

Technical Note 79

Rev. 1.3

Configuring and Using the POS/2000 Series Ethernet Gateway

GE Catalog Number: PLENETG04
Systech Port Server Series POS/2000

Subject: Installing/Configuring Gateways and NativeCOM
Applies To: All POS/2000 Use with the GE PMCS Offering

The PLENETG04 connects to a 10 Mbps Ethernet cable and provides eight serial ports that are software selectable to RS-232, RS-422, or RS-485. The PLENETG04 uses the TCP/IP family of protocols to provide terminal connectivity and communications services in open systems environments. Each serial port can provide +5 or +12 Volts of power, eliminating the need for external power packs. Support for current loop is provided. An optional built in 2400 bps Hayes compatible modem is also available. The Ethernet Gateway will be referred to in many instances as the port server.



Figure 1: PLENETG04

Features and Benefits

The PLENETG04 offers the following features and benefits:

- Easy setup and configuration.
- Open systems communications for multi-site data networks.
- Reduces cost and complexity.
- Eight DB-9 high-speed serial ports with screw-down connectors.
- Four Ethernet Hub ports.
- Software selectable RS-232, RS-422, or RS-485 modes on each port.
- Software selectable +5 V or +12 V power on each serial port.
- Current loop support on two ports.
- IP packet routing.
- Operating system independent.
- Complete remote diagnostics.
- LEDs for each port, signaling port status, and error conditions.
- Industry standard interoperability.
- Developer's API for custom, on board applications and protocols.
- Raw reverse telnet option so you can access ports without using special protocol or processing.
- Multiple services per port allow the setting up of both incoming and outgoing services on the same port.
- Reverse telnet support for a variety of UNIX operating systems.

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1 PLENETG04 Panel Connectors

Figure 2 shows the PLENETG04 front panel. Eight DB-9 serial ports are numbered left to right, 1 through 8. There are four RJ-45 Hub ports labeled A, B, C, and H. There is an RJ-11 connector for the optional internal modem. Each connector has an associated LED that signals normal operation or error conditions. In addition, there is a status LED in the upper right corner that indicates the overall status of the PLENETG04:

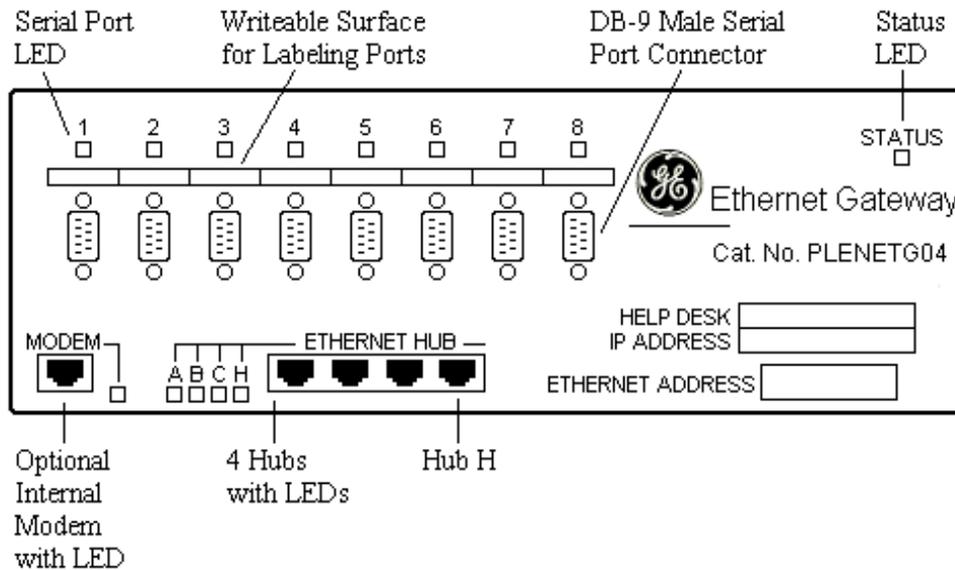


Figure 2: PLENETG04 Front Panel View

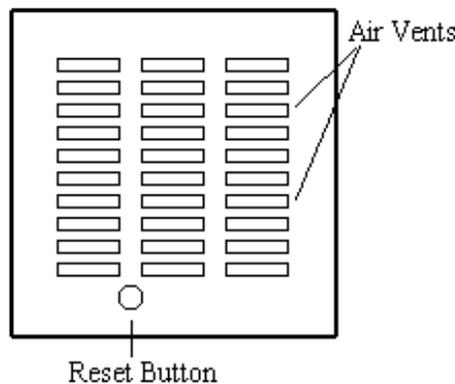


Figure 3: PLENETG04 Side Panel View

The side panel contains several air vents. The reset/default button is recessed into a round opening in the side panel below the air vents.

WARNING! Do not insert any objects, particularly any metal objects, into any of the air vents located on the right side panel. The power supply is located in this area. Inserting a metal object into an air vent could result in a dangerous electrical shock.

2 Possible Configurations of the PLENETG04

2.1 IP Addresses

The PLENETG04 provides flexibility in assigning the necessary IP address. The IP address can be assigned using four different methods (4.1 NativeCOM, 4.2 Telnet, a 4.3 Web Browser, or 4.4 HyperTerminal).

2.2 Session Settings

When the PLENETG04 is booted, the configuration information that defines the operation of the session (the active configuration) is loaded into memory from the current configuration database in Flash memory. Any configuration setting can be changed in the active configuration. In addition, the active configuration can be saved in the current configuration database (in Flash memory) so that the changed settings will be available after reboot/restart.

When the PLENETG04 is delivered, the current configuration database contains factory default settings. In addition, a factory default configuration database (a copy of the current configuration database) is stored in Flash memory. The factory default configuration database is stored as a backup configuration, which can be restored into the current configuration database if necessary. If the PLENETG04 encounters an error condition while loading the current configuration database into the active configuration, it will load the factory default configuration database into the active configuration instead. This is done in order to complete the boot. The status LED on the front panel will flash alternately yellow and green to indicate that a problem occurred and the factory default configuration has been loaded.

2.3 Changing Settings

The configuration settings can be changed:

- Using the command interface via a Telnet connection to the PLENETG04.

Note: *Telnet is the easiest method and the one preferred for GE PMCS systems.*

- For Windows NT users using the NativeCOM port redirector software developed and provided free of charge with the PLENETG04. The GE PMCS system uses the NativeCOM software to create the COM ports that are needed for the GE32MODB server.
- Using a Web browser to connect to the IP address of the PLENETG04.
- Using the command interface via a HyperTerminal connection to the PLENETG04 for non-GE IP addresses.

2.4 Commonly Used Settings

Some of the commonly changed configuration items are (see next page):

	Option	Factory Setting	PLENETG04 Shell Command
Passwords	user login	user	set <u>u</u> ser
	administrative	admin	set <u>a</u> dmin
Networking	Internet address	0.0.0.0	set ip
	sub-net mask	0.0.0.0	set <u>m</u> ask
	initial route list		add <u>r</u> oute
	host name list		add <u>h</u> ost
	domain name	yourdomain.com	set <u>d</u> omain
	DNS server list		add <u>n</u> ameserver
Asynch Serial Ports	service definition	default	set
	speed	9600	set <u>s</u> peed
	character length	8	set <u>s</u> ize
	stop bits	1	set <u>s</u> top
	parity	none	set <u>p</u> arity
	input flow control	xoff	set <u>i</u> nput
	output flow control	xon	set <u>o</u> utput
	inactivity timeout	0	set <u>t</u> imeout
	switch character	break key	set <u>s</u> witch
	DCD modem signal	required	set ignoredcd
	power	none	set power
	interface	rs232	set interface
	description		set portdesc

Table 1: Commonly Changed Configuration Items

3 Using the PLENETG04 with the PMCS

3.1 Software Requirements

3.1.1 PLENETG04 Software

To use the PLENETG04 with the PMCS NativeCOM software included with the unit, the software must be installed on the PC hosting the server.

3.1.2 PMCS Server

Unlike previous PMCS offerings, which used the GE32ENET server, the PLENETG04 uses the GE32MODB server. If the PLENETG04 is being refitted into a system that previously used the GE32ENET server, the system must be converted to use the GE32MODB server.

3.2 Hardware Requirements

3.2.1 RS-485 Half-Duplex

The PLENETG04 uses a standard male DB-9 connector on each port. To use the RS-485 half-duplex, tie pins 2 and 3 together for the Modbus RTU (+) and tie pins 7 and 8 together for the Modbus RTU (-). A 9-pin D-subminiature solder-type connector is recommended. The cable should be either a Belden 9841 or a Belden 3074F. The plugs could be found at <http://catalog.phoenixcontact.com/index.cmd!/?country=us> and are shown on the next page:

Description	Type	Order Number
socket (female end)	SUBCON 9/F-SH	27 61 49 9
pin (male end)	SUBCON 9/M-SH	27 61 50 9

Table 2: D-SUB Plug Connectors



Figure 4: D-SUB Plug Connectors

3.2.2 RS-422 and RS-485

The DB-9 pin-outs for RS-422 and RS-485 modes are:

Pin #	Name Direction
1	not used
2	RXB input
3	TXB output
4	not used
5	GND
6	not used
7	TXA output
8	RXA input
9	PWR output

Table 3: DB-9 Pin-Outs

In RS-422 mode, the transmitter remains enabled at all times. In RS-485 mode, the transmitter is disabled automatically when the POS/2000 has no data to transmit.

Note: *The pins not used should have nothing connected to them.*

A diagram of the pin configuration is shown on the next page:

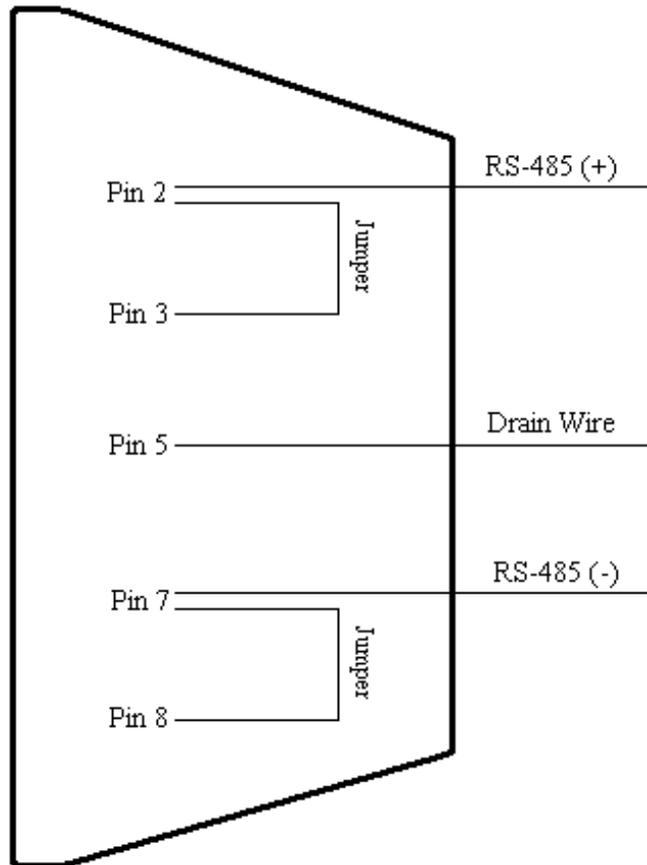


Figure 5: Pin Configuration Diagram

3.2.3 Terminating Resistor

There is not a built in terminating resistor in the latest version of the Gateway. For correct impedance matching, which allows for proper signal reception and transmission, a terminating resistor is recommended at both ends of the RS-485 transmission line in accordance with the PMCS wiring protocol. A 120 Ohm, ½ Watt, 5% terminating resistor should be placed across the (+) and (-) terminals.

3.3 Powering up the Gateway

Plug the unit into a source of AC power and turn the power switch on (1).

WARNING! *Do not insert any objects, particularly any metal objects, into any of the air vents located on the right side panel. The power supply is located in this area. Inserting a metal object into an air vent could result in a dangerous electrical shock.*

When powering up the PLENETG04, it will run a self-test. The status LED (upper right corner of the front panel) will rapidly blink yellow during the test. As boot up progresses, the LED will slowly flash yellow and then turn green. The LED will slowly blink green during normal operation.

4 Configuration of the PLENETG04

To set up and configure the system, use the 4.1 NativeCOM software, 4.2 Telnet, a 4.3 Web Browser, or 4.4 HyperTerminal. These systems are case sensitive, so enter all commands and data in the lower case. If a new Gateway with a default IP address of 0.0.0.0 is to be assigned a GE IP address, then using NativeCOM is recommended. If the Gateway's IP address is to be changed from one GE IP address to another GE IP

address, NativeCOM is also recommended, but Telnet or a Web browser will work as well. Once the IP address is set, Telnet or a Web browser is recommended to set all other settings in the PLENETG04. If the Gateway is to be assigned a non-GE IP address, using HyperTerminal is recommended for all settings.

Note: *The four numbers within a mask of an IP address cannot begin with a zero. If a number within the mask or IP address that is required begins with a zero, then that zero must be dropped or else a wrong mask or IP address will be entered automatically. For example, an IP address of 193.045.006.020 must be entered as 193.45.6.20.*

4.1 NativeCOM

Note: *The NativeCOM software will not be able to assign an IP address if it has been initially booted and hooked up to a network with a DHCP server. The Ethernet Gateway comes from the factory with an IP address and a gateway address of 0.0.0.0. Anytime the Ethernet Gateway has this initial configuration, it will acquire an IP address from an available DHCP server. If the NativeCOM software cannot be used to assign the IP address, try using the HyperTerminal procedure below.*

Power up all the POS/2000s being used on the system. Insert the line from the Ethernet LAN into the "H" connector in the Hub on the Gateway(s). Make note of the MAC address number (Ethernet address) on the front of the Ethernet Gateway. This number will be needed to set up the TCP/IP address.

4.1.1 NativeCOM Installation on the Host PC

If installing NativeCOM from a CD, insert the CD into the CD-ROM drive. If the CD does not start running by itself, then click on Start and enter Run. Type "d:\setup". Follow the directions given to complete the installation.

If installing the NativeCOM software from the two diskettes included in the carton specifically for GE PMCS, then:

- 1) Enter Disk 1 into the a:\ drive and select setup.exe.
- 2) Enter Disk 2 and install from the command prompt a:\>support\GEPatch.exe.
- 3) A response should return saying NativeCOM was successfully configured for use with GE PMCS.
- 4) Reboot the PC.

4.1.2 IP Address

Setting the IP address of the PLENETG04 is most easily done using the NativeCOM software and is recommended for GE PMCS:

- 1) Click Start, enter Programs, then NativeCOM, and finally Port Server Utilities (see next page):

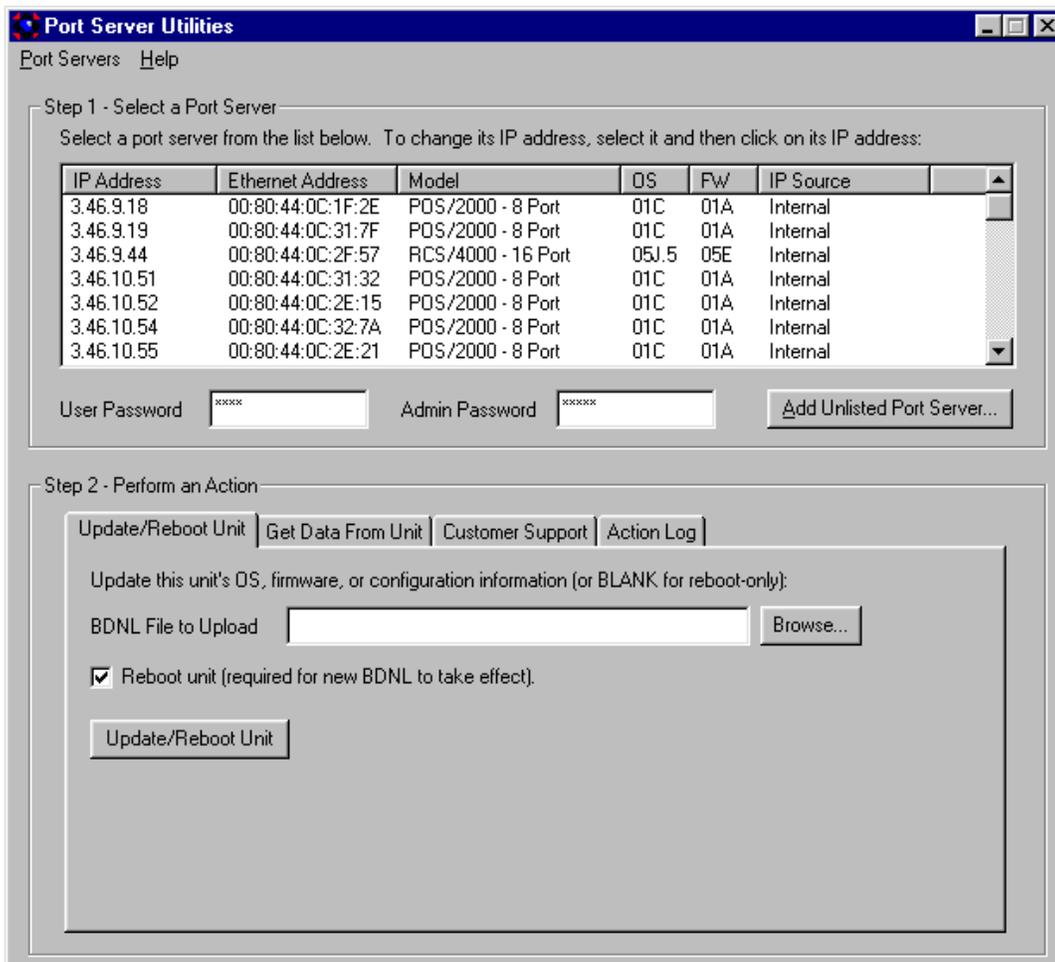


Figure 6: Port Server Utilities

- 2) Click on Click to Assign (or the old IP address if it is given) in the IP Address column to highlight it, and then click on Click to Assign (or the old IP address) again to enter the new address. Hit Enter. If changing an old IP address to a new IP address, then click Yes in the PSUTIL window that appears.
- 3) Manually reboot the Ethernet Gateway after the new IP address appears in the Port Server Utilities box.

4.1.3 Settings

After the software has been installed and the PC rebooted, Chapter 3: User Guide in the NativeCOM manual on the CD should be read to become more familiar with the software. Follow the instructions on setting up the IP address, adding multiple ports, selecting port driver settings, etc. Here are some guidelines to follow:

Note: *If using the NativeCOM software, no other port settings need to be made. The NativeCOM software will automatically configure the ports for the settings it receives from the master application. For the PMCS, the master application is the GE32MODB server. The new configuration changes to the Ethernet Gateway can be made via a Telnet session into the Gateway:*

- 1) Click Start, enter Programs, NativeCOM, and then NativeCOM Configuration Utility.
- 2) Click Add in the Port Server section.

- 3) On the first Gateway, select the starting COM port to be 5 and let the software create the maximum of eight ports. On the next Ethernet Gateway, select the starting COM port to be 13. Repeat this for each additional Gateway. The mapping is as follows:

Gateway Number	Gateway Port	PC COM Port
1	1	5
1	2	6
1	3	7
...
2	1	13
2	2	14
2	3	15

Table 4: Port Mapping

- 4) For Driver Settings, let the protocol be Telnet (binary). If this option can not be found, then a version later than 4.06 is being used, which no longer has this feature.

Note: *NativeCOM version 4.07 is required for GE PMCS.*

- 5) Do not bother with the port settings, with the exception of setting the RS-485 interface, as the port settings are received from the GE32MODB server during port initialization.

Note: *The easiest way to set the RS-485 interface in the Ethernet Gateway is to use Telnet. Follow the steps in paragraph 4.2 Telnet.*

4.2 Telnet

Note: *If the Ethernet network being used utilizes a DHCP server, skip the paragraph below. Do not connect the PLENETG04 to the LAN until the TCP/IP address is assigned, or else the DHCP server will assign the address automatically.*

This method is OK to use if a previous GE IP address was configured. Changing the IP address and/or other configurations can be made while still connected to the network:

- 1) Connect the PLENETG04 server to the Ethernet LAN using a 10BASET RJ-45 connector located on the front panel. Use Hub port H to connect the PLENETG04 to the LAN using a straight through cable. Hub ports A, B, or C can be used to connect other peripheral devices to the LAN using straight through cables.
- 2) Go to Start on your PC and select Run. Type “telnet” followed with the current GE IP address:

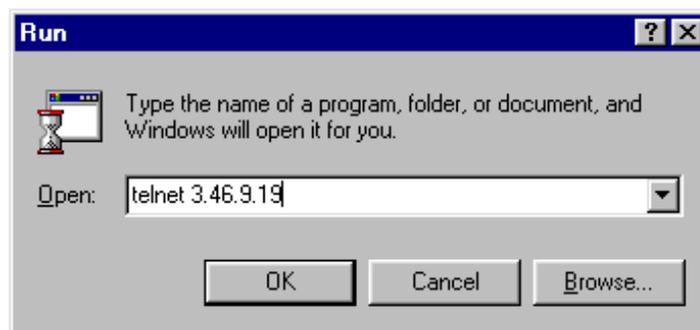


Figure 7: Run Telnet Window

- 3) After connecting to Telnet, the welcome banner and a password prompt will be displayed. The factory supplied user password is "user". Enter the administrative mode so you can assign an IP address to the PLENETG04. The administrative password is "admin":

```
Welcome to the SYSTECH POS/2000 Remote Communication Server
Password:user
Session #1
```

Single-key Commands:

Other commands:

```
-----
?          help          slip          term
admin      ppp             stty
hangup     rlogin         telnet
```

Use BREAK or switch key to switch to next session

```
1/0>>admin
Password:admin
[admin:1/1]>>
```

- 4) To assign the IP address, type "set ip" followed by the IP address. For example, if the PLENETG04's new IP address is 3.46.9.19, type:

```
[admin:1/2]>>set ip 3.46.9.19
```

- 5) To make sure that the gateway's IP address is permanently stored, enter the expert mode by typing "expert" and then type "boot". Then select "a" and change the setting to either 1 or 2. The factory default should be 1, but to be sure that the IP address will be permanently stored, this step should not be skipped (see next page):

```
[admin:1/2]>>expert
[expert:1/3]>>boot
a. bootp/dhcp/rarp is enabled
b. automatic memory dump on error is disabled
e. OS is automatically loaded after reset

q. exit.
Selection: a
bootp/dhcp/rarp options:
  0 - enabled
  1 - disabled with auto re-enable
  2 - disabled
Choice:1
a. bootp/dhcp/rarp is disabled with auto re-enable
b. automatic memory dump on error is disabled
e. OS is automatically loaded after reset

q. exit.
Selection: q
save changes (y/n)? y
.
[expert:1/4]>>save
[expert:1/5]>>
```

By saving again after it asks to save the changes, the changes are saved permanently in non-volatile memory. The IP address and port settings will be retained during reboot.

Note: *To go back to the previous mode, type “exit”.*

- 6) If the network is sub-netted, a sub-net mask also needs to be entered. For example, on a class B network with 8-bit sub-net numbers 255.255.255.0, type:

```
[expert:1/5]>>set mask 255.255.255.0
```

- 7) To change the interface of a single port or a list of ports, type “set interface” followed by the port number(s) and the type of interface. For example, to simultaneously set all the ports for RS-485 interface, type:

```
[expert:1/6]>>set interface 1-8 rs485
```

Note: *If all of the ports on the Gateway are not being used, leaving one port set to the RS-232 interface is recommended. This is to allow possible communication with the Gateway using HyperTerminal if ever needed. If using the external RS-485 triplex adapters required on earlier POS/2000 models, the +5 VDC to pin 9 must be turned on. Type:*

```
[expert:1/7]>>set interface 1-8 5
```

- 8) Reset the PLENETG04 either by cycling power or by typing “reboot”. Rebooting from Telnet can only be done in the expert mode.

```
[expert:1/81]>>reboot
```

- 9) When the PLENETG04 has rebooted, repeat step 1 above to log in. Telnet or login sessions with other hosts on the network can be established via any of the serial ports on the PLENETG04 using commands available in the user mode. To continue customizing the PLENETG04 for application, use commands available in the administrative mode.

- 10) Verify that the IP address in the Ethernet Gateway can be pinged from the host PC. This is done by entering the MS-DOS prompt and typing “ping” followed by the IP address. Once the IP address can be seen from the host PC, any new configuration changes to the Gateway can be made via Telnet and/or a Web browser.

- 11) Other commands displaying information that can be viewed using Telnet include:

- [expert:1/9]>>show sp

This shows all the ports with their respective baud rates.

- [expert:1/10]>>show ip

This shows the IP address of the gateway.

- [expert:1/11]>>show port #

This can show a single port (enter a single port number) or a list of ports (enter a range of port numbers, i.e. 1-8) and all their parameters.

4.3 Web Browser

This method is OK to use if a previous GE IP address was configured. Changes to the IP address and/or other configurations can be made while still connected to the network.

Configuration changes to the POS/2000 can be made using any Web browser that supports tables. When using a Web browser to change the configuration settings, make the changes in the active configuration. The active configuration must be saved (save command) in the current configuration database for the changes to be available after rebooting/restarting:

- 1) Enter the current IP address in the Web browser.
- 2) Click on General Network Settings in the POS/2000 Main Configuration Menu:

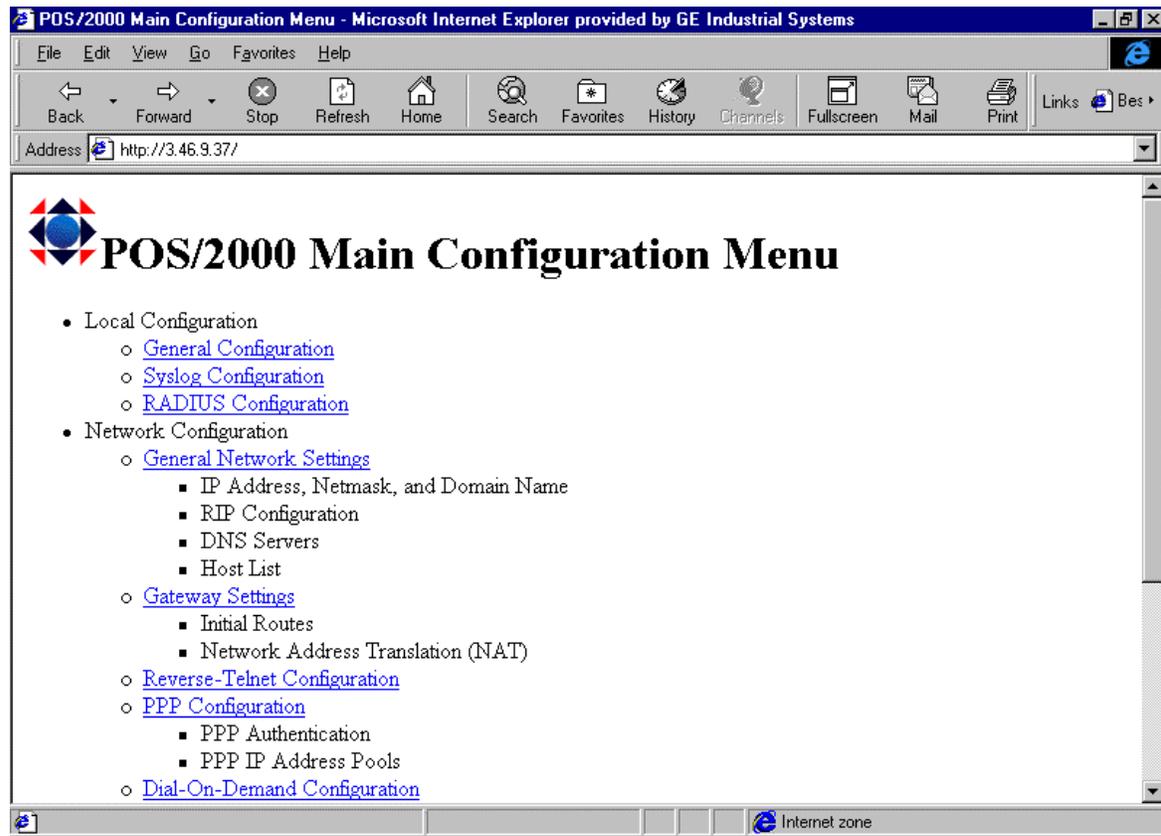


Figure 8: POS/2000 Main Configuration Menu Screen

- 3) Enter the new IP address in the provided space. Other information can be changed here as well.
- 4) Click Update Database.
- 5) Click on the highlighted saved button and confirm the save.
- 6) Reboot the Ethernet Gateway.

All other information is configured in the same manner.

4.4 HyperTerminal

HyperTerminal is recommended for use with non-GE IP addresses. If a non-GE IP address is required, then follow these steps to setup the PLENETG04:

- 1) Connect the RS-232 cable to COM1 of the host PC and to port 1 (or any of the ports that are set to the RS-232 interface) of the Ethernet Gateway. A null modem and a gender changer if needed must be attached to the Gateway end of the RS-232 cable.
- 2) Power up the unit.
- 3) Open HyperTerminal. If HyperTerminal does not start running, select Hypertrm.exe and enter a connection name.
- 4) Select Properties, and then select Direct to COM1 in the Connect Using field:



Figure 9: Ethernet Gateway Properties Window

- 5) Select Configure and setup the COM1 Properties as the window on the next page shows:

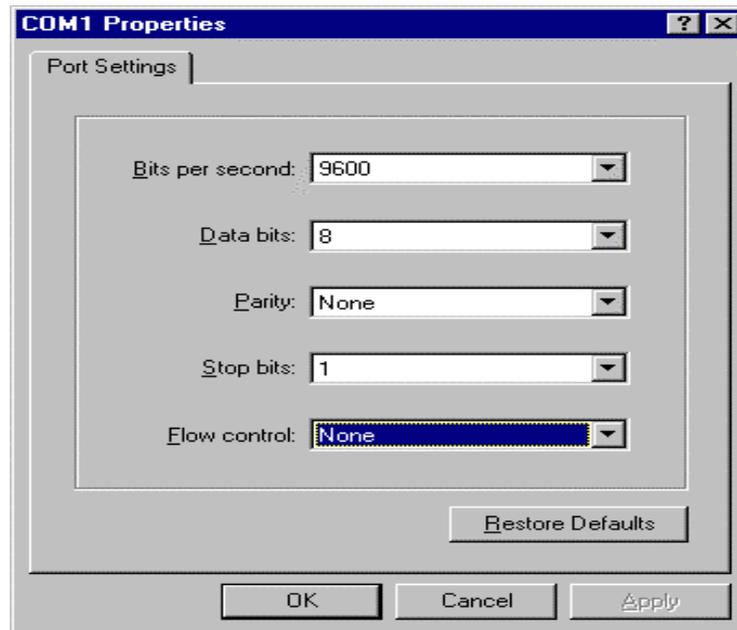


Figure 10: COM1 Properties Window

- 6) Click OK, and a welcome banner and a password prompt will be displayed. The factory supplied user password is "user". Type "user" and the following should appear:

```

Session #1

Single-key Commands:

Other commands:
-----
?          help          slip          term
admin      ppp          stty
hangup     rlogin      telnet

Use BREAK or switch key to switch to next session

1/0>>
  
```

- 7) Type "admin" to enter the administrative mode so an IP address can be assigned to the PLENETG04. The administrative password is "admin":

```

1/0>>admin
Password:admin
[admin:1/1]>>
  
```

- 8) To assign the IP address, type "set ip" followed by the new IP address. For example, if the PLENETG04's IP address is to be 192.111.222.33, type:

```

[admin:1/2]>>set ip 192.111.222.33
  
```

- 9) To make sure that the IP address is permanently stored, enter the expert mode by typing “expert” and then type “boot”. Then select “a” and change the setting to either 1 or 2. The factory default should be 1, but to be sure that the IP address will be permanently stored, this step should not be skipped:

```
[admin:1/2]>>expert
[expert:1/3]>>boot
a. bootp/dhcp/rarp is enabled
b. automatic memory dump on error is disabled
e. OS is automatically loaded after reset

q. exit.
Selection: a
bootp/dhcp/rarp options:
  0 - enabled
  1 - disabled with auto re-enable
  2 - disabled
Choice:1
a. bootp/dhcp/rarp is disabled with auto re-enable
b. automatic memory dump on error is disabled
e. OS is automatically loaded after reset

q. exit.
Selection: q
save changes (y/n)? y
.
[expert:1/4]>>save
[expert:1/5]>>
```

By saving again after it asks to save the changes, the changes are permanently saved in non-volatile memory. The IP address and port settings will be retained during reboot.

Note: To go back to the previous mode, type “exit”.

- 10) If the network is sub-netted, entering a sub-net mask is also needed. For example, on a class B network with 8-bit sub-net numbers 255.255.255.0, type:

```
[expert:1/5]>>set mask 255.255.255.0
```

- 11) To change the interface of a single port or a list of ports, type “set interface” followed by the port number(s) and the type of interface. For example, to simultaneously set all the ports for RS-485 interface, type:

```
[expert:1/6]>>set interface 1-8 rs485
```

Note: If all of the ports on the Gateway are not being used, leaving one port set to the RS-232 interface is recommended. This is to allow possible communication with the Gateway using HyperTerminal if ever needed. If using the external RS-485 triplex adapters required on earlier POS/2000 models, the +5VDC to pin 9 must be turned on. Type:

```
[expert:1/7]>>set interface 1-8 5
```

- 12) Reset the PLENETG04 either by cycling power or by entering the expert mode and typing “reboot”. Rebooting using HyperTerminal can only be done in the expert mode.

```
[expert:1/8]>>reboot
```

- 13) When the PLENETG04 has rebooted, log in can again be attempted by repeating step 1 above. HyperTerminal sessions with other hosts on the network can also be established via any of the serial ports on the PLENETG04 using commands available in the user mode. Also, to continue customizing the PLENETG04 for application, use commands available in the administrative mode.
- 14) Verify that the IP address in the Ethernet Gateway can be pinged from the host PC. This is done by entering the MS-DOS prompt and typing “ping” followed by the IP address. Once the IP address can be seen from the host PC, any new configuration changes to the Gateway can be made via HyperTerminal only, due to the non-GE IP address.
- 15) Other commands displaying information that can be viewed using HyperTerminal include:

- [expert:1/9]>>show sp

This shows all the ports with their respective baud rates.

- [expert:1/10]>>show ip

This shows the IP address of the gateway.

- [expert:1/11]>>show port #

This can show a single port (enter a single port number) or a list of ports (enter a range of port numbers, i.e. 1-8) and all their parameters.

5 Configuring POS/2000 with a Router IP

This requires configuring the Ethernet Gateway IP address (default route). This is necessary if there are multiple sub-nets in a given installation. The default router can be configured by using the add route command from the administrative shell. The exact command is “add route default <gateway IP> net 1”. This will add a default route through the Gateway IP address (i.e. the router). After this information is changed, be sure to use the save command to save the configuration into flash. Typing “show” displays the following terms and their abbreviations:

```
[admin:1/1]>>show
```

```
Usage: show {option}:
```

```
option:
```

ban banner	ma mask	ra radius
C(0-33)	mod model	ri rip
com community	modem	ro route
co contact	mpool	rt rtelnet
def default	na nameserver	si size
des description	nt nat	sn snmp
dod dial_on_demand	ou output	sp speed
do domain	own owner	st stop
ho host	pa parity	sw switch
ig ignoredcd	port	sys system
in input	pd portdesc	te term
int interface	pow power	ti timeout
ip ip	ppool	tr traps
lo location	pppadlist	ve version
mac	pppauthlist	

```
[admin:1/2]>>
```

After setting up the router IP and saving, rebooting, etc., please type “show ro” on the command line. Information that is similar to that highlighted in red should appear:

```
[admin:1/3]>>show ro
```

Initial Routes:

Destination	Gateway	Flags Metric Gateway Type
default	3.46.0.1	net 1 address

```
[admin:1/4]>>
```

6 The PLENETG04 and PMCS in Operation

When all the components of the system (PLENETG04, NativeCOM software, GE32MODB server, etc.) are configured correctly, the PLENETG04 should be a transparent component requiring virtually no maintenance. If it is in a dusty environment, then the fan filter on the end of the unit should be cleaned on a regular basis.

6.1 LEDs

The PLENETG04 has several LED status indicators:

- PLENETG04 - There is a status LED located in the upper right corner of the front panel that indicates the overall status of the unit. It will blink green when working correctly.
- Serial Ports - There is an LED located above each of the eight serial port connectors. Each port will blink green when transmitting or receiving data. It will also interleave a yellow blink when power to pin 9 has been enabled. It will blink orange/red if an error occurs.
- Hubs - There is an LED located next to each of the four Hub ports. Each LED will be green when a valid Ethernet connection is made and blinks when data is transmitted.
- Modem - There is an LED located next to the optional internal modem connector.

The LEDs use red, yellow, and green lights along with blinking combinations of the three to indicate the status of the components of the PLENETG04. For a complete listing of possible LED indicators, please refer to the PLENETG04 Administrator's Guide located in the CD included with the Ethernet Gateway.

6.2 Web Server

Each PLENETG04 has its own built in Web server. Just type in the IP address of the Ethernet Gateway into the address line of a Web browser. The server has a plethora of data. Some of the port settings may look incorrect, but they will be dynamically overwritten by the NativeCOM software.

Note: *Some browsers will display an error message when trying to access the Web server in the Ethernet Gateways. Just hit Refresh on the toolbar.*

7 The Port Server

7.1 Adding Multiple Ports on a Port Server

To add a group of NativeCOM ports from a single port server, click Add in the port server section of the main control panel window. The Add Port Server window will appear (see next page):

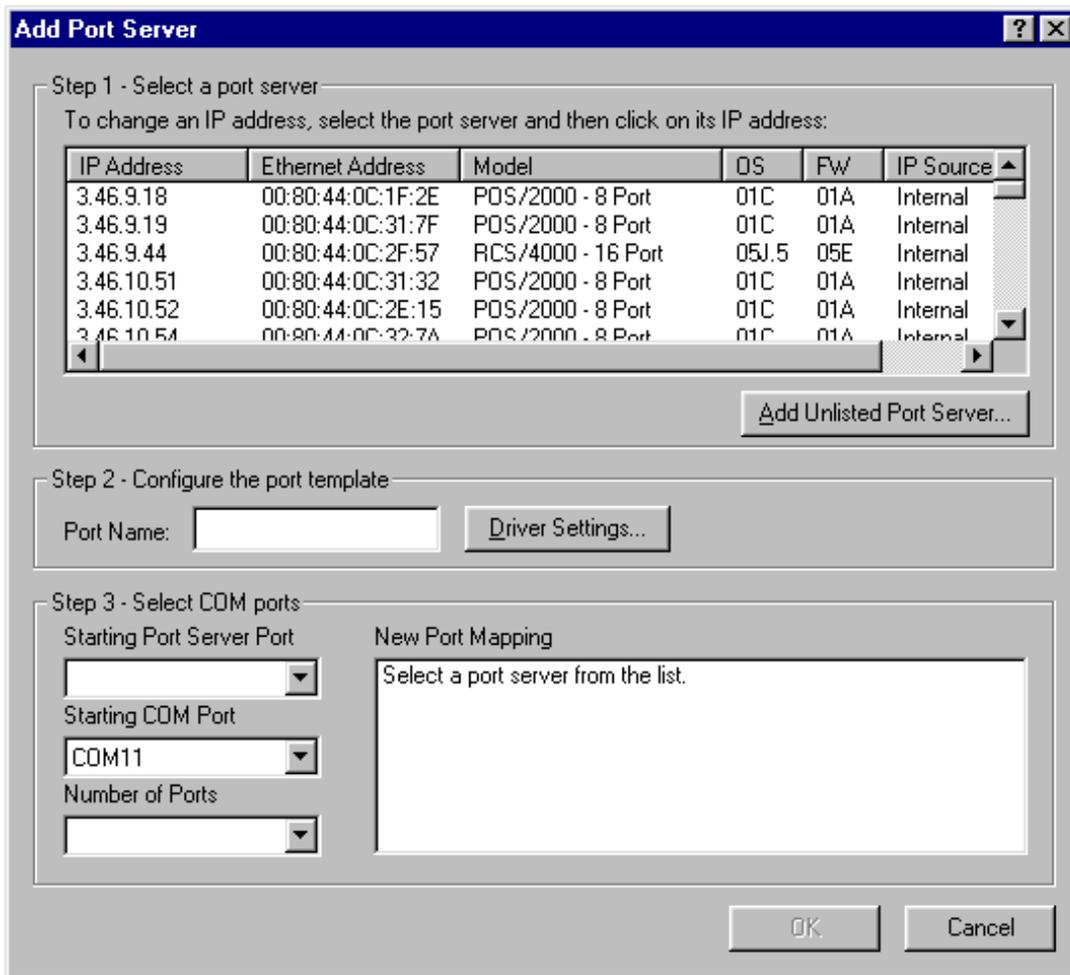


Figure 11: Add Port Server Window

A list of port servers available on the network is displayed. Click on the entry of the port server that is to be added to highlight it.

Note: Some port servers running older software will not be displayed in the list. To add a port server to the list so that it can be selected, click Add Unlisted Port Server.

The first field of the entry shows the IP address of the port server. If no IP address is shown, no IP address has been assigned yet. To assign an IP address to the port server, click on Click to Assign in the IP Address field. The field becomes a text box. Enter the IP address to be assigned to the port server.

Note: Some port servers running older software will display a dialog box when the IP Address field is clicked. The dialog box will display the Ethernet address. Enter the IP address in the text box.

7.2 Selecting Port Server Parameters

7.2.1 Port Name

Enter any desired information in the name box (up to 64 characters) to serve as a mnemonic for the port. This name appears elsewhere to identify the ports. The port number will be appended for each port.

7.2.2 Driver Settings

Additional settings for port template parameters are available when Driver Settings is clicked.

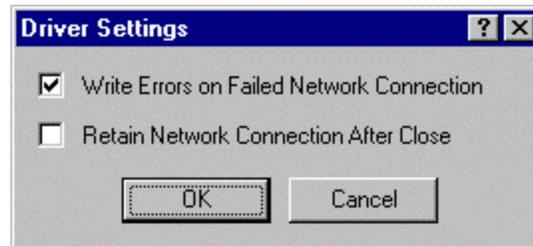


Figure 12: Driver Settings Window

Note: *Write Errors on Failed Network Connection (Windows NT Only).*

By default, the Write Errors on Failed Network Connection option is checked, causing write calls on a NativeCOM port to return error status if the network connection for the port is lost during the write. If this option is unchecked, interrupted write calls will not return error status and the failed writes will appear to have succeeded.

8 Retaining Network Connection after Closing

Normally, when application software closes a NativeCOM port, the software drops the associated TCP session. With this option in effect, the NativeCOM port software holds the TCP session, even when the associated COM port is closed.

9 Ports

9.1 Selecting Ports

By default, Add Ports assumes that all ports will be configured on the port server, starting with the first available COM port on the host. The number of ports and/or starting port can be changed using the following fields.

9.1.1 Select Starting Port Server Port

Select the starting port to use on the port server. If the specified port server is a model that includes an internal modem, the first port will be the modem.

9.1.2 Select Starting COM Port

Choose a COM port using the Starting COM Port dropdown list. The menu lists COM ports in the form "COMx", where "x" is a decimal integer. Only unused COM port names are listed. Each COM port, starting at COM1, is in one of three states:

- Used by a non-NativeCOM port (e.g., "native" COM ports, parallel ports).
- Used by a NativeCOM port.
- Unused. The COM port dropdown list includes enough unused COM port names to configure a maximum of 255 total COM ports. For example, if COM1 and COM2 were the system's native COM

ports, and COM10 through COM18 were configured parallel ports, the COM port list would initially include COM3 through COM9 and COM19 through COM255.

9.1.3 Select Number of Ports to Create

Select the number of sequential ports to create, up to the number available on the port server, given the starting port number selected.

9.2 Adding Ports

When the list of ports to be created is correct, click OK to add the ports to the system. If there are any problems with the parameters that have been entered, an appropriate alert is displayed and the Add window appears. To return to the main dialog box without adding any ports, click Cancel at any time.

If any of the ports that are added are already reserved to another host, a Notice window appears:

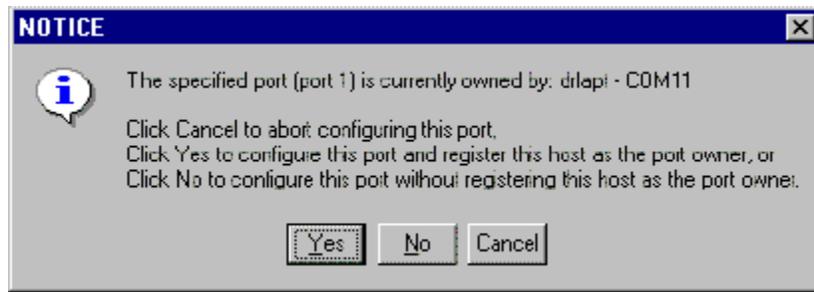


Figure 13: Port Configuration Notice Window

Resolve the ownership of the port by clicking the appropriate button:

- Cancel - Do not add the port.
- Yes - Add the port and change the owner to the current host.
- No - Add the port without changing the owner.

NativeCOM will continue adding the remainder of the ports.

9.3 Deleting or Modifying a COM Port

In the control panel, a scrollable list of all the NativeCOM ports that are currently configured (not including standard COM ports) is displayed. Select a port to be deleted or modified. Only one port can be selected at a time. The Remove and Properties buttons operate on the selected port:

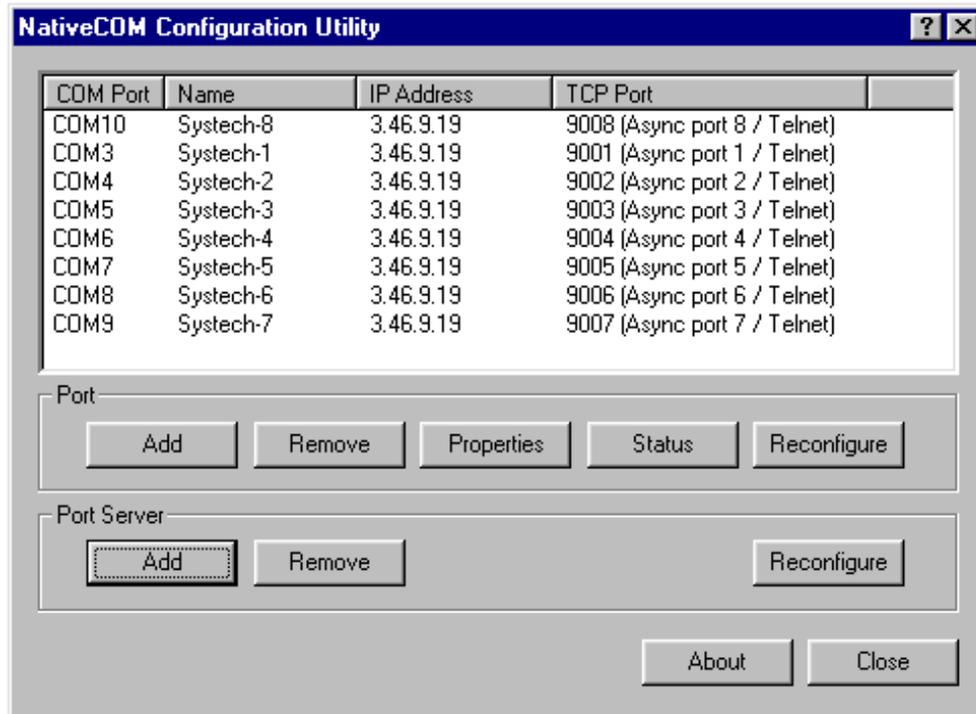


Figure 14: NativeCOM Configuration Utility Window

There are four columns of information in each row (COM port number, COM port name, IP address, and remote TCP port). Scroll horizontally to see the entire lines. Drag the column separators to alter the column widths:

- COM Port - Device name selected by user.
- Name - Mnemonic identifier selected by user.
- IP Address – Host’s name or numeric IP address.
- TCP Port - Remote TCP port number specified by user (the Asynch port number is also listed).

9.4 Deleting a COM Port

Clicking Remove in the port section deletes the currently selected NativeCOM port from the display. Before deleting, a confirmation window, with its own Yes and No buttons, is displayed:



Figure 15: Delete NativeCOM Port Confirmation Window

If an attempt is made to delete a NativeCOM port that is currently open, the NativeCOM port software displays the alert window shown below. Click Delete to delete the COM port or Cancel without deleting the port (see next page):

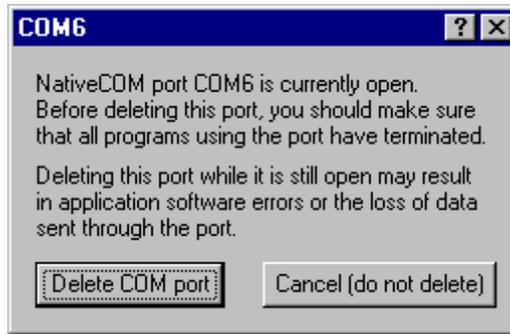


Figure 16: Delete COM Port Confirmation Window

9.5 Deleting a Port Server

Clicking Remove in the port server section deletes all the ports on the currently selected port server unit (i.e., same name or IP address as the selected port). Before deleting, a confirmation dialog box (as described above in 9.4 Deleting a COM Port) is displayed.

9.6 Modifying a COM Port

Clicking Properties in the main control panel window brings up the COM Properties window for the selected port:

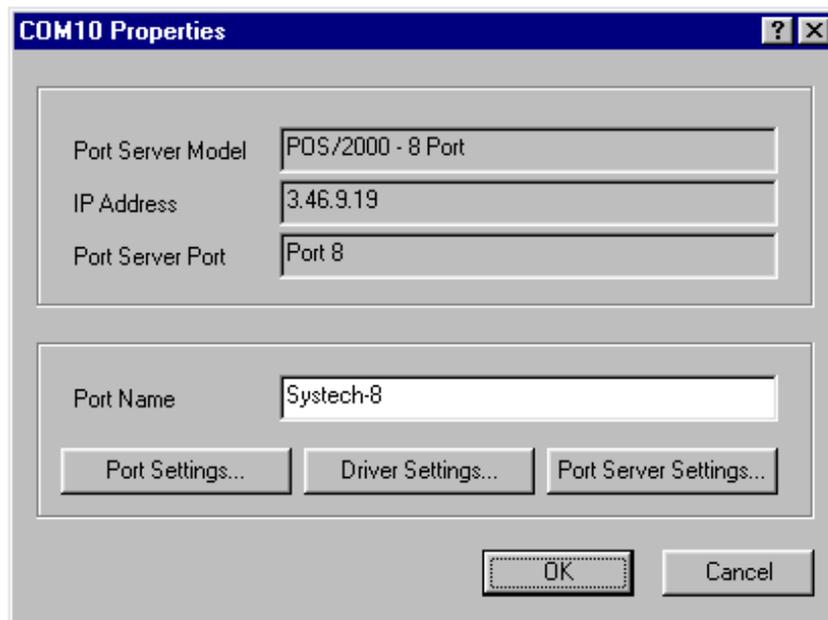


Figure 17: COM Port Properties Window

This window configures the default port settings on the port server unit. It is useful for configuring port parameters on ports running in raw TCP mode or on units that do not support the Telnet COM port control option.

9.6.1 Port Settings

To modify the port settings, click Port Settings to bring up the COM Port Settings window, which is similar to the standard system Properties window for COM ports (see figure 10).

9.6.2 Driver Settings

To modify additional driver related settings, click Driver Settings.

9.6.3 Port Server Settings

To modify port server specific settings, click Port Server Settings. A Web browser will be launched, opening a NativeCOM port configuration page on the port server. Using this page, parameters can be set that are not included in the Win32 API, such as, power, electrical interface, etc. For example, the POS/2000 port server setting page, shown on the next page, provides settings for electrical interface, port description, etc.:

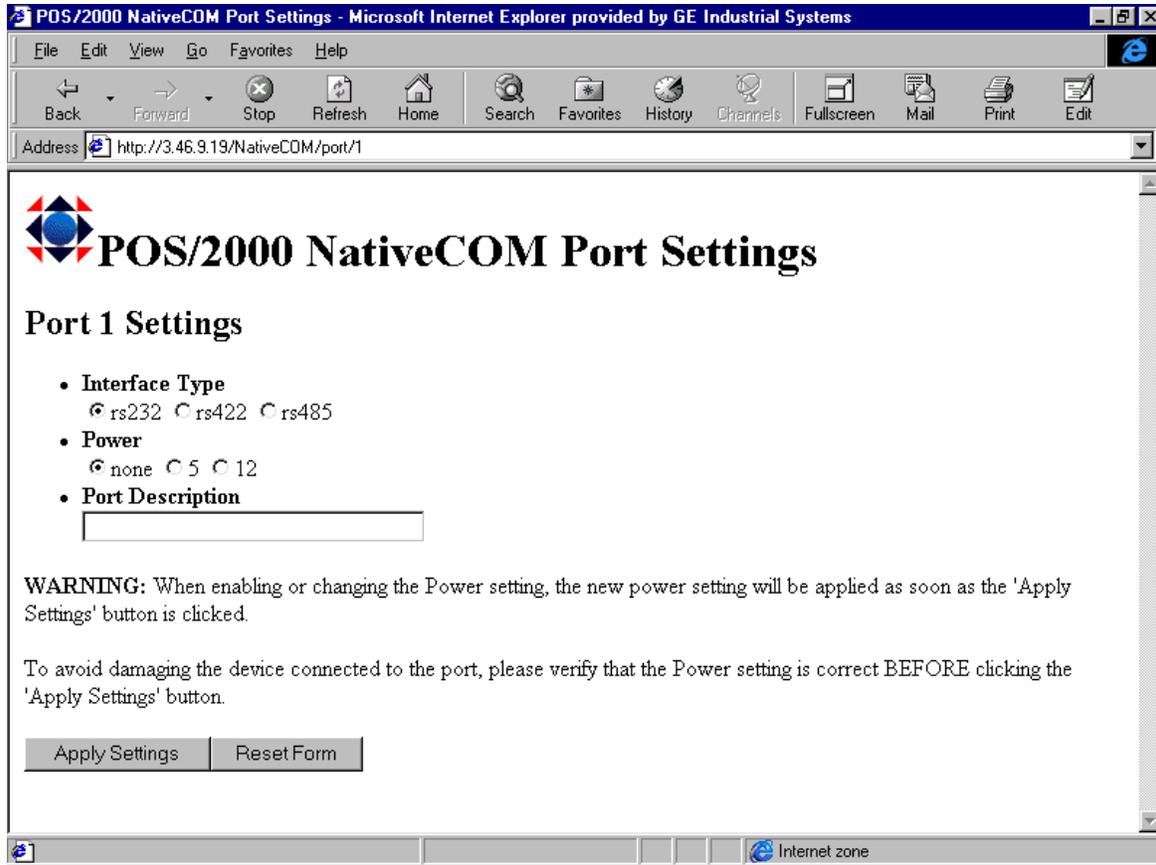


Figure 18: POS/2000 NativeCOM Port Settings Screen

9.7 Viewing the Current Settings

Clicking Status in the main control panel window displays the NativeCOM Port Status window. A scrollable list of NativeCOM ports similar to the NativeCOM Port Utilities Window is displayed (see figure 11).

If a list entry is selected, the lower portion of the status window presents detailed status for the selected port. While the window is open, any changes in the NativeCOM Port Status will change the data displayed, in real time, without user intervention.

The first line of the status display (labeled Configuration:) summarizes the protocol and option configuration for the port, as defined in the Add NativeCOM Port window or the Driver Settings window.

The second line of the display (labeled Protocol Options:) summarizes the settings for any Telnet protocol options that have been negotiated. The line is blank unless a Telnet session is currently established for the port.

The third line (labeled Connection Status:) shows the current state for the port. Each NativeCOM port can be in one of the following states:

- Closed/Disconnected - In this state, no process holds a valid file handle for the NativeCOM port, and there is no TCP session established. This is the initial state for all NativeCOM ports.
- Open/Trying - In this state, one or more processes are attempting to open the NativeCOM port. The NativeCOM port software is in the process of establishing a TCP session with the designated remote server.
- Open/Renegotiating or Negotiating - In the Renegotiating state, the NativeCOM port software has succeeded in establishing a TCP session with the remote server and is in the process of negotiating Telnet options. In the Negotiating state, the Win32 CreateFile() call has not yet completed.
- Open/Connected - In this state, the NativeCOM port software has completed negotiations with the remote server, and the Win32 CreateFile() call has completed. Data written to the port (e.g., with a WriteFile call) will be transmitted to the remote. Data received from the remote is available to processes (e.g., via ReadFile calls).
- Open/Reconnecting - In this state, one or more processes hold valid file handles for the NativeCOM port, but the TCP session with the remote server has been lost. This state can result from network errors or from a user initiated disconnect. Any writes that were in progress when the connection was lost report an error as defined by the Write Errors option in Driver Settings. Any pending writes are blocked until the network connection is reestablished. When in this state, the driver will continually attempt to reconnect to the port server until a connection is reestablished or the port is closed.
- Closed/Connected - In this state, no process holds a valid handle for the port, but a TCP session is established with the remote server. A port stays in this state after the last close if the Retain Connection option is in effect for the port.

The Transmit and Receive lines indicate whether data is currently flowing. The port is considered active if data has been transmitted or received within the last 3 seconds. The number of characters transmitted and received since the session was established or the statistics were cleared is displayed.

The Last Error line describes the last error condition present on the session. This line is blank unless one of the following has happened since the port was opened:

- The NativeCOM port has returned an error status for any Win32 system call to the port.
- The port's TCP session was unexpectedly dropped (i.e., the remote device terminated the TCP connection with an FIN or Reset).
- The NativeCOM port software has failed to establish a TCP session, either due to network errors (e.g., the host name could not be resolved, the remote IP address could not be reached, etc.), or because the remote device refused the TCP connect request from the NativeCOM port software.

Clicking Clear Statistics resets the character counters and clears the Last Error display. Clicking on Force Disconnect forces the host to drop the TCP connection to the remote end. For a discussion of additional actions associated with losing or dropping a TCP session, see Loss of TCP Connection in Chapter 4: Operation in the NativeCOM manual on the CD.

9.8 Displaying Real Time Events

Clicking Trace in the status window brings up the trace window for the port. The trace window displays events in real time in a scrollable window. Three classes of events may be selected from to include in the trace. To start tracing on a port, click Start. While the trace is running, the Start button changes to Stop and trace data is shown in the scrollable window. Clicking Stop may temporarily stop the trace. While the trace is stopped, the Stop button changes to Start. Scroll forward and back through the trace buffer. Clicking Start resumes the trace. Events that occur on the channel while tracing is stopped are lost. The trace buffer is circular, so it will contain a limited amount of trace history. If the trace window is left with tracing on, trace data will still be collected and will be available for viewing upon reopening the trace window:

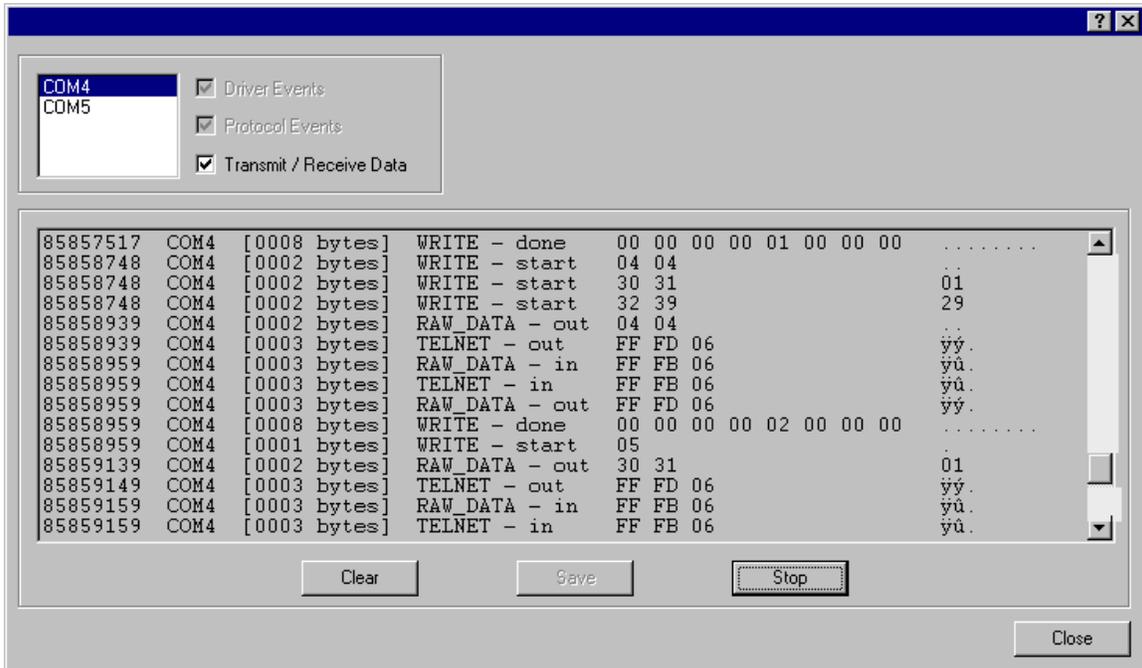


Figure 19: Trace Window

The three classes of trace events range from driver events (the least detailed level of tracing) to transmit/receive data (the most detailed level of tracing). Driver events include:

- System calls entering the driver (OPEN, CLOSE, IOCTL).
- System events posted by the driver (errors, modem signal changes, etc.).
- TCP connections established/disconnected.
- TCP errors (remote end disconnection, etc.).

Protocol events include all Driver Events and events associated with the protocol in effect on the COM port (such as all Telnet option negotiations). Transmit/receive data events include driver events, protocol events, and a record of every data byte transmitted and received on the COM port.

9.9 Clear, Save, Close

Clicking Clear clears the port's trace buffer.

The Save button allows you to write the current trace buffer contents to a text file. Specify the output file name with a standard file dialog box. Trace data is stored as flat ASCII data, one trace record per line. Lines are terminated with ASCII LF (no CR), with the most recent trace record appearing first.

To exit the trace window, click Close. It is possible to leave the trace window (i.e., close the window) without disabling event tracing for the port. Tracing is only disabled by clicking Stop.

9.10 Reconfiguring a Port Server

To reconfigure the port server with the existing configuration, click Reconfigure in the port section in the main control panel to reconfigure the selected port or click Reconfigure in the port server section to reconfigure the entire port server. Reconfiguring might be required if the port server was replaced or its configuration reset.

9.11 Replacing a Port Server

To replace a port server with a new unit at the same IP address:

- 1) Remove the old port server.
- 2) Install the new port server on the network.
- 3) Assign the same IP address (the IP address assigned to the old port server) to the new port server.
- 4) In the control panel, select one of the ports on the port server being replaced and click Port Server Reconfigure.

10 Specifications

Power Requirement	Control Power	85 – 264 VAC
Environment	Operating Temperature	0 – 50 °C
	Storage Temperature	-10 – 70 °C
	Relative Humidity	10 – 90 % at 40 °C non-condensing
	Fast Transient Surge	IEC 801-4
	Radiation EMI Withstand	IEC 801-3
	Capability Electrostatic Discharge	IEC 801-2, Severity Class 4
Standards	UL Listed	
	CSA Certified	
Dimensions	10 inches x 4.75 inches x 4.5 inches (254 mm x 121 mm x 114 mm)	

Table 5: Specifications

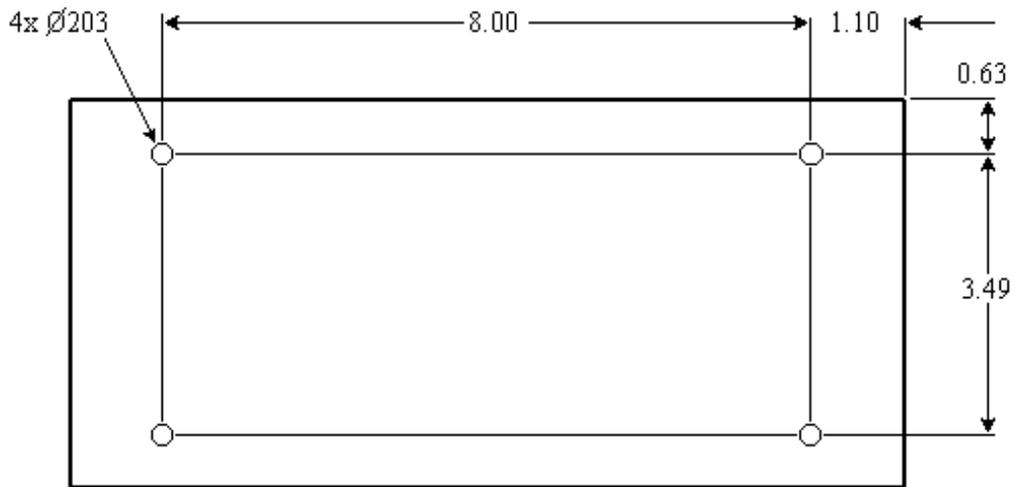


Figure 20: Mounting Bracket Holes Location

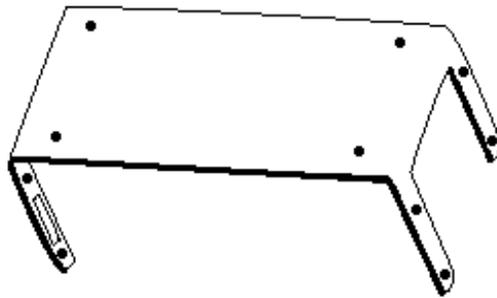


Figure 21: Mounting Bracket

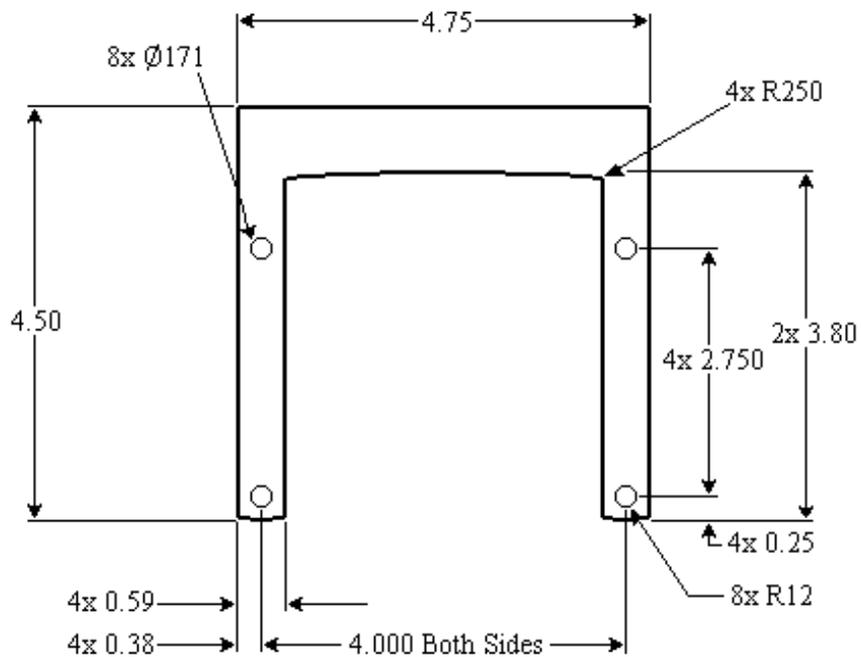


Figure 22: Mounting Bracket Front View

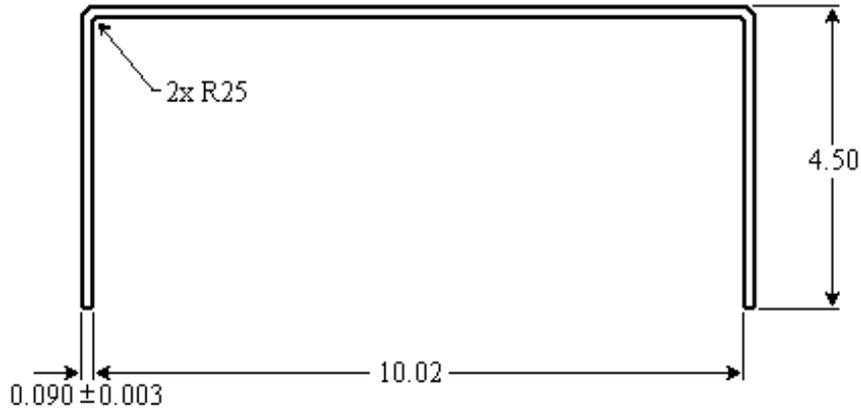


Figure 23: Mounting Bracket Side View

Appendix A: Null Modem Pin-Outs

DB-25 to DB-25			DB-9 to DB-9			DB-25 to DB-9		
2	to	3	1 and 6	to	4	2	to	2
3	to	2	2	to	3	3	to	3
4	to	5	3	to	2	4	to	8
5	to	4	4	to	1 and 6	5	to	7
6 and 8	to	20	5	to	5	6 and 8	to	4
7	to	7	7	to	8	7	to	5
20	to	6 and 8	8	to	7	20	to	6 and 1

Table 6: Null Modem Pin-Outs

Appendix B: NativeCOM Driver Configuration

The NativeCOM networked COM ports software package provides the Windows administrator with the ability to configure, manage, and diagnose NativeCOM ports. The administrator accesses the user interface elements via the control panel. NativeCOM port management is also integrated with the operating system standard COM port dialogs so that NativeCOM ports appear alongside standard COM ports in the setup dialogs for modems, printers, communications software, etc.

To access the NativeCOM main control panel, click the NativeCOM icon in the system's control panel window (see figure 14).

NativeCOM ports are added, deleted, and modified in the NativeCOM ports control panel. Ports may be added one at a time, or all of the ports may be configured on a port server in one step. The multiple port configuration option can only be used if no port has been added on that port server. Once a single port has been added, all subsequent ports must be added individually. The Add button in the port section of the control panel adds a single port. The Add button in the port server section of the control panel adds multiple ports to the same port server.