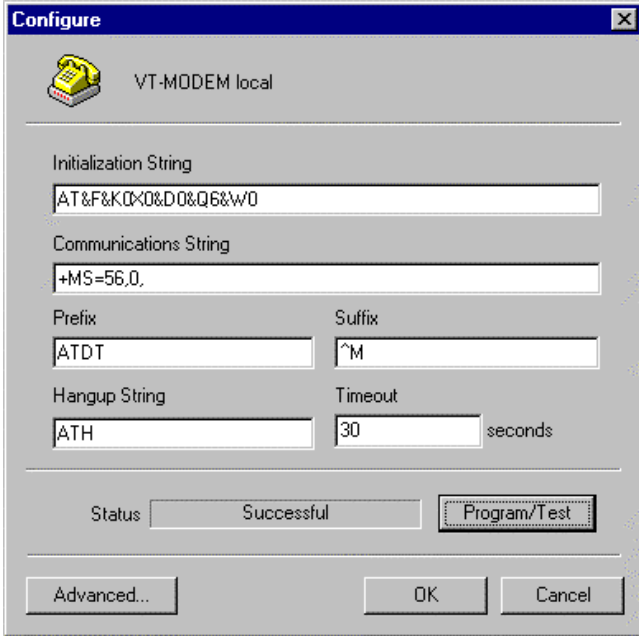
Screen Shot 4



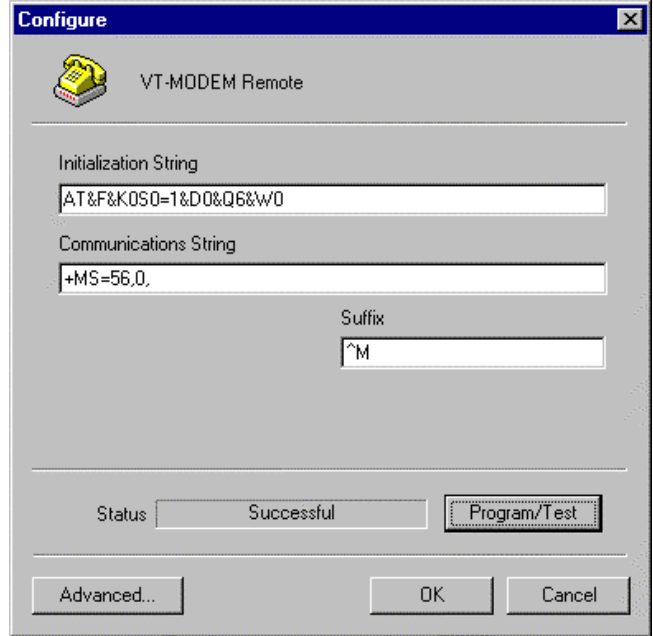
Screen Shot 5

Configuring the modems before remote communications:

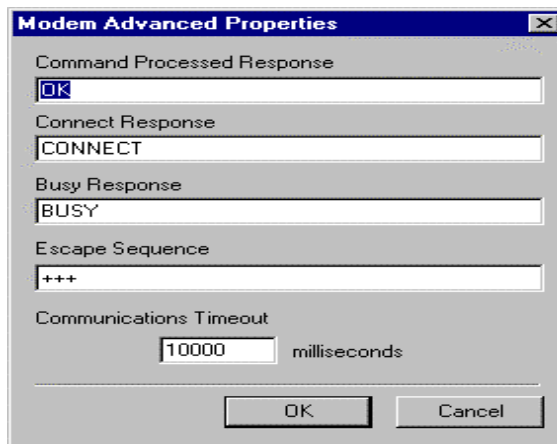
- SIEMENS STEP 7 Micro/WIN 32 Software** - In the “Communications Setup” window create a new modem configuration for the local and remote modem. To do this double-click on the local modem, click the “Add...” button, and enter desired name (in this case the name “VT-MODEM local” was used). Click on the “Configure...” button to enter the modem configuration information. Enter the following information: Initialization String = AT&F&K0X0&D0&Q6&W0, Communications String=+MS=56,0, Prefix = ATDT, Suffix = ATH, Hangup String = ^M, Timeout = 30 (See Screen Shot 6). Add a remote modem as well (in this case “VT-MODEM remote”). In the “Configure” window for the remote modem enter the following information: Initialization String = AT&F&K0S0=1&D0&Q6&W0, Communications String = +MS=56,0, Suffix = ^M (See Screen Shot 7). Click on the “Advanced...” button in the configuration window for either the remote or local modem; enter the information as shown in Screen Shot 8.



Screen Shot 6



Screen Shot 7



Screen Shot 8

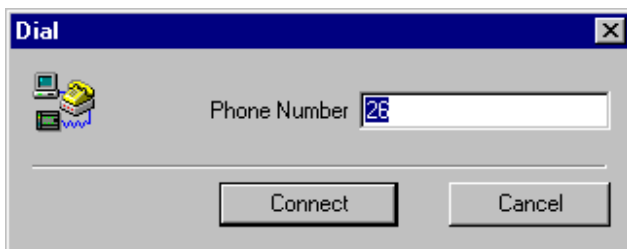
- **VT-MODEM-1-** Connect the local VT-MODEM-1 to the local PC via the VT-CBL-MDM (Straight-wired DB9 cable) and select the “Program/Test” in the modem “Configure” window. When the status window reads “Successful” then the commands have been successfully sent to the modem (See Screen Shot 6).
- **VT-MODEM-2-** Connect the remote modem to the local PC via the VT-CBL-MDM (Straight-wired DB9 cable) and select the “Program/Test” in the modem “Configure” window for the remote modem. When the status window reads “Successful” then the commands have been successfully sent to the modem (See Screen Shot 7).

Connecting the Hardware:

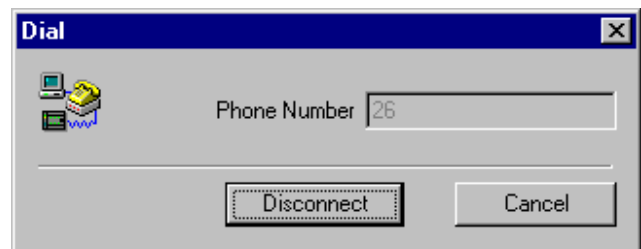
- **Phone connection-** The two modems were connected to an internal analog phone simulator through their Line RJ11 jacks using standard RJ11 telephone cables.
- **VT-MODEM-1 (local)-** Connect the modems serial port to the serial port, as indicated in the “Properties” window (See Screen Shot 4), on the local PC via the VT-CBL-MDM (straight-wired DB9 cable).
- **VT-MODEM-2 (remote)-** Connect the male-to-male null modem cable to the modems serial port and the female side of the PC/PPI cable.
- **SIEMENS S7-200 CPU 212-** Connect the male end of the PC/PPI cable to the female DB9 RS485 port on the PLC.

Establishing the Connection:

- **SIEMENS STEP 7 Micro/WIN 32 Software-** In the “Communications Setup” window double-click on the “Connect Modem” icon, enter the phone number that correlates to the remote modem, and click on the “Connect” button (See Screen Shot 9). To disconnect the modems close the Micro/WIN software or double-click on the “Disconnect Modem” icon in the “Communication Setup” window, and click on the “Disconnect” button (See Screen Shot 10).



Screen Shot 9



Screen Shot 10

Conclusion: This test successfully established communications between a PC and an S7-200 CPU 212 using SIXNET industrial modems.