



7838 N Faulkner Rd. Milwaukee, Wisconsin 53224

Phone 414-355-2807

Fax 414-355-3508

## Disclaimer and Revisions

Operation of this equipment in a residential area is likely to cause interference in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

*Attention: This product has been designed to comply with the limits for a Class B digital device pursuant to Part 15 of 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 this guide, may cause harmful interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lakewood Instruments will void the user's authority to operate this device.

The information in this paper may change without notice. The manufacturer assumes no responsibility for what may or may not appear in this paper. For additional information, technical specifications, interface issues and clarification, contact Tom Tinney at 414-355-2807

## Declaration of Conformity

The XPort Device Webserver contained in the WEBNode conforms to the following standards: (according to ISO/IEC Guide 22 and EN 45014)

### **Manufacturer's Name & Address:**

WEBNode: Lakewood Instruments, 7838 N. Faulkner Road, Milwaukee, WI 53224

*Has declared that the following product:*

### **Product Name Model: WEBNode Device Server**

*Conforms to the following standards or other normative documents:*

### **Electromagnetic Emissions:**

EN55022: 1998 (IEC/CSP1R22: 1993) Radiated RF emissions, 30MHz-1000MHz

Conducted RF Emissions – Telecom Lines – 150KHz – 30MHz

FCC Part 15, Subpart B, Class B

IEC 1000-3-2/A14: 2000

IEC 1000-3-3: 1994

### **Electromagnetic Immunity:**

EN55024: 1998 Information Technology Equipment-Immunity Characteristics

Direct ESD, Contact Discharge

Indirect ESD

Radiated RF Electromagnetic Field Test

Electrical Fast Transient/Burst Immunity

RF Common Mode Conducted Susceptibility

Power Frequency Magnetic Field Test

For further information contact Lakewood Instruments directly at 414-355-2807

# 1. Overview

The WEBNode connects serial devices to Ethernet networks using the IP protocol family. The information in this paper is relevant to WEBNode devices with firmware version LKWD\_XPTEX\_6102GCCC1.ROM and higher. The WEBNode device contains an Internal Network device server.

## 2. Introduction

### *2.1 Protocol Support*

The WEBNode uses the Internet Protocol (IP) for network communications and the Transmission Control Protocol (TCP) to assure that no data is lost or duplicated, and that everything sent to the connection arrives correctly at the target.

Other supported protocols includes (but is not currently configured when used with a 2000 series controller):

- 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.

### *2.2 Addresses and Port Numbers*

#### **Hardware Address**

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

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

*Note: The MAC address is printed on the ID label as the serial number.*

#### **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 WEBNode 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) is associated with a specific TCP/UDP port number assigned by Lakewood Instruments during manufacture. Each WEBNode leaves the factory with a unique port number so that no two WEBNode's will require the same porting on a common network. Ports are factory configured and not user programmable.

In order for the WEBNode to be accessed externally via the internet, the customer must have two items resolved.

- 1) The network or the connection to the network where the WEBNode will reside must have an Internet Service Provider (ISP) Internet address that is an STATIC IP address. This requires that the ISP lock down a specific address (Example: <http://169.256.23.13>) that will provide a consistent address for connection purposes. Without the STATIC IP, the Lakewood Remote Windows Software (LRWS) and CPR Programs cannot tunnel through the internet to the controller, since they will not know where the controller is residing. The installation site may already have a static IP if they originate their own homepage or use programs (accounting/sales/engineering) that require field personnel to communicate with internal systems. If not, the customer's ISP may set up a STATIC IP connection for a fee. An alternative to the customer attaching a WEBNode and controller to their network is to use the EZWEB Wireless system from Lakewood Instruments. This requires no additional infrastructure to support, but does have a fee based to maintain a wireless Internet connection separate from the customer's system.
- 2) The network must have "port forwarding" or "Open porting" for the ports 30718 and an additional port specific to each individual device (found on the serial number tag). Port forwarded port 30718 is a "tagback" port which allows the WEBNode programs to handshake with the originating PC before completing the connection via the secondary port, where the data interchange and RS232 communications packages will be exchanged. The port from the WEBNode serial number tag will number from 10001 thru 12000)

## *2.3 Addresses and Port Numbers*

### **WEBNode Email/Text message Alerts**

The WEBNode can be user programmed through the device homepage (ending in 8080 instead of 80, Ex: <http://168.24.1.14:8080>). The homepage contains links to the Lakewood products page as well as tables for contact information in case of an alarm. The function and set-up of this page is covered in the installation manual.

In order for the unit to send the alert, internet access for the network connection that is home to the WEBNode must be established (tested by the test alert button). If the network has blocked common sites like MSN or Yahoo, the email alert may not be sent. NO customer email server or SMTP access is required and no additional set-up is required for this function to operate. Port 25 may be required to be opened to traffic (talk to the IT department about concerns for spamming)

The WEBNode can be custom configured to use SITE specific email servers for an additional charge.

## 2.4 Serial RS232 Interface

The table below lists the RS232 signals for the WEBNode. The RS232 interface is a 9-pin Male D-style connector. In this configuration, the unit is a DTE device.

**Table 1 - RS232 Signals**

WEBNode Signal	Direction	DTE DB-9 Male Pin #	DCE DB-9 Female Pin #
Data Out (TXD)	Out	3	2
Data In (RXD)	In	2	3
Ground		5	5
RTS	In	8	7
CTS	Out	7	8

**Note:** RTS and CTS control lines are not enabled at the factory. See **Configurable Pin Settings** on page 3-14 and **Flow** on page 3-22.

## 2.5 Power Supply

The WEBNode can use any DC power source from 9VDC to 24VDC. A typical power cube sent with the unit is a 9VDC, 500 mA, 8W power cube. However, there are other units that can be used as long as they are in the range of 9-24VDC and supply the proper wattage. The WEBNode power adapter is a 2.1mm, positive center power jack. The jack is equivalent to a CUI Inc. PJ-002A power jack.

## 2.6 Ethernet Interface

### 2.6.1 LEDs

The device contains the following LEDs:

- 10BaseT/100BaseTX (Bi-color, Left LED)
- Full/Half Duplex (Bi-color, Right LED)

**Table 2 - WEBNode LED Functions**

Left LED	Right LED	Meaning
Solid Amber		10BASE-T
Solid Green		100BASE-Tx
Blinking Amber		Half Duplex Activity
Blinking Green		Full Duplex Activity

## 2.7 Technical Specifications

**Table 3 - Technical Specs**

Category	Description
CPU	DSTni-EX 186 CPU
Firmware	Upgradeable via TFTP and serial port
Reset Circuit	200msec power up/down reset pulse. Reset triggered at 3.08V
Serial Interface	RS232. Baudrate software selectable (300 to 230400bps in standard mode, 460800 and 921600 in high performance mode)
Serial Line Formats	7 or 8 data bits, 1-2 Stop bits, Parity: odd, even, none
Modem Control	CTS, RTS
Flow Control	XON/XOFF (software), CTS/RTS (hardware), None
Network Interface	RJ45 Ethernet 10Base-T or 100Base-TX (Auto-sensing)
Compatibility	Ethernet: Version 2.0/IEEE 802.3
Protocols Supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, Auto IP, SMTP, and HTTP
LEDs	10Base-T & 100Base-TX Activity, Full/half duplex.
Management	Internal web server, SNMP (read only) Serial login, Telnet login
Security	Password protection, Locking features, optional Rijndael 128-bit encryption
Internal Web Server	Serves static web pages and Java applets
Weight	2.2oz
Material	Case: Flame Retardant
Temperature	Operating range: -40°C to +85°C (-40°F to 185°F) High performance mode has an upper temperature limit of 75°C.
Relative Humidity	Operating: 5% to 95% non-condensing
Warranty	1-year limited warranty
Included Software	Lakewood Windows Remote Software (LRWS), .NET framework 1.1, Windows™ based Comm Port Redirector
EMI Compliance	Radiated & conducted emissions - complies with Class B limits of EN 55022:1998 Direct & Indirect ESD - complies with EN55024:1998 RF Electromagnetic Field Immunity - complies with EN55024:1998 Electrical Fast Transient/Burst Immunity - complies with EN55024:1998 Power Frequency Magnetic Field Immunity - complies with EN55024:1998 RF Common Mode Conducted Susceptibility - complies with EN55024:1998

## 2.8 Known Port Penetration Programs

The table below is a current (as of this writing) list of known port penetration programs. These programs CANNOT infiltrate a port with an ACTIVE WEBNode in place. The web server inherent to the WEBNode functions in a format known as “.COB” and requires no additional program or file system support from the customer network or server. An active WEBNode server polls constantly, therefore the ports are effectively “Grabbed” and no additional products or programs may utilize those ports to transmit or receive data blocks. IF someone was able to “hack” through the WEBNode (requires an understanding of proprietary programming of WEBNode), they would find the LONWORKS Based 2000 series controller behind it thru an RS-232 connection point, which only responds to specific XMODEM commands and inquiry strings related to its internal functions and DOES not require or have the capacity to interface with a standard LINUX/CISCO/Windows based server/PC systems, except thru the LRWS monitoring program. If they are talking to the 2000 Sereis, LRWS is exluded from communicating, so no data/program transfer can occur. It is not possible to write any executable file to an 2000 series controller thru the port while in the field. As a side note, the WEBNode in service at the Lakewood Instruments factory that is used for training and demo purposes has been exposed to the internet and monitored since 01-14-08 with NO system or file penetrations

We provide this list as a courtesy. IF your WEBNode is removed from service and the ports are left open, a web crawler MAY find them. If your security/anti-virus programs are up to date, there will be NO problems, since these particular Trojans and viruses are well known.

port 10000 Oracle, TCP Door, XHX	port 10520 Acid Shivers
port 10000 (UDP) - XHX	port 10528 Host Control
port 10001 DTr, Lula	port 10607 Coma
port 10002 Lula	port 10666 (UDP) - Ambush
port 10003 Lula	port 10887 BDDT
port 10008 liOn	port 10889 BDDT
port 10012 Amanda	port 11000 DataRape, Senna Spy Trojan Generator
port 10013 Amanda	port 11011 Amanda
port 10067 Portal of Doom	port 11050 Host Control
port 10067 (UDP) - Portal of Doom	port 11051 Host Control
port 10084 Syphillis	port 11111 Breach
port 10084 (UDP) - Syphillis	port 11223 Progenic trojan, Secret Agent
port 10085 Syphillis	port 11225 Cyn
port 10086 Syphillis	port 11225 (UDP) - Cyn
port 10100 Control Total, GiFt trojan, Scalper	port 11660 Back streets
port 10100 (UDP) - Slapper	port 11718 Kryptonite Ghost Command Pro
port 10167 Portal of Doom	port 11831 DarkFace, DataRape, Latinus, Pest, Vagr Nocker
port 10167 (UDP) - Portal of Doom	port 11977 Cool Remote Control
port 10498 (UDP) – Mstream	port 11978 Cool Remote Control
	port 11980 Cool Remote Control
	port 12000 Reverse Trojan
	port 30700 Mantis
	port 30947 Intruse