



Diagraph[®]

An **ITW Company**

ETHERNET MODULE

PLATINUM SERIES



6000-420N
Revision A

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1.0 Introduction



1.1 The Platinum Series Ethernet Module

The 6000-420 Platinum Series Ethernet Module is a wired and wireless Ethernet option available for any of the Platinum Series Products. It is easily integrated into the main controller assembly through a PC-104 based option stacking system. Once installed, the configuration of the card is handled through the user interface or remotely over Ethernet.

1.2 Product Safety

Safety awareness is critical when working with equipment that contains moving parts and extending pneumatic cylinders. Please read all warnings and cautions thoroughly before operating this device.

This product meets the requirements of CAN/CSA-22.2 NO.60950-00 * UL 60950 using Diagraph an ITW Company approved items. Units are only tested and qualified with Diagraph an ITW Company approved parts and accessories. Use of other parts or accessories may introduce potential risks that Diagraph an ITW Company can assume no liability for.

WARNINGS

- **WARNING - Moving parts of this machine can present hazards. Components that cannot be guarded because of loss of functionality are marked with a warning symbol.**
- **Be aware of the tamp cylinder extension distance, and avoid accidental triggering of the photosensor.**
- **When servicing the unit's electronic assemblies, always remove the power cord from the unit to prevent accidental shock.**
- **When running for extended periods of time, use caution when accessing the drive module circuitry. The motor drive power transistors, motor case, and motor heatsink can become hot under constant use.**
- **Always close the air inlet valve shutoff when removing or servicing pneumatic module or tamp cylinder.**
- **Wear personal protective equipment, as instructed by your supervisor, when operating or working near this device.**

COMPLIANCE

- **CAUTION: Not for use in a computer room as defined in the Standard for the Protection of Electronic Computer/ Data Processing Equipment, ANSI/NFPA 75.**
- **ATTENTION: Ne peut être utilisé dans une salle d'ordinateurs telle que définie dans la norme. ANSI/NFPA 75 Standard for the Protection of Electronic Computer/ Data Processing Equipment**

- This unit has been tested and found to comply with the limits for a Class A device, pursuant to part 15 of the FCC Rules.
- This unit has been tested to comply with CE Standards.
- This unit is equipped with an Emergency Stop switch. Depressing this switch will cause all machine operations to cease.
- This unit was tested and it was determined that a potential for tipping exists in certain orientations. In compliance with UL safety standards, the stand must be secured to the surface where it is located. Additionally, this type of securing will result in greater product application accuracy.

1.3 Document Conventions

Formatting conventions are used throughout this manual as a method of providing consistency for notes and warnings.

Goal: This indicates a particular objective for the section.

Note: This indicates that there is more information available for the in-depth reader.



WARNING *This symbol indicates a danger of injury to the user. Hazards are identified by the exclamation mark in a triangle and bold italics text.*

1.4 Warranty Information

The PA/4600 and PA/6000 systems and options, including all components unless otherwise specified, carry a limited warranty.

For all warranty terms and conditions, contact Diagraph, an ITW Company, for a complete copy of the Limited Warranty Statement.

1.5 Specifications

Category		Description
Network Standards		IEEE 802.11b ; IEEE 802.11g
Frequency Range		2.412 – 2.484 GHz
Antenna Connector		1, no diversity supported.
Data Rates		1,2,5.5,11Mbps(802.11b) 6,9,12,18,24,36,48,54Mbps(802.11g)
Radio	Number of Selectable Subchannels	Up to 14 channels. Profiles available will include USA, France, Japan, Spain, Canada and "Other" (multiple countries)
	Modulations	OFDM, DSSS, DBPSK, DQPSK, CCK , 16QAM, 64QAM
	Antenna Connector	1
Security		WEP 64/128, WPA – PSK, TKIP, AES end-to-end encryption
Maximum Receive Level		-10 dBm (with PER < 8%)
Receiver Sensitivity		-72dBm for 54Mbps -87 dBm for 11Mbps -89 dBm for 5.5Mbps -90 dBm for 2.0Mbps -92 dBm for 1.0Mbps
WLAN Power and Link LED Current		Max: 4 mA

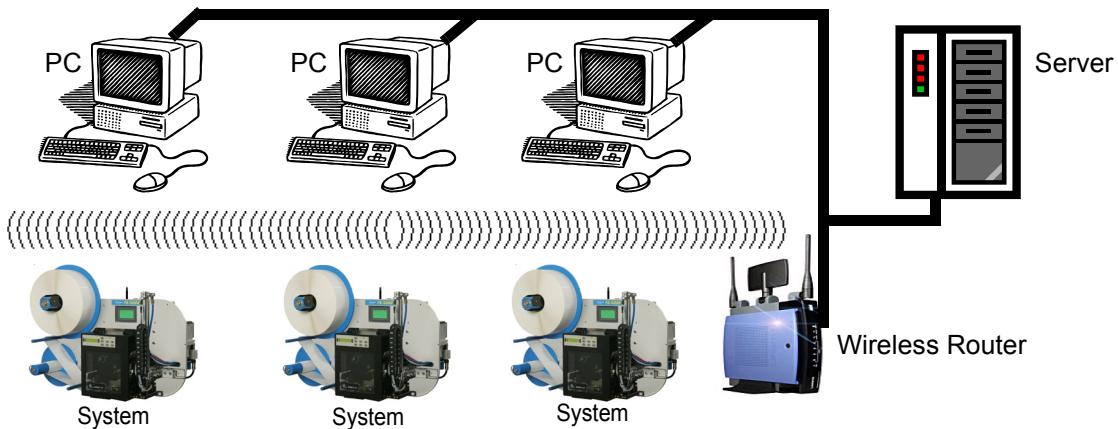
2.0 Ethernet Basics



This Ethernet card provides two possible mediums for physical layer connection. The first is a wired-LAN, using a 10/100 BaseT connection. This is best used for environments that are electrically noisy, or the distance between the system and the access point would be too far for wireless communication. The second method is wireless, using the industry standard 802.11b or 802.11g radio interfaces. Wireless makes integration much faster, removing complexity and costs due to running cables. In the wireless medium, there are two choices on how to setup the network. These two methods, Infrastructure and Ad-Hoc, are further explained below.

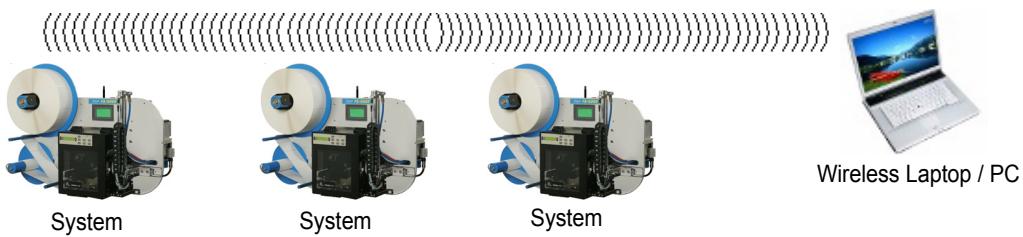
2.1 Wireless - Infrastructure

This method of wireless networking is fairly standard for laptops and other wireless-Ethernet based devices. This system relies on a network server to act as the backbone for setting up unique addresses for each device on the network and management of communication functions. This type of networking makes sharing of data and devices easier than the next method.



2.2 Wireless - Ad-Hoc

This method of wireless networking allows a peer-to-peer connection to be made to transfer data. No supporting network server is required, but the computer or device sending data to a target system must know the IP address to make the virtual connection. If no network backbone is present, or the user wishes to test the unit without need for IS / IT intervention, the Ad-Hoc method works best. Any wireless laptop computer can be run in Ad-Hoc mode to directly communicate to a system.



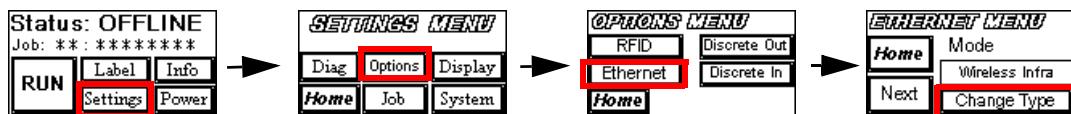
3.0 Setup



Step 1 - Determine the Network Type

Goal: Determine the best configuration for the network. If the system is to run in the wireless mode, there are two choices for operation mode. See the prior section for which selection is appropriate for the application. Select the appropriate network type.

Map:



From the offline screen, select the Settings button. On the Settings Menu, press the Options button. From the Options Menu choices, press the Ethernet button. The first screen in the Ethernet Menu is the choice of Mode. Select the correct mode from these choices:

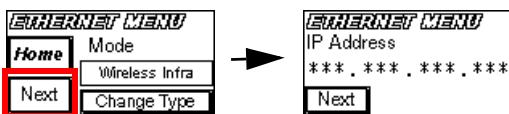
- Wireless Infra This mode uses the antenna in a network where a network server is present and there is a wireless access point to the network
- Wireless AdHoc This mode uses the antenna to allow point-to-point communications for networks without an access point or network server
- Wired 100BaseT This mode uses the hard-wired connection into the RJ45 connector for communications on a Cat 5 or better cabled system
- Serial Com This mode disables the Ethernet interface to allow direct serial communication into the standard serial port of the MCA

Once this selection has been made, press "Next" for the next setup step.

Step 2 - Set the IP Address

Goal: Assign the system a unique IP (Internet Protocol) Address number. This is typically a static number administered by the IT / IS group for the company. There are four numbers that make up the address which range from 000 to 255.

Map:



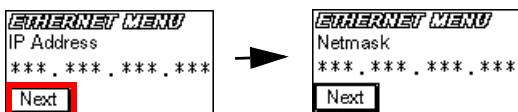
From the Ethernet Mode screen, press "Next" to enter the IP Address menu screen. Enter the unique static IP number supplied by the Network Administrator. Record this number on the last page of this manual.

Once this selection has been made, press "Next" for the next setup step.

Step 3 - Set the Netmask

Goal: Assign the net mask for the system. A netmask defines the number of bits taken from the IP address that are assigned for the host part. There are four numbers that make up the address which range from 000 to 255.

Map:



From the Ethernet IP Address screen, press "Next" to enter the Netmask menu screen. Enter the mask number supplied by the Network Administrator. Record this number on the last page of this manual.

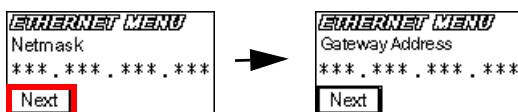
Once this selection has been made, press "Next" for the next setup step.

Step 4 - Set the Gateway Address

Goal: Assign the gateway address for the system. The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the unit. The gateway address must be within the local network. There are four numbers that make up the address which range from 000 to 255.

Note: No entry or a value of 000.000.000.000 is necessary for an Ad-Hoc network type, since no Gateway exists.

Map:



From the Ethernet Netmask screen, press "Next" to enter the Gateway Address menu screen. Enter the address number supplied by the Network Administrator. Record this number on the last page of this manual.

Once this selection has been made, press "Next" for the next setup step.

Step 5 - Set the SSID (Wireless Only)

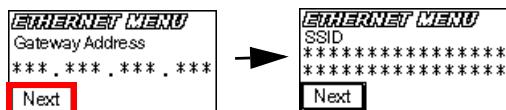
Goal: Assign the SSID, which is the Service Set Identifier. The SSID is the name of the wireless local area network (WLAN). This is represented by a 32 character name.

Note: For an Infrastructure Network, this name must match the wireless access point SSID.

Note: For an Ad-Hoc Network, all units on the network must have the same SSID to communicate. The Ad-Hoc network channel is defaulted to channel 10. This can only be changed by the Administrator software, if necessary.

Note: The name entered must be left-justified, so additional blank spaces may be required to shift the whole name to the left-most position. Also, there are two independent lines that are concatenated to make the entire 32 character name.

Map:



From the Ethernet Gateway Address screen, press "Next" to enter the SSID menu screen. Enter the name of the WLAN supplied by the Network Administrator.

Once this selection has been made, press "Next" to return to the first Network screen. Record this setting on the last page of this manual. Press the "Home" button for the settings to take effect. This will interrupt the communications for a minimum of 10 seconds. If the unit is set up for wireless, it can take longer to acquire the host and establish itself on the network.

Step 6 - Set the Baud Rate

Goal: Establish the baud rate communications speed between the system and the printer module. Although the network card uses Ethernet for communications to the Host, the printer still requires the correct baud rate to get data to and from the unit.

Map:



Enter the Baud Rate menu by starting in the Offline Screen. Press the "Settings" button followed by the "System" button in the next screen. Press "Next" until the Baud Rate screen is visible. Set the baud rate to the same value as the printer. Since the physical distance is very short between the MCA and Printer, the communication rate should be maximized to reduce transmission time. Depending on the printer utilized, this can be set as high as 115.2 k baud. Record this number on the last page of this manual.

4.0 Example Setup



Most wired Ethernet connections are straight forward, but the wireless modes and settings can be confusing. To help ease the setup of the wireless connections, the following examples illustrate the two possible configuration scenarios. The Ad-Hoc requires the most setup steps, with the same final steps for Ad-Hoc, Infrastructure, and Wired, which are listed last.

4.1 Ad-Hoc Example

Begin by consulting with the Network Administrator to get these items ready before setup:

- A Static IP address for each system on the network
- The Netmask for these systems
- The SSID of the router or similar device that the systems will need to use for the wireless link

Use these values to enter in the Setup steps above.

If the Administrator has no preference or if there are any other wireless devices operating in the area, the following values can be utilized:

IP Address = 192.168.0.2, 192.168.0.3, 192.168.0.4, etc. (Reserve 192.168.0.1 for the laptop)

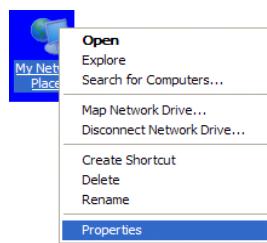
Netmask = 255.255.255.0

SSID = DIAGRAPH

To configure a Windows-based computer to communicate to the device, follow the steps below:

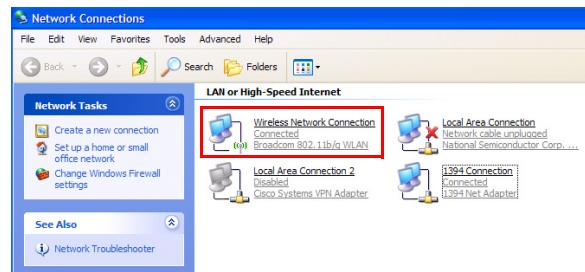
Step 1 - My Network Places

From the desktop, right-click on the My Network Places and Select Properties



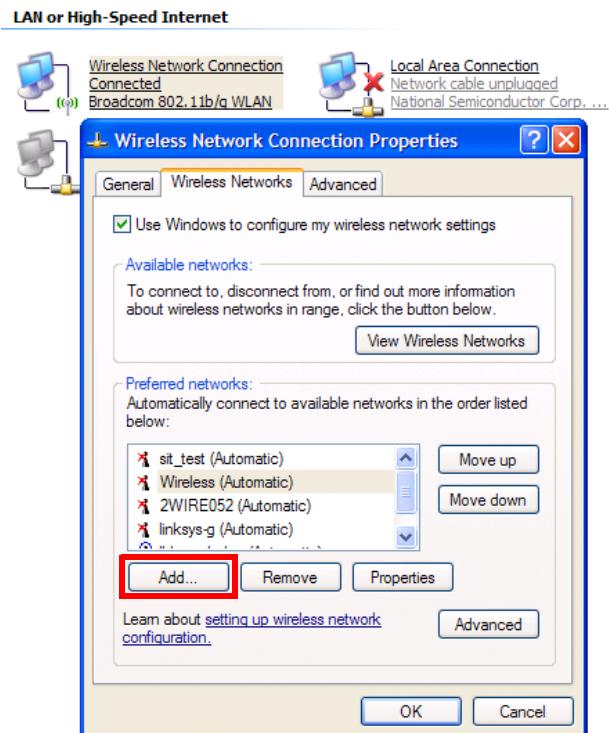
Step 2 - Wireless Network Connection

Right-click on Wireless Network Connections and again select Properties



Step 3 - Adding a Wireless Network

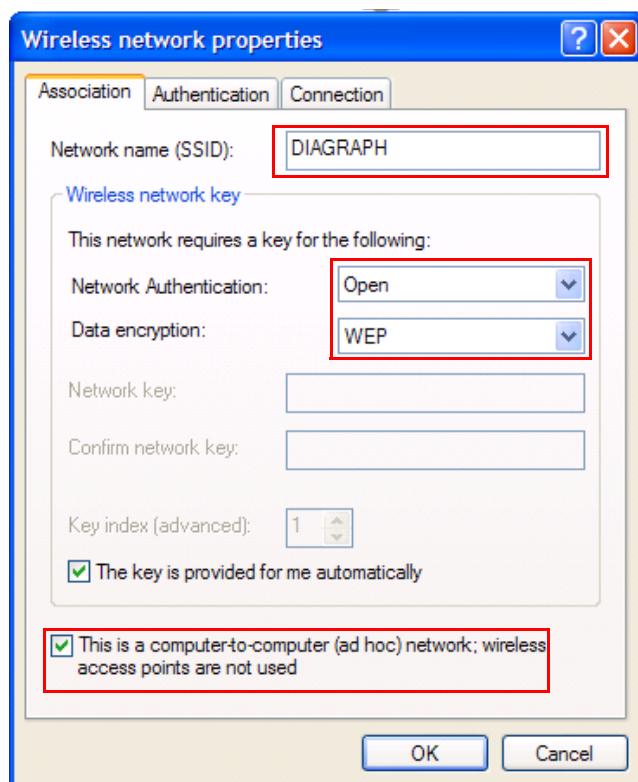
Click the "Add" button to create a new wireless network. This will not effect any of the other wireless networks that already exist.



Step 4 - Configuring the Network

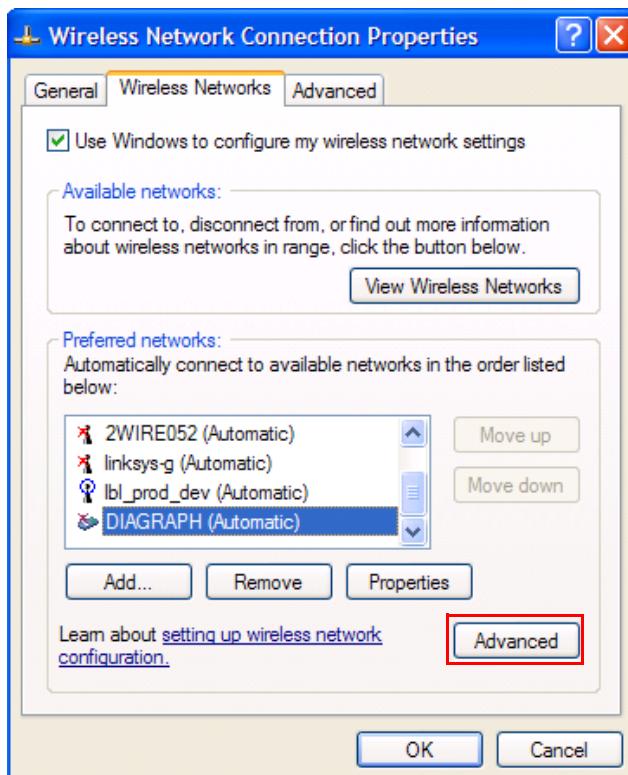
Windows will open up a dialog box to key in the settings for the wireless network. For this example, key in an SSID of "DIAGRAPH" (case sensitive). Next, select the Authentication to be Open and encryption as WEP. In this example, there will not be any data encryption for security. If this is desired later, it can be changed here, but must also be entered into each system by using the direct web access to the system. Once the open encryption steps are complete, a common web browser on the PC can be used to access the unit and set up encryption.

Next, check the box for ad-hoc networking.



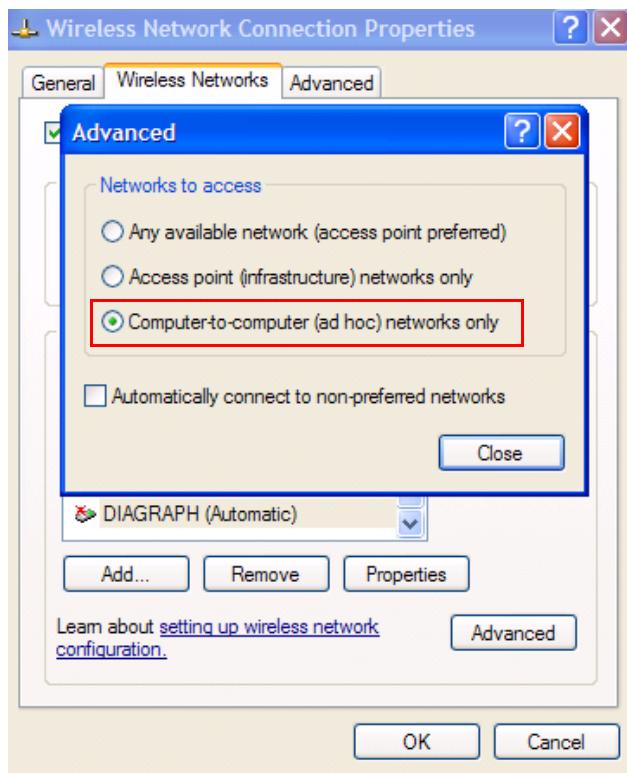
Step 5 - Advanced Settings

Back in the Wireless Network Connection menu, go to the Wireless Network tab and press the "Advanced" button to change the wireless access method.



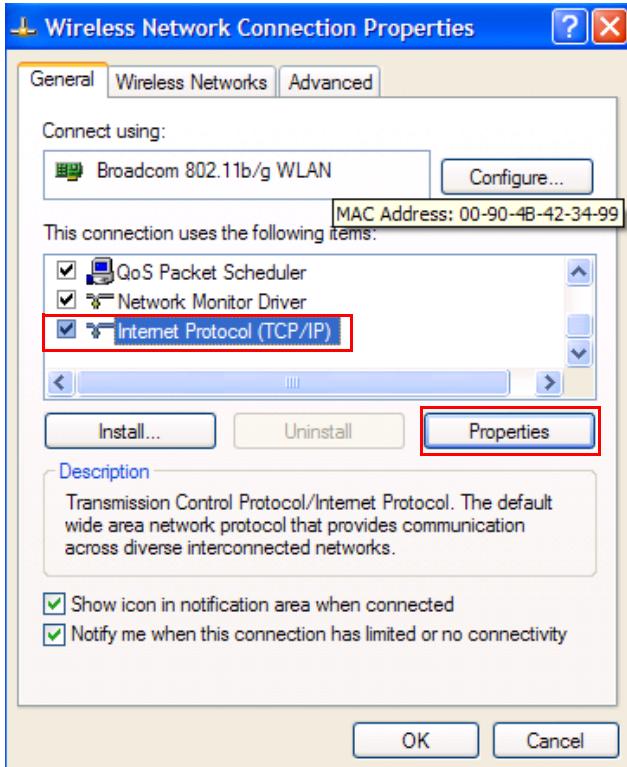
Step 6 - Networks to Access

To activate communications to the Ad-Hoc network, the Computer to Computer selection is required. Select this value and close the dialog box.



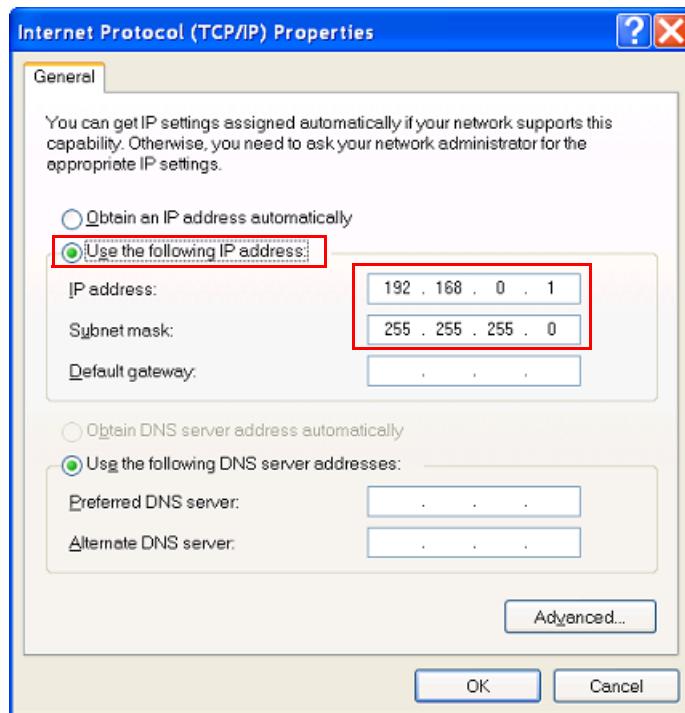
Step 7 - Setting the PC IP Information

The TCP/IP settings need to be modified to work on the Ad-Hoc network. Select the “General” tab on the Wireless Network Connection Properties and click on the “Internet Protocol (TCP/IP)” connection. Press the Properties button to change these settings



Step 8 - TCP/IP Settings

These settings are typically set for “Obtain an IP-address automatically”, and should be returned to this once the Ad-Hoc network testing is complete. To establish the Ad-Hoc identity on the PC, select “Use the following IP Address”. Enter an IP address of 192.168.0.1 and a Subnet Mask (Netmask) of 255.255.255.0, then press OK.



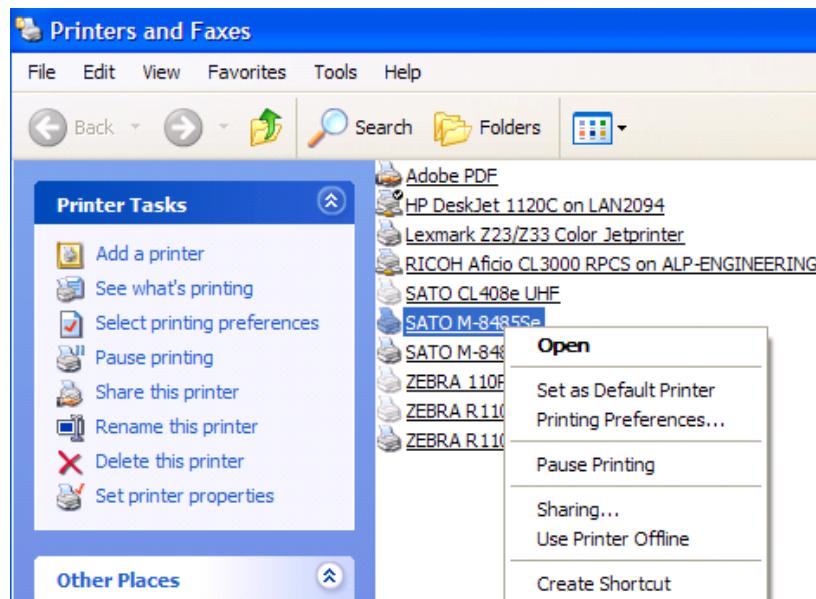
This ends the steps specific to Ad-Hoc Network setup. Continue to the next steps to configure the printer driver.

4.2 IP Printer Driver Configuration

Configuring a printer for IP printing is the same for Wireless modes of Ad-Hoc and Infrastructure, as well as wired 100BaseT. Follow these steps to configure the print driver:

Step 1 - Select the printer

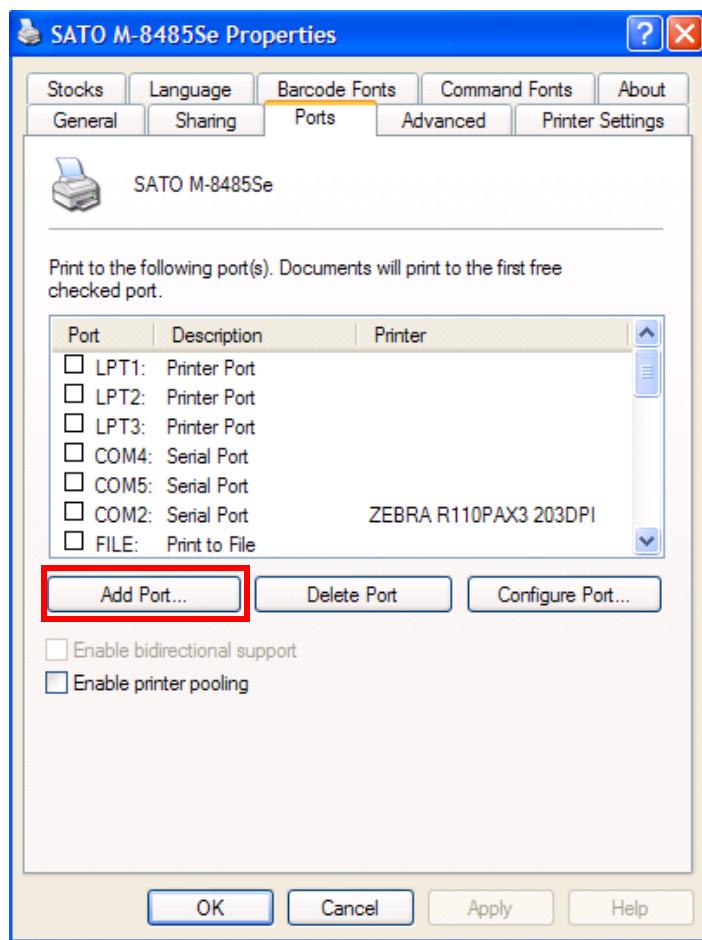
From the start menu, select Printers and Faxes. Select the printer driver from those listed. The printer driver should have been installed prior to this step. Once the printer is selected, right-click it and select “Properties”.



Example Setup

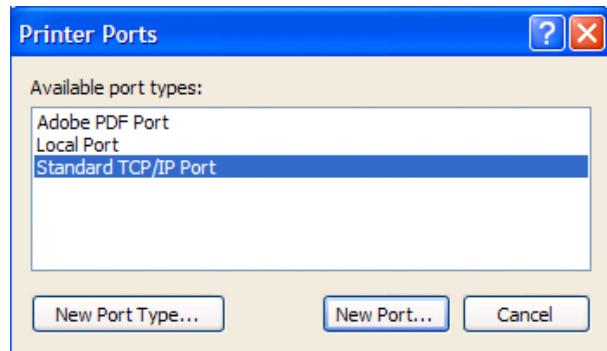
Step 2 - Configure a TCP/IP Port

Select the “Ports” tab and press the “Add Port...” button.



Step 3 - Setup a standard TCP/IP Port

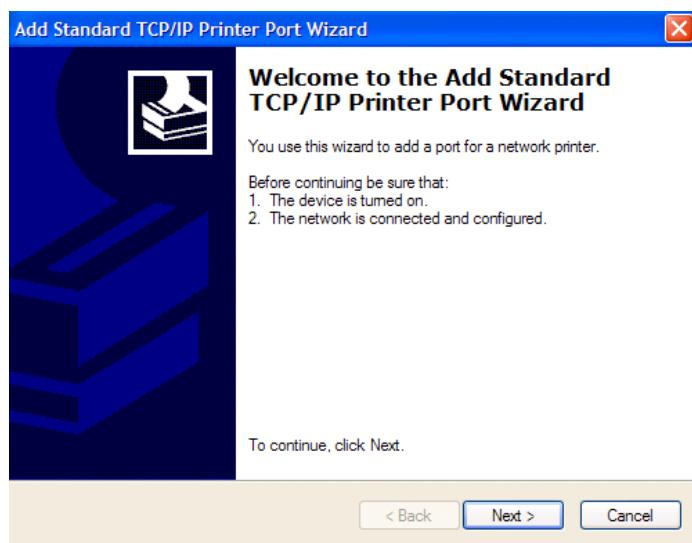
Choose “Standard TCP/IP Port” and press the “New Port...” button.



Example Setup

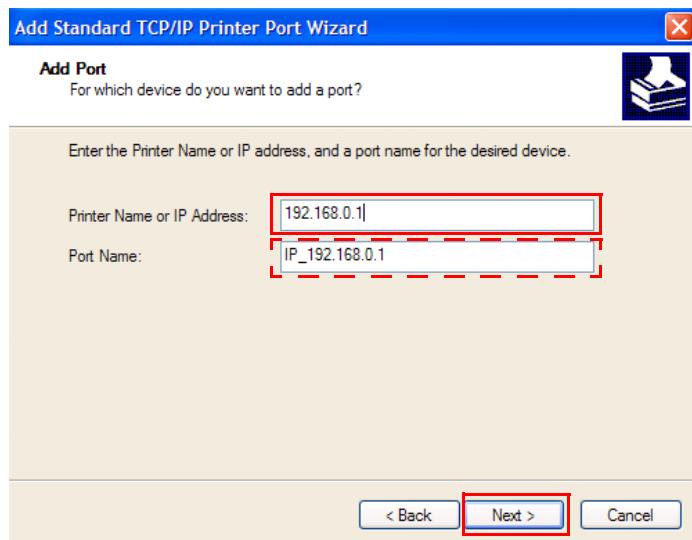
Step 4 - TCP/IP Wizard

Windows will start a port configuration wizard to enter the IP and other information.



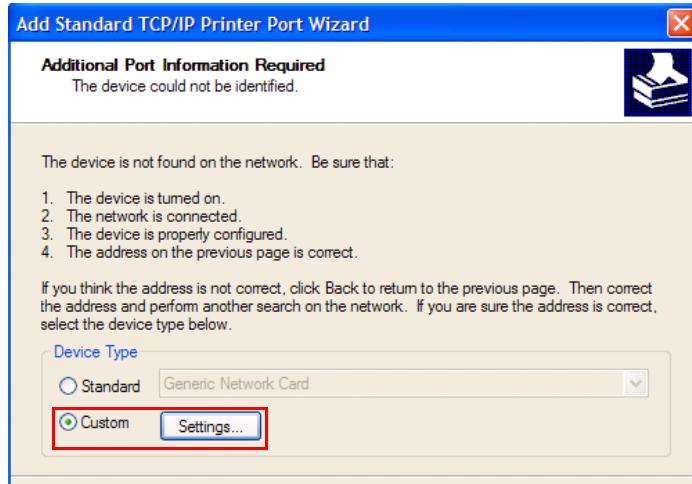
Step 5 - IP Address of Device

Enter the IP Address of the system being installed (not the one from the PC in the earlier setup steps). This number must exactly match the remote system's configured IP address. Press "Next" when complete. Optionally, the Port Name can be entered to be used as a reference later.



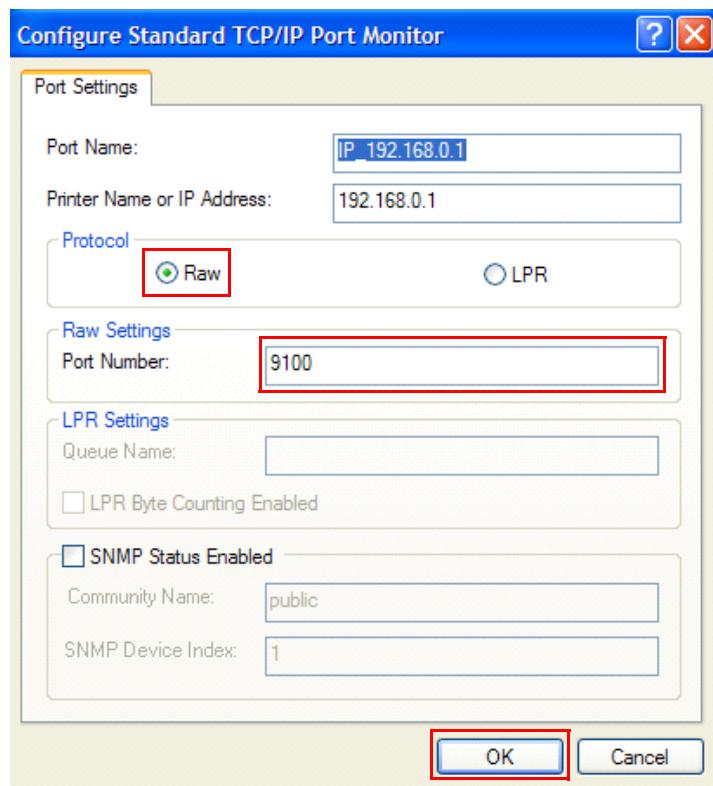
Step 6 - Port Number Settings

In the next screen, select the Custom device type and then press "Settings..."



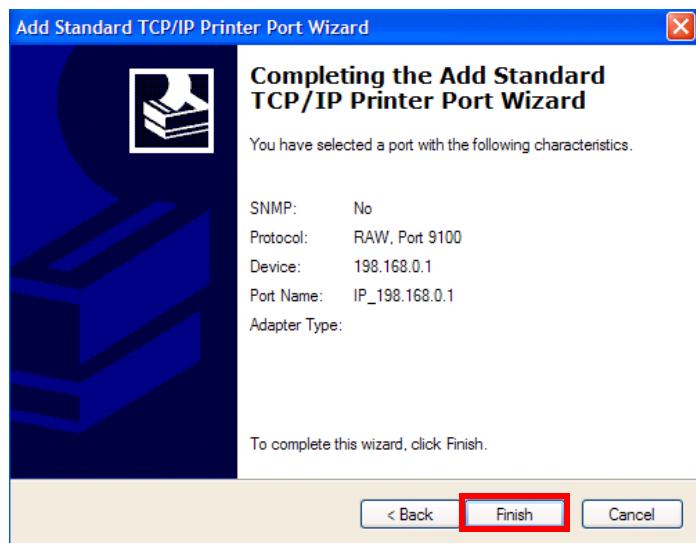
Step 7 - Select the Monitor Port Number

Choose the protocol to be “Raw” format and the Port Number for TCP/IP connection to occur on 9100. This is important because connecting on another port will not allow data to reach the printer or MCA unit. The value of 9100 is the default for the system. Press “OK” when this step is complete.



Step 8 - Finalize the Setup

Finalize the settings by pressing the “Finish” button. This driver should now be ready to handle sending data down to the system.



5.0 Troubleshooting



5.1 Pinging a System

To check for a simple, low-level connection to the system from a networked PC terminal running Windows, click on the program Start button. Click on the "Run..." button and type in cmd.exe on the command line, then press enter. It will pull up a window similar to the one shown below.

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>ping 172.16.3.10

Pinging 172.16.3.10 with 32 bytes of data:

Reply from 172.16.3.10: bytes=32 time=245ms TTL=64
Reply from 172.16.3.10: bytes=32 time=2ms TTL=64
Reply from 172.16.3.10: bytes=32 time=2ms TTL=64
Reply from 172.16.3.10: bytes=32 time=2ms TTL=64

Ping statistics for 172.16.3.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 245ms, Average = 62ms

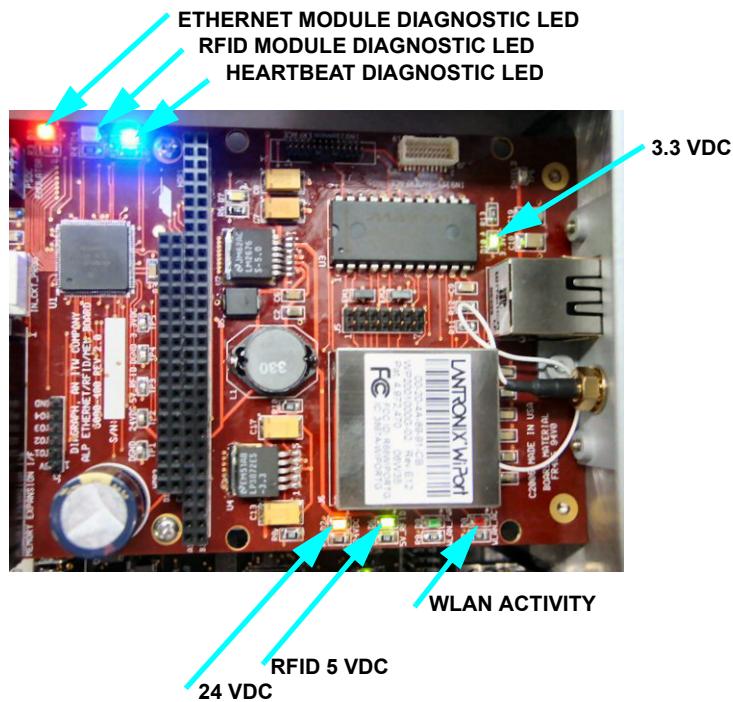
C:\Documents and Settings\Administrator>
```

Type the word "ping", followed by a space and the IP address of the system that is configured and powered up. Press enter and observe the diagnostic data returned. The PC will send out packets of data and wait for a response from the system. If the system was configured properly and the communications are working, the system will return the data and the PC will report the round trip time for the message to be sent and received. Typically, the first packet has to learn the routing to the system device, and therefore takes longer than subsequent messages. If the packet is not returned, that corresponding error message will be shown in the message window. If the message returns in failure, check the following items:

- The system has the correct IP Address (no typo's)
- The system has the antenna connected properly and it is pointing up, if this is a wireless set up.
- The gateway address is correct (LAN or Wireless Infrastructure connection).
- The SSID is correct, with padded spaces to left-justify the name and the case of the letters is correct (WLAN only).

5.2 Board-Level Signal Diagnostics

The 6000-400 PCB handles wireless and wired Ethernet communications and optionally integrates RFID support, as well as expanded memory and USB peripheral support. This board is installed into the highest PC104 location on the expansion stack.



DIAGNOSTIC LED

ETHERNET MODULE DIAG. LED

RFID MODULE DIAG. LED

HEARTBEAT DIAG. LED

3.3 VDC

24 VDC

RFID 5 VDC

WLAN ACTIVITY

MEANING / STATUS

This LED is lit when the Ethernet module is recognized as an installed option on the PCB

This LED is lit when the RFID Engine has been recognized as an installed option on the PCB

This LED flashes every second to indicate the firmware is running properly

This LED indicates that the 3.3 voltage converter is working properly to run the Ethernet module

This LED indicates that the incoming supply from the MCU board is working properly

This LED indicates that the high-current 5 volt regulator is working properly to run the RFID module

This LED will briefly flash on occasion as there is wireless data activity to the system. It will not be active for wired-LAN mode

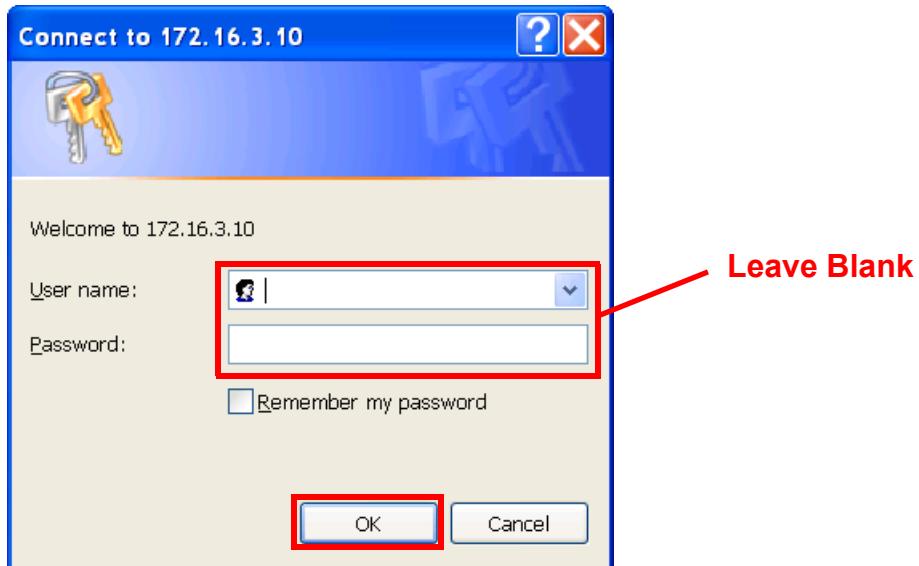
6.0 Advanced Setup



6.1 Manually Changing Values through HTTP

The settings of the Ethernet communications can be performed through a web browser to modify settings for WEP (data encryption), IP Settings, and WLAN configuration. The following screens show sample screens of the web interface.

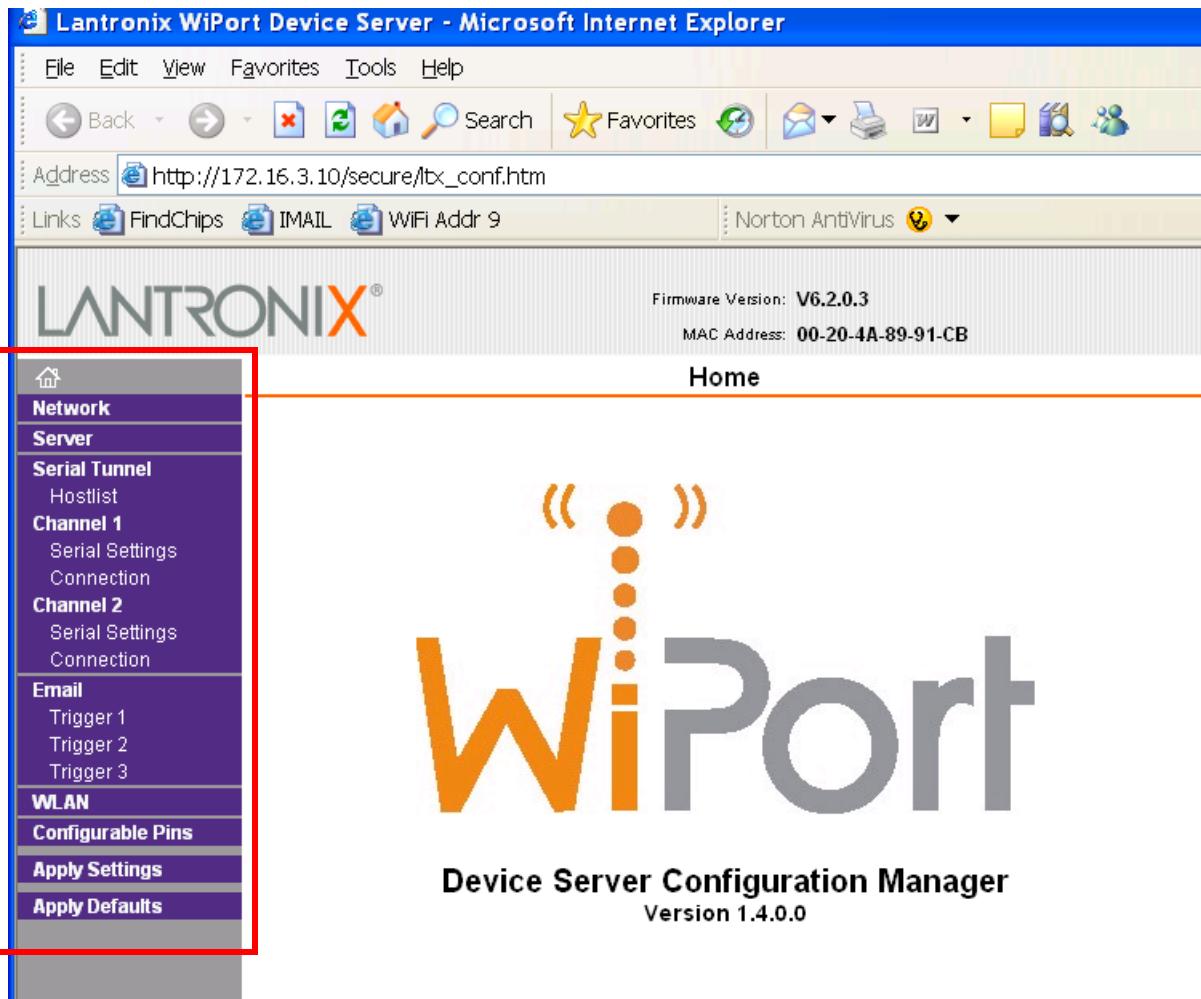
Access the device-server web pages by entering: <http://xxx.xxx.xxx.xxx>, where the x's represent the IP address of the unit to contact. When the prompt for security login appears, leave the entry boxes blank and press OK to continue to the home page screen.



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Advanced Setup

From the home web page, there is a directory to the left of the page to select which parameters to modify.



The Network settings allow the IP, Gateway, Netmask, and other relevant settings to be modified. The Server, Serial Tunnel, Channel 1 & 2, Email, and Configurable Pins should not be changed. The WLAN settings allow modification of the SSID, Network Mode, and WEP values. The next two screens show these menus and what parameters can be safely modified.

6.2 Network Settings via HTTP

The following screen shows a typical Network Setting screen. The superimposed green boxes indicate values that can be safely changed. Values in superimposed red slashed boxes indicate values that should not be changed.

Address Go

Links [FindChips](#) [IMAIL](#) [WiFi Addr 9](#)

Norton AntiVirus

Firmware Version: V6.2.0.3
MAC Address: 00-20-4A-89-91-CB

Network Settings

IP Configuration

Obtain IP address automatically

Auto Configuration Methods

BOOTP: Enable Disable

DHCP: Enable Disable

AutoIP: Enable Disable

DHCP Host Name:

Use the following IP configuration:

IP Address:

Subnet Mask:

Default Gateway:

Ethernet Configuration

Auto Negotiate

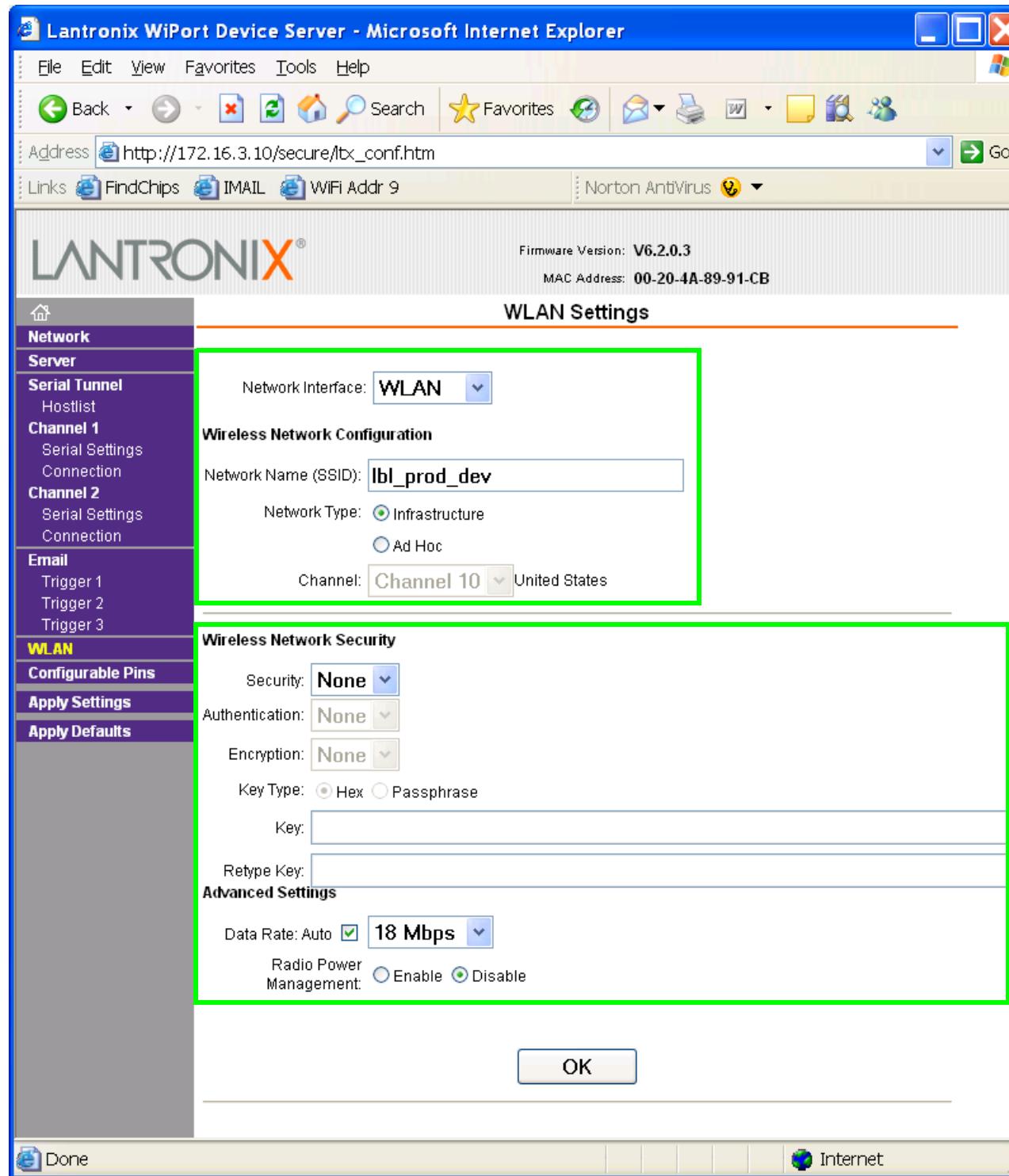
Speed: 100 Mbps 10 Mbps

Duplex: Full Half

OK

6.3 WLAN Settings via HTTP

The following screen shows a typical WLAN Setting screen. The superimposed green boxes indicate values that can be safely changed. Values in superimposed red slashed boxes indicate values that should not be changed



7.0 Card Installation



If the system was originally ordered with an optional Ethernet Module, it will be installed at the factory. For replacement or field-based installations, please follow the steps below for properly installing this module.

Tools Required:

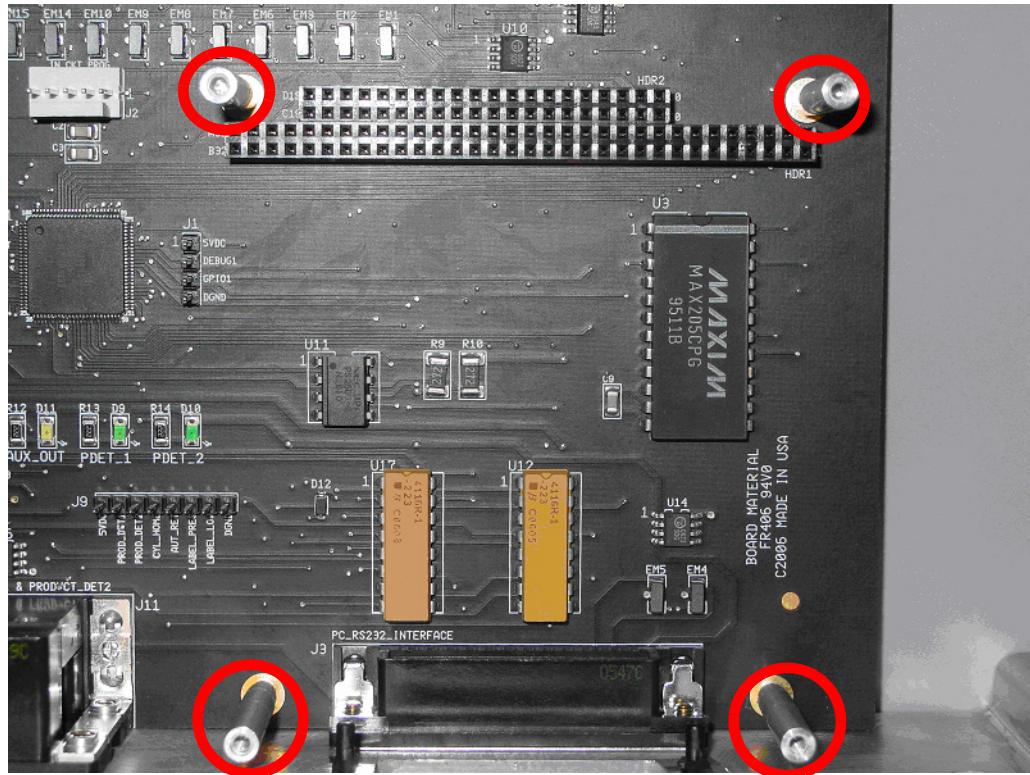
- 3/16 inch Hex-nut driver
- 1/4 inch Hex-nut driver
- Phillips screwdriver

Installation:

Step 1: Disconnect the power supply cord from the unit. Unscrew the lid and the two rear thumb screws on the rear panel of the MCA. Remove the MCU board.

Step 2: Locate the PC104 connectors (HDR1 & HDR2) for mounting the 6000-400 PCB

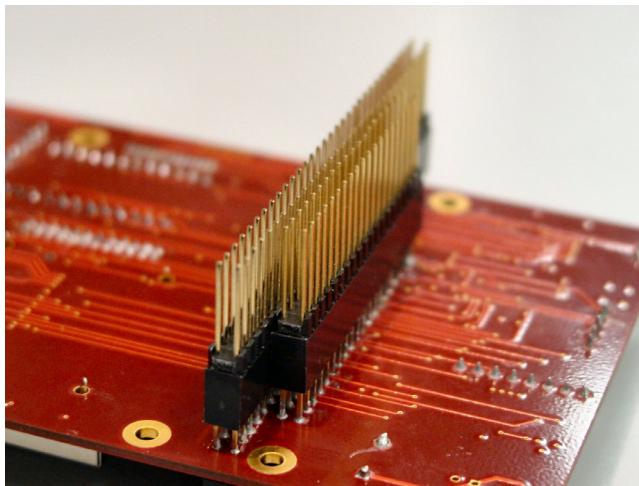
Step 3: Insert the four (4) threaded standoffs into the mounting holes on the board, thread end into the MCU. Use the four (4) nylon lock nuts to secure the standoffs



Step 4: Loosen, but do not remove the jack screws holding the MCU board to the rear panel with the 3/16 inch hex-nut driver. This will allow room to install the Ethernet PCB onto the PC104 stack.

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Step 5: Determine if there is a Discrete I/O Card Module installed, and if not, add the PC104 stacking connectors to allow the extra height needed to align the Ethernet module to the access port for the connections to the antenna or wired-Ethernet Cat 5 cable. If the Discrete I/O module is present, discard the stacking connectors.



Step 6: Carefully seat the Ethernet Module onto the PC104 connector bus, making sure to align the pins into the sockets correctly.

Step 7: Insert the 4-40 screws into the Ethernet board to secure it to the standoffs below the board.

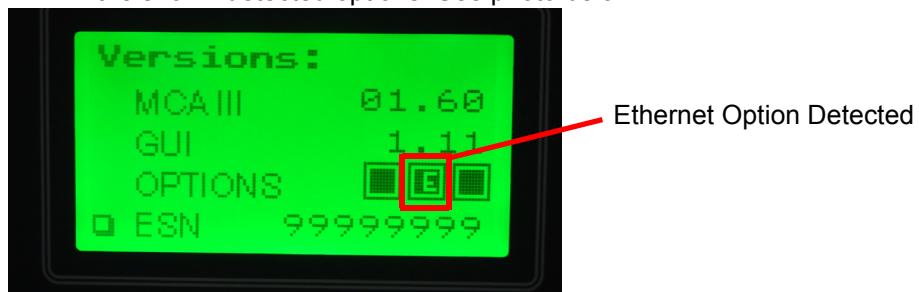
Step 8: Install the jackscrews (2) into the rear panel to secure the Ethernet board. Tighten with the 3/16 inch hex-nut driver. Tighten the remaining jackscrews from the other connectors that were loosened in prior steps to facilitate the installation of the board. Be sure to limit the torque applied to keep from stripping out the jackscrews. Insert the MCU back into the MCA unit and tighten the two thumbscrews.

Step 9: Install the antenna (for wireless configurations) or the Cat 5 cable (for wired Ethernet). Aim the antenna upward for the best possible reception signal.



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Step 10: Plug the unit into power and verify the Ethernet module is recognized by the system by looking for an “E” in the shown detected options. See photo below:



7.1 Spare Parts List

	Description
DOCUMENTATION	
6000-420N	Ethernet User Manual
6000-400	Ethernet PCB
6000-425	Wireless Ethernet Antenna

8.0 Operational Settings



Parameter Name	Setting
Network Mode	Wireless Infra / Wireless AdHoc / Wired 100BaseT / Serial Com
IP Address	-----
Netmask	-----
Gateway Address	-----
SSID	-----
Baud Rate	9600 / 19200 / 38400 / 57600 / 115200
System Serial Number	-----
Equipment Location	
Installed By	