VT-MODEM Interfaces with the PLC*Direct* DL250 PLC

Abstract: This document explains the procedure for interfacing a SIXNET Industrial Telephone Modem with a PLC*Direct* DL250 PLC. This setup will allow a remote computer to access the serial port on a DL250 PLC via a telephone modem connection.

This telephone modem interface provides long distance communications between the operator and the PLC. Diagnostics and troubleshooting can now be done from hundreds of miles away. This saves time and money because problems can be corrected or configuration changes made without traveling to the PLC.

Hardware and Software Used:

- SIXNET Industrial Modem (Part Number: VT-MODEM-1)
- Serial cable (Part Number: VT-CABLE-MDM which is supplied with theVT-MODEM-1)
- Serial Cable (Custom made RS-232C DB9M to HD15M)
- PLC*Direct* 250 PLC (using Port 2, RS-232C)
- PLC*Direct* DirectSOFT Software, V2.3
- Analog telephone line connections at both ends

Sending and Receiving Modem (SIXNET VT-MODEM-1) Setup Procedure:

1. Use Window's HyperTerminal to communicate to the modem. Settings can be changed by connecting* the straight through cable, which comes as part of the Industrial Modem package (VT-CABLE-MDM) to the serial port on the modem and the serial port of the computer (i.e. serial port COM1, 2 etc.).

   Note:
   a) *For information on how to use HyperTerminal, please consult the SIXNET VT-MODEM online help guide located on the SIXNET CD in the Product Catalog.*

   b) ** Cycle power on your modem each time a cable is disconnected and then reconnected.*

2. Start Hyper Terminal. Enter a name for your connection. Select OK.

3. Choose the Com port you want to use. Select OK.

4. Enter the appropriate Com properties. Select OK.

— **Important** —

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 communication properties are memorized by the VT-MODEM. The saved communication properties will be used for future communications with any attached device that does not initiate communications with the modem (such as most PLC's).
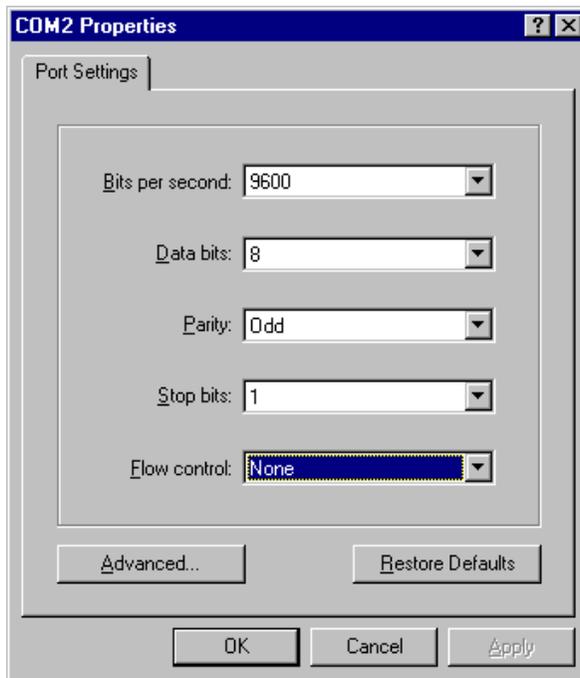
1. The Hyper Terminal screen, on the next page, will appear. To check communication, type **AT
   <Enter>. *OK* should appear. Send the following AT commands. The commands in **bold** need to be
   sent, the others may be necessary if you find you cannot communicate, or have unreliable
   communications, with the PLC.

   AT&F&W0&W1*<Enter>* - Sets the modem to factory defaults
   ATS0=1*<Enter>*   - Set the modem to auto-answer
   AT&K0*<Enter>*   - Disables flow control
   AT&D0*<Enter>*   - Tells the modem to ignore DTR
   AT%C0*<Enter>*   - Disables data compression
   AT&V*<Enter>*   - Use this to verify changes

   ATS37=9*<Enter>* - Sets the modem to modem baud rate to 9600
   ATN0*<Enter>*   - Forces modem to communicate to modem at baud rate set up by S37
   AT\N1*<Enter>*   - Sets the operating mode of the modem to direct async.communication, no
                              send/receive buffers, and no error checking
   AT%E0*<Enter>*   - Disables the internal line quality check

2. Store the above AT commands to user profile 0 (or 1), with the following command: **AT&W0
   <enter>**(or **W1**).

3. If you wish to load this profile upon power up, you will want to use the load command: **AT&Y0
   <enter>** (or **Y1**) depending upon which stored profile you saved the previous set of commands to.

```
Modem Set-up - HyperTerminal                                          _ □ ✕
File  Edit  View  Call  Transfer  Help

   [D] [☞] [☎][☎] [□][☎] [☞]

 AT
 OK
 AT&F
 OK
 ATS0=1
 OK
 AT&W0
 OK
 AT&Y0
 OK
 _

Connected 0:06:54     Auto detect   9600 8-0-1   SCROLL  CAPS  NUM  Capture  Print echo
```
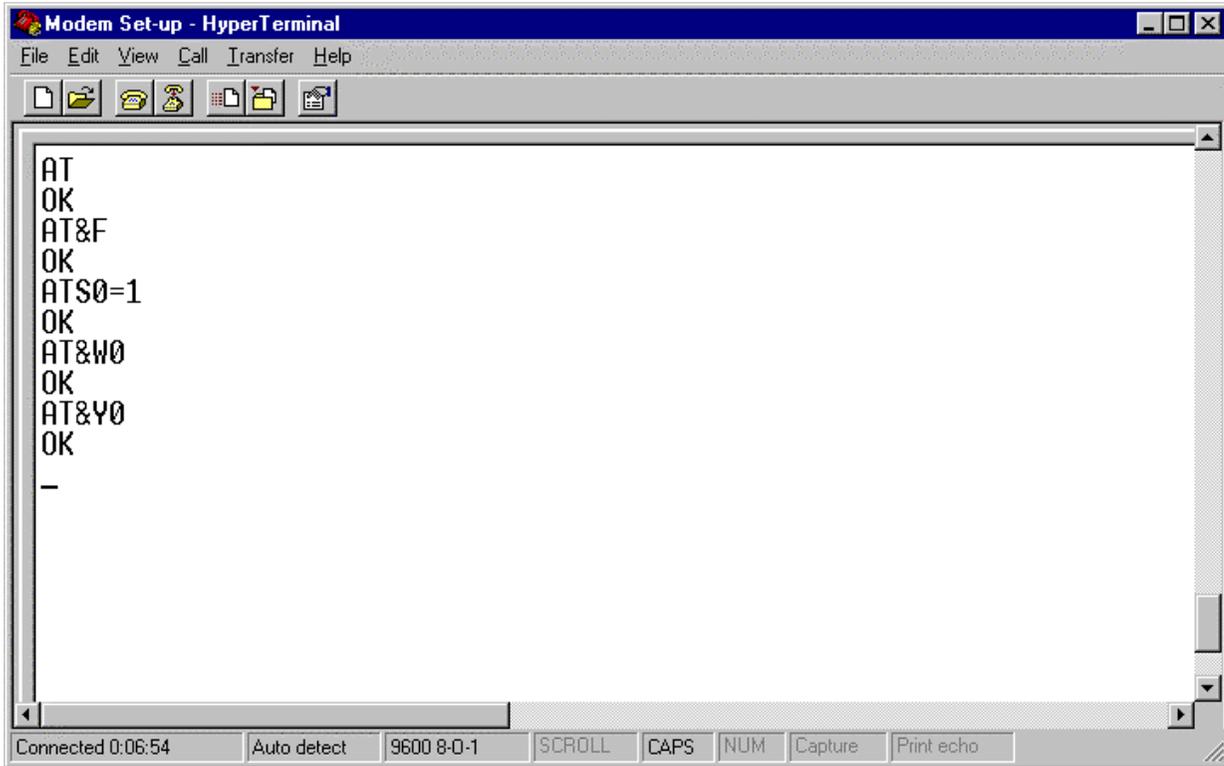
4. The "receiving" VT-MODEM set-up is complete

5. Repeat steps 1 through 4 for the "sending" VT-MODEM.

6. Connect* your computer to the "sending" VT-MODEM, using the VT-CABLE-MDM. This is a standard straight-through cable with a DB-9(M) connection to the modem and a DB-9(F) connection to the computer.

7. Connect* the DL250 PLC to the "receiving" VT-MODEM, using a cable with the following connectors and wiring:

> VT-MODEM   DL250 PLC
> DB-9(M)   HD-15(M), Port 2
>   RXD 2 — 3 /RXD2 (RS-232C)
>   TXD 3 — 2 /TXD2 (RS-232C)
>   GND 5 — 7 0V
>   4 RTS2 (RS-232C)**
>   5 CTS2 (RS-232C)**

*   *Cycle power on your modem each time a cable is disconnected and then reconnected.*
**   *On the HD-15 jump 4 to 5.*

8. Call the "receiving" modem. To dial a number in HyperTerminal, you can use the command: ATDT<phone number>. When you have successfully connected to another modem, it will show the baud rate at which you are connected.

```
Modem Set-up - HyperTerminal
File  Edit  View  Call  Transfer  Help

AT
OK
AT&F
OK
ATS0=1
OK
AT&W0
OK
AT&Y0
OK
at
OK
ATDT23
CONNECT 9600
_

Connected 1:22:02    Auto detect    9600 8-0-1    SCROLL  CAPS  NUM  Capture  Print echo
```
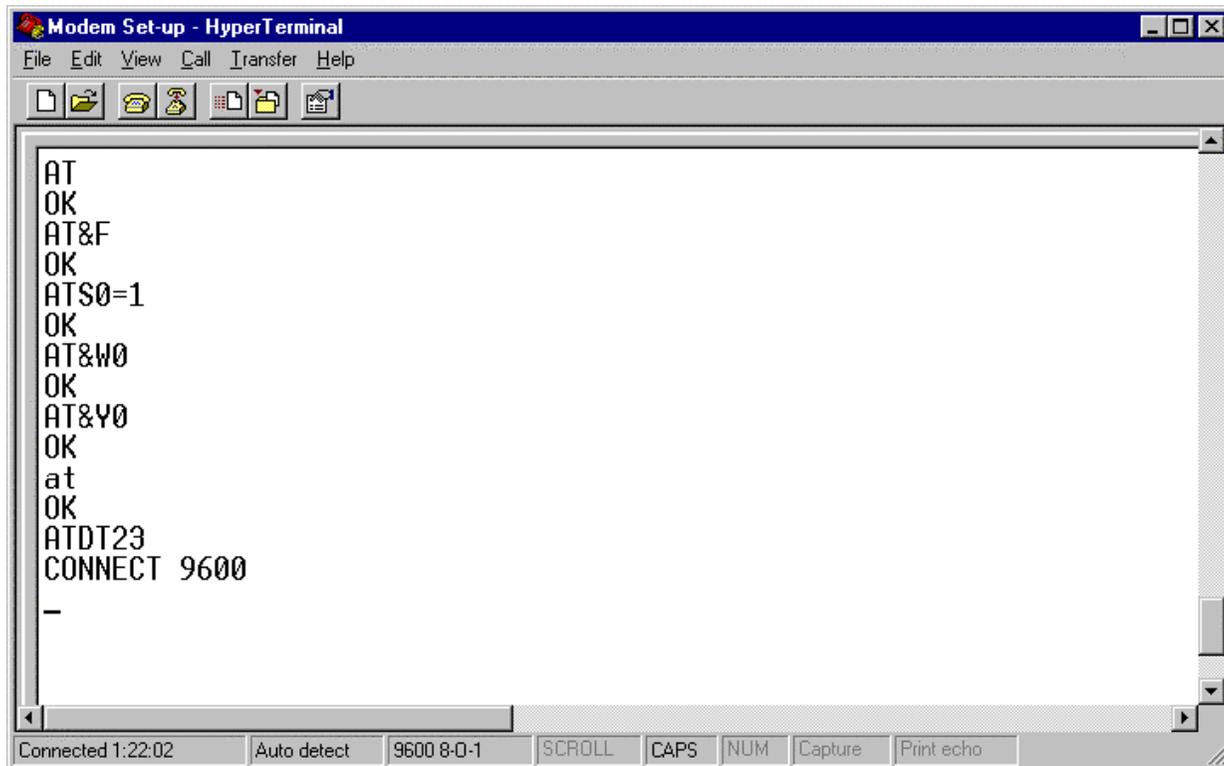
9. Exit Hyper Terminal. Select Yes. The modems should not disconnect.

```
HyperTerminal
⚠  You are currently connected.
   Are you sure you want to disconnect now?

        Yes           No
```
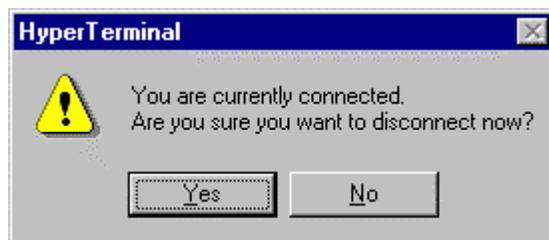
10. Save your session. Select Yes.

```
HyperTerminal
❓  Do you want to save session Modem Set-up ?

      Yes        No        Cancel
```

11. Start the DirectSOFT program.

12. Select new link, which starts the LinkWizard. Select the appropriate communications port.
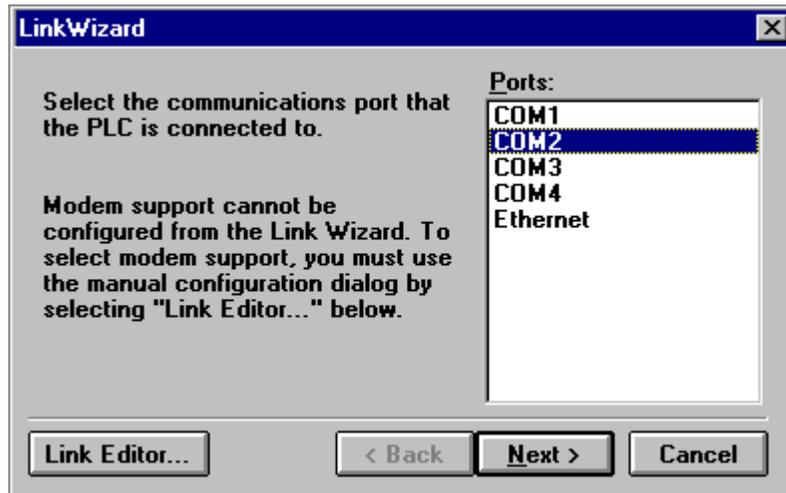
13. Select 105/205/350/405 Family.
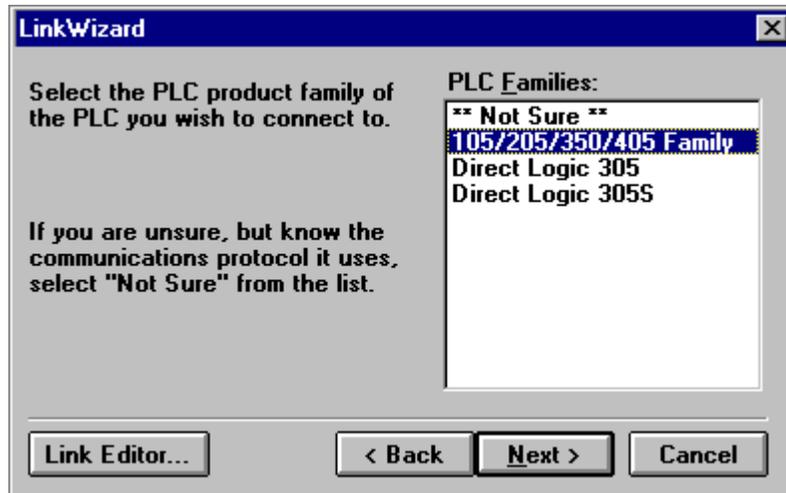
14. Select DirectNET serial communication protocol.

LinkWizard

Select the protocol to use in the communications link.

If you selected a PLC family, a valid protocol has been selected for you.

If the selected protocol supports node addressing, enter the station address. If you are unsure, leave the default.

Protocols:
- **DirectNET**
- K Sequence

Address: 1

[Link Editor...]   [< Back]   [Next >]   [Cancel]
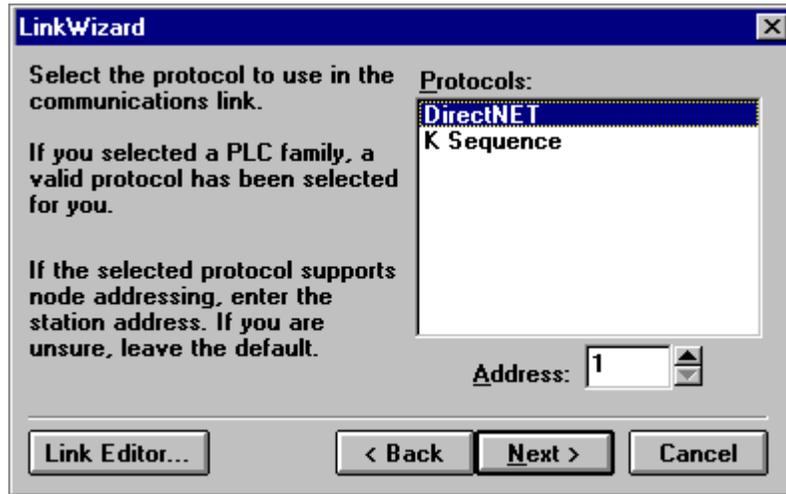
15. Name your Link. Select Finish. Link settings are complete.

LinkWizard

Link settings complete!
Please select a unique name for the new link.

Link Name: VT_MODEM_Link

Link Description: To PLC #7 via VT Modem on Com2

Settings

PLC:	250	Port:	COM2
Protocol:	DirectNET	Baud:	9600
Address:	1	Parity:	Odd

[Link Editor...]   [< Back]   [Finish]   [Cancel]
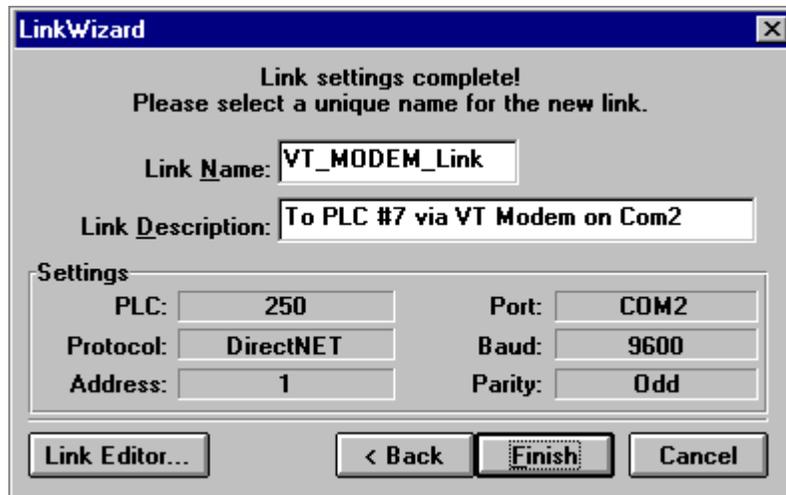
16. You are now connected to the PLC through the modems.
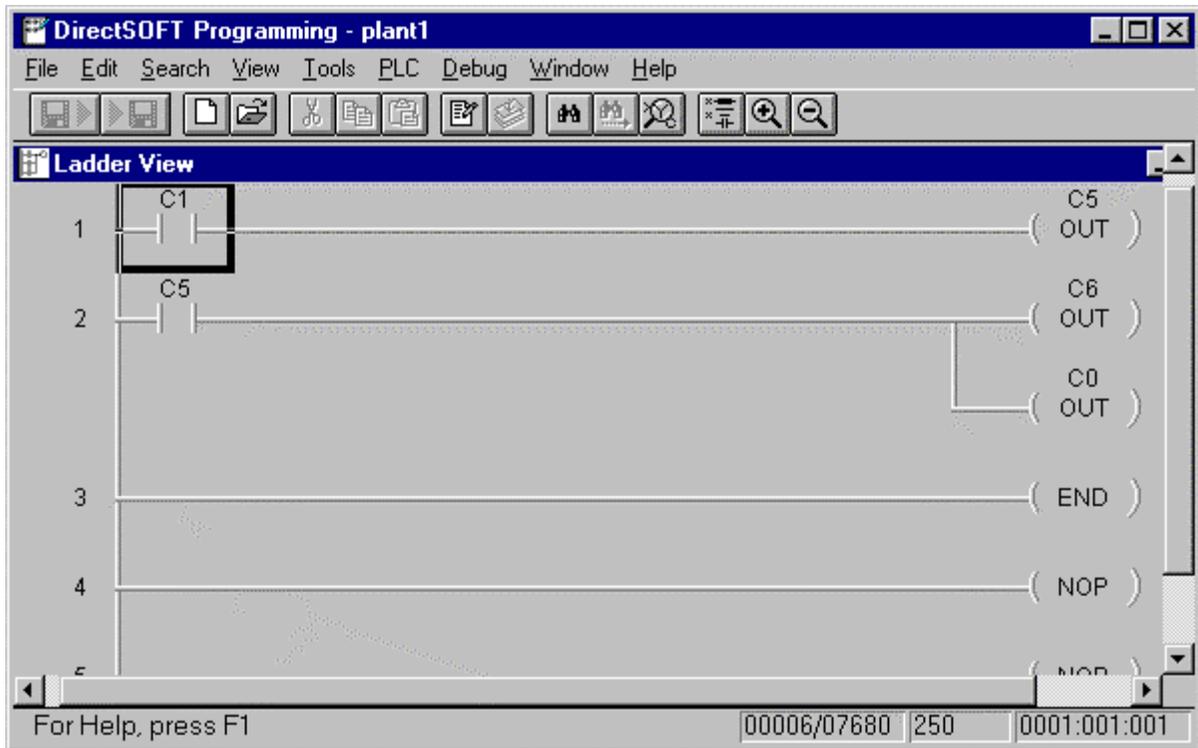
17. When you have completed your tasks within DirectSOFT, exit as usual.

18. Start Hyper Terminal. Re-open the session you saved earlier.
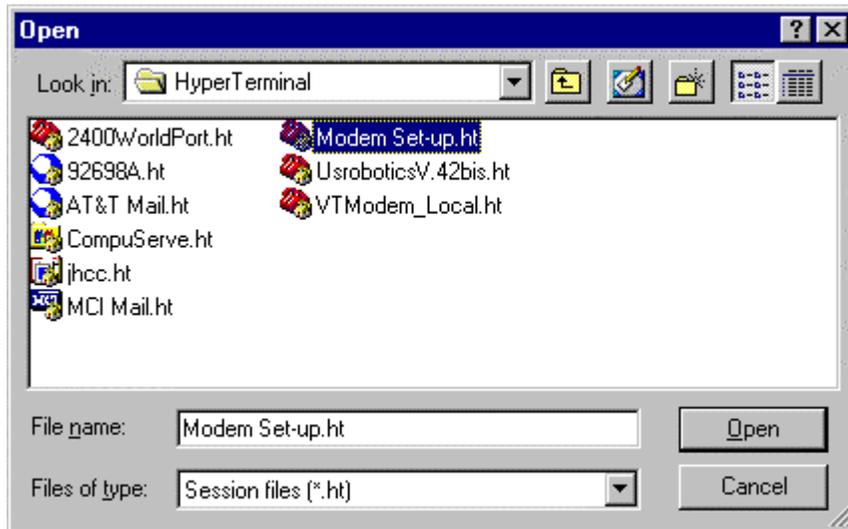
19. Entering the escape sequence +++ will switch the modem from on-line state to command state. The default escape sequence is three successive plus signs not preceded by the AT prefix and not followed by a carriage return. The escape sequence will not be echoed to the screen. The modem will respond

to the escape sequence with the OK result code at which point AT commands can be entered. (If you want to return to the on-line state, enter the ATO <enter>command). Enter ATH <enter> to hang-up the connection. Your phone line is now on-hook.
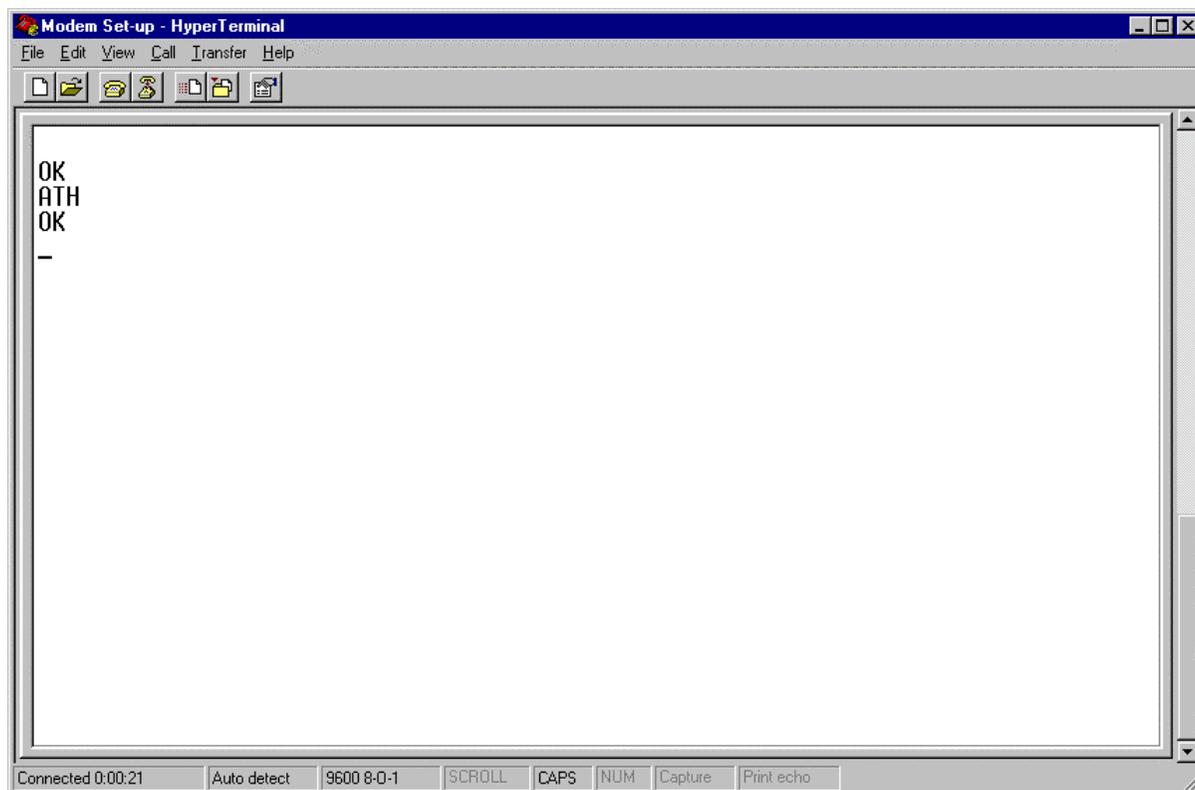
VT-MODEM Default LED Indications

LED	Default Indication
Carrier Detect	ON when a phone line connection has been established.
Data Terminal Ready	ON at all times.
Receive Data	ON when characters are being received through the phone line.
Transmit Data	ON when characters are being sent from the PLC or attached device.
Power LED	ON when power is applied to the modem.

For additional help, refer to the VT-MODEM online manual, which can be found on the SIXNET CD or downloaded from our Web site at: www.sixnetio.com.