PC Communications Options Installation Instructions

PV-S Series Grid-tied Photovoltaic Inverter

152678 Rev B

This Installation Instruction Sheet covers how to install the equipment for the PC Communications features of the PV-S Series Grid-tied Photovoltaic Inverter. Configuration and operation of these options is covered in the model-specific PV-S Series Planning and Installation Manuals.

WARNING: Shock Hazard

The PV-S Series enclosures contain exposed high-voltage conductors. The enclosure doors should remain closed with the latches tightened, except during installation, maintenance or testing. These servicing instructions are for use by qualified personnel who meet all local and state code requirements for licensing and training for the installation of Electrical Power Systems with AC and DC voltage to 600 volts. To reduce the risk of electric shock, do not perform any servicing other than that specified in the installation instructions unless you are qualified to do so. Do not open the cabinet doors if extreme moisture is present (rain or heavy dew).

WARNING: Lethal Voltage

In order to remove all sources of voltage from the PV-S Series, the incoming power must be de-energized at the source. This may be done at the main utility circuit breaker and by opening the AC Disconnect and the DC Disconnect Switches on the PV-S Series. Review the system configuration to determine all of the possible sources of energy. In addition, allow 5 minutes for the DC bus capacitors to discharge after removing power.

Tools Required

The following tools may be required to install this equipment:

- Screw-driver set
- Trade-size conduit knock-out set
- Main Inverter Enclosure Key (7mm triangle key)

External Services Required

One of the following external services may be required to operate these options.

- POTS phone service (POTS - Plain Old Telephone Service)
- Wireless phone service
- Local area network
- Contact the wireless modem manufacturer for the suggested wireless service provided in your region.

Important: When arranging for wireless service:

- Don’t get any voice features
- Disable GPRS.
- Get circuit switched data (CDS) service and use only the CSD# and not the voice #.

Operational Safety Procedures

Never work alone when servicing this equipment. A team of two is required until the equipment is properly de-energized, locked-out and tagged, and verified de-energized with a meter.

Thoroughly inspect the equipment prior to energizing. Verify that no tools or equipment have inadvertently been left behind.

Lockout and Tag

Safety requirements mandate that this equipment not be serviced while energized. Power sources for the PV-S Series must be locked-out and tagged prior to servicing. A padlock and tag should be installed on each energy source prior to servicing.

WARNING: Shock Hazard

Review the system schematic for the installation to verify that all available energy sources are de-energized. DC bus voltage may also be present. Be sure to wait the full 5 minutes to allow the capacitors to discharge completely.

Refer to the model-specific PV-S Series Operation and Maintenance Manuals for proper lock-out and tagging procedures.

De-Energize/Isolation Procedure

WARNING

The terminals of the DC input may be energized if the PV arrays are energized. In addition, allow 5 minutes for all capacitors within the main enclosure to discharge after disconnecting the PV-S Series from AC and DC sources.

Refer to the model-specific PV-S Series Operation and Maintenance Manuals for proper de-energize/isolation procedures.

PC Connection Methods to the PV-S Series

Personal computers (PC) can be used to access the system status and programming features of the PV-S Series Grid-tied Photovoltaic Inverters. A computer can be connected either directly or remotely using one of the following communications kits.

- POTS Connect (p/n 1-152674-01). This kit allows a PC to be connected remotely using a modem and an analog phone line.
- Wireless Connect (p/n 1-152659-01). This kit allows a PC to be connected remotely using a wireless phone service.
- Ethernet LAN Connect (p/n 1-152658-01). This kit allows a PC to be connected remotely using a local area network.
- Direct Connect (p/n 1-152624-01). This kit allows a a PC to be connected directly to the unit using a serial communications cable.

These kits are intended for installation in the Communications Enclosure. Conduit space is provided at the bottom of the Communications Enclosure to allow for cable entry from the supporting communications service. Water-proof conduit fittings may be required in out-door installations. Be sure to check with local codes.

Important: Outdoor installations require that all conduit fittings interfacing with the PV-S Series be NEMA-4 rated.

Figure 1 The Communications Enclosure

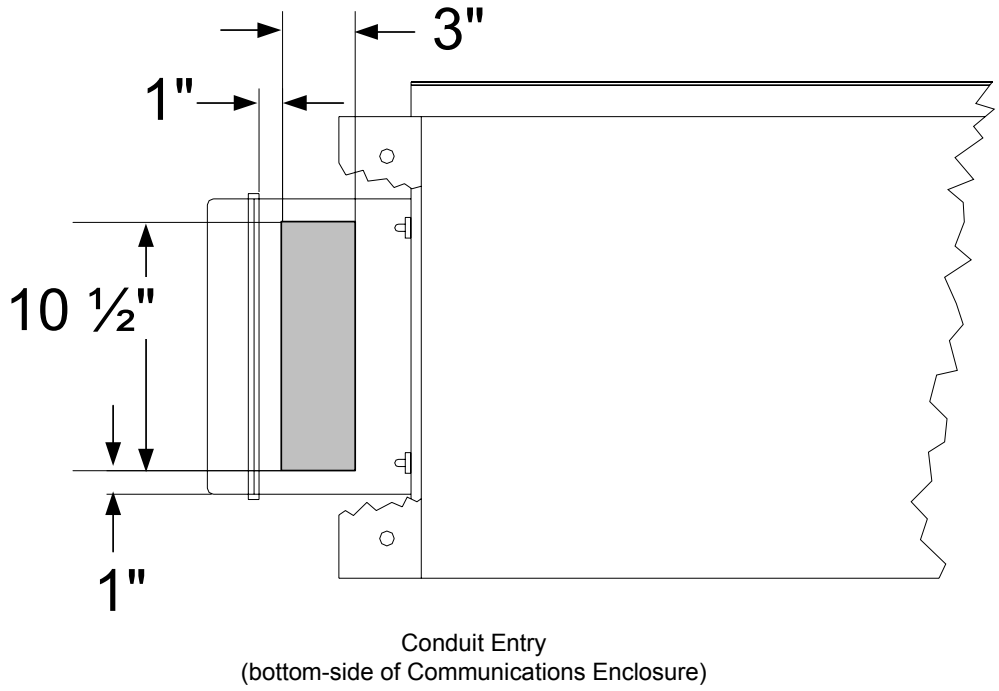


Figure 2 Conduit Entry (not-to-scale)

Arranging for a service provider to use these features such as phone service, wireless internet access or LAN access, is the end-user's responsibility.

Important: Consult the PV-S Series Planning and Installation Manuals for more detailed instructions on conduit requirements.

POTS Access Kit

This kit includes one each of the following equipment.

1. Mounting Panel
2. MultiTech® 56K modem
3. RS232/FO Converter (configured for Ethernet)
4. Fiber-optic (FO) cable
5. Power cord
6. SA2 Surge Arrestor
7. Modem Software CD and Owner's Manual

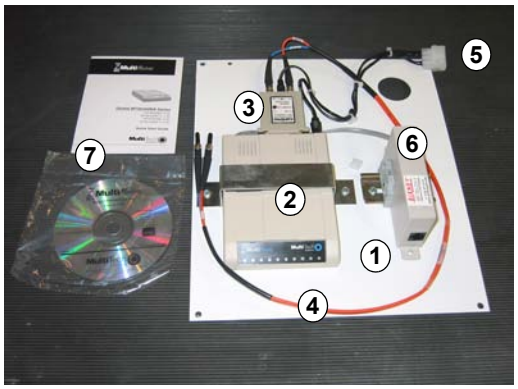
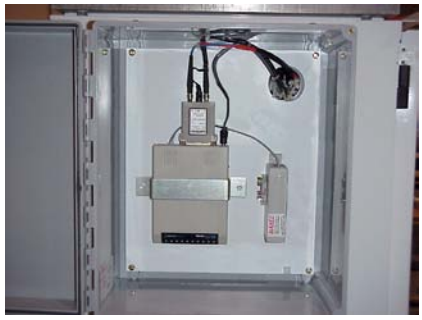


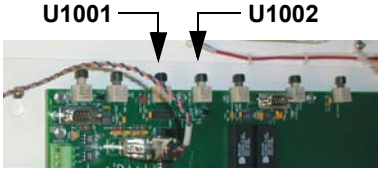
Figure 3 POTS Access Components

To Install the POTS Access Kit:

1. Open the Main Inverter Enclosure and the Communications Enclosure.
2. Punch or drill an appropriate sized hole in the bottom of the Communications Enclosure for the phone cable to enter. Install a water-tight conduit fitting.
3. Place the mounting panel (1) inside the Communications Enclosure and secure it to the back of the enclosure with the four 8-32 x 0.38" screws that are included within the enclosure.
4. Route the phone line through the water-tight conduit fitting and plug the RJ11 plug into the RJ11 Port on the SA2 Surge Arrestor (6) marked "UNPROTECTED".
5. Route the Fiber-Optic (FO) cable (4) connected to the RS232/FO Converter through the conduit into the Main Inverter Enclosure.
   a) Connect the blue fiber to the CCU2B at the port labeled **U1002**.
   b) Connect the orange fiber to the CCU2B at the port labeled **U1001**.
6. On the inside, upper left, of the Main Inverter Enclosure, locate the power cablemate (**P13**). It should be connected with a cable tie to the Analog Inputs harness (J14). Remove the cable tie if necessary.
7. Plug the black power cable (5) from the RS232/FO converter into the corresponding power cablemate (**P13**) from the Main Inverter Enclosure.
8. Close and lock both enclosures.



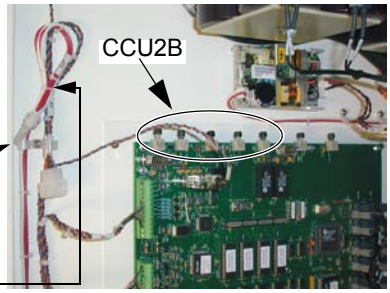
Communications Enclosure with the POTS Kit installed



CCU2B Port Enlargement

Power Cord (**P13**) cablemate (on left inside wall of the Main Inverter Enclosure.)

Cable Tie (Can be removed if necessary to connect to cablemate)

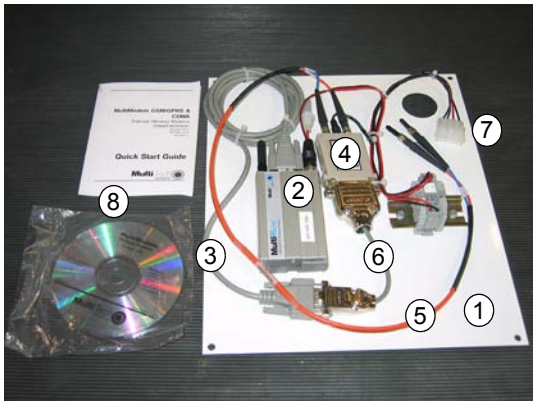


Main Inverter Enclosure
(with door open--left inside wall)

Figure 4 Installing the POTS Access Kit

Wireless Access

Important: When arranging for wireless service:
- Don't get any voice features
- Disable GPRS.
- Get circuit switched data (CDS) service and use only the CSD# and not the voice #.



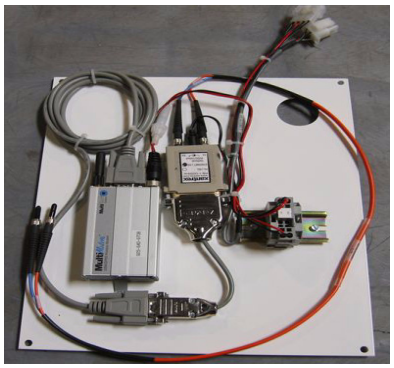
This kit includes one each of the following equipment.

1. Mounting plate with the following components
2. MultiTech® GSM Wireless Modem, with antenna
3. Serial Interface Cable
4. RS232/Fiber-Optic Converter (configured for Ethernet)
5. Fiber-Optic Cable
6. DB25-to-DB9 Adapter Cable
7. Power Cord
8. Modem Software Disk and Owner's Manual

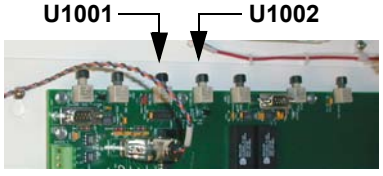
Figure 5 Wireless Access Components

To Install the Wireless Remote Access Kit:

1. Open the Main Inverter Enclosure and the Communications Enclosure.
2. Place the mounting panel (1) inside the Communications Enclosure and secure it to the back of the enclosure with the four 8-32 x 0.38" screws that are included within the enclosure.
3. Route the fiber-optic cable (5) connected to the RS232/FO Converter through the conduit into the Main Inverter Enclosure
   a) connect the blue fiber to the CCU2B at the port labeled **U1002**, and
   b) connect the orange fiber to the CCU2B at the port labeled **U1001**.
4. Locate the power cablemate (**P13**) hanging on the left side of the Main Inverter Enclosure.
5. Plug the black power cable (7) from the RS232/FO converter into the corresponding cablemate (**P13**) from the Main Inverter Enclosure.
6. Close and lock both enclosures.



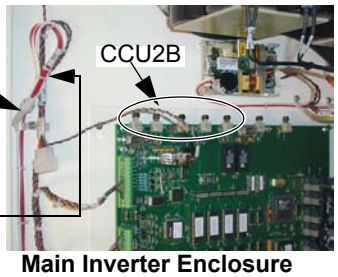
Communications Enclosure with the Wireless Kit installed



CCU2B Port Enlargement

Power Cord (**P13**) cablemate (on left inside wall of the Main Inverter Enclosure.)

Cable Tie (Can be removed if necessary to connect to cablemate)



Main Inverter Enclosure
(with door open--left inside wall)

Figure 6 Installing the Wireless Connect Kit

Ethernet LAN Access

Important: Additional equipment, such as a router or LAN hub may be necessary if more than one inverter is to be networked together.

This kit includes one each of the following equipment.

1. Mounting plate with the following components
2. MOXA® LAN kit
3. RS232/Fiber-Optic Converter (configured for Ethernet)
4. Fiber-Optic cable
5. Power cord
6. SA2 Surge Arrestor
7. LAN card software disk and Owner's Manual

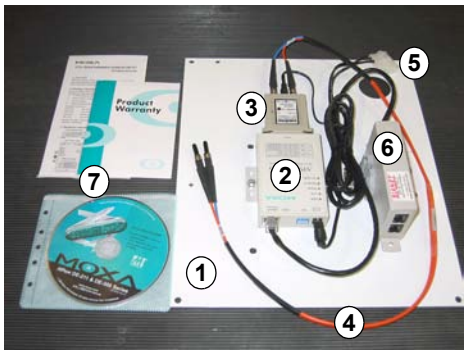
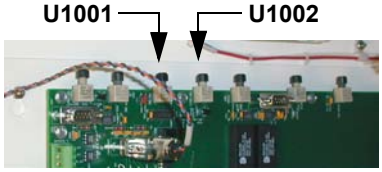


Figure 7 LAN Access Kit Components

To Install the Ethernet Access Kit:

1. Open the Main Inverter Enclosure and the Communications Enclosure.
2. Punch or drill an appropriate sized hole in the bottom of the Communications Enclosure for the LAN cable to enter. Install a water-tight conduit fitting.
3. Place the mounting panel (1) inside the Communications Enclosure and secure it to the back of the enclosure with the four 8-32 x 0.38" screws that are included with the enclosure.
4. Route the LAN cable through the water-tight conduit fitting and plug the RJ45 plug into the RJ45 Port on the SA2 Surge Arrestor (6) marked "UNPROTECTED".
5. Route the fiber-optic cable (4) connected to the RS232/FO Converter through the conduit into the Main Inverter Enclosure
   a) connect the blue fiber to the CCU2B at the port labeled **U1002**, and
   b) connect the orange fiber to the CCU2B at the port labeled **U1001**.
6. Locate the power cablemate (**P13**) hanging on the left side of the Main Inverter Enclosure.
7. Plug the black power cable (5) from the RS232/FO converter into the corresponding cablemate (**P13**) from the Main Inverter Enclosure.
8. Close and lock both enclosures.
9. To configure the IP Address for the Ethernet LAN unit, see page 8.

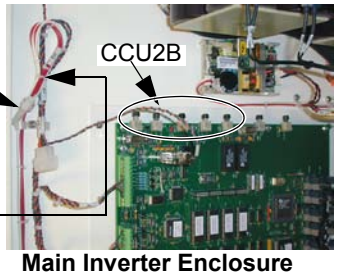
Communications Enclosure with the Ethernet LAN Kit installed



CCU2B Port Enlargement

Power Cord (**P13**) cablemate (on left inside wall of the Main Inverter Enclosure.)

Cable Tie (Can be removed if necessary to connect to cablemate)



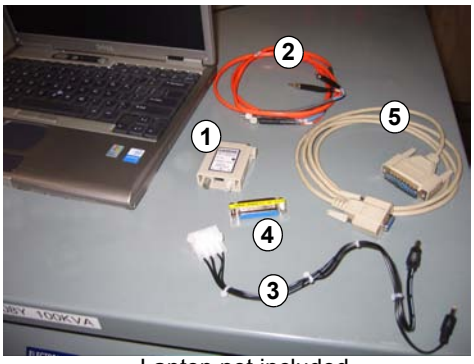
Main Inverter Enclosure
(with door open--left inside wall)

Figure 8 Installing the Ethernet LAN Kit

Direct Access Kit

This kit includes one each of the following components.

1. RS232/Fiber-Optic Converter (configured for PC)
2. Fiber-Optic Cable
3. Power Cord
4. DB25-DB25 Gender-changer Adapter
5. DB25-DB9 Serial Cable



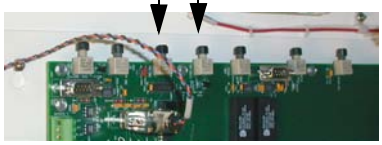
Laptop not included.

Figure 9 Direct Access Kit Components

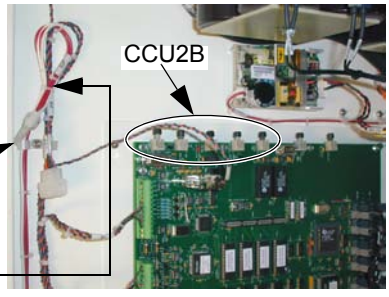
To Install the Direct Access Kit:

1. Open the Communications Enclosure.
2. If a communications option is installed, disconnect the TX (transmit-orange) and RX (Receive-blue) fiber-optic cables from the installed RS232/FO Converter in the Communications Enclosure.
3. Reconnect the TX (transmit-orange) and RX (Receive-blue) fiber-optic cables to the RS232/FO Converter ① from the Direct Connect Kit.
4. Disconnect the power plug from the installed RS232/FO converter and plug it into the RS232/FO Converter ① from the Direct Connect Kit.
5. Plug the DB25-to-DB25 Gender-changer Adapter ④ into the Serial Communications Port on the RS232/FO Converter.
6. Plug the DB25 connector on the serial cable ⑤ into the gender-adapter and the DB9 connector of the serial cable into the serial port on the computer.
7. If no communications option is installed, use the power cord ③ and fiber-optic cable ② supplied with the Direct Connect kit to make the connections to the **P13** power cable and the CCU2B **U1001** and **U1002** ports in the Main Inverter Enclosure.

Communications Enclosure with the Direct Connect Kit installed



CCU2B Port Enlargement



Main Inverter Enclosure
(with door open--left inside wall)

Figure 10 Installing the Direct Connect Kit

Ethernet LAN Configuration

In order for the Ethernet LAN card to access the local area network, the IP Address must be configured using a personal computer connected directly to the LAN card in the Communications Enclosure. The following instructions are provided for establishing the IP address. If more than one PV-S Series Inverter is being networked, this procedure must be repeated for each unit to be installed.

Hardware Requirements

- ❒ DB25-Male to DB9-Female Serial Null Modem Cable (not provided with kit).

Software Requirements

- ❒ NPORT Management Suite (supplied on the NPort Installation CD)
- ❒ MOXA PComm Program supplied on the NPort Installation CD (also available at (http://web4.moxa.com/support/download.asp)

IP Address Configuration

To configure the Ethernet LAN:

1. Verify that the Ethernet LAN Kit is installed into the PV Series inverter.
2. Verify that the AC power is 'ON' in the inverter.
3. Disconnect the RS232/Fiber-Optic Converter from the LAN unit. (3)
4. Connect the DB25 Male connector of the modem cable to the LAN unit's Serial connector. (4)
5. Connect the DB9 Female connector of the modem cable to a PC RS232 port (COMM port). (5)

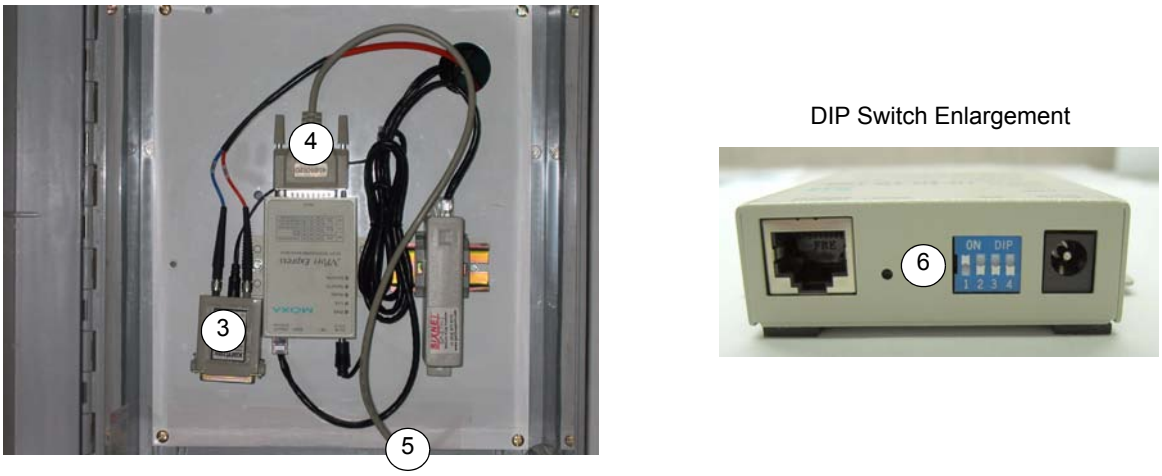


Figure 11 Connecting the DB25-to-DB9 Serial Null Modem Cable

6. Set the DIP switch 1 on the LAN unit to the ON position. (6)

7. Start the LAN configuration program.
   a) Click Windows **START**.
   b) Select **PROGRAMS**.
   c) Select **PCOMM LITE 2000(XP) VER 1.2-PCOMM TERMINAL EMULATOR**.
8. Select the **PORT MANAGER** menu tab. Open the **PROPERTIES** window by doing one of the following:
   a) Doubleclick on the **PORT MANAGER** Menu tab,
   b) Select **OPEN**, or
   c) Press the keyboard combination **CTRL+ALT+O**.
9. When the **PROPERTIES** window is displayed, select the **COMMUNICATION PARAMETER** tab and use the drop-down boxes next to each COM Option to select the following parameter.

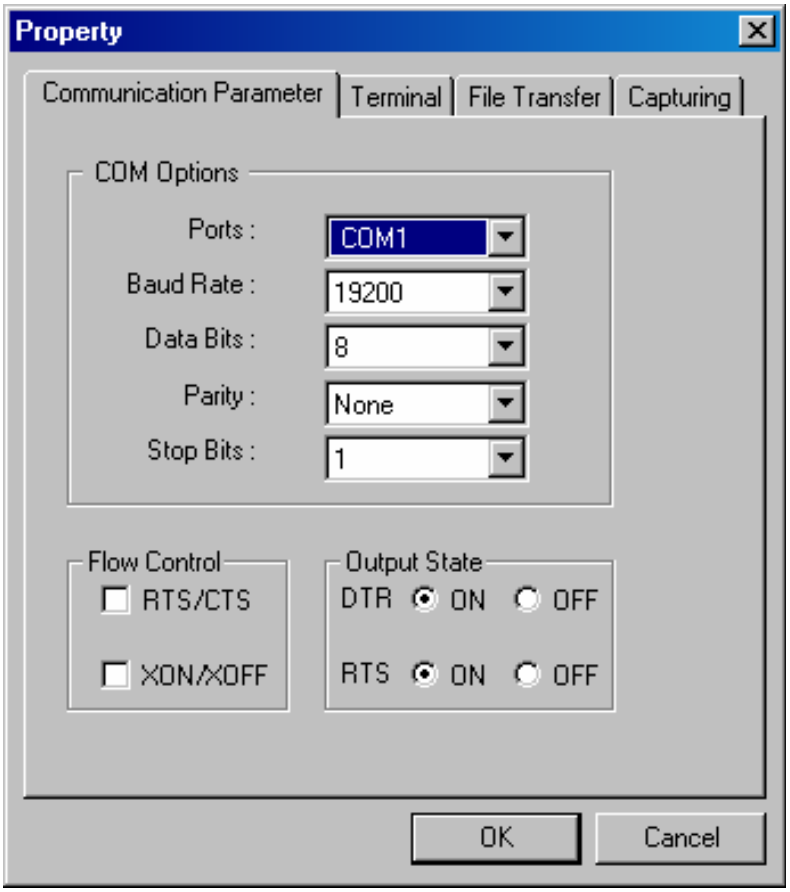


Figure 12 Setting the Communication Parameters

   a) Ports: to the appropriate COM port on the computer being used for this setup, and
   b) Baud Rate: to 19200.
   c) Do not change any other settings.

10. Select the **TERMINAL** Tab.
    a) Set the Terminal Type: to VT100,
    b) Then select the OK button.

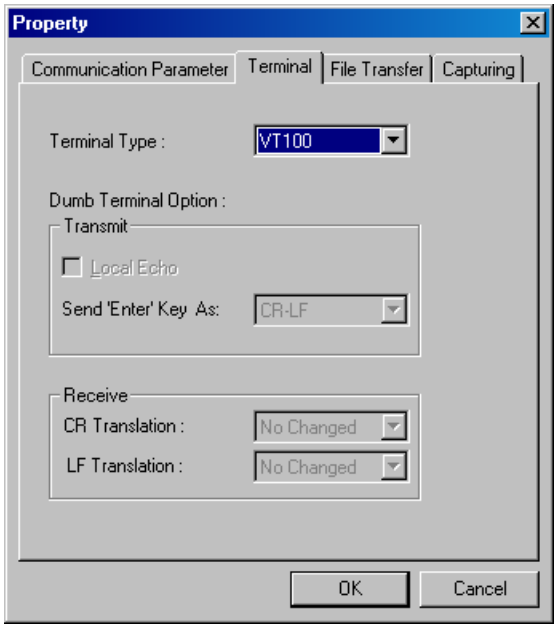


Figure 13 Selecting the Terminal Type

The Terminal Emulator will establish communication with the LAN unit and the following window will be displayed.

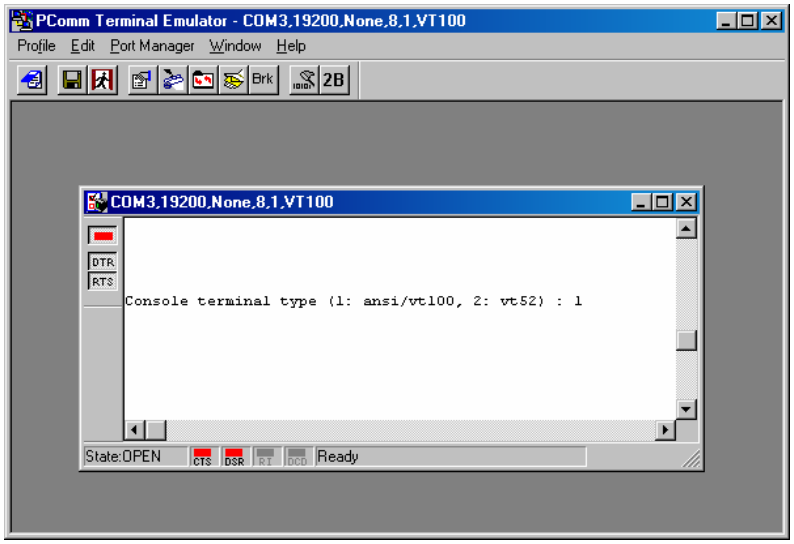


Figure 14 PCComm Terminal Emulator Window

11. Select **CONSOLE TERMINAL TYPE 1**, and press the ENTER key. The following window will be displayed.

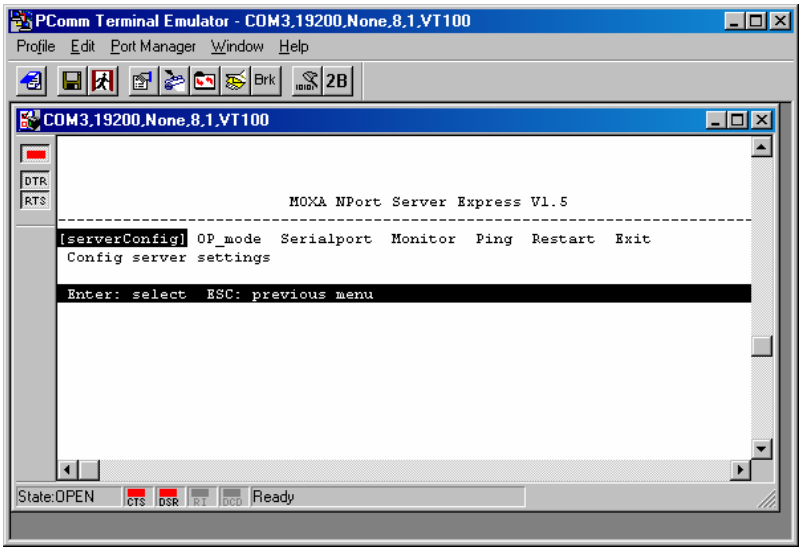


Figure 15 Server Configuration Selection

12. Using the arrow keys to navigate, select **serverConfig**, then press the **ENTER** key. The following window will be displayed.

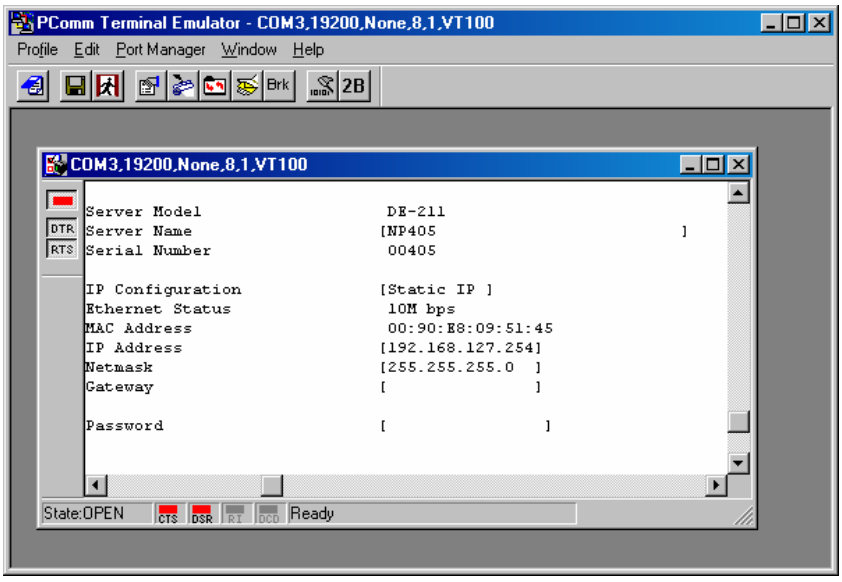


Figure 16 Entering the IP Address, Netmas, and Gatway Addresses

13. Enter the IP Address, Netmask, and Gateway for the LAN network as provided by your network administrator.
14. Press the **ESC** key, after completing the configuration. This will return you to the main menu.

15. Using the arrow keys, select **OP_mode** , then press the **ENTER** key.

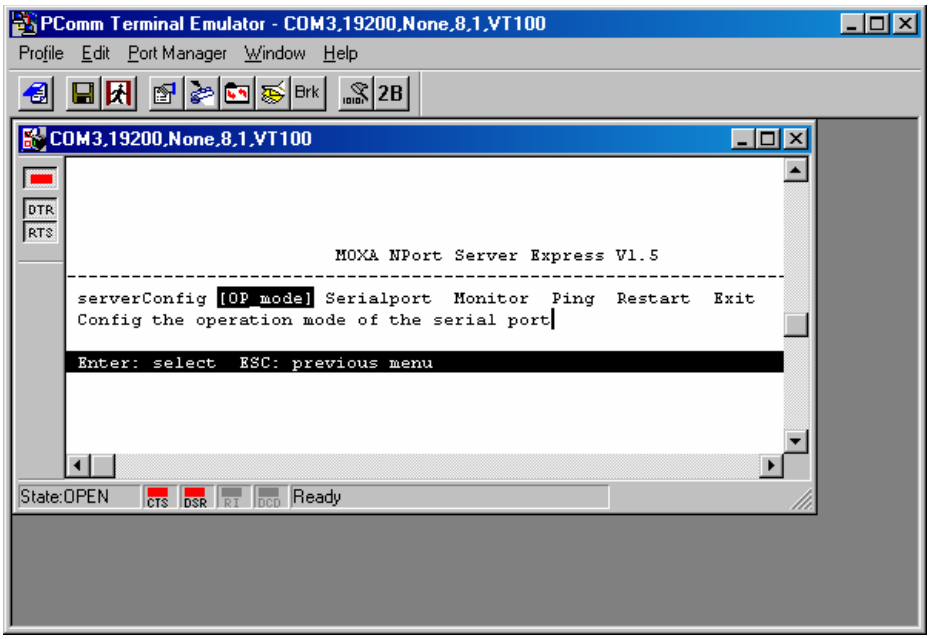


Figure 17 Selecting OP_mode

16. With **Host Based / Driver Mode** highlighted, press the **ENTER** key. This will bring up more settings.

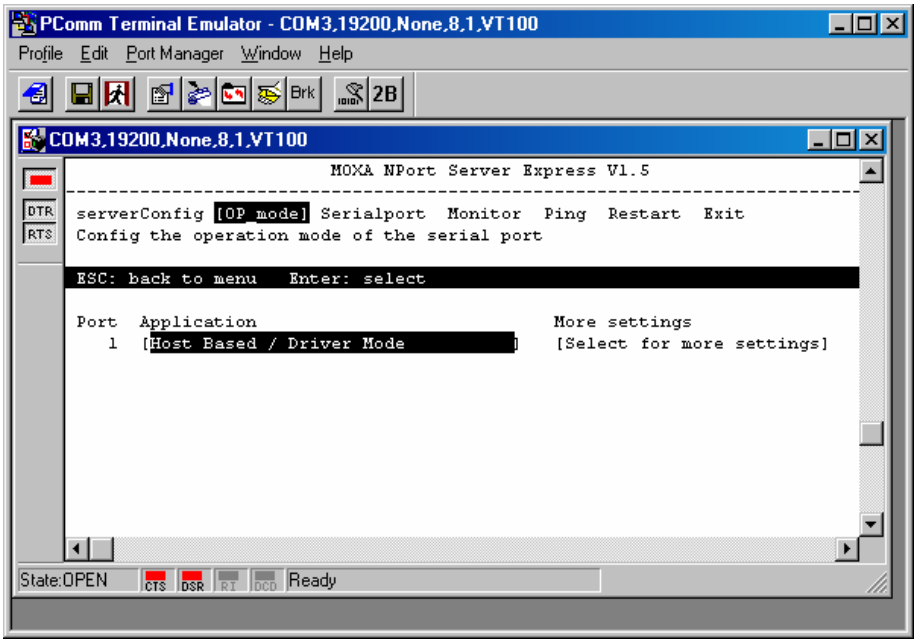


Figure 18 Setting Op_mode Parameters

17. Using the arrow keys, select **TCP SERVER** from the menu and press the **ENTER** key.

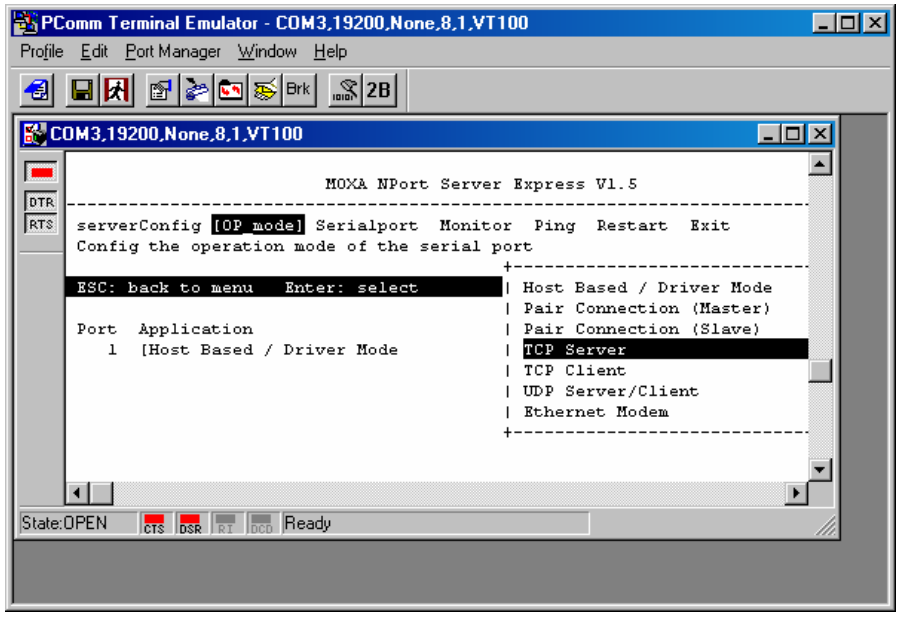


Figure 19 Setting the Host to TCP Server

18. Using the arrow keys, select "**Select for more settings**", then press the **ENTER** key.

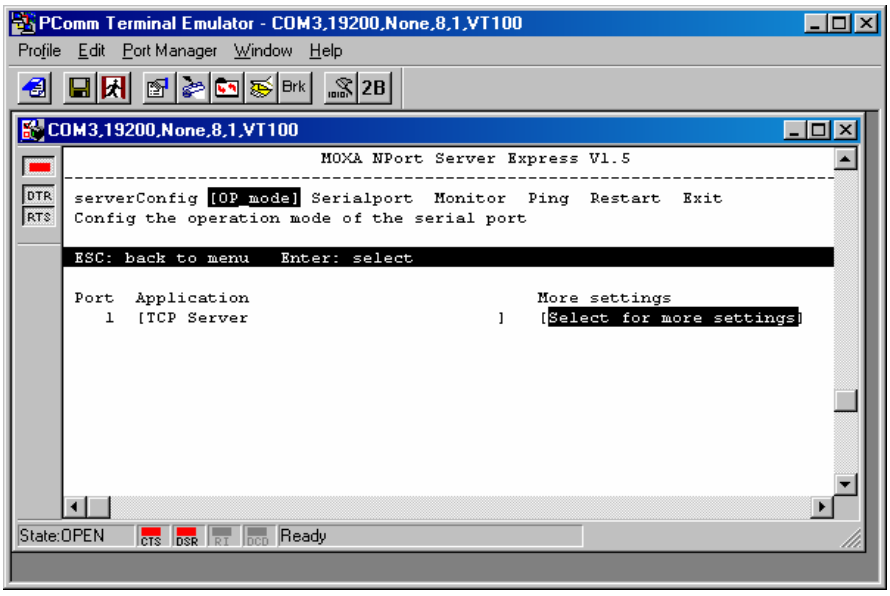


Figure 20 TCP Server Additional Settings

The following window will be displayed.

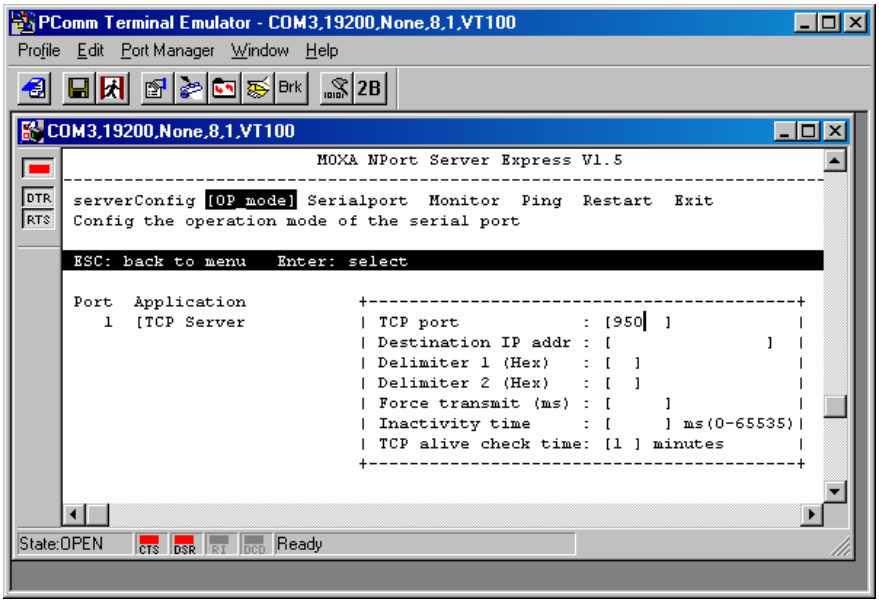


Figure 21 TCP Server Parameters

19. Enter the parameters as follows:
    a) TCP Port: to '**950**',
    b) TCP alive check time: to '**1**',
    c) Then press the **ESC** key twice. Do not change any other settings.
20. Using the arrow keys, select **Serialport**, then press the **ENTER** key.

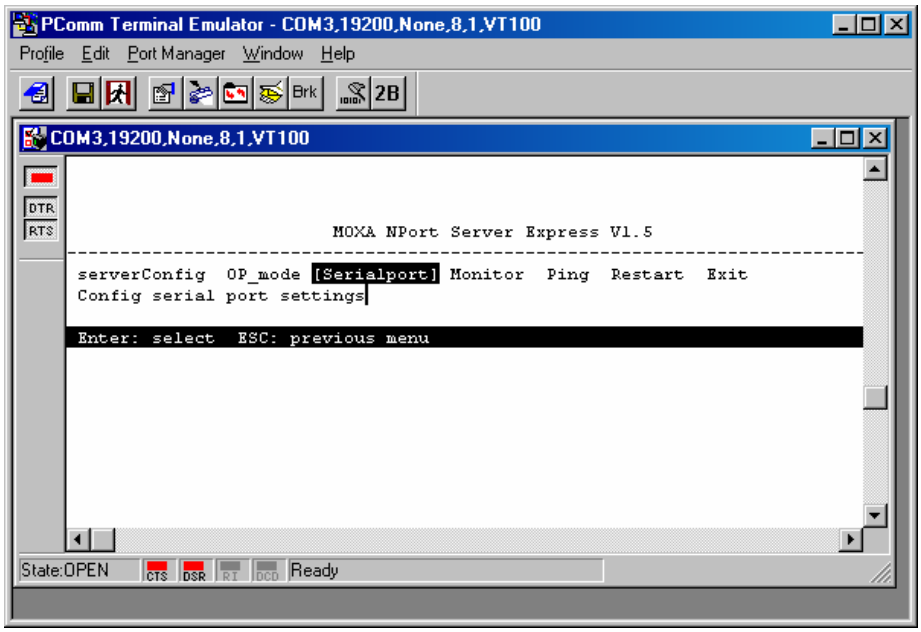


Figure 22 Selecting the Serial Port Settings

21. The following window will be displayed. Use the arrow keys to select the following parameters.

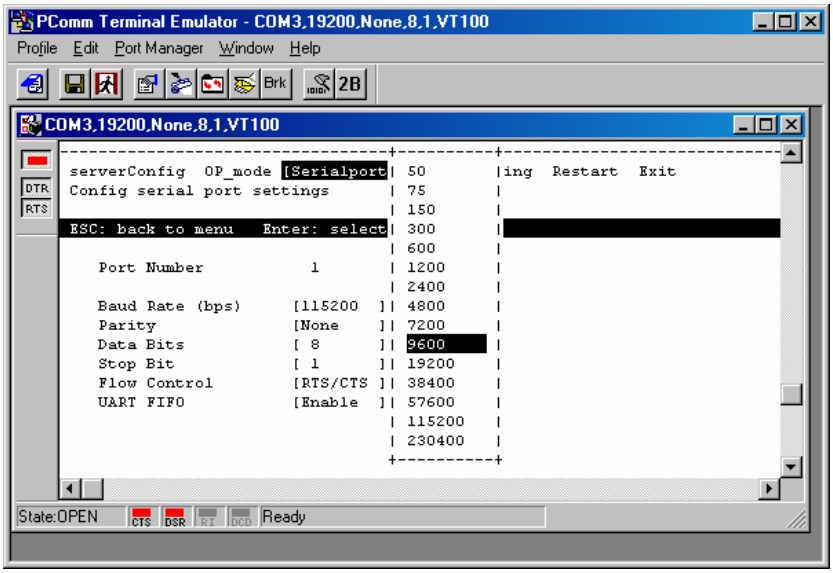


Figure 23 Setting the Serial Port Baud Rate

a) Use the arrow keys to select **Baud Rate (bps)**, then press the **ENTER** key.

b) Select **9600** from the menu, then press the **ENTER** key.

22. Using the arrow keys, select **Flow Control**, then press the ENTER key.

a) Select a **Flow Control** of **None** from the menu (using the arrow keys) and press the ENTER key.

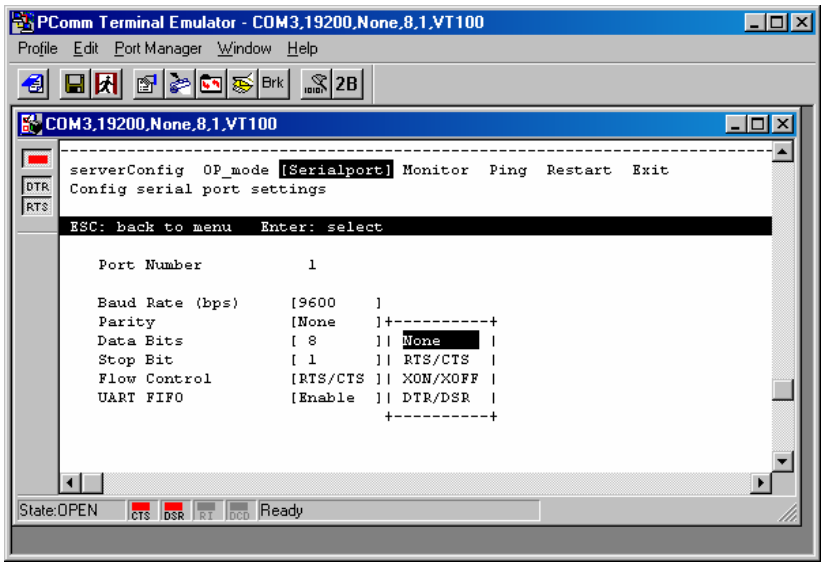


Figure 24 Setting the Serial Port Flow Control

23. Press the ESC key.

24. Select Restart, then press the ENTER key.

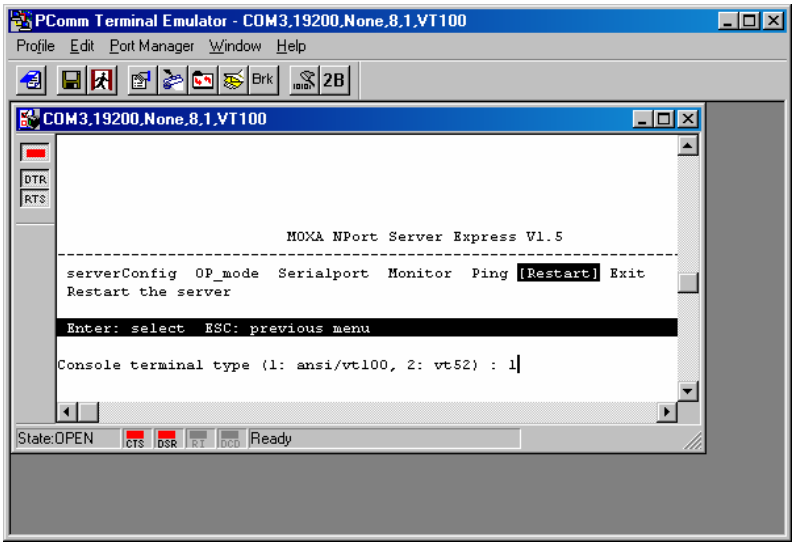


Figure 25 Setting the Serial Port Flow Control

25. Press the ENTER key, to configure LAN unit.

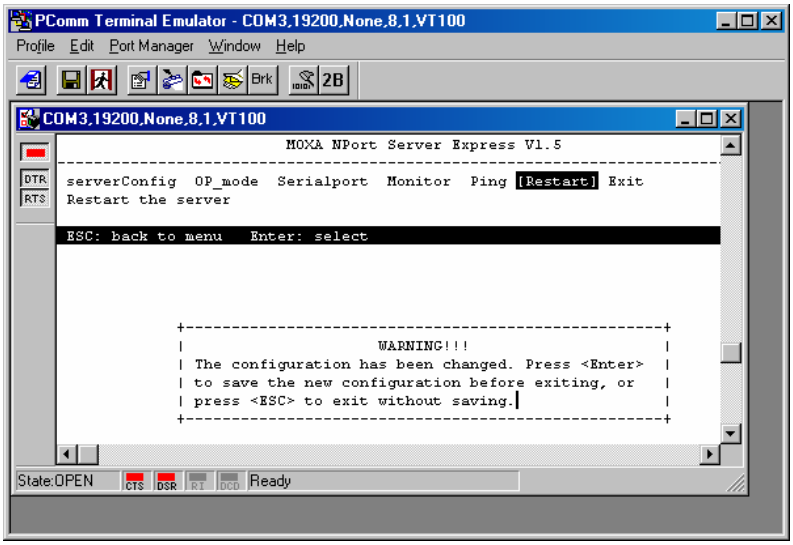


Figure 26 Setting the Serial Port Flow Control

26. Exit the PComm terminal Emulator program.
27. Disconnect the modem cable to the LAN unit's serial connector.
28. Reconnect the RS232/Fiber-Optic Converter to the LAN unit's Serial port.
29. Set all DIP switches on the LAN unit to the **OFF** position.
30. Verify that the Ethernet LAN is connected to a LAN network system.

The Ethernet LAN is now configured to communicate to the CCU2 board located in the PV-S Series inverters.

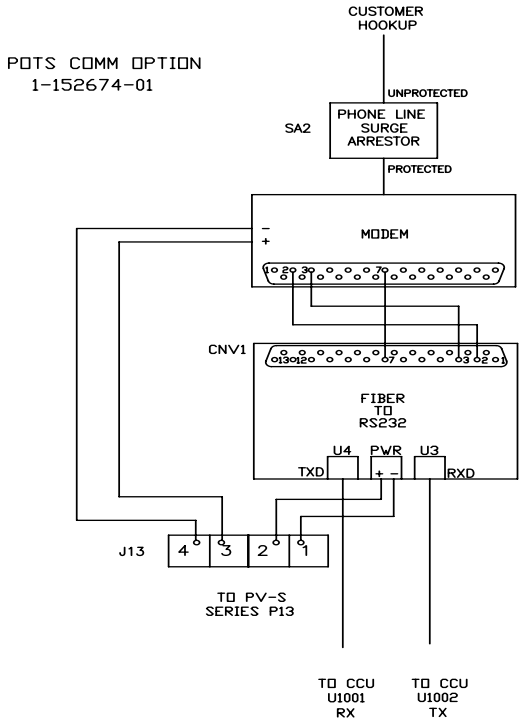


Figure 27 POTS Schematics

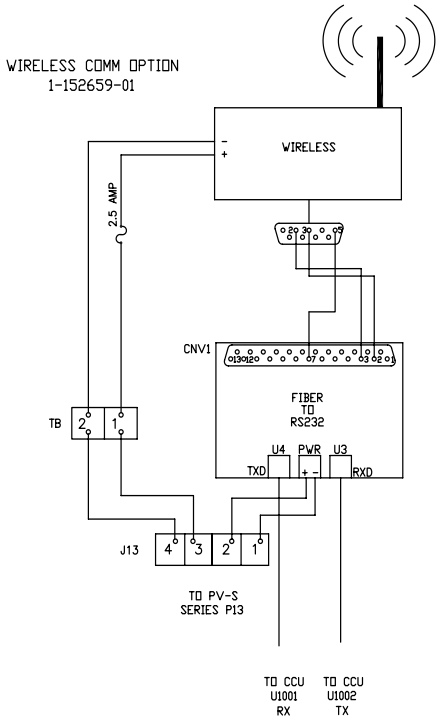


Figure 28 Wireless Schematics

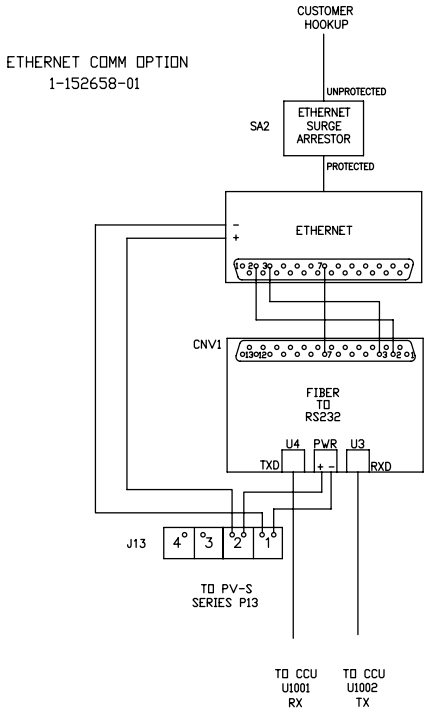


Figure 29 Ethernet LAN Schematics

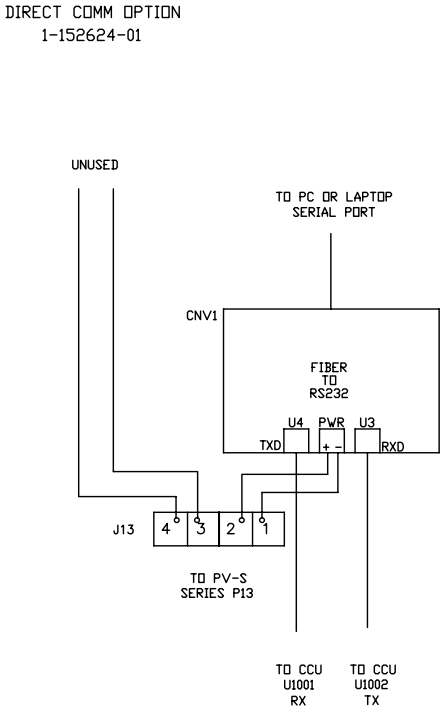


Figure 30 Direct Connect Schematics

Summary

The configuration and operation instructions for these features are in the PV-S Series Planning and Installation Manuals.

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