Ethernet

Interface for 520 and 920i HMI Digital Indicators
Version 2.0

Installation and Configuration Manual

RICE LAKE WEIGHING SYSTEMS
Commitment Beyond Measurement®

ISO 9001 REGISTERED

72117

Contents

Version 2.07, May 2005

About this Manual

This manual is intended for use by service technicians responsible for installing the Ethernet card option in the 520 indicator and 920i programmable indicator.

Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at **www.rlws.com**.

1.0 Introduction

The Ethernet card option (PN 77205) for the 520 indicator comes with an Ethernet interface card and the Ethernet module. The Ethernet card option (PN 71986) for the 920i indicator is a single board. Both can be factory installed by Rice Lake Weighing Systems, if ordered at the same time as the indicator. Sections 2.0 – 4.0 cover the 520 indicator and sections 5.0 – 7.0 cover the 920i programmable indicator.

2.0 520 Installation

Warning ***The 520 does not have an on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.***

Caution ***Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.***

This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicators must be performed by qualified service personnel only.

The indicator enclosure must be opened to install the Ethernet card.

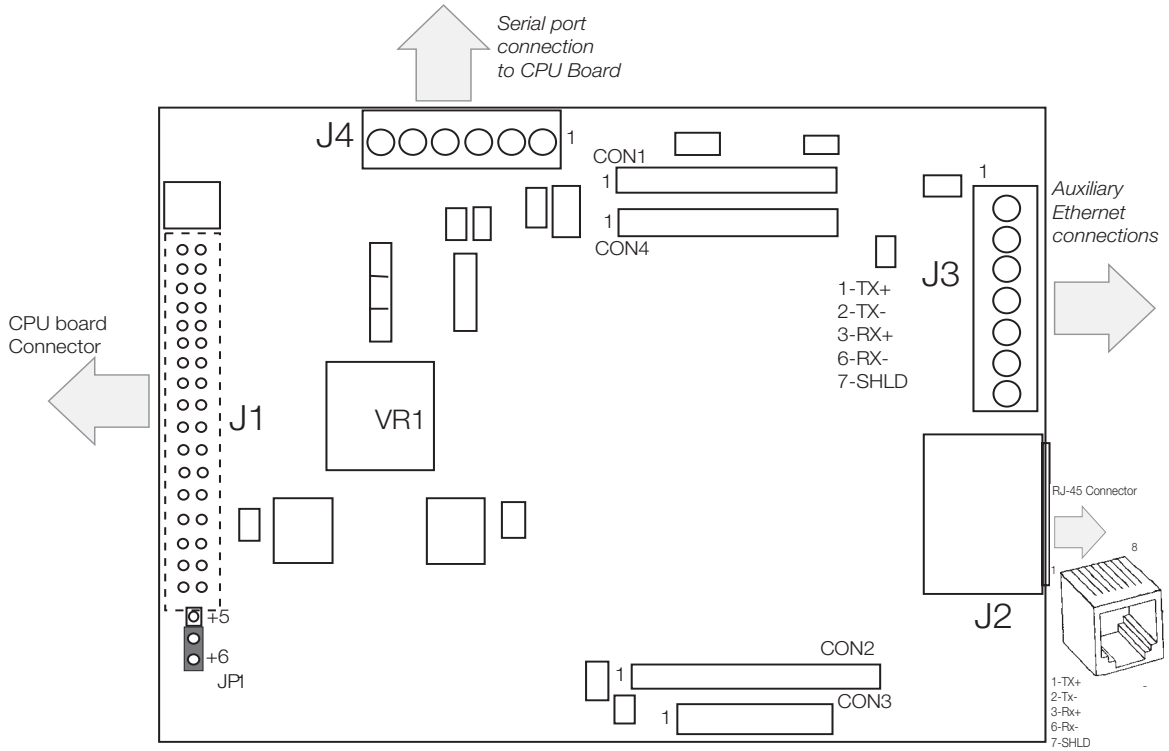

Figure 2-1. 520 Indicator Ethernet Interface Card

2.1 520 Ethernet Card Installation

1. Disconnect the 520 indicator from power source.
2. Place indicator on an antistatic work mat. Remove screws that hold the cover to the enclosure body, then lift the cover away from the enclosure and set it aside.
3. Remove plug from cord grip on the indicator that will be used to run the Ethernet cabling.
4. Carefully align the option card connector (J1) with connector J2 on the 520 CPU board. Press down to seat the option card in the CPU connector.

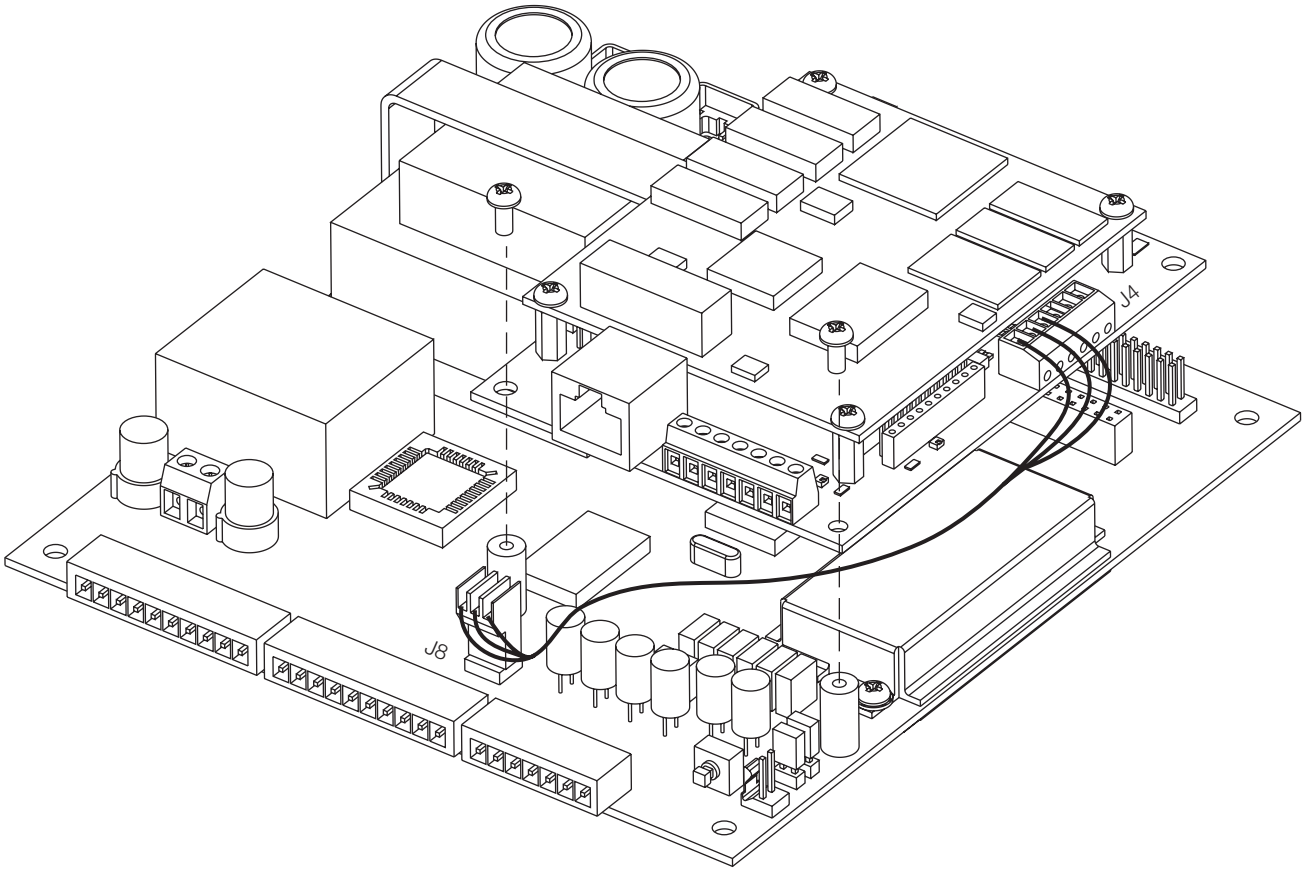

Figure 2-2. Ethernet Card Installation onto 520 CPU Board

5. Use the screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the 520 CPU board.
6. Ensure jumper JP1 on the Ethernet card is in the +6V position for installation in the 520.

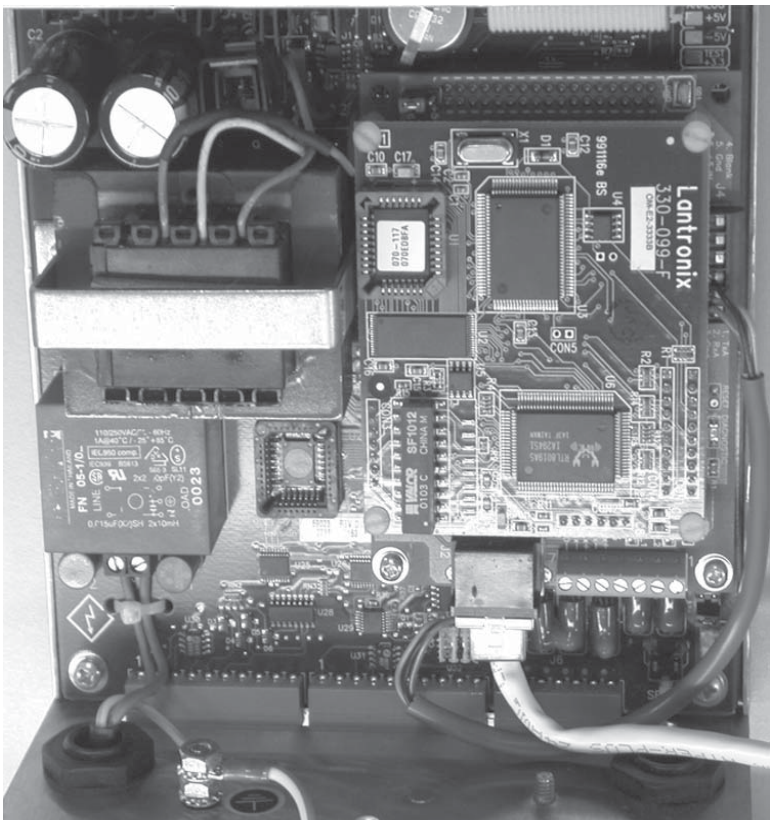

Figure 2-3. Ethernet Card Installation onto 520 CPU Board

2.1.1 520 Ethernet Card Wiring

Communications port J8 on the 520 CPU board is a special internal connection to the EDP port for RS-232 communications at up to 19200 bps. (The 520 and Ethernet card default RS-232 baud rate is 9600. The Ethernet card and indicator must be set to the same baud rates). The Ethernet cards RS-232 baud rate can be changed, please refer to the *Lantronix User's Guide* for further instructions.

1. Attach the six inch three-pin cable (PN 72696) to J4 on the Ethernet interface board and to J8 on the 520 CPU board.

NOTE: The external EDP port connections can not be used when the Ethernet card is plugged into J-8.

2. Wire cables to the connector using the information shown in Table 2-1 and Table 2-2.
3. Once cables are attached, plug connector J8 into the header on the board.

Connector	Pin	Wire Color	Signal
J8	1	Red	Tx
	2	Black	G
	3	Green	Rx

Table 2-1. 520 J8 Pin Assignments

Connector	Pin	Wire Color	Signal
J4	1	Green	TXD
	2	Red	RxD
	3	Black	Gnd

Table 2-2. Ethernet Card J4 Pin Assignments

4. Reconnect power to the indicator.

2.2 520 Ethernet Option Parts Kit Contents

Table 2-3 parts list for the 520 Ethernet option (PN 77205).

PN	Description
14822	Screws, 4-40NCx1/4 (2)
15631	Cable tie, 3 in nylon (1)
54933	Screws, 3/16 (4) (on assembly)
55878	Hex nut 4-4 (4) (on assembly)
68434	Standoff, male 4-40NC (4) (on assembly)
72696	3-pin cable (1)
75147	Cover plate, Ethernet RJ-45 (1)
77208	Module, Ethernet (1)
77209	Interface card (1)
78271	Modular jack (1)
78269	RJ-45 cable, 5 in (1)
72117	Ethernet installation manual (1)
72763	Ethernet CD for 520 and 920i (1)

Table 2-3. PN 77205 Parts Kit Contents

3.0 Assigning an IP Address (520)

The following section covers the steps required to assign an IP address. The IP address must be assigned and configured before a network connection is available. The two easiest ways to assign an IP address include:

- Device Installer
- Network port login

Both of these installer tools are located on the Ethernet Configuration CD, PN 72763.

Refer to the *Lantronix User's Guide* found on the Ethernet Configuration CD for further information on the Ethernet configuration procedures.

3.1 520 Device Installer

The Device installer utility provides the preferred method for setting up an IP address for the Ethernet card with the 520 indicator.

The Device installer runs on a personal computer to help assign an IP address. To use the Device installer, use the following steps:

1. Insert the Ethernet Configuration CD into the hard drive of your IBM-compatible personal computer running Windows® 95, 98, ME, 2000, and XP computers.
2. Install Device installer per on-screen instructions.
3. Start the Device installer program and follow the on screen instructions.

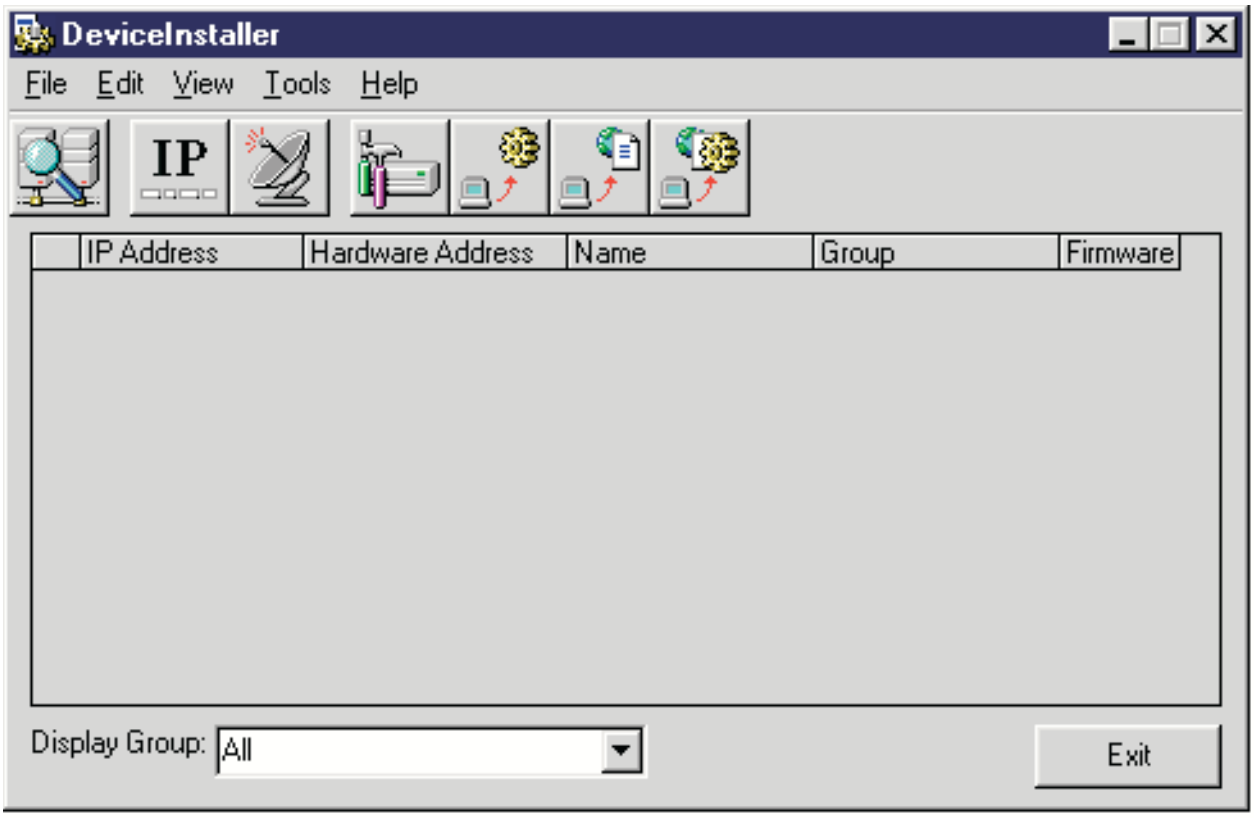

Figure 3-1. Device Installer Main Menu Screen

The 520 unit comes supplied with a pre-configured IP address which automatically enables Dynamic Host Control Protocol (DHCP)—A protocol for assigning an IP address to a network device, within Device installer.

4. Click *Tools / Assign IP Address* to assign a new IP address. The following screen appears.

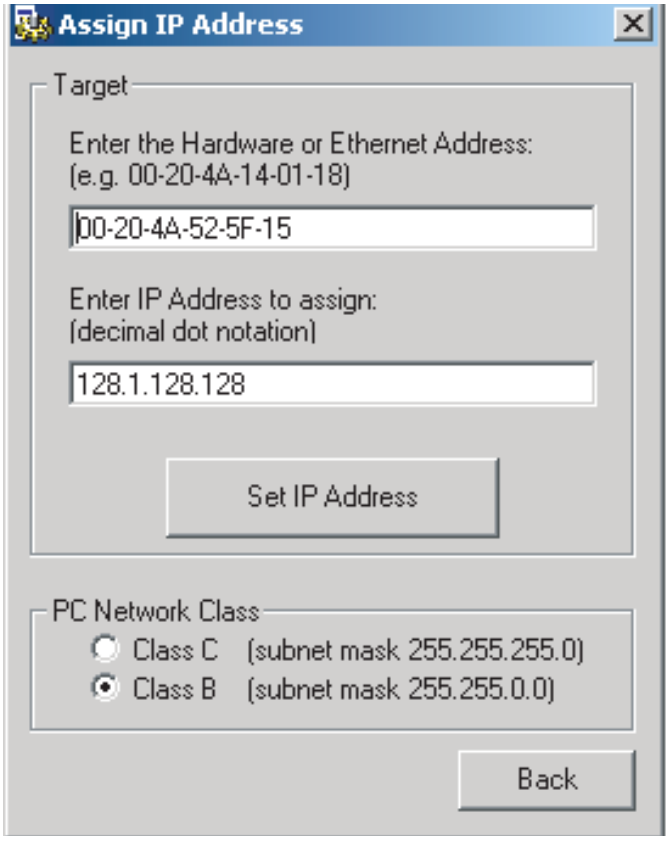

Figure 3-2. Device Installer IP Address Assign Screen

5. Enter the hardware address found on the serial tag on the option board.
6. It is recommended that you assign your own IP address to the card. Enter the chosen IP address in the Enter IP field. Record the configured IP address for future reference.
7. Press Set IP to assign a new IP address.

NOTE: The Device installer will search the network to see if the proposed IP address is already being used. If it is already in use, on the network, the operation will fail.

® Windows is a registered trademark of Microsoft Corporation

3.2 Network Port Login

The network port login provides a way to make a telnet connection to the network port (9999). This ARP method is available under UNIX and Windows-based systems. To utilize network port login, use the following steps:

1. Set a static ARP with the desired IP address using the hardware address of the 520 Ethernet card. The address is printed on a label attached to the Ethernet card.

NOTE: In order for the ARP command to work in Windows®, the ARP table on the PC must have at least one IP address defined other than its own. Type "ARP - A" at the DOS prompt (or from Run) to verify that there is at least one entry in the ARP table. If there is no entry other than the local machine, ping another IP machine on your network to build the ARP table. This has to be a host other than the machine on which you are working. Once there is at least one entry in the ARP table, use the following commands to ARP an IP address to the scale.

arp –s 128.1.123.123.00-20-4a-xx-xx-xx

2. Open a Telnet connection to port 1 by clicking the Telnet icon on the Toolbar. The connection will fail quickly but the device server temporarily changes its IP address to the one designated in this step and sets all required parameters.

   Telnet 128.1.123.123.1

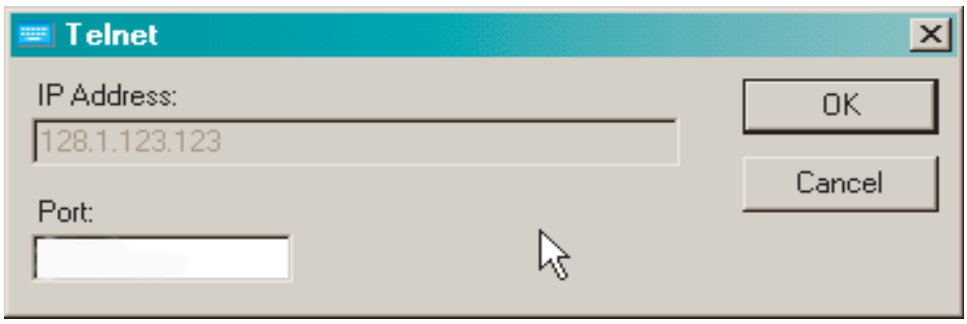

Figure 3-3. Telnet IP Address Window

3. Open a Telnet connection to port 9999 and press the **ENTER** key within three seconds to go into the Setup mode. if you wait longer than three seconds, the unit will reboot. Set all required parameters.

   Telnet 128.1.123.123.9999

NOTE: The IP address you just entered is temporary and will revert to the default when the unit's power is reset unless you log into the unit and store the changes permanently.

3.3 Configuration Parameters

Web configuration can be done by entering the IP address and clicking GO. This allows changing any or all setup in the Ethernet card.

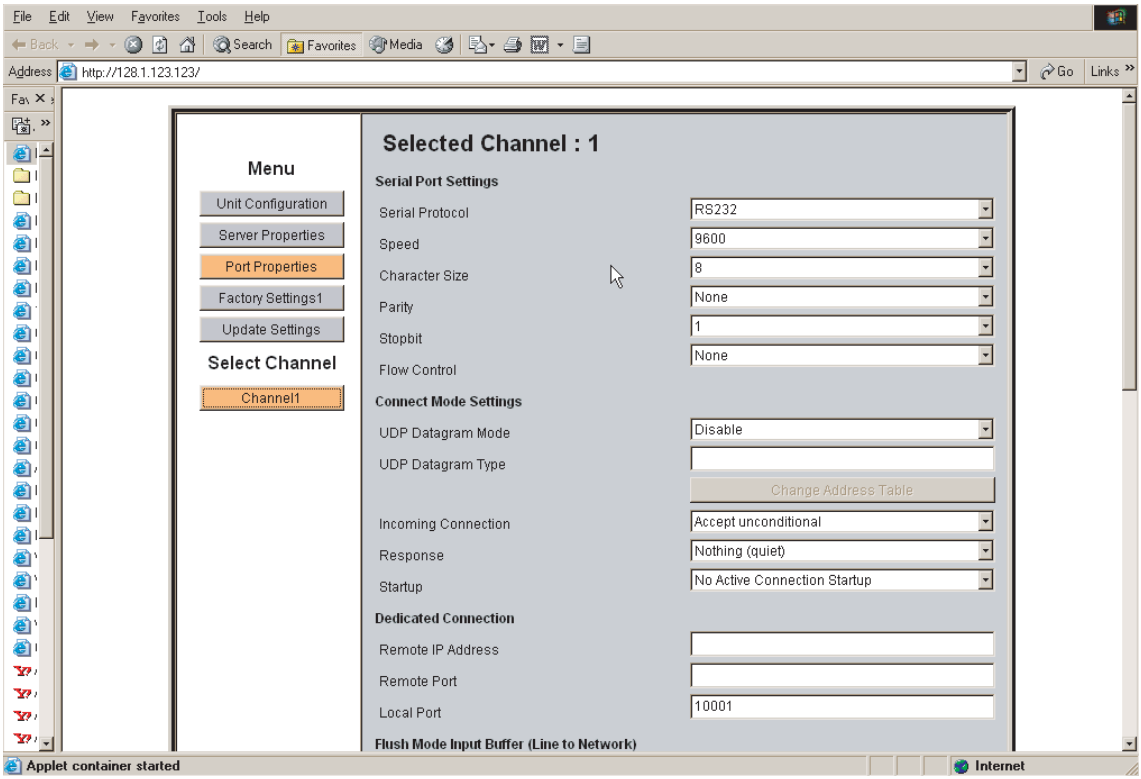

Figure 3-4. Telnet Web Page

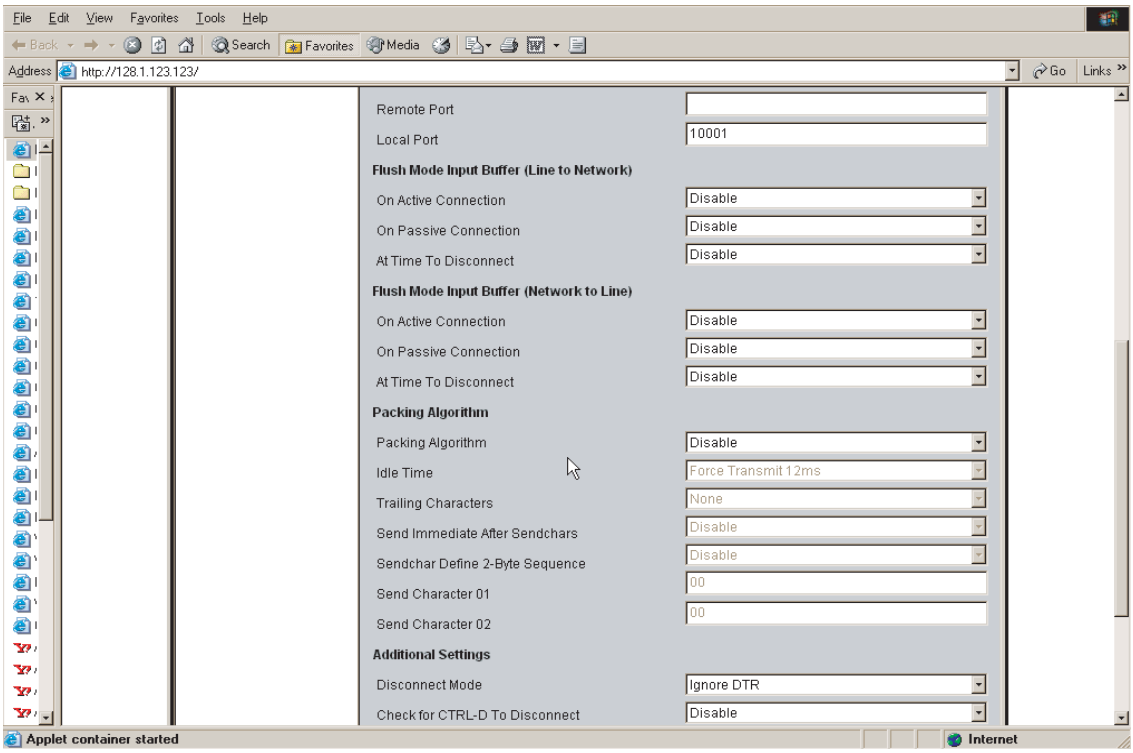

Figure 3-5. Telnet Web Page

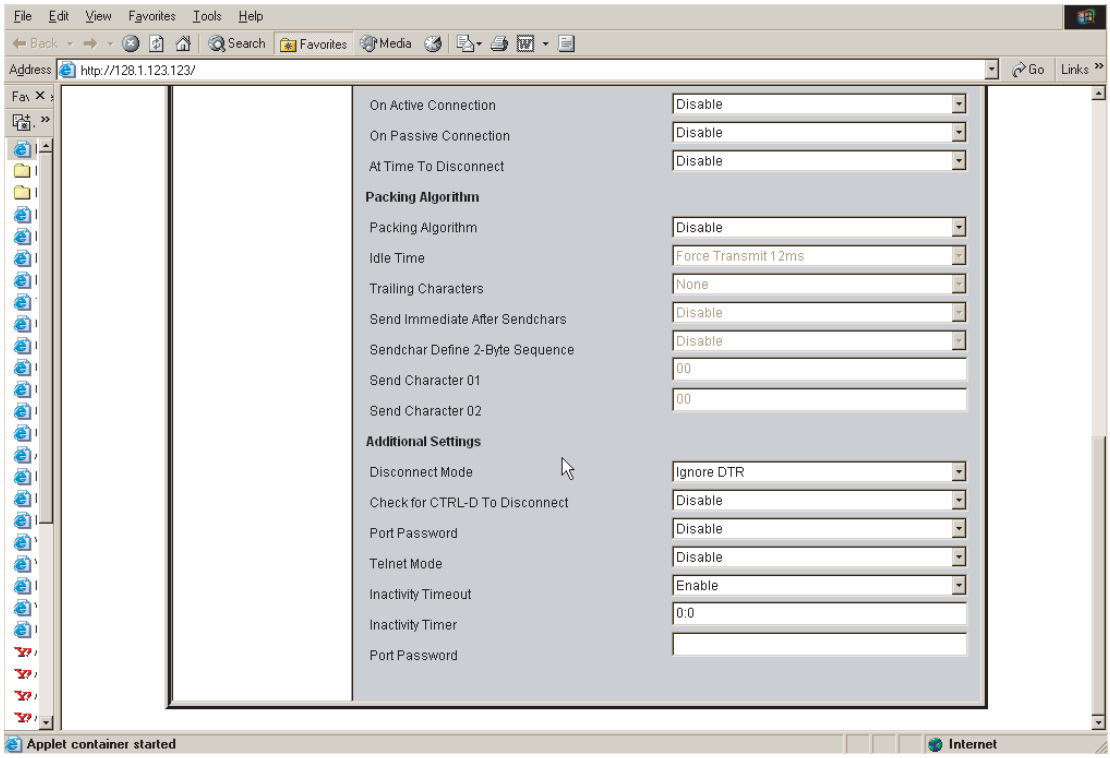

Figure 3-6. TelNet Web Page

Refer to the *Lantronix User's Guide* or more information on Ethernet configuration by Telnet.

4.0 520 Ethernet Card Specifications

Protocols Supported

ARP, UDP, TCP, BOOTP, Telnet, ICMP, SNMP, DHCP, TFTP, and HTTP

Device Support

Supports any asynchronous serial device with 7- or 8-bit data, with or without parity requiring Ethernet access

Network Interface

RJ-45 (10/100-Base-T) Ethernet or terminal

Data Rates

Serial speeds 300 bps to 19200 bps

Management

Internal HTTP server
SNMP (read only)
Serial login
Telnet login

Firmware

Flash ROM standard; downloadable from a TCP/IP host (TFTP) or over the serial port

LEDs

Serial 1: Green
Serial 2: Yellow
Diagnostic: Red
10m BPS: Green
100m BPS: Green

Power Requirements

6v – supplied by 520 indicator

Environmental

Operating
Temperature 5 to +50°C (41 to 122°F)
Storage
Temperature –40 to +60°C (–40 to 151°F)

Weight

0.8 lb (0.35 kg)

Certifications and Approvals

FCC B

TUV

c UL us
LISTED

CE

Warranty

1-year limited warranty

5.0 920i Installation

Warning *The 920i does not have an on/off switch. Before opening the unit, ensure the power cord is disconnected from the power outlet.*

Caution *Use a wrist strap to ground yourself and protect components from electrostatic discharge (ESD) when working inside the indicator enclosure.*

This unit uses double pole/neutral fusing which could create an electric shock hazard. Procedures requiring work inside the indicators must be performed by qualified service personnel only.

The indicator enclosure must be opened to install the Ethernet card.

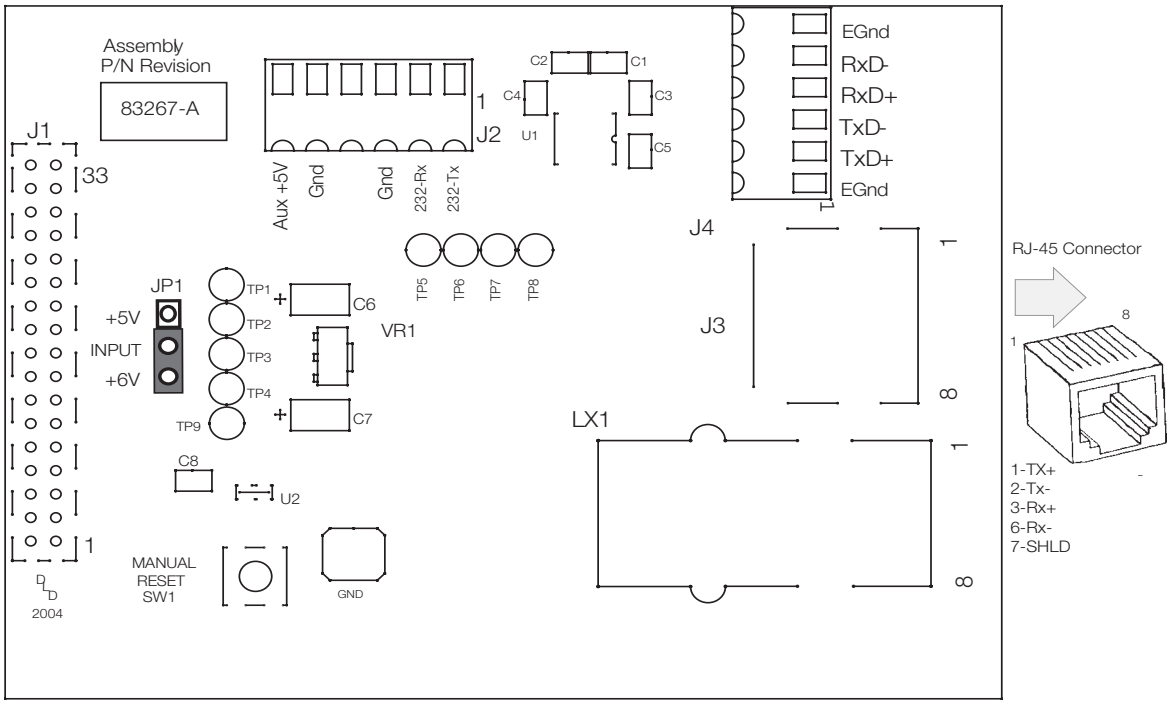

Figure 5-1. 920i Indicator Ethernet Interface Card

5.1 920i Ethernet Card Installation

1. Disconnect the 920i indicator from power source.
2. Place indicator on an antistatic work mat. Remove screws that hold the backplate to the enclosure body, then lift the backplate away from the enclosure and set it aside.
3. Remove plug from the cord grip on the indicator that will be used to run the Ethernet cable.
4. Carefully align the option card connector (J1) with connector (J5) or (J6) on the 920i CPU board or in any slot in a two or six channel expansion board. Press down to seat the option card in the CPU or option host board connector.
5. Use the screws provided in the option kit to secure the other end of the option card to the threaded standoffs on the 920i CPU or option host board serial connectors.
6. Ensure jumper JP1 is in the +6V position on the Ethernet Interface board for installation.

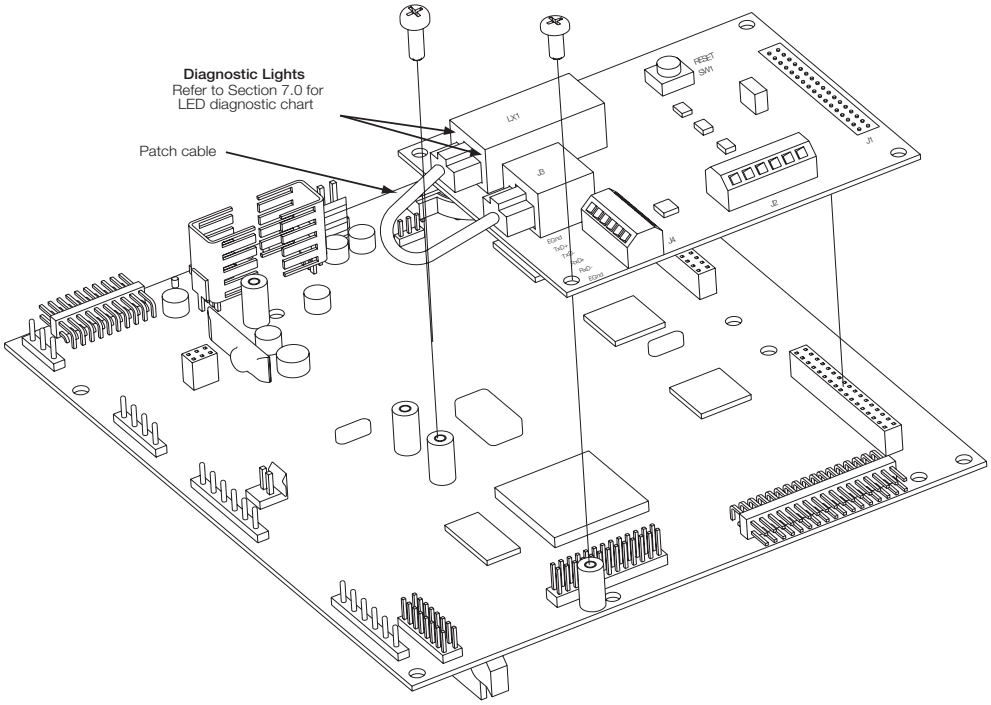

Figure 5-2. Ethernet Card Installation onto 920i CPU Board

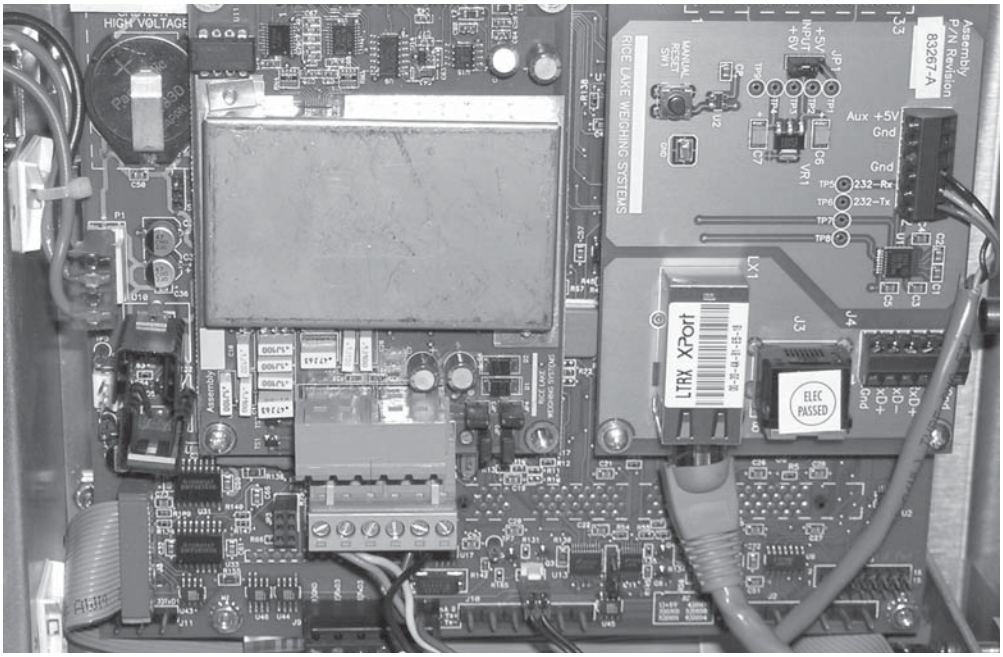

Figure 5-3. Ethernet Card Installation onto 920i CPU Board

NOTES:

- Connection with an RJ-45 connector should be made directly to LX1. See Figure 5-3.
- If termination to LX1 with an RJ-45 connector is not possible, connection with twisted-pair cable should be made directly to J4. Use the patch cable to connect LX1 and J3 as jumpers, only if J4 connection is used. See Figure 5-2.

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5.1.1 920i Ethernet Card Serial Port Wiring

The Ethernet card requires an RS-232 communications connection to the 920i. RS-232 communications are available on ports 1, 3, or 4. These ports support full duplex RS-232 at up to 115200 bps. (The 920i and Ethernet card default serial baud rate is 9600. Both must be set to the same baud rate.) To change the Ethernet card baud rates, refer to the *Lantronix User's Guide*.

1. To attach the 60-inch, unshielded cable directly to the 920i, remove the serial connector from the CPU board (port 1, 3, or 4).
2. Use the supplied 60-inch, unshielded cable to run from J2 on the Ethernet board to the 920i connector of choice (J9, J10, or J11). Table 5-2 shows the 920i pin assignments.
3. Once cables are attached, plug the connector into the header on the board. Table 5-1 shows the Ethernet card serial port pin assignments.

Pin	Signal
1	TxD
2	Rxd
3	Gnd
4, 5, or 6	Not Used

Table 5-1. Ethernet Card J2 Pin Assignment

4. Use cable ties to secure loose cables inside the enclosure away from high voltage circuits.

Connector	Pin	Signal	Port
J11	1	Gnd	1
	2	RS-232 RxD	
	3	RS-232 TxD	
J9	1	GnD	3
	2	RS-232 RxD	
	3	Rs-232 TxD	
J10	1	GnD	4
	2	RS-232 RxD	
	3	RS-232 TxD	

Table 5-2. 920i Pin Assignments

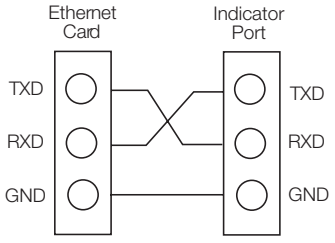

Figure 5-4. Ethernet Card Serial Wiring

5.1.2 External Ethernet Cabling

Configure external Ethernet cabling using either the RJ-45 connector (LX1) or the hardwire connection to J4 on the Ethernet card. When using an external RJ-45 connector, we recommend using a DNET 1 network surge suppressor (PN 72682) wired through a cord grip with the RJ-45 socket left outside of the enclosure.

Pin	Signal
1	Gnd
2	TxD+
3	TxD-
4	RxD+
5	RxD-
6	Gnd

Table 5-3. Ethernet Card J4 Pin Assignment

5.1.3 Reassembling The Enclosure

1. Once cabling is complete, position the backplate over the enclosure and reinstall the backplate screws. Use the torque pattern provided below to prevent distorting the backplate gasket. Torque screws to 15 in/lbs (1.7 N-m), or refer to the installation instructions for your particular enclosure.

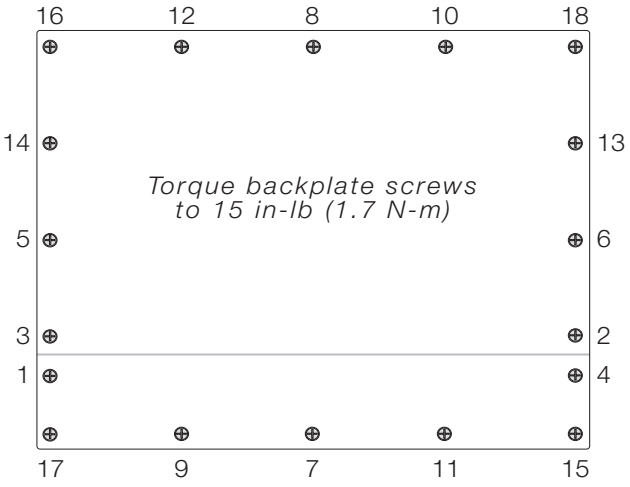

Figure 5-5. 920i Enclosure Backplate

2. Ensure no excess cable is left inside the enclosure and tighten the cord grips.
3. Reconnect power to the indicator.

NOTE: Contact factory for washdown option.

5.2 920i Ethernet Option Parts Kit Contents

Table 5-4 shows the parts list for the 920i Ethernet option (PN 71986)

PN	Description
14822	Screws, 4-40NCx1/4 (2)
15631	Cable tie, 3 in nylon (2)
54325	Unshielded cable, grey 60 in (1)
78269	RJ-45 cable, 5 in (1)
83267	Ethernet card, RS-232/Ethernet (1)
71986	920i embedded device server (1)
72117	Manual (1)
72763	Ethernet CD for 520 and 920i (1)

Table 5-4. Parts Kit Contents

6.0 Assigning an IP Address (920i)

The following section covers the steps required to assign an IP address. The IP address must be assigned and configured before a network connection is available. The two easiest ways to assign an IP address include:

- XPort Installer
- Network port login

Both of these installer tools are located on the Ethernet Configuration CD, PN 72763.

Refer to the *Lantronix User's Guide* found on the Ethernet Configuration CD for further information on the Ethernet configuration procedures.

6.1 920*i* XPort Installer

The XPort installer utility provides the preferred method for setting up an IP address for the Ethernet card with the 920*i* programmable indicator.

The XPort installer runs on a personal computer to help assign an IP address. To use the XPort installer, use the following steps:

1. Insert the Ethernet Configuration CD into the hard drive of your IBM-compatible personal computer running Windows® 95, 98, ME, 2000, and XP computers.
2. Install XPort installer per on-screen instructions.
3. Start the XPort installer program and follow the on screen instructions.

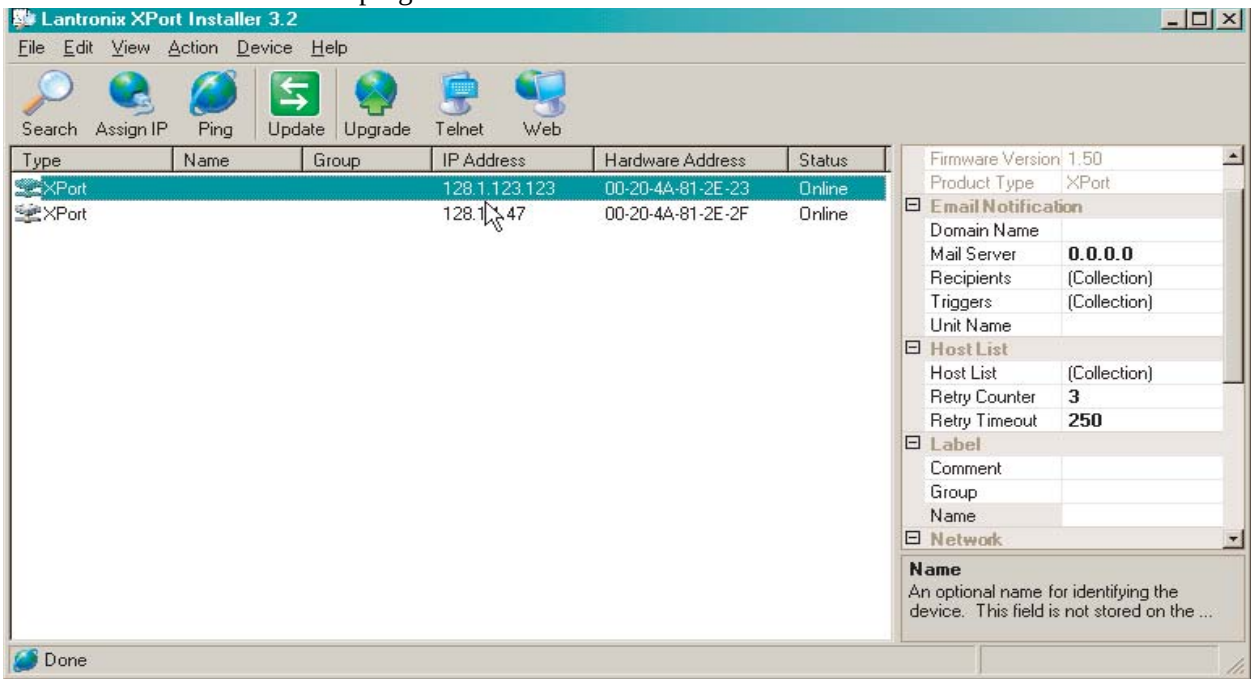

Figure 6-1. XPort Installer Main Menu Screen

The 920*i* unit comes supplied with a pre-configured IP address which automatically enables Dynamic Host Control Protocol (DHCP)—A protocol for assigning an IP address to a network device, within the XPort installer.

NOTE: The web connection to the 920i Ethernet card requires the original JAVA by Sun Microsystems. For a free download, go to www.JAVA.com

Click *Action / Assign IP Address* to assign a new IP address. The following screen appears.

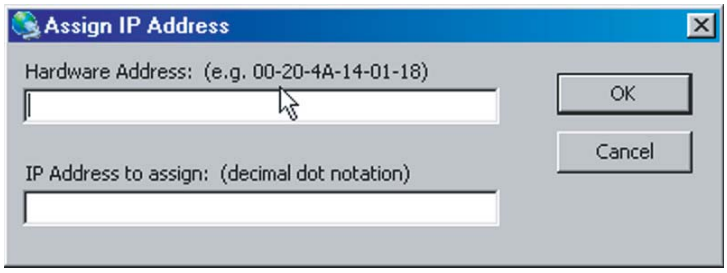

Figure 6-2. XPort Installer IP Address Assign Screen

1. Enter the hardware address found on LX1.
2. It is recommended that you assign your own IP address to the card. Enter a chosen IP address in the *Enter IP* field. Record the configured IP address for future reference.
3. Press *Set IP* to assign a new IP address.

NOTE: The XPort installer will search the network to see if the proposed IP address is already being used. If it is already in use, on the network, the operation will fail.

6.2 Network Port Login

The network port login provides a way to make a telnet connection to the network port (9999). This ARP method is available under UNIX and Windows-based systems. To utilize network port login, use the following steps:

1. Set a static ARP with the desired IP address using the hardware address of the scale. The address is printed on a label attached to the Ethernet card.

   NOTE: In order for the ARP command to work in Windows®, the ARP table on the PC must have at least one IP address defined other than its own. Type "ARP - A" at the DOS prompt (or from Run) to verify that there is at least one entry in the ARP table. If there is no entry other than the local machine, ping another IP machine on your network to build the ARP table. This has to be a host other than the machine on which you are working. Once there is at least one entry in the ARP table, use the following commands to ARP an IP address to the scale.

   arp –s 128.1.123.123.00.20-4a-xx-xx-xx
2. Open a Telnet connection to port 1 by clicking the Telnet icon on the Toolbar. The connection will fail quickly but the device server temporarily changes its IP address to the one designated in this step and sets all required parameters.

   Telnet 128.1.123.123.1

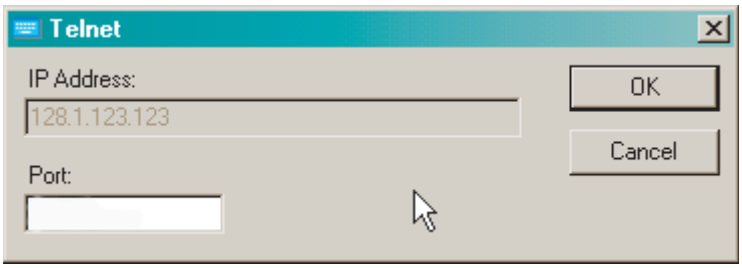

Figure 6-3. Telnet IP Address and Port Address window

3. Open a Telnet connection to port 9999 and press the **ENTER** key within three seconds to go into the Setup mode. if you wait longer than three seconds, the unit will reboot. Set all required parameters.

   Telnet 128.1.123.123.9999

   NOTE: The IP address you just entered is temporary and will revert to the default when the unit's power is reset unless you log into the unit and store the changes permanently.

6.3 Configuration Parameters

Web configuration of the card can be done by entering the IP address and clicking GO. This allows changing any or all setup in the Ethernet option card.

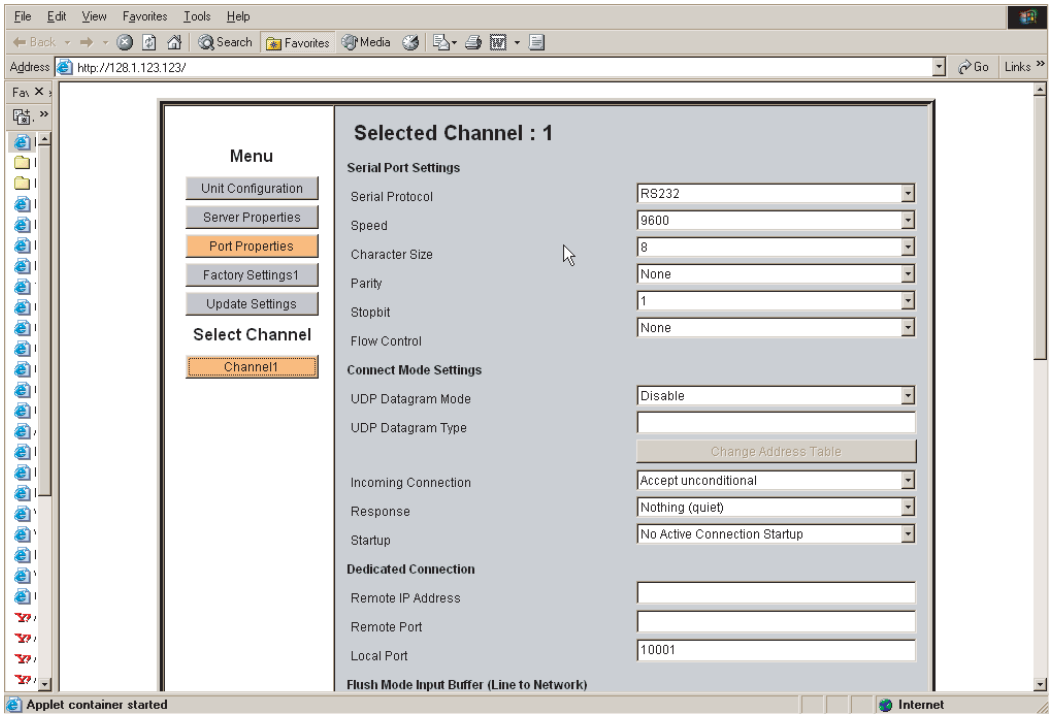

Figure 6-4. XPort Installer Web Page

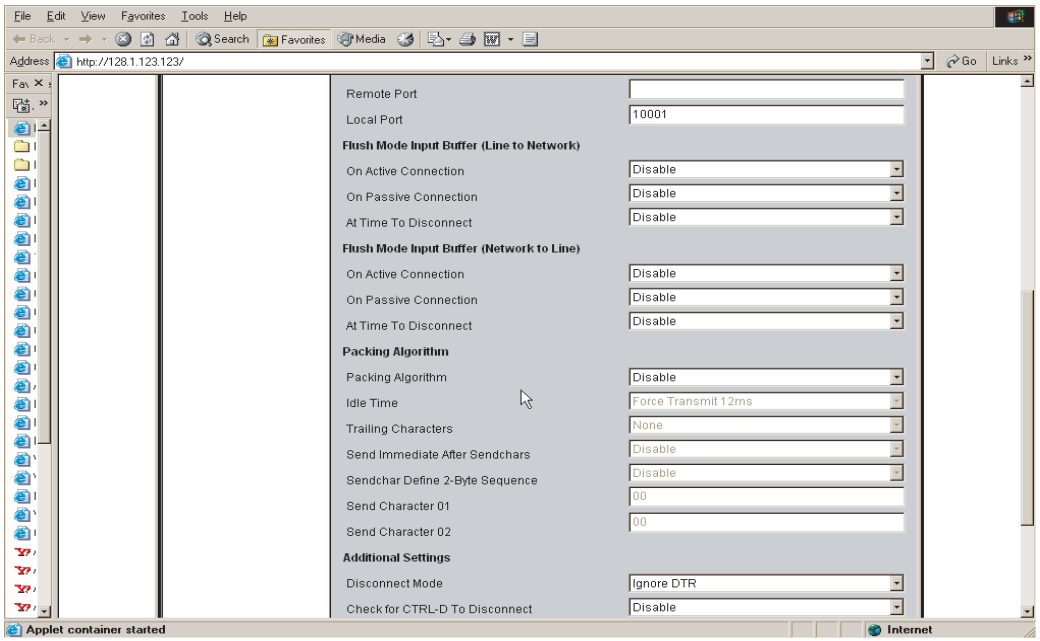

Figure 6-5. XPort Installer Web Page (continued)

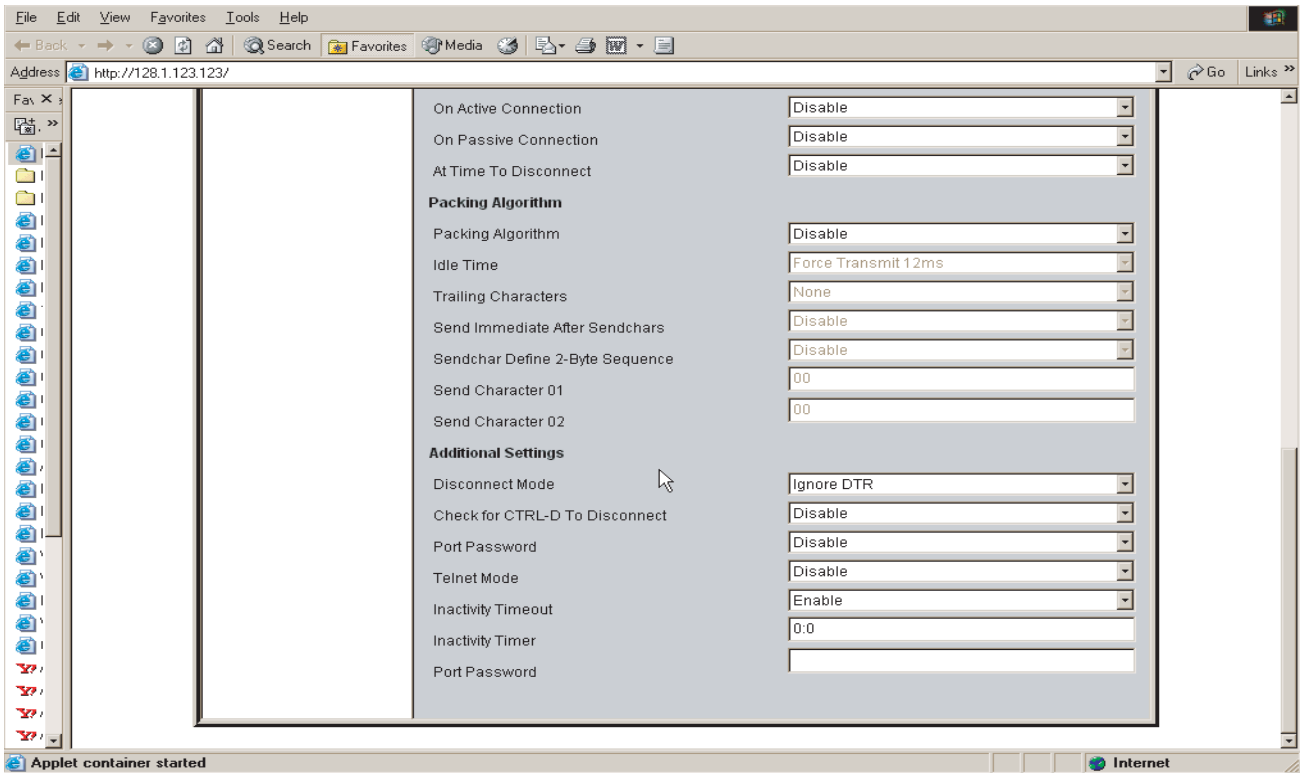

Figure 6-6. XPort Installer Web Page (continued)

Refer to the *Lantronix User's Guide* for further instructions on Ethernet configuration by Telnet.

NOTE: The 920i Ethernet option acts as an Ethernet – TCP/IP to RS-232 converter. The converter can act as a server and accept an incoming connection, or, through a special serial command prepended to a serial transmission, it can connect to remote servers. Once a connection is established, the 920i can send commands and handle responses using the internal serial API.

To terminate a connection from the 920i, sett a transmission idle time out on the Ethernet card. After "X" amount of time without transmission from the 920i, the card terminates the connection.

7.0 920i Ethernet Specifications

Protocols Supported

920*i* Indicator: TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP

Device Support

Supports any asynchronous serial device with 7- or 8-bit data, with or without parity requiring Ethernet access

Network Interface

RJ-45 (10/100-Base-T) Ethernet or terminal

Data Rates

Serial speeds 300 bps to 115Kbps

Management

Internal HTTP server
SNMP (read only)
Serial login
Telnet login

Firmware

Flash ROM standard; downloadable from a TCP/IP host (TFTP) or over the serial port

LEDs

Two Bi-Color LEDs

LEFT LED	RIGHT LED	MEANING
Off	Off	No Link
Off	Solid Amber	100 Base-T Half Duplex Link
Off	Blinking Amber	100 Base-T Half Duplex Activity
Off	Solid Green	100 Base-T Full Duplex Link
Off	Blinking Green	100 Base-T Full Duplex Activity
Solid Amber	Off	10 Base-T Half Duplex Link
Blinking Amber	Off	10 Base-T Half Duplex Activity
Solid Green	Off	10 Base-T Full Duplex Link
Blinking Green	Off	10 Base-T Full Duplex Activity

Power Requirements

6v – supplied by 920*i* indicator

Environmental

Operating
Temperature 5 to +50°C (41 to 122°F)
Storage
Temperature –40 to +60°C (–40 to 151°F)

Weight

0.8 lb (0.35 kg)

Certifications and Approvals

FCC B
TUV

C UL US
LISTED

CE

Warranty

1-year limited warranty

8.0 Appendix A

Figure 8-1. RJ-45 Connector

PIN	Function	Color
1	TX+	White/Orange
2	TX-	Orange
3	RX+	White/Green
4		Blue
5		White/Blue
6	RX-	Green
7		White/Brown
8		Brown

Table 8-1. Pin Assignments

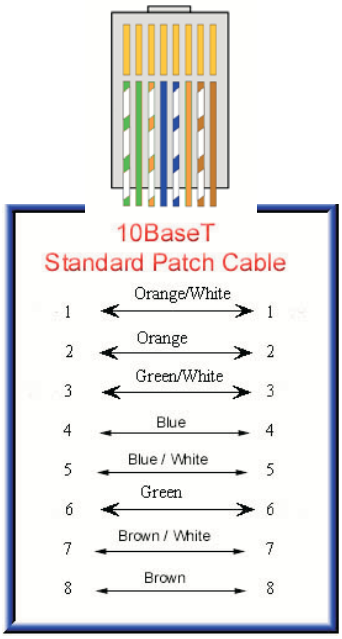

Figure 8-2. Standard Patch Cable

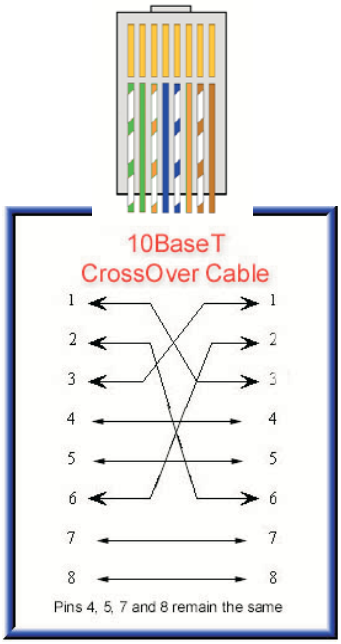

Figure 8-3. CrossOver Cable

9.0 Glossary

100Base-T

Standard for 100 Mbps Ethernet (IEEE 802.3) over unshielded twisted pair (UTP) cable. Commonly known as Fast Ethernet.

10Base-T

Standard for 10 Mbps Ethernet (IEEE 802.3) over unshielded twisted pair (UTP) cable.

ASCII

American Standard Code for Information Interchange - a 7 bit code used to represent text control codes.

CAT-5

Category 5 - UTP cable rated for data rates up to 1000 Mbps.

CAT-6

UTP cabling that is rated for up to 1000 Mbps. Standard is currently under development by the Electrical Industries Alliance/Telecommunications Association (EIA/TIA) organization.

CRC

Cyclic Redundancy Check.

DHCP

Dynamic Host Control Protocol.

Ethernet™

The dominant local area network technology in use today. There are a number of flavors of Ethernet, dependent on the cabling use.

Fast Ethernet

An upgraded version of Ethernet that runs a 1000 Mbps. Also known as 100Base-T and 100Base-FX.

FTP

File Transfer Protocol - allows you to transfer files regardless of type of computer system being used.

Gbps

Gigabit per second - a data transfer rate of 1 billion bits per second.

HDLC

High Level Data Link Control - a bit-oriented framing system used by Modbus+, smart modems and many other systems.

HTTP

Hyper Text Transfer Protocol - the application protocol used to transfer web information between server and browser.

IEEE

Institute of Electronic Engineers - developer of very important physical and data-link standards and networks. These are known as Project 802.

IEEE 802.3

The official designation for networking technology commonly known as Ethernet.

IEEE 802.11

Standards for wireless LAN technology.

IP

Internet Protocol - the networking layer of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol.

LAN

Local Area Network - A communications network designed to connect computers in a limited geographic area (typically under 10 km).

LRC

Longitudinal Redundancy Check.

MAC

Media Access Control - the protocol responsible for controlling which device can talk on the network at any given time.

Mbps

Megabit per second - a data transfer rate of 1 million bits per second.

Manchester Encoding

A digital signalling scheme that uses signal transistors rather than levels to indicate data: (i.e. One = Negative Transition and Zero = Positive Transition).

NIC

Network Interface Card - the computer card responsible for interfacing between the computer and the network.

RJ-45

The standard 8-pin connector for Ethernet.

SDLC

Synchronous Level Data Link Control - a bit-oriented framing system developed by IBM that is a super set of HDLC.

SMB

Server Message Block - a Microsoft application layer protocol for file transfer between Windows servers and workstations.

SMTP

Simple Mail Transfer Protocol - an application protocol used to send e-mails over the Internet.

SNMP

Simple Network Management Protocol a standard for automatically checking the health of all network equipment and reporting back to a network management system.

SPX/IPX

Sequenced Packet Exchange/Internetwork Packet Exchange - Network and transfer layer protocols (like TCP/IP) that were developed by Novel.

STP

Shielded Twisted Pair.

TCP

Transmission Control Protocol - the transport layer of the TCP/IP protocol.

TCP/IP

Transmission Control Protocol/ Internet Protocol - a pair of protocols that look after getting a message through a complex network (such as the Internet).

TELNET

A protocol that allows your desktop computer to communicate over a network as if it were a dumb terminal attached to a main frame.

TOKEN-RING™

The IBM network system using token passing for access control over ring wiring. Now considered obsolete.

UTP

Unshielded Twisted Pair.

UART

Universal Asynchronous Receiver Transmitter.

VLAN

Virtual Local Area Network - a collection of computers on a LSN that act as a self-contained group.

VPN

Virtual Private Network.

VRC

Virtual Redundancy Check.

WAN

Wide Area Network - a communications network designed to connect computers across the country or world.

520/920i Ethernet Interface Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for two years.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

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RLWS and buyer agree that RLWS's sole and exclusive liability hereunder is limited to repair or replacement of such goods. In accepting this warranty, the buyer waives any and all other claims to warranty.

Should the seller be other than RLWS, the buyer agrees to look only to the seller for warranty claims.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.

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