LANTRONIX®

WiPort

WiPort™ User Guide

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Disclaimer and Revisions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device is intended only for OEM Integrators. The OEM integrator should be aware of the following important issues.

Labeling of the End Product

The end product to integrate this module has to be clearly identified on the label that this end product contains an FCC approved RF module. The format of such statement could be "Contains Transmitter with FCC ID: R68WIPORTG" or similar.

Integration Note

a) This module is authorized under limited module approval specified to mobile host equipment. So, the antenna must be installed such that 20cm is maintained between the antenna and users.

b) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

Note: *In the event that these conditions can not be met (for example certain laptop configurations, general purpose PCMCIA or similar cards, or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product (including the transmitter) and obtaining a separate FCC authorization.*

Note: *Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device*.

Contents

1: Using This Guide

Purpose and Audience

This guide provides the information needed to configure, use and update the WiPort™ and is intended for software developers and system integrators who are embedding the WiPort in their designs.

Note: *For the WiPort model WP2001000M-02, additional information is in the Modbus Protocol User Guide located at www.lantronix.com/support/documentation.html.*

Chapter Summary

The remaining chapters in this guide include:

Introduction	Describes the main features of the WiPort and the protocols it supports.
Using DeviceInstaller	Provides information for viewing the WiPort's configuration using DeviceInstaller.
Configuration Using Web-Manager	Details configuration using the Web-Manager to set parameters such as port and server properties.
Configuration via Serial Mode or Telnet Port	Provides instructions for accessing Setup Mode (command line interface) using a Telnet connection through the network or a terminal or terminal emulation program through the serial port. Details the parameters that you must configure.
Configurable Pins	Provides instructions for configuring the eleven General Purpose I/O pins.
Monitor Mode	Provides instructions for accessing and using the command line interface for monitoring the network and diagnosing problems.
Wireless Bridging	Provides information on the WiPort wireless bridging feature.
Updating Firmware	Provides instructions for obtaining the latest firmware and updating the WiPort.
Troubleshooting	Describes common problems and error messages and how to contact Lantronix Technical Support. Also provides information on diagnostic LEDs.

Additional Documentation

The following guides are available on the product CD and the Lantronix web site (www.lantronix.com)

WiPort Development Kit Quick Start Guide	Briefly explains the basics to get the WiPort up and running.
WiPort Integration Guide	Provides information about the WiPort hardware and integrating the WiPort into another product.

2: Introduction

WiPort is a wireless embedded device server that provides a network-enabling solution based on the IEEE 802.11b/g wireless standard. WiPort allows Original Equipment Manufacturers (OEMs) to add wireless connectivity to their products by incorporating it onto a circuit board.

The WiPort functions independently of a PC, providing a fully integrated solution that combines a processor, memory, 802.11b/g transceiver, and dual high-speed serial ports into a single compact module. It includes an operating system, an embedded Web server, and a full TCP/IP protocol stack. In addition, the WiPort sends email alerts and supports numerous other network communication protocols, including ARP, UDP, TCP, ICMP, Telnet, AutoIP, DHCP, HTTP, SNMP, and SMTP.

Wired Equivalent Privacy (WEP) and Wireless Protected Access (WPA) are available to guarantee the security of the wireless communication. WEP uses an RC4 encryption algorithm with a configured 64-bit or 104-bit key to scramble the data. WPA uses TKIP which expands upon WEP by changing the key automatically every session, detecting intrusion and using improved authentication.

For OEMs who wish to customize the user interface by employing common and familiar tools, the WiPort serves applets to a Web browser, resulting in interactive Web pages. This customization of HTML Web pages and configuration screens tailors the WiPort to fit unique requirements.

Capabilities

The WiPort device server has the following capabilities:

- Communication between TCP and UDP to serial.
- Wireless interface (802.11b/g) with WEP or WPA protection.
- Ethernet interface.
- Email notification of configurable alarms and events.
- Upgradeable firmware.
- SNMP monitoring.
- Connects devices through a TCP or UDP data channel to computers or to another device server.
- Contains a web server allowing presentation of custom content and easy configuration through the browser.
- Contains eleven programmable I/O pins used to monitor or control attached devices.
- WiPort-G models are configurable for wireless bridging (see on *8:Wireless Bridging*). This allows a host connected to the WiPort over a wired Ethernet interface to be accessible over a wireless network.

Applications

The WiPort device server connects serial devices such as those listed below to wireless and Ethernet networks using the IP protocol family.

- Remote sensing
- CNC controllers
- Data collection devices
- Telecommunications equipment
- Data display devices
- Security alarms and access control devices
- Time clocks and terminals

Protocol Support

The WiPort device server uses the TCP/IP protocol stack for network communications. Other supported protocols include:

- ARP, UDP, TCP, ICMP, Telnet, TFTP, AutoIP, DHCP, HTTP, and SNMP for network communications and management.
- TCP, UDP, and Telnet for connections to the serial port.
- TFTP for firmware and web page updates.
- IP for addressing, routing, and data block handling over the network.
- User Datagram Protocol (UDP) for typical datagram applications in which devices interact with other devices without maintaining a point-to-point connection.
- SMTP for e-mail transmission.

Configuration Methods

For the unit to operate correctly on a network, it must have a unique IP address on the network. There are three basic methods for logging into the device server:

DeviceInstaller: View the current WiPort configuration using a Graphical User Interface (GUI) on a PC attached to a network. (See *3:Using DeviceInstaller*.)

Web-Manager: Through a web interface, configure the WiPort and its settings using the WiPort's Web-Manager. (See *4:Configuration Using Web-Manager*.)

Serial & Telnet Ports: There are two approaches to accessing Serial Mode. Make a Telnet connection to the network port (9999) or connect a terminal (or a PC running a terminal emulation program) to the unit's serial port. (See *5:Configuration via Serial Mode or Telnet Port*.)

Addresses and Port Numbers

Hardware Address

The hardware address is also referred to as the Ethernet address or the MAC address. The first three bytes of the Ethernet address are fixed and read 00-20-4A, identifying the unit as a Lantronix product. The fourth, fifth, and sixth bytes are unique numbers assigned to each unit.

Example: 00-20-4A-14-01-18

Note: *Make note of the MAC address. It is needed to locate the WiPort using DeviceInstaller.*

IP Address

Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit. The WiPort is automatically assigned an IP address on DHCP-enabled networks as it is DHCP-enabled by default.

Port Numbers

Every TCP connection and every UDP datagram is defined by a destination IP address and a port number. For example, a Telnet application commonly uses port number 23. A port number is similar to an extension on a phone system.

The unit's serial channel (port) can be associated with a specific TCP/UDP port number. Port number 9999 is reserved for access to the unit's Setup (configuration) Mode window. Ports 0-1024 are reserved as well. For more information on reserved port numbers, refer to *Table 5-7. Reserved Port Numbers*.

3: Using DeviceInstaller

This chapter covers the steps for viewing the WiPort device server's properties and device details.

The WiPort's default configuration is as follows:

- Network name: LTRX_IBSS
- Ad hoc mode
- No security
- BOOTP, DHCP, and AutoIP enabled.

The computer on which DeviceInstaller will be installed needs to have access to a wireless card with the same settings. Set the IP address to 0.0.0.0.

Note: *AutoIP generates a random IP address in the range 169.254.0.1 to 169.254.255.254 if no BOOTP or DHCP server is found*

Accessing WiPort using DeviceInstaller

Note: *Make note of the MAC address. You will need it to locate the WiPort using DeviceInstaller. For more information on the hardware address, see* *Hardware Address on page 11*.

Follow the instructions on the product CD to install and run DeviceInstaller.

1. Click **Start→Programs → Lantronix→DeviceInstaller→DeviceInstaller.**
2. Click on the **Wireless** folder. The list of Lantronix wireless devices available displays.
3. Expand the list of WiPorts by clicking the **+** symbol next to the WiPort icon. Select the WiPort unit by clicking on its IP address to view its configuration.

ck

Viewing the WiPort's Current Configuration

Follow the *Accessing WiPort using DeviceInstaller* on page 13 to locate the WiPort.

1. In the right window, click the **Device Details** tab. The current WiPort configuration displays:

Name	Configurable field. Enter a **name** to identify the WiPort. Double-click on the field, type in the value, and press **Enter** to complete. This name is not visible on other PCs or laptops using DeviceInstaller.
Group	Configurable field. Enter a **group** to categorize the WiPort. Double-click on the field, type in the value, and press **Enter** to complete. This group name is not visible on other PCs or laptops using DeviceInstaller.

Comments	Configurable field. Enter **comments** for the WiPort. Double-click on the field, type in the value, and press **Enter** to complete. This description or comment is not visible on other PCs or laptops using DeviceInstaller.
Device Family	Non-configurable field. Displays the WiPort's device family type as **Wireless**.
Type	Non-configurable field. Displays the device type as **WiPort**.
ID	Non-configurable field. Displays the WiPort's ID embedded within the box.
Hardware Address	Non-configurable field. Displays the WiPort's hardware (or MAC) address.
Firmware Version	Non-configurable field. Displays the firmware currently installed on the WiPort.
Online Status	Non-configurable field. Displays the WiPort's status as online, offline, unreachable (the WiPort is on a different subnet), or busy (the WiPort is currently performing a task).
Telnet Port	Non-configurable field. Displays the WiPort's port for telnet sessions.
WebPort	Non-configurable field. Displays the WiPort's port for Web-Manager configuration.
Maximum Baud Rate Supported	Non-configurable field. Displays the WiPort's maximum baud rate. ***Note:*** *the WiPort may not currently be running at this rate.*
Firmware Upgradeable	Non-configurable field. Displays **True**, indicating the WiPort's firmware is upgradeable as newer version become available.
IP Address	Non-configurable field. Displays the WiPort's current IP address. To change the IP address, see *4:Configuration Using Web-Manager* or *5:Configuration via Serial Mode or Telnet Port*.
Subnet Mask	Non-configurable field. Displays the WiPort's current subnet mask. To change the subnet mask, see *4:Configuration Using Web-Manager* or *5:Configuration via Serial Mode or Telnet Port*.
Gateway	Non-configurable field. Displays the WiPort's current gateway. To change the gateway, see *4:Configuration Using Web-Manager* or *5:Configuration via Serial Mode or Telnet Port*.
Number of Ports	Non-configurable field. Displays the number of ports on the WiPort.
Configurable Pins Available	Non-configurable field. Displays **True**, indicating configurable pins are available on the WiPort.
Email Trigger Available	Non-configurable field. Displays **True**, indicating email triggers are available on the WiPort.
TCP Keepalive valid range	Non-configurable field. Displays **1-65s**, the WiPort's TCP keepalive range.

DynamicIP	Non-configurable field. Indicates whether the current IP address on the WiPort was set using static or DHCP.
Number of COB partitions supported	Non-configurable field. Displays the number of COB partitions supported (between 19 and 51).
Supports AES Data Stream	Non-configurable field. Displays **True** if the WiPort unit supports AES encryption.
Support Configurable Pins	Non-configurable field. The WiPort supports configurable pins.
Supports 485	Non-configurable field. WiPort supports the RS-485 protocol.
Supports 920K Baudrate	Non-configurable field. WiPort supports baud rates up to 920K.
Supports Wired Ethernet	Non-configurable field. WiPort supports wired Ethernet.
Supports HTTP Setup	Non-configurable field. WiPort supports HTTP setup.
Supports 230K Baudrate	Non-configurable field. WiPort supports a baud rate of 230K.
Supports Email Triggers	Non-configurable field. WiPort supports email triggers.
Supports GPIO Communication	Non-configurable field. WiPort supports communication via General Purpose Input Output (GPIO).

4: Configuration Using Web-Manager

This chapter describes how to configure the WiPort using Web-Manager, Lantronix's browser-based configuration tool. The unit's configuration is stored in nonvolatile memory and is retained without power. The unit performs a reset after the configuration is changed and stored.

Accessing WiPort Web-Manager using DeviceInstaller

Follow the instructions on the product CD to install and run DeviceInstaller.

Note: *For more information on DeviceInstaller, see 3:Using DeviceInstaller.*

1. Run DeviceInstaller and search for the list of available Lantronix device servers.
2. Select the WiPort unit by clicking on its IP address.
3. In the right window, click the **Web Configuration** tab.
4. To view the WiPort's Web-Manager in the current DeviceInstaller window, click **Go**. To open the Web-Manager in a web browser, click Use **External Browser**. The Web-Manager displays.

Figure 4-1. Web-Manager

The main menu is in the left side of the Web-Manager window.

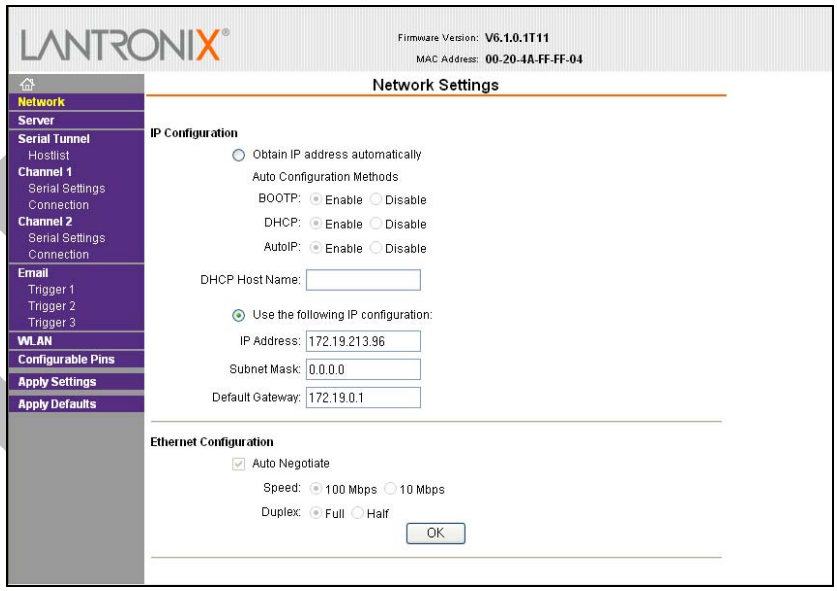
Note: *Alternatively, access the WiPort's Web-Manager if it is connected to the network by entering its IP address in a web browser.*

Network Configuration

The unit's network values display upon selecting **Network** from the main menu. The following sections describe the configurable parameters within the Network configuration menu.

Note: *The IP address is assigned via DHCP (on DHCP-enabled networks). Assign a static IP address if preferred.*

Figure 4-3. Network Settings



Automatic IP Address Configuration

To assign an IP address and its network configuration automatically:

1. Click **Network** from the main menu.
2. Select **Obtain IP address automatically**.
3. Enter the following (as necessary):

BOOTP	Select **Enable** to permit the Bootstrap Protocol (BOOTP). The BOOTP server automatically assigns the IP address from a pool of addresses.
DHCP	Select **Enable** to permit Dynamic Host Configuration Protocol (DHCP). DHCP automatically assigns a leased IP address to the WiPort unit.
Auto-IP	The WiPort generates an IP in the 169.254.x.x address range with a Class B subnet. Select the **Enable** checkbox to enable this feature.
DHCP Host Name	Enter the name of the host on the network providing the IP address.

Note: *Disabling BOOTP, DHCP, and Auto-IP (i.e. all three checkboxes) is not advised as the only available IP assignment method will then be ARP or serial port.*

4. Click the **OK** button when finished.

Static IP Address Configuration

To assign an IP address and its network configuration manually:

1. Click **Network** from the main menu.
2. Select **Use the following IP configuration**.
3. Enter the following (as necessary):

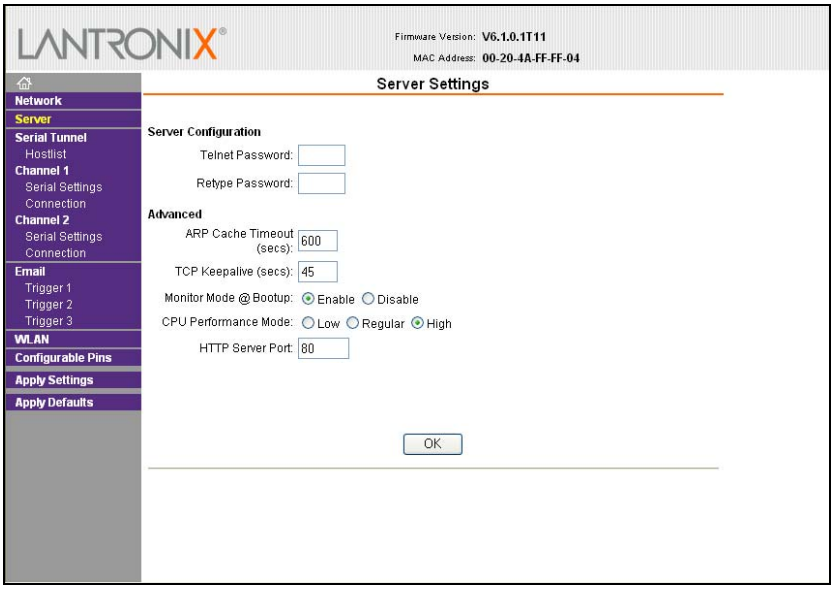
IP Address	If DHCP is not used to assign IP addresses, enter it manually. The IP address must be set to a unique value in the network.
Subnet Mask	A subnet mask defines the number of bits taken from the IP address that are assigned for the host part.
Default Gateway	The gateway address, or router, allows 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.

4. Click the **OK** button when finished.

Server Configuration

The unit's server values display upon selecting **Server** from the main menu. The following sections describe the configurable parameters within the Server configuration menu.

Figure 4-5. Server Settings



To configure the WiPort's device server settings:

1. Click **Server** from the main menu.
2. Configure or modify the following fields:

Server Configuration

Telnet Password	Enter the password required for Telnet access.
Retype Password	Re-enter the password required for Telnet access.

Advanced

ARP Cache Timeout	When the unit communicates with another device on the network, it adds an entry into its ARP table. ARP Cache timeout defines the number of seconds (1-600) before it refreshes this table.
TCP Keepalive	TCP Keepalive time defines how many seconds the unit waits during an inactive connection before checking its status. If the unit does not receive a response, it drops that connection. Enter a value between **0** and **65** seconds. **0** disables keepalive.
Monitor Mode @ Bootup	Select **Disable** to disable the entry into the monitor mode via the **yyy** or **xx1** key sequence at startup. This command prevents the unit from entering monitor mode by interpreting the stream of characters that are received during the device server's initialization at startup.
CPU Performance Mode	Select the WiPort's performance mode. Higher performance settings require more energy. **Low** is 26 Mhz. **Regular** is 48 Mhz; **High** is 88 Mhz. The default is **Regular**.
HTTP Server Port	This option allows the configuration of the web server port number. The valid range is **1-65535**. The default HTTP server port number is **80**.
MTU Size	The Maximum Transmission Unit (MTU) is the largest physical packet size a network can transmit for TCP and UDP. Enter between **512** and **1400** bytes. The default is **1400** bytes.

Host List Configuration

The WiPort scrolls through the host list until it connects to a device listed in the host list table. After a successful connection, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until the next successful connection.

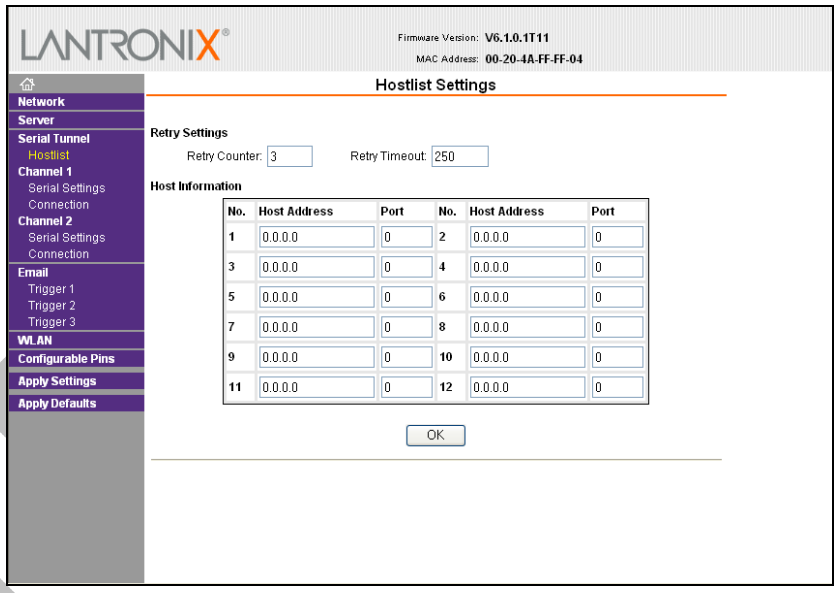
The host list supports a minimum of 1 and a maximum of 12 entries. Each entry contains an IP address and a port number.

Note: *The host list is disabled for Manual and Modem Mode. The unit will not accept a data connection from a remote device when the hostlist option is enabled.*

To configure the WiPort's host list:

1. From the main menu, click the **Hostlist** tab.

Figure 4-7. Hostlist Settings



2. Enter or modify the following fields from the Hostlist Settings window:

Retry Settings

Retry Counter	Enter the value for the number of times the WiPort should attempt to retry connecting to the host list.
Retry Timeout	Enter the duration (in seconds) the WiPort should abandon attempting a connection to the host list.

Host Information

Host Address	Enter or modify the host's IP address.
Port	Enter the target port number.

Channel 1 and Channel 2 Configuration

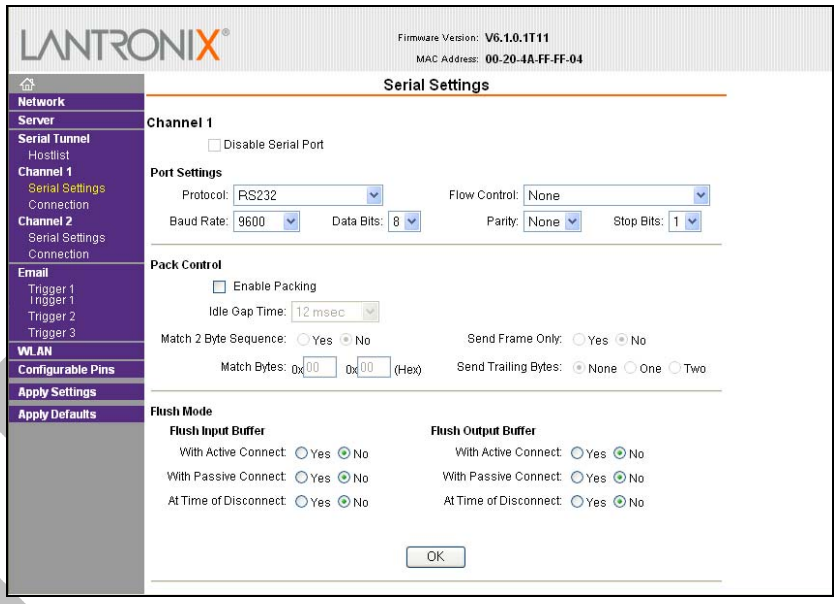
Channel 1 and Channel 2 configurations define how the serial ports respond to network and serial communication.

Serial Settings

To configure a channel's serial settings:

1. From the main menu, click **Serial Settings** for either Channel 1 or Channel 2 to display the Serial Settings page for the selected channel.

Figure 4-9. Channel Serial Settings



2. In the available fields, enter the following information:

Channel 1

Disable Serial Port	Available on Channel 1 settings only. When selected, disables communication through the serial port.

Port Settings

Protocol	Select the protocol type from the pull down menu for the selected channel. **RS-422/485 4-wire** and **RS-485 2-wire** options are available on the WiPort-485 only.
Flow Control	Flow control manages data flow between devices in a network to ensure it is processed efficiently. Too much data arriving before a device is prepared to manage it causes lost or retransmitted data.
Baud Rate	The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400, 460800, or 921600.
Data Bits	Indicates the number of bits in a transmitted data package.
Parity	Checks for the parity bit. The default is **None**.
Stop Bits	The stop bit follows the data and parity bits in serial communication. It indicates the end of transmission.

Pack Control

Enable Packing	Select the checkbox to enable packing on the WiPort. Two firmware-selectable packing algorithms define how and when packets are sent to the network. The standard algorithm is optimized for applications in which the unit is used in a local environment, allowing for very small delays for single

	characters, while keeping the packet count low. The alternate packing algorithm minimizes the packet count on the network and is especially useful in applications in a routed Wide Area Network (WAN). Adjusting parameters in this mode can economize the network data stream.
Idle Gap Time	Select the maximum time for inactivity. The default time is 12 milliseconds.
Match 2 Byte Sequence	Use to indicate the end of a series of data to be sent as one group. The sequence must occur sequentially to indicate to the WiPort end of the data collection.
Match Bytes	Use to indicate the end of a series of data to be sent as one group. Set this value to 00 if specific functions are not needed.
Send Frame Only	After the detection of the byte sequence, indicates whether to send the data frame or the entire buffer. Select **True** to send only the data frame.
Send Trailing Bytes	Select the number of bytes to send after the end-of-sequence characters.

Flush Input Buffer (Serial to Network)

With Active Connect	Select **Yes** to clear the input buffer with a connection that is initiated from the device to the network.
With Passive Connect	Select **Yes** to clear the input buffer with a connection initiated from the network to the device.
At Time of Disconnect	Select **Yes** to clear the input buffer when the network connection to or from the device is disconnected.

Flush Output Buffer (Network to Serial)

With Active Connect	Select **Yes** to clear the output buffer with a connection that is initiated from the device to the network.
With Passive Connect	Select **Yes** to clear the output buffer with a connection initiated from the network to the device.
At Time of Disconnect	Select **Yes** to clear the output buffer when the network connection to or from the device is disconnected.

Connection Settings - TCP

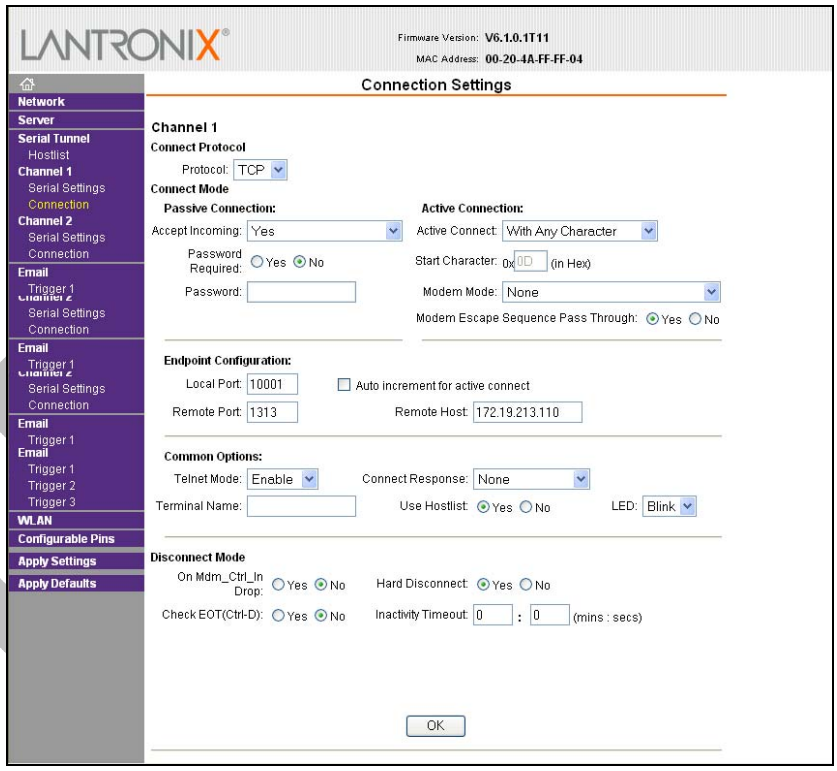
To configure a channel's TCP settings:

1. From the main menu, click **Connection** for either Channel 1 or Channel 2 to display the Connection Settings page for the selected channel.
2. In the available fields, enter the following information:

Connect Protocol

Protocol	Select **TCP** from the pull down menu.

Figure 4-11. TCP Connection Settings



Connect Mode: Passive Connection

Accept Incoming	Select **Yes** to accept incoming connections.
Password Required	Determines whether a password is required for an incoming passive connection. Field is not available when a password is set for Telnet mode.
Password	If Password Required was set to **Yes**, enter the password for passive connections.

Connect Mode: Active Connection

Active Connect	Select **None** to disable **Active Connect**. Otherwise, indicate the connection type from the drop-down list: **With Any Character:** Attempts to connect when any character is received from the serial port. **With Active Mdm Ctrl In:** Accepts external connection requests only when the **modem_control_in** input is asserted. **With Start Character:** Attempts to connect when it receives a specific start character from the serial port. The default start character is carriage return. **Manual Connection:** Attempts to connect when directed by a command string received from the serial port. **Auto Start:** Automatically connects to the remote IP address and port after booting up.
Start Character	If Active Connect is set to **With Start Character**, enter the start character in this field.

Modem Mode	Indicates the on-screen response type when in Modem Mode (if **Modem Mode** is enabled).

Endpoint Configuration

Local Port	Enter the local port number.
Auto increment local port number	Select to auto-increment the local port number for new outgoing connections. The range of auto-incremented port numbers is 50,000 to 59,999 and loops back to the beginning when the maximum range is reached.
Remote Port	Enter the remote port number.
Remote Host	Enter the IP address of the remote device.

Common Options

Telnet Mode	This field is available for configuration only when Active Connection is set to **None**. Select **Enable** to permit Telnet communication to the WiPort unit.
Terminal Name	This field is available for configuration only when Telnet Mode is set to **Enable**. Use the terminal name for the Telnet terminal type. Enter only one name. When this option is enabled, the unit also reacts to the EOR (end of record) and binary options, which can be used for applications such as terminal emulation to IBM hosts.
Connect Response	A single character is transmitted to the serial port when there is a change in connection state. Default setting is **None**.
Use Hostlist	If this option is set to **True**, the device server scrolls through the host list until it connects to a device listed in the host list table. Once it connects, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until it is able to connect to another IP in the host list. The host list is disabled for Manual Mode and for Modem Mode. The unit will not accept a data connection from a remote device when the host list option is enabled. For information on configuring the host list, see *Host List Configuration* on page *20*.
LED	Select **Blink** for the status LEDs to blink upon connection or **None** for no LED output.

Disconnect Mode

On Mdm_Ctrl_In Drop	Set to **Yes** for the network connection to or from the serial port to drop when modem_control_in transitions from a high state to a low state.
Hard Disconnect	When set to **Yes**, the TCP connection closes even if the remote site does not acknowledge the disconnect request.
With EOT	Choose **Yes** to drop the connection when Ctrl-D or Hex 04 is detected. Both Telnet mode and Disconnect with EOT must be enabled for Disconnect with EOT to function properly. Ctrl D is only detected going from the serial port to the network.

Inactivity Timeout	Use this parameter to set an inactivity timeout. The unit drops the connection if there is no activity on the serial line before the set time expires. Enter time in the format mm:ss, where m is the number of minutes and s is the number of seconds. To disable the inactivity timeout, enter **00:00**.

Connection Settings - UDP

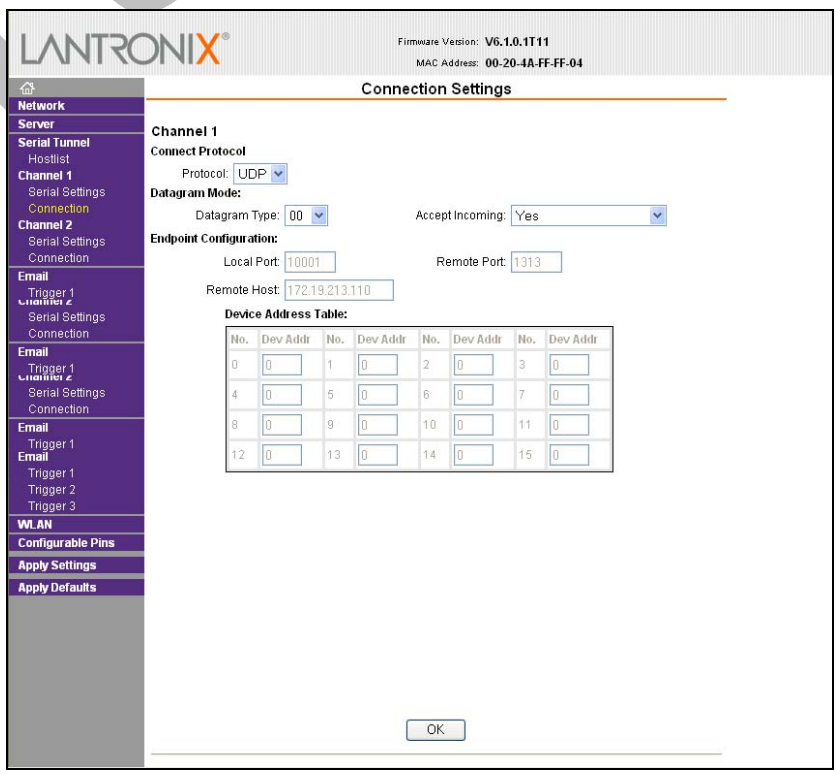
To configure a channel's UDP settings:

1. From the main menu, click **Connection** for either Channel 1 or Channel 2 to display the Connection Settings page for the selected channel.
2. In the available fields, enter the following information:

Connect Protocol

Protocol	Select **UDP** from the pull down menu.

Figure 4-13. UDP Connection Settings



Datagram Mode

Datagram Type	Configures remote IP or network broadcast address and the remote port. Enter **01** for directed or broadcast UDP.
Accept Incoming	Select **Yes** to accept incoming UDP datagrams.

Endpoint Configuration

Local Port	Enter the local port number.
Remote Port	Enter the port number of the remote device.

Remote Host	Enter the IP address of the remote device.
Change Address Table	Field enabled when Datagram Type is set to **FD**. Enter values between 1and 255 to identify units on the local network of device servers.

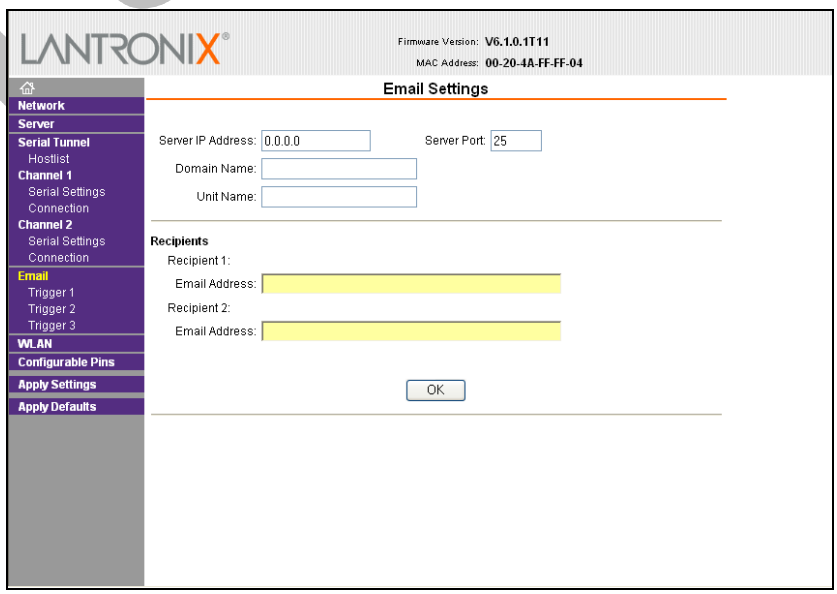
Email Configuration

The unit sends an Email to multiple recipients when a specific trigger event occurs. There are three separate triggers, based on any combination of the configurable pins when selected as user I/O functions. Optionally, use a two-byte serial string to initiate a trigger. Each trigger is independent of the others. Each condition within an individual trigger must be met before the unit will send the Email.

To configure the WiPort's email settings:

1. From the main menu, select **Email** to open the Email Settings window.

Figure 4-15. Email Settings



2. Configure the following fields:

Server IP Address	Enter the IP address of the mail server.
Server Port	Enter the port number on the email server.
Domain Name	Enter the Email server's domain name.
Unit Name	Enter the username used by the WiPort to send Email messages. Spaces are not permitted.

Recipients

Recipient 1: Email Address	Enter the email address designated to receive email notifications.
Recipient 2: Email Address	Enter an additional email address designated to receive email notifications.

Trigger Configuration

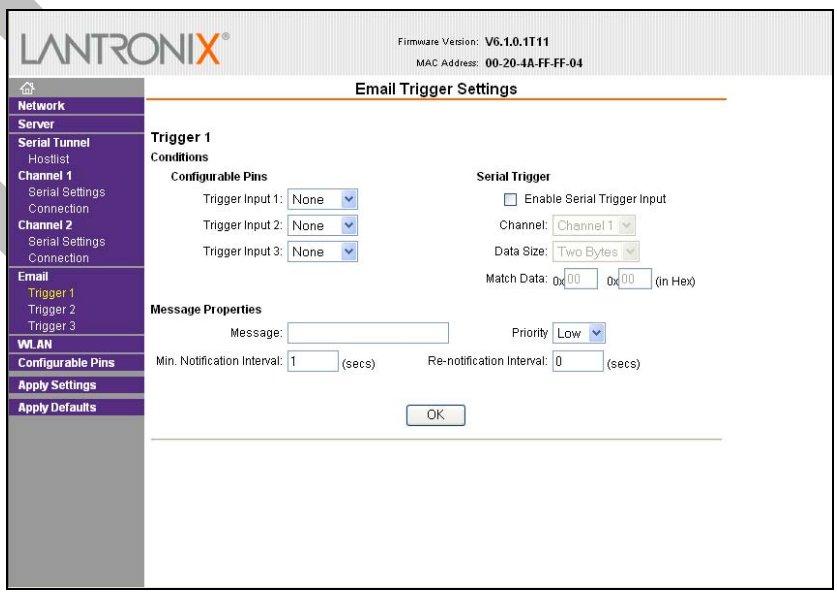
A trigger event occurs when the unit receives either one or two bytes of a specified sequence on the serial port, or because of a specified combination of conditions on the configurable pins.

Set the configurable pins to Active, Inactive, or None. The configurable pins are disabled if they are all set to None. If both the serial sequence and the configurable pins are disabled, the trigger is disabled.

To configure the WiPort's email trigger settings:

1. From the main menu, select **Trigger 1**, **Trigger 2**, or **Trigger 3** to configure the desired Trigger settings. The **Email Trigger Settings** page opens.

Figure 4-17. Email Trigger Settings



2. Configure the following fields:

Conditions

Configurable Pins	Select the condition from the pull down menu for the configurable pins. Repeat for each **Trigger Input** field.
Enable Serial Trigger Input	When selected, specified serial communications count as a trigger input.
Channel	Select the channel prompting the trigger.
Data Size	Select the data size prompting the trigger.
Match Data	Enter the data which, when appears in the communication stream, prompts a trigger.

Note: *All of the conditions must match for an email notification to be sent.*

Message Properties

Message	The subject line of the trigger event email to the specified recipient(s).

Priority	The priority level for the e-mail.
Notification Interval	The notification interval is the minimum time allowed between individual triggers. If a trigger event occurs within the minimum interval since the last trigger, it is ignored.
Re-notification Interval	Indicates the time interval in which a new email message is sent to the recipient(s) when a single trigger event remains active.

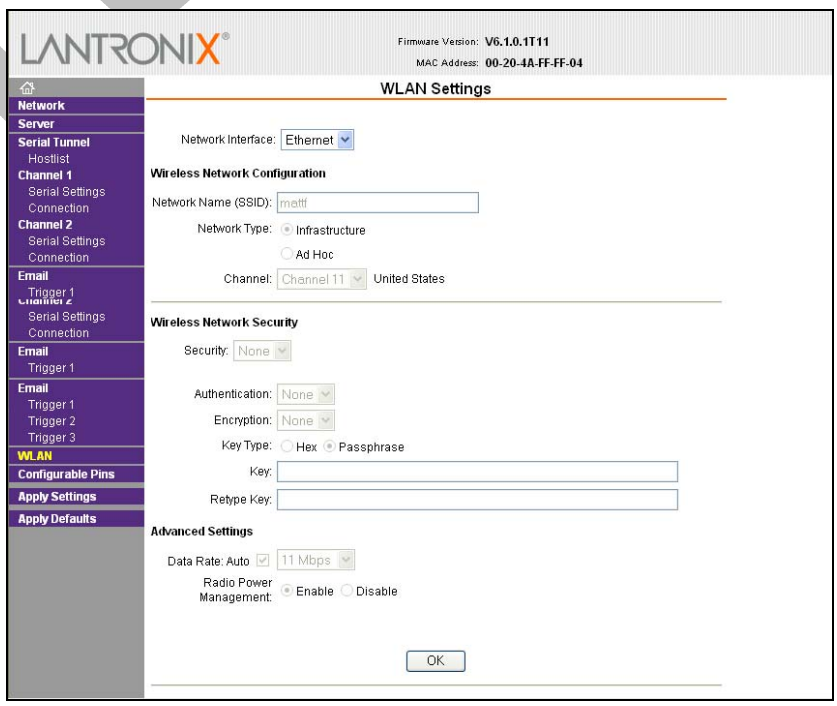
WLAN Configuration

Without adequate protection, a wireless LAN is susceptible to access by unauthorized users.

To configure the WiPort's WLAN settings:

1. Select **WLAN** from the main menu to open the WLAN Settings window.

Figure 4-19. WLAN Settings



2. Enter or modify the following fields:

Network Interface	Use the pull down menu to select a **WLAN** interface or an **Ethernet** interface. ***Note:*** *Fields on this page are not modifiable when* ***Ethernet*** *is selected.*

Wireless Network Configuration

Network Name	Enter the name of the wireless network (SSID). The WiPort connects to this wireless network.
Network Type	Select **Infrastructure** or **Ad-Hoc**.

Channel	Configurable only when Network Type is set to **Ad-Hoc**. Select from the pull down menu the radio channel for the Ad Hoc network. The default value is **11**.

Wireless Network Security

Security	As a security measure, enable **WEP** or **WPA** on the WiPort. By default, wireless security is disabled on WiPort.

WEP Options

Authentication	Select an authentication scheme (**Open/None** or **Shared**) from the drop down menu.
Encryption	Select the encryption type (**64 bits** or **128 bits** for WEP) from the pull down menu. **64 bits** is the default encryption for WEP.
Key Type	Select the key type (**Hex** or **Passphrase**).
Key	Enter the **Encryption Key** in hexadecimal value if **Hex** is selected as the Key Type. Enter key as a string if **Passphrase** is selected as the Key Type. Passphrase input is not the same as ASCII input. . A passphrase of more than 20 characters is recommended for adequate security. Spaces and punctuation are permitted.

WPA Options

Authentication	Select **Pre-Shared Keys** from the drop down menu.
Encryption	Select the encryption type from the pull down menu. **TKIP** is the default encryption for WPA.
Key Type	Select the key type (**Hex** or **Passphrase**).
Key	Enter the **Encryption Key** in hexadecimal value if **Hex** is selected as the Key Type. Enter key as a string if **Passphrase** is selected as the Key Type. Passphrase input is not the same as ASCII input. A passphrase of more than 20 characters is recommended. Spaces and punctuation characters are permitted.

Advanced Settings

Data Rate	WiPort permits the control of the transmission data rate. Click the **Auto** check box to allow the WiPort to automatically set the data rate (or leave unchecked to manually set the transmission rate). The default rate is **11 Mbps**. If the **Auto** check box is selected, choose the maximum data rate from the drop down menu. If the **Auto** check box was not selected, select the fixed data rate (in Mbps) from the drop down menu. ***Note:*** *For WiPort version WP2001000G-02 (WiPort-G), the maximum data rate cannot be selected when the WiPort automatically sets the data rate. WiPort-G supports the following additional rates: 18 Mbps, 24 Mbps, 36 Mbps, and 54 Mbps.*

Radio Power Management	Power management reduces the overall power consumption of the WiPort unit. Selecting **Enable** increases the response time.

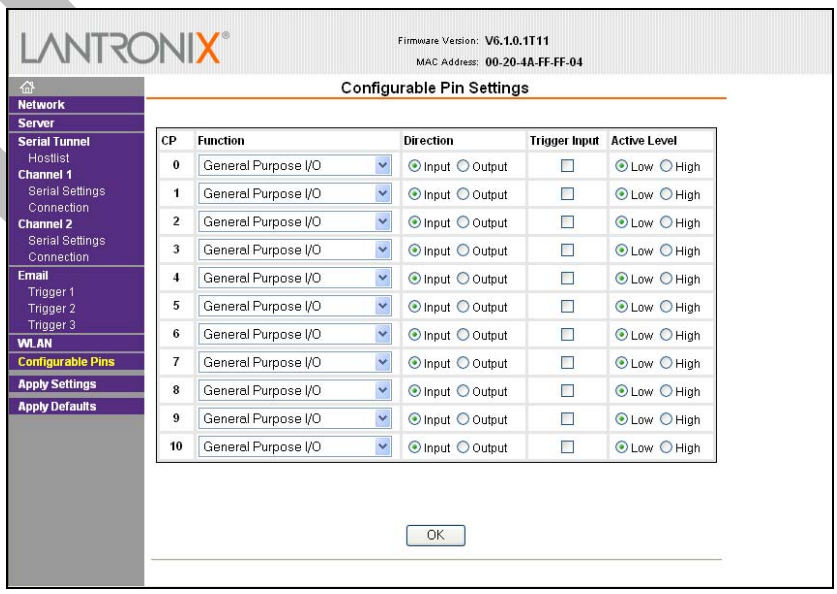
Configurable Pin Settings

There are 11 configurable hardware pins on the WiPort unit. For each pin, configure the pin function, communication direction, and its activity level. For more information, see *Configurable Pins* on page 60.

To configure the WiPort's OEM Configurable Pins:

1. Click **Configurable Pins** from the main menu to open the Configurable Pins window.

Figure 4-21. Configurable Pins Settings



2. Configure or modify the following fields for each pin:

Function	From the pull down menu, select the purpose of the specified pin. See *Configurable Pin Functions* for a description of each available function.
Active Level	Select the signal active level (**Low** or **High**).
Direction	Select whether the pin inputs or outputs.

Configurable Pin Functions

General Purpose I/O	Monitors input via the 77F0 port or controls output by the 77F0 port.
Modem Ctrl in, chan 1	Allows for control of the connection (and disconnection) of channel 1.
Modem Ctrl out, chan 1	Indicates a connection is established on channel 1.
Modem Ctrl in, chan 2	Allows for control of the connection (and disconnection) on channel 2.

Modem Ctrl out, chan 2	Indicates a connection is established on channel 2.
Serial Status LED out, chan 1	Indicates channel 1 status and extended diagnostics when the Diagnostics LED is lit.
Serial Status LED out, chan 2	Indicates channel 2 status.
Diagnostics LED out	Indicates errors and configurations.
Reset to Defaults in	Asserting during bootup for at least 7 seconds resets the configuration back to factory default. Used when network access is impossible because of improper configuration.
RS-485 Select out	Selects between RS-232 and RS-485 line drivers. Applies to WiPort-485 only.
RS-485 2 Wire out	Selects 2-wire line drivers. Usable as a half/full duplex selector. Applies to WiPort-485 only.
RS-422/485 4 Wire out	Selects 4-wire line drivers. Applies to WiPort-485 only.

Updating Settings

Click the **Apply Settings** button from the main menu to save and apply the configuration changes.

Applying Defaults

Click the **Apply Defaults** button from the main menu to apply the factory settings to the WiPort. For a list of the default settings, refer to *Default Settings* on page 57.

5: Configuration via Serial Mode or Telnet Port

Configure the unit so that it can communicate on a network with your serial device. As an alternative to Web-Manager, the WiPort unit is configurable using a terminal program to access the serial port locally. Using this terminal program to respond to prompts is referred to as the **Setup Mode**. A Telnet connection may also be used to configure the unit over the network.

The unit's configuration is stored in nonvolatile memory and is retained without power. You can change the configuration at any time. The unit performs a reset after the configuration has been changed and stored.

Note: *The menus in this section show a typical device. Not all devices display information in the same manner.*

Accessing Setup Mode

Telnet Access

Note: *Alternatively, use DeviceInstaller to access Telnet. Select the device from the main window list, and click the* ***Telnet Configuration*** *tab in the right window. If using* ***Telnet*** *from the DeviceInstaller toolbar, skip steps 1 through 3.*

To configure the unit over the network, establish a Telnet connection to port 9999:

1. From the Windows **Start** menu, click **Run**.
2. From the Run dialogue box**,** type the following command (where x.x.x.x is the IP address and 9999 is the unit's fixed network configuration port number):

   Windows: `telnet x.x.x.x 9999`
   UNIX: `telnet x.x.x.x:9999`

3. Click **OK**. The following information displays:

Figure 5-1. MAC Address

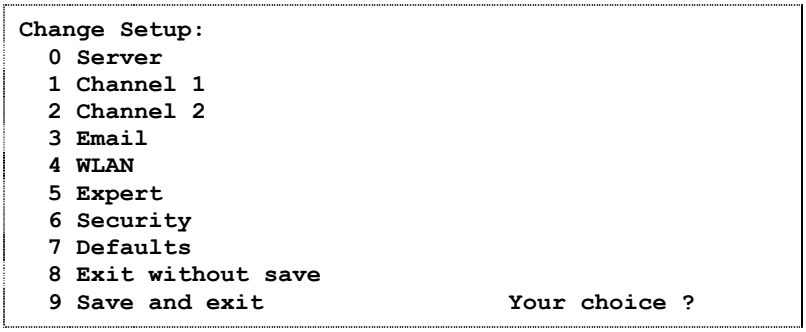
```
MAC address 00204AFFFF30
Software version V6.0.0.0 (050214)

Press Enter to go into Setup Mode
```

4. To enter the Setup Mode, press **Enter** within 5 seconds.

   Note: *Connection fails if* ***Enter*** *is not pressed within 5 seconds.*

   The configuration settings display, followed by the setup menu options:

Figure 5-3. Setup Menu Options



5. Select an option on the menu by entering the number of the option in the **Your choice ?** field and pressing **Enter**.

   View the current configuration by pressing **Enter** from the Change Setup menu.

   To enter a value for a parameter, type the value and press **Enter**. To confirm a current value, press **Enter** (without inputted parameters).

6. When finished, save the new configurations (**9 Save and exit**). The unit reboots.

Serial Port Access

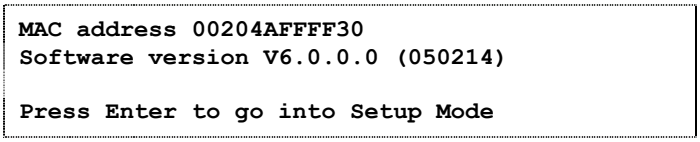
To configure the unit through a serial connection:

1. Connect a console terminal or PC running a terminal emulation program to your unit's serial port. The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.
2. Reset the WiPort unit by cycling the unit's power (turning the power off and back on). Immediately upon resetting the device, enter three lowercase **x** characters (**xxx**).

   Note: *The easiest way to enter Setup Mode is to hold down the **x** key at the terminal (or emulation) while resetting the unit. This must be done within three seconds of resetting the WiPort.*

3. Upon connection, the following information displays:

Figure 5-5. MAC Address



4. To enter the Setup Mode, press **Enter** within 5 seconds.

   Note: *Connection fails if **Enter** is not pressed within 5 seconds.*

   The configuration settings display, followed by the setup menu options:

Figure 5-7. Setup Menu Options

```
Change Setup:
  0 Server
  1 Channel 1
  2 Channel 2
  3 Email
  4 WLAN
  5 Expert
  6 Security
  7 Defaults
  8 Exit without save
  9 Save and exit                    Your choice ?
```

5. Select an option on the menu by entering the number of the option in the **Your choice ?** field and pressing **Enter**.

   View the current configuration by pressing **Enter** from the Change Setup menu.

   To enter a value for a parameter, type the value and press **Enter**. To confirm a current value, press **Enter** (without inputted parameters).

6. When finished, save the new configurations (**9 Save and exit**). The unit reboots.

Server Configuration

The unit's basic server (i.e. network) values display upon selecting **Server** (option **0** from the Change Setup menu). The following sections describe the configurable parameters within the Server configuration menu.

Network Mode

Select the network mode for the WiPort. Options available are **Wired Only**, **Wireless Only**, and **Bridging**. For more information on Bridging, see *8:Wireless Bridging* on page 67.

```
Network Mode <0=Wired Only 1=Wireless Only
2=Bridging<One Host> >:
```

Set the IP Address

If DHCP is not used to assign IP addresses, enter it manually. The IP address must be set to a unique value in the network. Enter each octet and press **Enter** between each section inputted. The current value is displayed in parentheses.

```
IP Address : ( 0) ( 0) ( 0) ( 0) _
```

Set the Gateway IP Address

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.

The default is **N** (No), indicating the gateway address has not been set. To set the gateway address, type **Y**. At the prompt, enter the gateway address.

```
Set Gateway IP Address (N) ? Y
Gateway IP addr ( 0) ( 0) ( 0) ( 0)_
```

Set the Netmask

A netmask defines the number of bits taken from the IP address that are assigned for the host part.

```
Netmask: Number of Bits for Host Part (0=default) (0) _
```

The unit prompts for the number of host bits to be entered, then calculates the netmask, which displays in standard decimal-dot notation when the saved parameters are displayed (for example, 255.255.255.0).

Table 5-1. Standard IP Network Netmasks Representing Host Bits

Network Class	Host Bits	Netmask
A	24	255.0.0.0
B	16	255.255.0.0
C	8	255.255.255.0

Change Telnet Configuration Password

Setting the Telnet configuration password prevents unauthorized access to the setup menu via a Telnet connection to port 9999 or via web pages. The password must have 4 characters.

```
Change telnet config password (N) ? _
```

An enhanced password setting (for Telnet access only) of 16 characters is available under option **6 Security** from the Change Setup menu.

Note: *A password is not required to access the Setup Mode window via a serial connection.*

DHCP Name

If a DHCP server has automatically assigned the IP address and network settings, discover the unit by using the DeviceInstaller network search feature.

There are three methods for assigning DHCP names to the unit.

- **Default DHCP Name**: If the DHCP name is not changed and the IP is 0.0.0.0, then the DHCP name defaults to CXXXXXX (XXXXXX is the last 6 digits of the MAC address shown on the label on the bottom/side of the unit). For example, if the MAC address is 00-20-4A-12-34-56, then the default DHCP name is C123456.
- **Custom DHCP Name**: Create your own DHCP name. If using an IP address of 0.0.0.0, then the last option in Server configuration is **Change DHCP device name**. This option allows you to change the DHCP name to an alphanumeric name (LTX in the example).

  ```
  Change DHCP device name (not set) ? (N) Y
  Enter new DHCP device name : LTX
  ```

- **Numeric DHCP Name:** You can change the DHCP name by specifying the last octet of the IP address. When you use this method, the DHCP name is LTXYY where YY is what you chose for the last octet of the IP address. If the IP address you specify is 0.0.0.12, then the DHCP name is LTX12. This method only works with 2-digit numbers (0-99).

The third octet of the IP address sets the BootP/DHCP/AutoIP options. To disable an option, set the appropriate bit:

5-2. BootP/DHCP/AutoIP options

Options	Bit
AutoIP	0
DHCP	1
BootP	2

For example, if the third octet is 0.0.5.0, the AutoIP and BootP options are disabled; only DHCP is enabled. (The value 5 results from adding the binary equivalents of 0 and 2.) This is the most common setting when using DHCP.

Channel 1 and Channel 2 Configuration

Select option **1 Channel 1** or **2 Channel 2** from the Change Setup menu to define how the serial port responds to network and serial communications. The following sections describe the configurable parameters within the Channel configuration menu.

Table 5-3. Serial and Telnet Port Parameters

```
Baudrate (115200) ?
I/F Mode (4C) ?
Flow (00) ?
Port No (14009) ?
ConnectMode (C0) ?
Remote IP Address : (000) .(000) .(000) .(000)
Remote Port  (0) ?
DisConnMode (00) ?
FlushMode   (00) ?
DisConnTime (00:00) ?:
SendChar 1  (00) ?
SendChar 2  (00) ?
```

Baudrate

The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400, 460800, or 921600. The current value is displayed in parentheses.

```
Baudrate (9600) ? _
```

I/F (Interface) Mode

The Interface (I/F) Mode is a bit-coded byte entered in hexadecimal notation. The current value is displayed in parentheses.

```
I/F Mode (4C) ? _
```

Note: *RS-422 and RS-485 are available on Channel 2 only (WiPort-485 models) if the WiPort is used with the WiPort evaluation board. Otherwise, RS-422 and RS-485 functions are available on only one channel; depending on which channel the drivers were added, these functions are available on either channel 1 or channel 2.*

The following table displays available I/F Mode options:

Table 5-4. Interface Mode Options

I/F Mode Option	7	6	5	4	3	2	1	0
RS-232 (1)							0	0
RS-422/485 4-wire(2)							0	1
RS-485 2-wire(2)							1	1
7 Bit					1	0		
8 Bit					1	1		
No Parity			0	0				
Even Parity			1	1				
Odd Parity			0	1				
1 stop bit	0	1						
2 stop bits(1)	1	1						

(1) 2 stop bits are implemented by the software. This might influence performance.

(2) On WP2004000-01 (WiPort-485) only.

Note: *If attempting to select an I/F Mode bit pertaining to RS-422/485 on a WiPort model WP2001000-01, a "WARNING: RS-422/485 I/F Modes not supported" message displays. RS-422/485 settings are available on the WP2004000-01 (WiPort-485).*

The following table demonstrates some common I/F Mode settings:

Table 5-5. Common Interface Mode Settings

Common I/F Mode Setting	Binary	Hex
RS-232C, 8-bit, No Parity, 1 stop bit	0100 1100	4C
RS-232C, 7-bit, Even Parity, 1 stop bit	0111 1000	78
RS-485 2-wire, 8-bit, No Parity, 1 stop bit	0100 1111	4F
RS-422, 8-bit, Odd Parity, 1 stop bit	0101 1101	5D

Flow

Flow control sets the local handshaking method for stopping serial input/output. The current value is displayed in parentheses.

```
Flow (0) ? _
```

Use the following table to select flow control options:

Table 5-6. Flow Control Options

Flow Control Option	Hex
No flow control	00
XON/XOFF flow control	01
Hardware handshake with RTS/CTS lines	02
XON/XOFF pass characters to host	05

Port Number

The **Port No** setting represents the source port number in TCP connections. It is the number that identifies the channel for remote initiating connections. The port number functions as the TCP/UDP source port number for outgoing packets. Packets sent to the unit with this port number are received to this channel. The port number selected is the Incoming TCP/UDP port and Outgoing TCP/UDP source port.

```
Port No (10001) ? _
```

The current value is displayed in parentheses. The default setting for Port 1 is 10001. The range is 1-65535, except for the following reserved port numbers:

Table 5-7. Reserved Port Numbers

Port Numbers	Reserved for
1 – 1024	Reserved
9999	Telnet setup
14000-14009	Reserved for Redirector
30704	Reserved (77F0h)
30718	Reserved (77FEh)

Note: *It is recommended to not use the reserved port numbers for this setting as incorrect operation may result.*

Use Port 0 for the outgoing local port to change with each connection. The port range is 50,000 to 59,999. Each subsequent connection increments the number by 1 (it wraps back around to 50,000).

Only use this automatic port increment feature to initiate a connection using TCP. Set the port to a non-zero value when the unit is in a passive mode or when using UDP instead of TCP.

Connect Mode

Connect Mode defines the unit's connection method and its reaction to incoming connections over the network. The current value is displayed in parentheses.

```
ConnectMode (C0) ? _
```

Enter Connect Mode options in hexadecimal notation:

Table 5-8. Connect Mode Options

Connect Mode Option	7	6	5	4	3	2	1	0
a) Incoming Connection								
Never accept incoming	0	0	0					
Accept with modem_control_in Active	0	1	0					
Always Accept	1	1	0					
b) Response								
Nothing (quiet)				0				
Character response (C=connect, D=disconnect, N=unreachable)				1				
c) Active Startup								
No active startup					0	0	0	0
With any character					0	0	0	1
With modem_control_in Active					0	0	1	0
With a specific start character					0	0	1	1
Manual connection					0	1	0	0
Autostart					0	1	0	1
Hostlist	0	0	1	0				
d) Datagram Type								
Directed UDP					1	1	0	0
e) Modem Mode								
No Echo			0	0		1	1	
Echo & Modem Response (Numeric)			0	1		1	1	1
Echo & Modem Response (Verbose)			0	1		1	1	0
Modem Response Only (Numeric)			0	0	1	1	1	1
Modem Response Only (Verbose)			0	0	1	1	1	0

a) *Incoming Connection*

Never Accept Incoming	Rejects all external connection attempts.
Accept with modem_control_in Active	Accepts external connection requests only when the modem_control_in input is asserted. Cannot be used with Modem Mode.
Always Accept	Accepts any incoming connection when a connection is not already established. Default setting.

b) Response

Character Response	A single character is transmitted to the serial port when there is a change in connection state: C = connected, D = disconnected, N = host unreachable. This option is overridden when the Active Start Modem Mode or Active Start Host List is in effect. Default setting is Nothing (quiet).
No Active Startup	Does *not* attempt to initiate a connection. Default setting.
With Any Character	Attempts to connect when any character is received from the serial port.
Accept with modem_control_in Active	Attempts to connect when the modem_control_in input changes from not asserted to asserted.
With a Specific Start Character	Attempts to connect when it receives a specific start character from the serial port. The default start character is carriage return.
Manual Connection	Attempts to connect when directed by a command string received from the serial port. The first character of the command string must be a **C** (ASCII 0x43), and the last character must be either a carriage return (ASCII 0x0D) or a line feed (0x0A). No blanks or space characters may be in the command string. Between the first and last command string characters must be a full or partial destination IP address and can include a destination port number. The IP address must be in standard dot-decimal notation and may be a partial address, representing the least significant 1, 2, or 3 bytes of the remote IP address. The period is required between each pair of IP address numbers. If present, the port number must follow the IP address, must be presented as a decimal number in the range 1-65535, and must be preceded by a forward slash (ASCII 0x2F). The slash separates the IP address and the port number. If you omit the port number from a command string, the internally stored remote port number starts a connection. If a partial IP address is presented in a command string, it is interpreted to be the least significant bytes of the IP address and uses the internally stored remote IP address to provide the most significant bytes of the IP address. If the IP address entered is 0.0.0.0/0, the device server enters Monitor Mode. For example, if the remote IP address already configured in the unit is 129.1.2.3, then an example command string would be C3/7. (This would connect to 129.1.2.3 and port 7.) You may also use a different ending for the connection string. For example, C50.1/23 would connect you to 129.1.50.1 and port 23.

Table 5-9. Manual Connection Address Example

Command String	Result if remote IP is 129.1.2.3 and remote port is 1234
C121.2.4.5/1	Complete override; connection is started with host 121.2.4.5, port 1

Command String	Result if remote IP is 129.1.2.3 and remote port is 1234
C5	Connects to 129.1.2.5, port 1234
C28.10/12	Connects to 129.1.28.10, port 12
C0.0.0.0/0	Enters Monitor Mode

Autostart (Automatic Connection)	The unit automatically attempts a connection to the remote IP address and port after booting up.
Hostlist	If this option is set to True, the device server scrolls through the host list until it connects to the first available device listed in the host list table. Once it connects, the unit stops further attempts. If this connection fails, the unit continues to scroll through the table until it is able to connect to the next available IP address in the host list. Hostlist supports a minimum of 1 and a maximum of 12 entries. Each entry contains the IP address and the port number. The hostlist is disabled for Manual Mode and for Modem Mode. The unit will not accept a data connection from a remote device when the hostlist option is enabled.

Figure 5-11. Hostlist Example

```
Baudrate (9600) ?
I/F Mode (4C) ?
Flow (00) ?
Port No (10001) ?
ConnectMode (C0) ?25

Hostlist :

No Entry !

Change Hostlist ? (N) Y
01. IP address : (000) 172.(000) 19.(000) 0.(000) 1     Port :
(0) ?23
02. IP address : (000) 172.(000) 19.(000) 0.(000) 2     Port :
(0) ?3001
03. IP address : (000) 172.(000) 19.(000) 0.(000) 3     Port :
(0) ?10001
04. IP address : (000) .(000) .(000) .(000)

Hostlist :
01. IP : 172.019.000.001  Port : 00023
02. IP : 172.019.000.002  Port : 03001
03. IP : 172.019.000.003  Port : 10001

Change Hostlist ? (N) N

Hostlist Retrycounter  (3) ?
Hostlist Retrytimeout  (250) ?
DisConnMode (00) ?
FlushMode   (00) ?
DisConnTime (00:00) ?:
SendChar 1  (00) ?
SendChar 2  (00) ?
```

To enable the hostlist:

1. Enter a **Connect Mode** of 0x20. The menu shows a list of current entries already defined in the product.
2. To delete, modify, or add an entry, select **Yes**. If entering an IP address of 0.0.0.0, that entry and all others after it are deleted.
3. After completing the hostlist, repeat the previous step if necessary to edit the hostlist again.
4. For **Retrycounter**, enter the number of times the Lantronix unit should try to make a good network connection to a hostlist entry that it has successfully ARPed. The range is 1-15, with the default set to 3.
5. For **Retrytimeout**, enter the number of seconds the unit should wait before failing an attempted connection. The time is stored as units of milliseconds in the range of 1-65535. The default is 250.

c) Datagram Type

Directed UDP	When selecting this option, the prompt requests the Datagram type. Enter **01** for directed or broadcast UDP. When the UDP option is in effect, the unit uses UDP datagrams to send and receive data.

d) Modem Mode

In Modem (Emulation) Mode, the unit presents a modem interface to the attached serial device. It accepts AT-style modem commands, and handles the modem signals correctly.

Normally, there is a modem connected to a local PC and a modem connected to a remote machine. A user must dial from the local PC to the remote machine, accumulating phone charges for each connection. Modem Mode allows you to replace modems with WiPorts, and to use an Ethernet connection instead of a phone call. By not having to change communications applications, you avoid potentially expensive phone calls.

To select Modem Mode, set the Connect Mode to **C6** (no echo), **D6** (echo with full verbose), or **D7** (echo with numeric response).

Note: *If the unit is in Modem Mode, and the serial port is idle, the unit can still accept network TCP connections to the serial port if Connect Mode is set to C6 (no echo), D6 (echo with full verbose), or D7 (echo with numeric response).*

Without Echo	In Modem Mode, echo refers to the echo of all of the characters entered in command mode; it does not mean to echo data that is transferred. Quiet Mode (without echo) refers to the modem not sending an answer to the commands received (or displaying what was typed).
Echo & Modem Response	**Full Verbose:** The unit echoes modem commands and responds to a command with a message string shown in the table below. **Numeric Response:** The unit echoes modem commands and responds to a command with a numeric response.

Modem Responses Only	**Full Verbose:** The unit responds to a command with a message string shown in the table below. **Numeric Response:** The unit responds to a command with a numeric response.

Table 5-10. Modem Mode Messages

Message	Meaning
Full Verbose	
OK	Command was executed without error.
CONNECT	A network connection has been established.
NO CARRIER	A network connection has been closed.
RING n.n.n.n.	A remote device, having IP address n.n.n.n, is connecting to this device.
Numeric Response	
0	OK
1	Connected
2	Ring
3	No Carrier
4	Error

Received commands must begin with the two-character sequence **AT** and be terminated with a carriage return character.

The unit ignores any character sequence received *not* starting with **AT**, and only recognizes and processes single **AT**-style commands. The unit treats compound **AT** commands as unrecognized commands.

If the **Full Verbose** option is in effect, the unit responds to an unrecognized command string that is otherwise formatted correctly (begins with **AT** and ends with carriage return) with the "OK" message and takes no further action.

If the **Numeric Response** option is in effect, the unit responds to an unrecognized command string that is otherwise formatted correctly with the "OK" message and takes no further action.

When an active connection is in effect, the unit transfers data and does not process commands received from the serial interface.

When a connection is terminated or lost, the unit reverts to command mode.

When an active connection is in effect, the unit terminates the connection if it receives the following sequence from the attached serial device:

- No serial data is received for one second.
- The character sequence +++ is received, with no more than one second between each two characters.
- No serial data is received for one second after the last + character. At this time, the unit responds affirmatively per the selected echo/response mode.

- The character string **ATH** is received, terminated with a carriage return. The unit responds affirmatively according to the selected echo/response mode and drops the network connection. The serial interface reverts to accepting command strings.

If this sequence is not followed, the unit remains in data transfer mode.

Table 5-11. Modem Mode Commands

Modem Mode Command	Function
ATDTx.x.x.x,pppp or ATDTx.x.x.x/pppp	Makes a connection to an IP address (x.x.x.x) and a remote port number (pppp).
ATDTx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATD0.0.0.0	Forces the unit into Monitor Mode. Uses remote IP address and port settings to initiate a connection.
ATD or ATDT	Forces the unit into Monitor Mode. Uses remote IP address and port settings to initiate a connection.
ATDx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATH	Hangs up the connection (Entered as +++ ATH).
ATS0=n	Enables or disables connections from the network going to the serial port. n=0 disables the ability to make a connection from the network to the serial port. n=1-9 enables the ability to make a connection from the network to the serial port. n>9 is invalid.
ATEn	Enables or disables character echo and responses. n=0 disables character echo and responses. n=1 enables character echo and responses.
ATVn	Enables numeric response or full verbose. n=0 enables numeric response. n=1 enables full verbose.

Note: *The unit recognizes these AT commands as single commands such as ATE0 or ATV1; it does not recognize compound commands such as ATE0V.*

Send the Escape Sequence (+++) in Modem Mode

```
Send '+++' in Modem Mode (Y) ? _
```

Disable or enable the WiPort's ability to send the escape sequence. The default is **Y** (Yes) (send the escape sequence).

Auto Increment Source Port

```
Auto increment source port (N) ? _
```

Y (Yes) auto increment the source port. The WiPort increments the port number used with each new connection.

Remote IP Address

This is the destination IP address used with an outgoing connection.

```
Remote IP Address : ( 0) ( 0) ( 0) ( 0)_
```

Note: *This option is not displayed when Hostlist is enabled from the* ***ConnectMode*** *prompt (see page 39 for more information).*

Remote Port

Set the remote TCP port number for the unit to make outgoing connections. This parameter defines the port number on the target host to which a connection is attempted.

```
Remote Port ( 0) ? _
```

To connect an ASCII terminal to a host using the unit for login purposes, use the remote port number 23 (Internet standard port number for Telnet services).

Note: *This option is not displayed when Hostlist is enabled from the* ConnectMode *prompt (see page 39 for more information).*

DisConnMode

Disconnect Mode (DisConnMode) determines the conditions under which the unit will cause a network connection to terminate. The current value is displayed in parentheses.

```
DisConnMode ( 0) ? _
```

In DisConnMode, modem_control_in either drops the connection or is ignored. The following table displays the available input options:

Table 5-12. Disconnect Mode Options

Disconnect Mode Option	7	6	5	4	3	2	1	0
Disconnect with modem_control_in drop (6)	1							
Ignore modem_control_in	0							
Telnet mode and terminal type setup (1)		1						
Channel (port) password (2)				1				
Hard disconnect (3)					0			
Disable hard disconnect					1			
State LED off with connection (4)								1
Disconnect with EOT (^D) (5)			1					

(1) The WiPort sends the "Terminal Type" upon an outgoing connection.
(2) A password is required for a connection to the serial port from the network.
(3) The TCP connection closes even if the remote site does not acknowledge the disconnection.
(4) When there is a network connection to or from the serial port, the state LED turns off instead of blinking.

(5) When **Ctrl D** or Hex 04 is detected, the connection is dropped. Both Telnet mode and Disconnect with EOT must be enabled for Disconnect with EOT to function properly. **Ctrl D** is only detected going from the serial port to the network.

(6) When modem_control_in transitions from a high state to a low state, the network connection to or from the serial port drops.

Flush Mode

The FlushMode (buffer flushing) parameter controls line handling and network buffers with connection startup and disconnect.

```
FlushMode ( 0) ? _
```

Select between two different packing algorithms (the current configuration is displayed within the parentheses). Available Flush Mode options are:

Table 5-13. Flush Mode Options

Function	7	6	5	4	3	2	1	0
Input Buffer (Serial to Network)								
Clear with a connection that is initiated from the device to the network				1				
Clear with a connection initiated from the network to the device			1					
Clear when the network connection to or from the device is disconnected		1						
Output Buffer (Network to Serial)								
Clear with a connection that is initiated from the device to the network								1
Clear with a connection initiated from the network to the device							1	
Clear when the network connection to or from the device is disconnected						1		
Alternate Packing Algorithm (Pack Control)								
Enable	1							

Pack Control

The packing algorithm defines how and when packets are sent to the network. The standard algorithm is optimized for applications in which the unit is used in a local environment. The alternate packing algorithm minimizes the packet count on the network and is especially useful in applications in a routed Wide Area Network (WAN). Adjusting parameters in this mode can economize the network data stream.

Pack control settings are enabled in Flush Mode. Set this value to 00 if specific functions are not needed.

Table 5-14. Pack Control Options

Option	7	6	5	4	3	2	1	0
Packing Interval								

Option	7	6	5	4	3	2	1	0
Interval: 12ms							0	0
Interval: 52ms							0	1
Interval: 250ms							1	0
Interval: 5sec							1	1
Trailing Characters								
None					0	0		
One					0	1		
Two					1	0		
Send Characters								
2-Byte Send Character Sequence				1				
Send Immediately After Send chars			1					

Packing Interval: Packing Interval defines how long the unit should wait before sending accumulated characters. This wait period is between successive network segments containing data. For alternate packing, the default interval is 12 ms.

Trailing Characters: In some applications, CRC, Checksum, or other trailing characters follow the end-of-sequence character; this option helps to adapt frame transmission to the frame boundary.

Send Characters:

- If **2-Byte Send Character Sequence** is enabled, the unit interprets the sendchars as a 2-byte sequence; if this option is not enabled, the unit interprets them independently.
- If **Send Immediately After Characters** is not set, any characters already in the serial buffer are included in the transmission after a "transmit" condition is found. If this option is set, the unit sends immediately after recognizing the transmit condition (sendchar or timeout).

Note: *A transmission might occur if status information needs to be exchanged or an acknowledgment needs to be sent.*

DisConnTime (Inactivity Timeout)

Use this parameter to set an inactivity timeout. The unit drops the connection if there is no activity on the serial line before the set time expires. Enter time in the format **mm:ss**, where m is the number of minutes and s is the number of seconds.

```
DisConnTime (0: 0) ?:
```

To disable the inactivity timeout, enter **00:00**. Range is 0 (disabled) to 5999 seconds (99 minutes, 59 seconds). The default is 0.

SendChar 1 and SendChar2

Enter up to two characters in hexadecimal representation.

```
SendChar 1 ( 0) ? _
SendChar 2 ( 0) ? _
```

If the unit receives a character on the serial line that matches one of these characters, it sends the character immediately, along with any awaiting characters, to the TCP connection. This action minimizes the response time for specific protocol characters on the serial line (for example, ETX, EOT). Setting the first SendChar to **00** disables the recognition of the characters. Alternatively, the unit can interpret two characters as a sequence (see *Pack Control* on page 47).

Telnet Terminal Type

This parameter displays only if the terminal type option is enabled in Disconnect Mode. If this option is enabled, use the terminal name for the Telnet terminal type. Enter only one name.

If the terminal type option is enabled, the unit also reacts to the EOR (end of record) and binary options, which can be used for applications such as terminal emulation to UNIX hosts.

Channel (Port) Password

This parameter appears only if the channel (port) password option is enabled in Disconnect Mode. If the option is enabled, set a password on the serial port.

Email Configuration

The unit sends an Email to multiple recipients when a specific trigger event occurs. There are three separate triggers, based on any combination of the configurable pins (PIO) when selected as user I/O functions. Optionally, use a two-byte serial string to initiate a trigger. To configure Email configuration settings, select option **3 Email** from the Change Setup menu.

Figure 5-13. Email Settings

```
*** E-mail
Mail server: 0.0.0.0
Unit       :
Domain     :
Recipient 1:
Recipient 2:
- Trigger 1
Serial trigger input: disabled
 Channel: 1
 Match: 00
Trigger input1: X
Trigger input2: X
Trigger input3: X
Message :
Priority: L
Min. notification interval: 1 s
Re-notification interval  : 0 s
- Trigger 2
Serial trigger input: disabled
 Channel: 1
 Match: 00
Trigger input1: X
Trigger input2: X
Trigger input3: X
Message :
```

```
Priority: L
Min. notification interval: 1 s
Re-notification interval  : 0 s
- Trigger 3
Serial trigger input: disabled
 Channel: 2
 Match: 00
Trigger input1: X
Trigger input2: X
Trigger input3: X
Message :
Priority: L
Min. notification interval: 1 s
Re-notification interval  : 0 s
 Server (0.0.0.0) ? ( 0) _
```

Mail Server

Enter the IP address of the mail server. Enter each 3-digit section and press **Enter** between each section inputted. The current value is displayed in parentheses.

```
Mail Server (0.0.0.0) ? ( 0) _
```

Unit Name

Enter the username used by the WiPort to send Email messages. The current value is displayed in parentheses. Spaces are not permitted.

```
Unit name () ? _
```

Domain Name

Enter the Email server's domain name. The current value is displayed in parentheses.

```
Domain name () ? _
```

Recipient 1

Enter the full Email address of the trigger email recipient. The current value is displayed in parentheses.

```
Recipient 1 () ? _
```

Recipient 2

Enter the full Email address of the trigger email recipient. The current value is displayed in parentheses.

```
Recipient 2 () ? _
```

Trigger 1

A trigger event occurs when the unit receives the specified trigger input because of a specified combination of conditions on the configurable pins.

```
Enable serial trigger input (N) ?
Trigger input1 [A/I/X] (X) ?
Trigger input1 [A/I/X] (X) ?
Trigger input1 [A/I/X] (X) ?
```

```
Message () ?
Priority (L) ?
Minimum notification interval (1 s) ?
Re-notification interval (0 s) ?
```

Set the configurable pins to **A** = Active, **I** = Inactive, or **X** = Don't Care. Active can mean Active Low or Active High. If the configurable pins are all set to **X** (Don't Care), then they are disabled. If both the serial sequence and the configurable pins are disabled, the trigger is disabled.

To change the configurable pins' settings, send setup records to Port 77FE.

The **Message** is the subject line of the trigger event Email to the specified recipient(s).

The **Priority** is the priority level for the trigger even Email. Enter **L** for normal priority or **H** for high priority.

The **Minimum notification interval** is the minimum time allowed between individual triggers. If a trigger event occurs within the minimum interval since the last trigger, it is ignored.

The **Re-notification interval** indicates the time interval in which a new Email message is sent to the recipient(s) when a single trigger event remains active.

Trigger 2

Refer to *Trigger 1* for details on completing these fields.

Note: *Each trigger is independent of the others. Each condition within an individual trigger must be met before the unit will send the Email.*

Trigger 3

Refer to *Trigger 1* for details on completing these fields.

Note: *Each trigger is independent of the others. Each condition within an individual trigger must be met before the unit will send the Email.*

WLAN Settings

Without adequate protection, a wireless LAN is susceptible to access by unauthorized users. As such, WiPort features the WPA security standard, based on IEEE802.11i and IEEE802.1X. WEP is provided for backwards compatibility and interaction with older devices.

To modify WLAN settings, select **4 WLAN** from the Change Setup menu.

Enable WLAN

Enable the Ethernet or the Wireless interface. When enabling WLAN, the Ethernet interface is disabled.

```
Enable WLAN (Y) ? _
```

Topology

Select **Infrastructure** (ESS) mode or **Adhoc** (IBSS) mode. Infrastructure mode communicates with Access Points. Adhoc mode communicates only with other clients.

```
Topology 0=Infrastructure, 1=Adhoc (0) ? _
```

Network Name (SSID)

Enter the name of the network to which the WiPort will connect.

```
Network name (LTRX_IBSS) ? _
```

Adhoc Network Channel

When **Adhoc** is selected in the **Topology** parameter and the WiPort cannot find the specified network, it creates one with that name by transmitting a beacon on the selected channel.

```
Channel (11) ? _
```

Only channels allowed in the country for which the WiPort is designated can be selected. The country is shown in the settings overview.

Security

The WiPort features WEP and WPA to secure all wireless communication. WPA is not available when **Adhoc** is selected as the topology.

```
Security 0=none, 1=WEP, 2=WPA (0) ? _
```

WEP

```
Authentication 0=open/none, 1=shared (0) ? _
Encryption 0=WEP64, 1=WPE128 (0) ?
Display current key (N) ?
Change key (N) ?
Key type 0=hex, 1=passphrase (0) ?
Enter key:
```

Authentication selects whether the encryption keys are matched (**1** = shared) with those of the communication partner before passing through messages or not (**2** = open/none).

The **Encryption** prompt requests the length of the encryption key and the security strength. WEP64 uses a 40bits/5 bytes key (option **0**). WPE128 uses a 104bits/13 bytes key (option **1**).

Select (**Y**) Yes at the **Display current key** prompt to show the currently configured key/passphrase

Change key permits modifying the currently configured key by selecting (**Y**) Yes.

The **Key type** requests whether the new key is in hexadecimal or passphrase format.

Enter key prompts for the new encryption key. The passphrase input is not the same as ASCII input (as used on some products). ASCII is translated directly into hexadecimal bytes according to the ASCII table. The WiPort passphrase is hashed using the Neesus Datacom algorithm (for WEP64) or MD5 (for WEP128).

The passphrase input is safer because it is up to 63 chars long. ASCII input is a maximum of 5 (WEP64) or 13 (WEP128) characters long and limits the number of key combinations.

Please refer to the other equipment's manual to determine the passphrase input style recommended.

Note: *Lantronix recommends using a passphrase of 20 characters or more for maximum security.*

WPA

This firmware version allows only Pre-Shared Keys (PSK) for authentication.

```
Group encryption 1=WEP64, 2=WEP128, 3=TKIP (1) ?
Display current key (N) ?
Change key (N) ?
Key type 0=hex, 1=passphrase (1) ?
Enter key: () ?
```

Set the **Group encryption** type to **1 (WEP64)**, **2 (WEP128)**, or **3 (TKIP)**. The group encryption for all wireless devices communicating with the same access point must be equal to receive broadcast and multicast messages. If any of these devices are WEP-only (no support for WPA), set the group encryption to WEP for all devices.

Select (**Y**) Yes at the **Display current key** prompt to show the currently configured key/passphrase

Change key permits modifying the currently configured key by selecting (**Y**) Yes.

The **Key type** requests whether the new key is in hexadecimal or passphrase format.

Enter key prompts for the new encryption key. The passphrase input is not the same as ASCII input (as used on other products). ASCII is translated directly into hexadecimal bytes according to the ASCII table. The WiPort passphrase is hashed using the Neesus Datacom algorithm (for WEP64) or MD5 (for WEP128).

The passphrase input is safer because it is up to 63 chars long. ASCII input is a maximum of 5 (WEP64) or 13 (WEP128) characters long and limits the number of key combinations.

Please refer to the other equipment's manual to determine the passphrase input style recommended.

Note: *Lantronix recommends using a passphrase of 20 characters or more for maximum security.*

Fixed or Automatic Data Rate

WiPort permits the control of the transmission rate. Select **0** to set a fixed data rate or select **1** to set an automatic data rate. The default is **1** (auto).

```
TX Data rate 0=fixed, 1=auto (1) ? _
```

Transmission Data Rate

If the above **TX Data rate** is set to **fixed**, the selected data rate is the WiPort's fixed transmission rate. If the above **TX Data rate** is set to **auto**, the selected data rate is the WiPort's maximum data rate. Lower data rates allow for larger distances. It may also be required when communicating with older devices. The default is 11 Mbps.

```
TX Data rate 0=1, 1=2, 2=5.5, 3=11 Mbps (0) ? _
```

WiPort version WP2001000G-02 offers additional transmission rate options:

```
TX Data rate 0=1, 1=2, 2=5.5, 3=11
             4=18, 5=24, 6=36, 7=54 Mbps (0) ? _
```

Note: *WiPort version WP2001000G-02's maximum data rate cannot be selected when **TX Data rate** is set to **auto**.*

Enable Power Management

This allows the software to turn off the radio when expecting not to receive or transmit soon. This feature reduces the power consumption by up to 170 mA. Enabling power management increases the response time, because the radio needs to start up again. The radio is enabled to synchronize and check for incoming messages (every 100 ms).

Note: *This option is not available when the* ***Topology*** *is set to* ***Adhoc.***

```
Enable power management (N) ? _
```

Expert Settings

Note: *Change these settings via Telnet or serial connections only.*

Caution: ***Only an expert should change these parameters. These changes hold serious consequences.***

TCP Keepalive Time

TCP Keepalive time defines how many seconds the unit waits during a silent connection before checking whether the currently connected network device is still on the network. If the unit does not receive a response, it drops that connection.

```
TCP Keepalive time in s (1s - 65s; 0s=disable): (45)? _
```

ARP Cache Timeout

When the unit communicates with another device on the network, it adds an entry into its ARP table. ARP Cache timeout defines the number of seconds (1-600) the unit waits before timing out this table.

```
ARP Cache timeout in s (1s - 65s; 0s=disable): (600)? _
```

CPU Performance

Select the WiPort's performance mode. Higher performance settings require more energy. **Low** is 26 Mhz, **Regular** is 48 Mhz, **High** is 88 Mhz. The default is **Regular**.

```
CPU performance (0=Regular, 1=Low, 2=High): (0) ? _
```

Disable Monitor Mode

Disables entry into Monitor Mode via the **yyy** or **xx1** key sequence at startup. This command prevents the unit from entering Monitor Mode by interpreting the stream of characters that are received during the device server's initialization at startup. The default is **N** (No).

```
Disable Monitor Mode @ bootup (N) ? _
```

HTTP Port Number

This option allows the configuration of the web server port number. The valid range is 1-65535. The default HTTP server port number is 80.

```
HTTP Port Number : (80) ? _
```

SMTP Port Number

This option allows the configuration of the SMTP port number. The valid range is 1-65535. The default HTTP server port number is 25.

```
SMTP Port Number : (25) ? _
```

MTU Size

The Maximum Transmission Unit (MTU) is the largest physical packet size a network can transmit for TCP and UDP. Enter between **512** and **1400** bytes. The default is **1400** bytes.

```
MTU Size: (1400) ? _
```

Alternate MAC Address

If necessary, enable the alternate MAC address (if specified in the OEM setup record).

```
Enable alternate MAC (N) ? _
```

Ethernet Connection Type

The WiPort allows for the Ethernet speed to be manually configured. Enter **0** for automatic negotiation (default). To select the speed and duplex, enter one of the following: **2** (10Mbit/half duplex), **3** (10Mbit/full duplex), **4** (100Mbit/half duplex), or **5** (100Mbit/full duplex).

```
Ethernet connection type: (0) ? _
```

Configurable Server Port Number

The host attached to the WiPort may communicate with other CoBos devices on the wireless network using the Lantronix Configuration Access Protocol (LCAP). This service is available on server port number 0x77FE (30718) and is fixed. When the WiPort is in bridging mode, the LCAP port number is modifiable so that the LCAP service is available on the wired interface for WiPort configuration.

For more information on bridging, see *8:Wireless Bridging*.

```
Config Server Port Number: (30718) ? _
```

Security Settings

Security settings can only be changed via the setup menu (telnet or serial).

Caution: *It is recommended to set security over a dedicated network or over the serial setup, to prevent eavesdropping.*

Note: *To prevent any unauthorized access from the network, disable the Telnet setup, port 77FE, and the Web setup features.*

Disable SNMP

For security purposes, disable SNMP (if required) on the WiPort unit. The current setting is displayed in parentheses.

```
Disable SNMP (N) ? _
```

SNMP Community Name

The SNMP Community Name is a required field for NMS to read or write to a device. Enter a string of 1 to 13 characters.

```
SNMP Community Name (public): _
```

The default entry is **public**. The current value is displayed in parentheses.

Disable Telnet Setup

*This setting defaults to the **N** (No) option. The **Y** (Yes) option disables access to the Setup menu via Telnet to port 9999.*

```
Disable Telnet Setup (N) ? _
```

Disable TFTP Firmware Upgrade

This setting defaults to the **N** (No) option. The **Y** (Yes) option disables TFTP for network firmware upgrades.

```
Disable TFTP Firmware Update (N) : _
```

Disable Port 77FE (Hex)

Custom programs use Port 77FE to configure the unit remotely. If required, disable this capability for security purposes.

```
Disable Port 77FEh (N) ? _
```

The default setting is the **N** (No) option, which enables remote configuration.

Disable Web Server

The **Y** (Yes) option disables the web server. This setting defaults to the N (option).

```
Disable Web Server (N) ? _
```

Disable Web Setup

The **Y** (Yes) option disables configuration via the Web-Manager. This setting defaults to the N (option).

```
Disable Web Setup (N) ? _
```

Disable ECHO Ports

This setting controls whether port 7 echoes characters it receives.

```
Disable ECHO ports (Y) ? _
```

AES Encryption

```
Enable Encryption (Y) ? _
```

```
Key length in bits (256): _
Change Key (N) ? _
Enter Key: _
```

The **Enable Encryption** option displays if the WiPort model features AES encryption. It enables AES encryption for tunneling only.

Valid options for the **Key length in bits** are 128, 192 and 256 bits

Select **Change Key** to modify the current AES encryption key. The default is (**N**) No.

If **Change Key** was selected, enter the key (at the **Enter Key** prompt) in hexadecimal numbers. Enter 32 characters for 128 bits key length, 48 characters for 192 bits key length, or 64 characters for 256 bits key length.

Enable Enhanced Password

Setting enhanced password allows an extended security password of 16-characters for protecting Telnet access. **N** (No) is the default, which permits a 4-character password protecting Setup Mode by means of Telnet and web pages.

```
Enable Enhanced Password (Y) ? _
```

Disable Port 77F0 (Hex)

Port 77F0 allows a custom application to query or set the eleven WiPort configurable pins when they are functioning as general purpose I/O (GPIO). Disable this capability, if desired, for security purposes.

```
Disable Port 77F0h ? _
```

The default setting, the **N** (No) option, enables GPIO control. The **Y** (Yes) option disables the GPIO control interface.

Default Settings

Select **7 Default Settings** from the Change Setup menu to reset the unit's Channel 1 configuration, Channel 2 configuration, E-mail settings, and Expert settings to the factory default settings. The server configuration settings for IP address, gateway IP address, netmask, wireless enable, infrastructure or adhoc setting, and wireless security settings remain unchanged. The configurable pins' settings also remain unchanged. The specific settings this option changes are listed below.

Note: *To reset to factory defaults, use the "Reset to Defaults" Configurable Pin. For more information on Configurable Pins, see on* *Configurable Pins page 60.*

Channel 1 Configuration

Baudrate	9600
I/F Mode	4C (1 stop bit, no parity, 8 bit, RS-232C, no flow control)
Port No	10001
Connect Mode	C0 (always accept incoming connection; no active connection startup)
Hostlist Retry Counter	3

Hostlist Retry Timeout	250 (msec)
Send Character	0x0D (CR)
All other parameters	0

Channel 2 Configuration

Baudrate	9600
I/F Mode	4C (1 stop bit, no parity, 8 bit, RS-232C, no flow control)
Port No	10002
Connect Mode	C0 (always accept incoming connection; no active connection startup)
Hostlist Retry Counter	3
Hostlist Retry Timeout	250 (msec)
Send Character	0x0D (CR)
All other parameters	0

WLAN Settings

Enable WLAN	(Y) Yes
Topology	Infrastructure
Network Name	LTRX_IBSS
Channel	11
Security	0 (none)
TX Data Rate	0 (fixed)
TX Data Rate	11 Mbps
Enable Power Management	N (No)

Expert Settings

TCP Keepalive	45 (seconds)
ARP Cache Timeout	600 (seconds)
CPU Performance	Regular
Disable Monitor Mode	(N) No
HTTP Port Number	80
SMTP Port Number	25
MTU Size	1400

Enable Alternate MAC	N (No) (for OEM use only)
Ethernet Connection Type	0 (auto negotiate)

Security Settings

Disable SNMP	(N) No
SNMP Community Name	public
Disable Telnet Setup	(N) No
Disable TFTP Firmware Update	(N) No
Disable Port 77FEh	(N) No
Disable Web Server	(N) No
Disable Web Setup	(N) No
Disable ECHO ports	(Y) Yes
Enable Encryption	(N) No
Enable Enhanced password	(N) No
Disable Port 77F0h	(N) No

Email Settings

Trigger Priority	L
Min. notification interval	1 second
All other parameters	0 (e.g. Email notification and triggers are disabled)

Exit Configuration Mode

To exit setup mode:

- Select option **9 Save and exit** from the Change Setup menu to save all changes and reboot the device. All values are stored in nonvolatile memory.

  or

- Select option **8 Exit without save** from the Change Setup menu to exit the configuration mode without saving any changes or rebooting.

6: Configurable Pins

The WiPort has eleven pins configurable for General Purpose I/O (GPIO).

Use these GPIO pins to control devices such as relays, servers, lights, monitor switches, sensors, and even processes such as data transfer.

Defaults Settings

- Function: general purpose input/output
- Direction: input
- Active Level: low

Set the functions for the eleven pins independently and in any combination. The initial directions (input/output) and active levels (low or high active) at boot up can also be configured through 77FE.

This chapter describes how the directions, active levels, and states can be dynamically controlled and probed through special port 77F0.

Features

- TCP and UDP can be used.
- The protocol supports up to 32 GPIO for future products.
- Function configuration can be retrieved.
- Input or output selection can be retrieved and controlled.
- Active low or high selection can be retrieved and controlled.
- Active or inactive selection can be retrieved and controlled.
- 77F0 can be disabled.

Every change of state (active/inactive) requires a command over TCP or UDP, and thus is not very fast. If you use this port for data transfer, the throughput is low, usually up to 1Kbps.

Control Protocol

The GPIO control protocol is a simple, proprietary protocol, which is described below.

Guidelines

The GPIO control protocol is described from the PC side. *Send* means from PC to WiPort. *Response* comes from WiPort to PC.

The protocol allows for control of up to 11 GPIOs.

The parameters are four bytes long and represent GPIOs 0-31, with GPIO0 in bit 0 of the first byte (Little Endian). Parameter bits for configurable pins not configured as GPIOs are undefined for **Get** commands and ignored on **Set** commands.

Every command consists of nine bytes: one command type of one byte and two parameters of four bytes each.

	Command	Parameter 1								Parameter 2							
Byte	0	1		2		3		4		5		6		7		8	
Pin Number		0	7	8	15	16	23	24	31	0	7	8	15	16	23	24	31

On some commands, one or all parameters are ignored.

For UDP, command type and parameters need to be in the same datagram.

Responses to valid commands are always five bytes long, consisting of the returned command byte and as parameters in the current or updated values. In case of an invalid command, only one byte with value 0FFh is returned.

	Command	Parameter 1							
Byte	0	1		2		3		4	
Pin Number		0	7	8	15	16	23	24	31

When sending a command (TCP and UDP), wait for the response before sending the next command.

Commands

Byte 0 Command Types

10h	**Get functions**
11h	**Get directions** (input or output)
12h	**Get active levels** (high active or low active)
13h	**Get current states** (active or not active)
19h	**Set directions**
1Ah	**Set active levels**
1Bh	**Set current states**

There is no **Set functions** command. Since the pin's function depends on the hardware in which the WiPort is embedded, that configuration is only allowed via 77FE. Settings changed by any of the **Set** commands are not stored and are lost when the unit is powered down or rebooted.

Command 10h, Get Functions

Send:		
	No parameters	
Response:		
	1 parameter	
	Bytes 1-4: Functions	
	Bit X	1 means general purpose IO available to the user.
		0 means dedicated function (e.g., serial flow control, diagnostics) for configurable pin X.

Command 11h, Get Directions

Send:		
	No parameters	
Response:		
	1 parameter	
	Bytes 1-4: Directions	
	Bit X	1 means GPIO X is an output.
		0 means it is an input.

Command 12h, Get Active Levels

Send:		
	No parameters	
Response:		
	1 parameter	
	Bytes 1-4: Active levels	
	Bit X	1 means GPIO X is active low (0V when active, 3.3V when inactive).
		0 means it is active high (3.3V when active, 0V when inactive).

Command 13h, Get Current States

Send:		
	No parameters	
Response:		
	1 parameter	
	Bytes 1-4: States	
	Bit X	1 means GPIO X is active
		0 means it is inactive.

Command 19h, Set Directions

Send:		
	2 parameters	
	Bytes 1-4: Mask	
	Bit X	1 means the direction for GPIO X will be updated with the value in the second parameter.
		0 means the direction for that GPIO will not change.
	Bytes 5-8: New Directions	
	Bit X	1 means GPIO X will become an output.
		0 means it will become an input.
Response:		
	1 parameter	
	Bytes 1-4: The updated directions	

Command 1Ah, Set Active Levels

Send:		
	2 parameters	
	Bytes 1-4: Mask	
	Bit X	1 means the direction for GPIO X will be updated with the value in the second parameter.
		0 means the active type for that GPIO will not change.
	Bytes 5-8: New Active Levels	
	Bit X	1 means GPIO X will become active low.
		0 means it will become active high.
Response:		
	1 parameter	
	Bytes 1-4: Updated active levels	

Command 1Bh, Set States

Send:		
	2 parameters	
	Bytes 1-4: Mask	
	Bit X	1 means the state for GPIO X will be updated with the value in the second parameter.
		0 means the state for that GPIO will not change.
	Bytes 5-8: New States	
	Bit X	1 means GPIO X will become active.
		0 means it will become inactive.
Response:		
	1 parameter	
	Bytes 1-4: Updated states	

Examples

Example 1: PC sends command 10h to find out which configurable pins are available as GPIO.

PC -> WiPort: 10h, 00h, 00h, 00h, 00h, 00h, 00h, 00h, 00h
WiPort -> PC: 10h, 03h, 02h, 00h, 00h

Command details:

10h = command 10h
00h, 00h, 00h, 00h = ignored
00h, 00h, 00h, 00h = ignored

Response details:

10h = response to command 10h
03h, 02h, 00h, 00h =

bits 0, 1, and 9 are 0 →CP0, CP1, and CP9 are configured as GPIOs (i.e. GPIO0, GPIO1, GPIO9).
bits 2 to 8 and 10 are 0 → configured for a special function and are unavailable for control or monitoring by the user.

Example 2: PC sends command 1Bh to change the current states of GPIO 0 and 1 (assuming they are configured as outputs).

PC -> WiPort: 1Bh, 01h, 02h, 00h, 00h, 01h, 00h, 00h, 00h
WiPort -> PC: 1Bh, 03h, 00h, 00h, 00h

Command details:

1Bh = command 1Bh
01h, 00h, 00h, 00h = the mask that determines which GPIOs will be changed.

Bit 0 and 9 are 1 → GPIO0 and GPIO9 will be changed.
bit 1 is 0 → GPIO1 will remain the same.

01h, 00h, 00h, 00h = the new states

bit 0 is 1 → GPIO0 will become 1.
bit 1 is ignored since it is masked out.
bit 0 is 0 → GPIO9 will become 0.

Response details:

1Bh = response to command 1Bh
03h, 00h, 00h, 00h =

bit 0 is 1 → GPIO0 = 1
bit 1 is 1 → GPIO1 = 1
bit 9 is 0 → GPIO9 = 0

7: Monitor Mode

Monitor Mode is a command-line interface used for diagnostic purposes.

There are two ways to enter Monitor Mode: locally via the serial port or remotely via the network.

Entering Monitor Mode via the Serial Port

To enter Monitor Mode locally:

1. Follow the same steps used for setting the serial configuration parameters (see *Serial Port Access* on page 34).
2. Instead of typing three **x** keys, however:

   a) Type **zzz** to enter Monitor Mode with network connections.

   b) Type **yyy** to enter Monitor Mode without network connections.

   A **0>** prompt indicates that you have successfully entered Monitor Mode.

Entering Monitor Mode via the Network Port

To enter Monitor Mode using a Telnet connection:

1. Establish a Telnet session to the configuration port (9999). The following message appears:

```
MAC address 00204A0113A3
Software version 05.3 (040129) WPT
Press Enter to go into Setup Mode
```

2. Type M (upper case).

   A **0>** prompt indicates that you have successfully entered Monitor Mode.

Monitor Mode Commands

The following commands are available in Monitor Mode.

Note: *All commands must be in capital letters.*

Table 7-1. Monitor Mode Commands

Command	Command Name	Function
VS	Version	Queries software header record (16 bytes) of unit.
GC	Get Configuration	Gets configuration of unit as hex records (120 bytes).
SC	Send Configuration	Sets configuration of unit from hex records.

Command	Command Name	Function
PI x.x.x.x	Ping	Pings unit with IP address x.x.x.x to check device status.
AT	ARP Table	Shows the unit's ARP table entries.
TT	TCP Connection Table	Shows all incoming and outgoing TCP connections.
NC	Network Connection	Shows the unit's current IP address.
RS	Reset	Resets the unit.
QU	Quit	Exits diagnostics mode.
G0, G1, ...,Ge, Gf	Get configuration from memory page	Gets a memory page of configuration information from the device.
S0, S1,...,Se, Sf	Set configuration to memory page	Sets a memory page of configuration information on the device.
GM	Get MAC address	Shows the unit's 6-byte MAC.
SS	Set Security record	Sets the Security record without the encryption key and length parameters. The entire record must still be written, but the encryption-specific bytes do not need to be provided (they can be null since they are not overwritten).

Responses to some of the commands are given in Intel Hex format.

Note: *Entering any of the commands listed above generates one of the following command response codes:*

Table 7-2. Command Response Codes

Response	Meaning
0>	OK; no error
1>	No answer from remote device
2>	Cannot reach remote device or no answer
8>	Wrong parameter(s)
9>	Invalid command

8: Wireless Bridging

The WiPort-G model supports wireless bridging. This allows a host, connected on the WiPort's wired Ethernet interface, to be accessible over the wireless network (via the WiPort).

To initialize the bridging feature:

1. Configure the WiPort's wireless settings. See *WLAN Settings* on page 51.
2. Enable bridging in Serial Mode. See *Server Configuration* on page 35.
3. Set up the wired host connected to the WiPort's Ethernet port.

Configuring the WiPort in Bridging Mode

Once in bridging mode, the services on the WiPort are available only through the wired interface. There are 3 methods for configuring the WiPort when in bridging mode.

Method 1

This method uses the current Ethernet wired host to configure the WiPort. This requires the modification of the wired host's IP address as well as the following steps:

1. Use a utility to locate the WiPort's MAC address and auto-IP address. This utility must use the Lantronix access protocol to query the WiPort.
2. Assign a static auto-IP address to the wired host within the same subnet as the WiPort.
3. Use the WiPort's Web-Manager or Telnet to port 9999 to configure the WiPort as necessary.
4. Configure the wired host's IP address back to the original IP address configuration.

Method 2

This method requires the current wired host to be disconnected temporarily. Another device physically connects to the WiPort's wired interface for configuration.

1. Disconnect the current wired host from the WiPort and connect the device used for configuring the WiPort.
2. Use a utility to locate the WiPort's MAC address and auto-IP address. This utility must use the Lantronix access protocol to query the WiPort.
3. Assign a static auto-IP address to the wired host within the same subnet as the WiPort.
4. Use the WiPort's Web-Manager or Telnet to port 9999 to configure the WiPort as necessary.
5. Disconnect the wired device and reconnect the original wired host to the WiPort.

Method 3

As an alternative to configuring through the wired interface, connect a device through the WiPort's serial port. For more information on configuration through the serial port, see *5:Configuration via Serial Mode or Telnet Port* on page 33.

9: Updating Firmware

This chapter explains how to obtain and update the unit's firmware.

Obtaining Firmware

Obtain the most up-to-date firmware and release notes for the unit from the Lantronix web site (www.lantronix.com) or by using anonymous FTP (ftp.lantronix.com/pub).

Reloading Firmware

There are several ways to update the unit's internal operational code (*.ROM): via DeviceInstaller (the preferred way), via TFTP, or via the serial port. You can also update the unit's internal Web interface (*.COB) via TFTP or DeviceInstaller.

Here are typical names for those files. Check the Lantronix web site for the latest versions and release notes.

Table 9-1. Firmware Files

ROM File	COB
WPTxxx.ROM	WPT_WNxxx.COB (Web-Manager)

Please refer to the DeviceInstaller User Guide for information about reloading firmware using DeviceInstaller. The other methods are discussed below.

Note: *For upgrading from pre-6.0.0.0 versions, see separate upgrade sheet.*

Using TFTP: Graphical User Interface

To download new firmware from a computer:

1. Use a TFTP client to put a binary file to the unit (*.ROM to upgrade the unit's internal operational code and *.COB to upgrade its internal Web interface).

   Note: *TFTP requires the **.ROM** (binary) version of the unit's internal operational code.*

2. In the **TFTP server** field, enter the IP address of the unit being upgraded.
3. Select **Upload** operation and **Binary** format.
4. Enter the full path of the firmware file in the **Local file name** field.
5. In the **Remote file name** field, enter the **current** internal operational code or **WEB1** to **WEB19** for the internal Web interface with 2MB flash, or **WEB1** to **WEB19** or **WEB51** for 4MB flash. (For WP2001000-01 and WP2002000-01 models, **W4=** ROM file. For WiPort-G models, **W6**=ROM file.)
6. Click the **Upload Now** button to transfer the file to the unit. The unit performs a power reset after the firmware has been loaded and stored.

Using TFTP: Command Line Interface

To download new firmware from a computer, enter the following from a TFTP command line interface:

```
tftp –i <ip address> put <local filename> <destination
file name>
```

The following examples demonstrate the TFTP command sequence to download the .rom file, the .fwx file, and the .cob file:

```
tftp –i 192.168.1.111 put wpt6101.rom W4

tftp –i 192.168.1.111 put wpt_webm_1300.cob WEB1
```

Recovering the Firmware Using the Serial Port

If for some reason the firmware is damaged, you can recover the firmware file by using the serial port to download the *.ROM file.

1. Start DeviceInstaller.
2. From the **Tools** menu, select **Advanced/Recover Firmware**. The Recover Firmware window displays.
3. Enter the com port on your PC and the location of the firmware file. The Device Model should indicate WiPort.
4. Click **OK** to download the file.

Note: *See also Recovering Firmware in the DeviceInstaller User Guide.*

10: Troubleshooting

This chapter discusses how you can diagnose and fix errors quickly without having to contact a dealer or Lantronix. The WiPort's diagnostic LEDs indicate the unit's status. It helps to connect a terminal to the serial port while diagnosing an error to view summary messages that may be displayed. When troubleshooting, always ensure that the physical connections (power cable, network cable, and serial cable) are secure.

Note: Some unexplained errors might be caused by duplicate IP addresses on the network. Make sure that your unit's IP address is unique.

When troubleshooting the following problems, make sure that the WiPort is powered up. Confirm that you are using a good network connection.

Diagnostic LED States

Condition	Diagnostic LED	Channel 1 Status LED
No Errors	OFF	N/A
Firmware storage checksum error	ON	Blink 1x/4 seconds
RAM error	ON	Blink 2x/4 seconds
Network controller error	ON	Blink 3x/4 seconds
Serial number storage checksum error	ON	Blink 4x/4 seconds
Duplicate IP address present	ON	Blink 5x/4 seconds
Firmware and hardware mismatch	ON	Blink 6x/4 seconds
Radio command failure	ON	Blink 7x/4 seconds
Faulty network connection	Blink 2x/second	Blink 4x/4 seconds
No DHCP response	Blink 2x/second	Blink 5x/4 seconds
Setup menu active	Blink 2x/second	Follow Diagnostic LED for 2 seconds, off for 2 seconds

Problems and Error Messages

Problem/Message	Reason	Solution
When you issue the **ARP –S** command in Windows, *The ARP entry addition failed: 5* message displays.	Your currently logged-in user does not have the right to use this command on this PC.	Have someone from your IT department log you in with sufficient rights.
When you attempt to assign an IP address to the unit by the ARP method and Telnet to the device server through port 1, the connection fails.	When you Telnet to port 1 on the device server, you are only assigning a temporary IP address. When you Telnet into port 9999 and do not press **Enter** quickly, the device server reboots, causing it to lose the IP address.	Telnet back to Port 1. Wait for it to fail, then Telnet to port 9999 again. Make sure you press **Enter** within 5 seconds.
When you Telnet to port 9999, the ***Press Enter to go into Setup Mode*** message displays. However, nothing happens when you press **Enter**, or your connection is closed.	You did not press **Enter** quickly enough. You only have 5 seconds to press **Enter** before the connection is closed.	Telnet to port 9999 again, but press **Enter** as soon as you see the *Press Enter to go into Setup Mode* message.
When you Telnet to port 1 to assign an IP address to the device server, the Telnet window does not respond for a long time.	You may have entered the Ethernet address incorrectly with the ARP command.	Confirm that the Ethernet address that you entered with the ARP command is correct. The Ethernet address may only include numbers 0-9 and letters A-F. In Windows and usually in Unix, the segments of the Ethernet address are separated by dashes. In some forms of Unix, the Ethernet address is segmented with colons.
	The IP address you are trying to assign is not on your logical subnet.	Confirm that your PC has an IP address and that it is in the same logical subnet that you are trying to assign to the device server.
	The device server may not be plugged into the network properly.	Make sure that the Link LED is lit. If the Link LED is not lit, then the device server is not properly plugged into the network.
When you try to assign an IP with DeviceInstaller, you get the following message: *No response from device! Verify the IP, Hardware Address and Network Class. Please try again.*	The cause is most likely one of the following: The Hardware address you specified is incorrect. The IP address you are trying to assign is not a valid IP for your	Double-check the parameters that you specified. ***Note:*** *You cannot assign an IP address to a device server through a router.*

Problem/Message	Reason	Solution
	logical subnet. You did not choose the correct subnet mask.	
The device server is not communicating with the serial device to which it is attached.	The most likely reason is the wrong serial settings were chosen.	The serial settings for the serial device and the device server must match. The default serial settings for the device server are RS-232, 9600 baud, 8 character bits, no parity, 1 stop bit, no flow control.
When you try to enter the setup mode on the device server via the serial port, you get no response.	The issue is most likely something covered in the previous problem, or possibly, you have **Caps Lock** on.	Double-check everything in the problem above. Confirm that **Caps Lock** is not on.
You can ping the device server, but not Telnet to the device server on port 9999.	There may be an IP address conflict on your network You are not Telneting to port 9999. The Telnet configuration port (9999) is disabled within the device server security settings.	Turn the device server off and then issue the following commands at the DOS prompt of your computer: ARP -D X.X.X.X (X.X.X.X is the IP of the device server). PING X.X.X.X (X.X.X.X is the IP of the device server). If you get a response, then there is a duplicate IP address on the network. If you do not get a response, use the serial port to verify that Telnet is not disabled.
The device server appears to be set up correctly, but you are not communicating with your device attached to the device server across the network.	If you are sure that the serial port setting is correct, then you may not be connecting to the correct socket of the device server. Another possibility is that the device server is not set up correctly to make a good socket connection to the network.	You can check to see whether there is a socket connection to or from the device server by checking the state of CP1, if it has been configured for LED1 functionality. If the state of CP1 is blinking consistently, or is completely off, then there is a good socket connection. If the state of CP1 is low, use the Connect Mode option **C0** for making a connection to the device server from the network. Use Connect Mode option **C1** or **C5** for a connection to the network from the device server. See the full list of Connect Mode options in Connect Mode on page 39.

Problem/Message	Reason	Solution
When connecting to the Web-Manager within the device server, the *No Connection With The Device Server* message displays.	Your computer is not able to connect to port 30718 (77FEh) on the device server.	Make sure that port 30718 (77FEh) is not blocked with any router that you are using on the network. Also, make sure that port 77FEh is not disabled within the Security settings of the device server.

Technical Support

If you are experiencing an error that is not described in this chapter, or if you are unable to fix the error, you have the following options:

To check our online knowledge base or send a question to Technical Support, go to http://www.lantronix.com/support.

Technical Support Europe, Middle East, and Africa
Phone: +33 (0) 1 39 30 41 72
Email: eu_techsupp@lantronix.com or eu_support@lantronix.com

Firmware downloads, FAQs, and the most up-to-date documentation are available at: www.lantronix.com/support

When you report a problem, please provide the following information:

- Your name, and your company name, address, and phone number
- Lantronix model number
- Lantronix MAC number
- Software version (on the first screen shown when you Telnet to port 9999)
- Description of the problem

Status of the unit when the problem occurred (please try to include information on user and network activity at the time of the problem).