CoBox-DR1-IAP User Guide

Rev. C   7/01

Contents

1: Introduction

The IAP Family of Device Servers

The Lantronix Industrial Automation Platform (IAP) family of Device Servers allows a single network and protocol to connect multiple serial devices from many vendors. IAP provides the automation industry with a network-enabling solution using TCP/IP and standard Ethernet networks that is vendor-independent.

By encapsulating serial data and transporting it over Ethernet, the Device Server allows virtual serial links to be established over Ethernet and IP (TCP/IP, UDP/IP) networks. As a result, limited distance, point-to-point, direct serial connections can be extended within the plant, throughout the facility, or across the global enterprise.

Existing COM-port based Windows™ applications can access network-enabled devices using Comm Port Redirector™ software. Redirector allows the creation of virtual serial ports, which can be mapped to remote Device Servers over Ethernet. When used in conjunction with an OPC server, most Windows-based HMI, SCADA, and PC-based control applications have full access to information in the connected device.

Lantronix provides IAP Device Servers specifically designed for different industrial environments.

♦ CoBox-DR1-IAP, with a DIN rail interface for harsh environments or alongside controls instruments in electrical panels.

♦ CoBox-FL-IAP, with fiber connectivity for long cable runs or electrically hazardous environments.

♦ UDS-10-IAP, a compact Device Server for use in less demanding environments.

A few examples of attached devices are:

- ♦ PLCs
- ♦ AC/DC drives
- ♦ CNC systems
- ♦ Operator panels and message displays
- ♦ Process Controls
- ♦ Instrumentation
- ♦ Power monitoring equipment
- ♦ Scales and weighing systems
- ♦ Barcode scanners
- ♦ Label printers
- ♦ Most factory floor serial devices
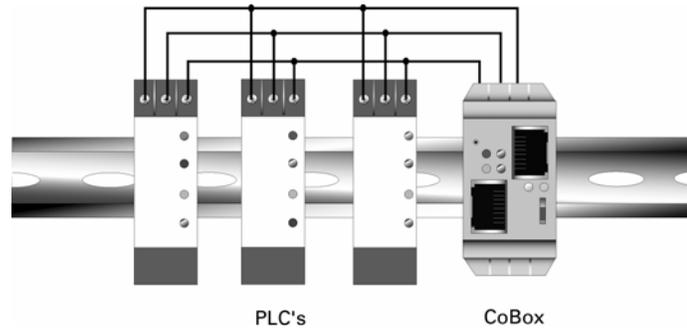
Figure 1-1
RS-485 Multidrop with CoBox-DR1-IAP

Features

IAP Device Servers, adapted to the three factory environments, can unite any mixture of equipment from industrial automation vendors into a single reliable pipeline. This new and open infrastructure opens the way for data to flow in real time from all your plant devices up to your IT layer.

The IAP Device Servers feature installable industrial communication protocols. Lantronix's Automation Protocols Suite (APS) includes protocols such as DF1 (Rockwell Automation) and Modbus (Schneider Electric). Where the Standard Tunneling protocol is limited to exclusive, device-to-device connections, the industrial protocols offer connections to other devices simultaneously.

You can set up the unit using the serial port, or remotely over Ethernet using Telnet or a web browser. The APS CD (the CD that comes with your Device Server) includes Windows-based configuration software that simplifies the process of installing protocols and configuring them for use with attached devices. Flash memory provides for maintenance-free, non-volatile storage and allows system upgrades.

2: DR1-IAP's Interfaces

Serial Interface

CoBox-DR1-IAP has RJ45 and screw block serial ports. The RJ45 port only supports RS232, whereas the screw block port supports RS232 and RS485/422. By setting the switch located on the face of the DR1-IAP, RS232 or RS485/422 can be selected.

Note: *CoBox-DR1-IAP is a single serial port device, meaning that only one port can be used at a time. In the configuration menu, Channel 1 refers to either one of the ports being used. Disregard Channel 2 (this channel applies to another type of product).*
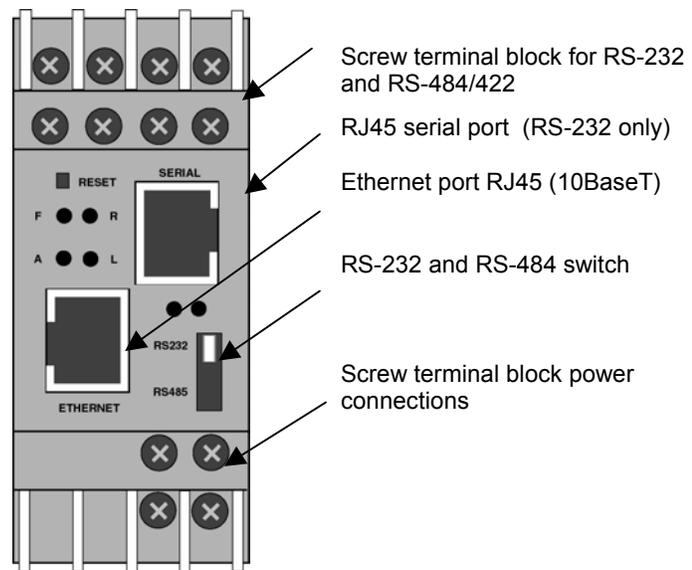
Figure 2-1
CoBox-DR1-IAP Front Panel

Network Interface

CoBox-DR1-IAP supports 10 Mbit Ethernet through its RJ45 (10BaseT) connector.

Hardware Address

The first three bytes are fixed and read 00-20-4A. The fourth, fifth, and sixth bytes represent the type of the product and the serial number in Hex notation.

Power Requirements

The CoBox-DR1-IAP is normally powered by the same 12Vor 24VDC supply that powers your panel. The unit requires a maximum of 3 Watts. Many AC-powered industrial controllers also supply 24VDC for use by field devices. The DR1-IAP is not shipped with a separate power supply, but any DC power supply between 9VDC and 30VDC can be used.

2-1

3: Network Protocols

The DR1-IAP uses TCP/IP protocols for network communication. The supported standards are: ARP, UDP, TCP, ICMP, Telnet, TFTP, DHCP, and SNMP. For transparent connections, TCP/IP (binary stream) or Telnet protocols are used. Firmware upgrades can be made with the TFTP protocol.

The IP (Internet Protocol) protocol defines addressing, routing, and data-block handling over the network. The TCP (transmission control protocol) assures that no data is lost or duplicated, and that everything sent into the connection on one side arrives at the target exactly as it was sent.

For typical datagram applications where devices interact with others without maintaining a point-to-point connection, UDP datagram is used.

Packing Algorithm

The two available packet algorithms (which define how and when packets are sent to the network) are software selectable. The standard algorithm is optimized for applications where DR1-IAP is used in a local environment, allowing for very small delays for single characters while trying to keep the packet count low. The alternate packing algorithm minimizes the packet count on the network and is especially useful for applications in routed Wide Area Networks. Various parameters can be set in this mode to economize the serial data stream.

IP Address

Every active device connected to the TCP/IP network must have a unique IP address. This IP address is used to reference a specific device, for example, to build a connection to DR1-IAP's serial port. See Appendix A for a complete description of IP Addressing.

Port Number

A destination IP address and a port number define every TCP connection and every UDP datagram. A port number is necessary to address an application or a channel on a network host. The port number can be compared to an extension on a PBX system.

A Telnet application (login to a host with an ASCII terminal) is commonly assigned TCP port number 23. More than one Telnet connection can be established to one host using the Telnet port; however, the other peer IP address/port number combinations must be different.

In the DR1-IAP, a port number can be configured on the channel (port). The DR1-IAP uses this port number for outgoing messages and incoming connections, or UDP datagrams, which are addressed to its port number. Port 9999 (decimal) is used for remote configuration.

4: Getting Started

Requirements

In addition to the CoBox-DR1-IAP and the materials included in the box, you will need the following items to prepare the unit for use:

◆   Windows 95/98/Me/NT/2000 equipped PC with a 10BASE-T Ethernet adapter

◆   An Ethernet crossover cable, or a hub switch with an available port and an Ethernet patch cable

◆   9 to 30 VDC power source

Connections

To set up the Device Server, you first need to attach an Ethernet cable and supply power to the unit.

1.   Locate the Ethernet port (10BASE-T, RJ45 connector) on the Device Server.

2.   If you are directly connecting the Device Server to your PC, connect an Ethernet crossover cable from the unit to your PC. Otherwise, connect an Ethernet patch between the Device Server and an available port on your Ethernet hub or switch.

3.   Apply 9 to 30 VDC power (3W maximum). If the unit is properly attached to the network, the green Link (L) indicator lights.

Install the APS Firmware

If this is your first time setting up the Device Server, you will need to install the APS firmware on your PC.

1.   Exit any programs you are running, including utilities and virus protection programs.

2.   Insert the APS CD into your CD-ROM drive. The installer should launch automatically.

   Note: *If the installer does not launch, on the Windows Task Bar click the **Start** button and select ➔ **Run**. In the **Open** field, type the CD-ROM drive letter, backslash, and then **setup.exe** (for example, E:\setup.exe).*

3.   Respond to the installation wizard prompts.

Assign an IP Address

The first step in setting up the unit is to assign it an IP address. The IP address identifies the DR1-IAP on the network. On an isolated network, you can assign IP addresses at random, as long as each is unique. If you are connecting the Device Server to an established network, you will need to coordinate assignment of an IP address with the network administrator.

Caution: *The IP address you assign must be within a valid range, unique to your network,* and in the same sub network as your PC.

1. From the Windows Task Bar, click the **Start** button and select **Programs→ APS Config→APS Config**. The Configuration Utility window displays.
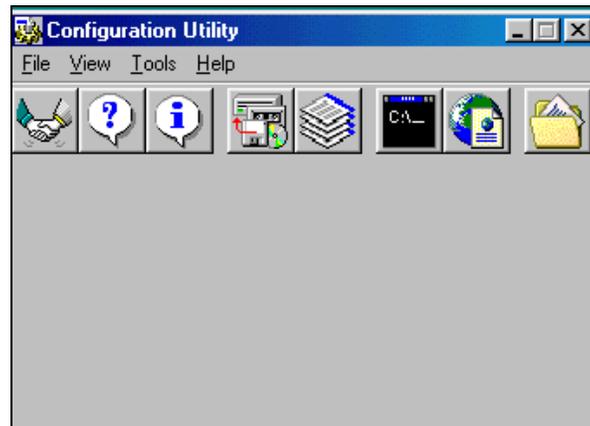
Figure 4-1
APS Configuration Utility Window

2. Click the **Assign IP** icon. The Assign IP Address window displays.
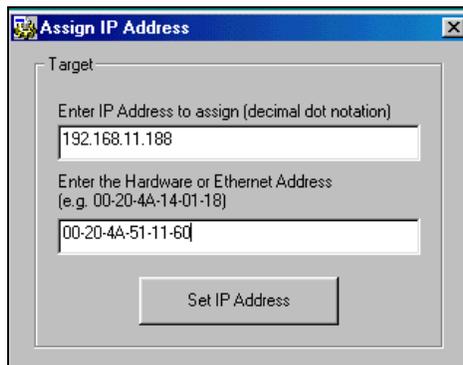
Figure 4-2
Assign IP Address Window

3. In the **Enter IP Address to assign** field, type the IP address that you would like to assign to the Device Server. Use dotted decimal notation (e.g., 192.168.11.188).

    Caution: Each device on the network must have a unique IP address, which must be within the range of valid addresses on the network segment it is attached to. If you are not sure, please check with your network administrator.

4. In the **Enter the Hardware or Ethernet Address** field, type the Ethernet address listed on the Device Server label (on the right side of the unit).

5. Click the **Set IP Address** button. The *Assign IP Successful* message displays. Click **OK**.

6. Click the **Ping** icon ⬛. The Ping Device window displays.

7. Click the **Ping** button. *Reply received* messages display in the window, indicating that the IP address has been entered successfully.
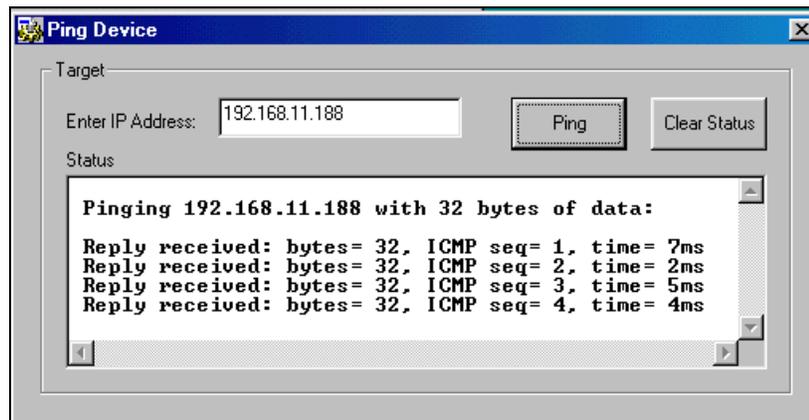
Figure 4-3
Ping Device Window

    Note*: If you do not receive reply messages similar to those above, make sure the Device Server is properly attached to the network and the IP address assigned to the device is valid for the particular network segment you are working with. If you are not sure, check with your network administrator.*

8. Click the **Query Device** icon. ⬛ The Query Device window displays. Confirm that the IP address is correct.

9. Click the **Get Device Information** button. **Firmware Type** displays the protocol that is currently loaded on the device.
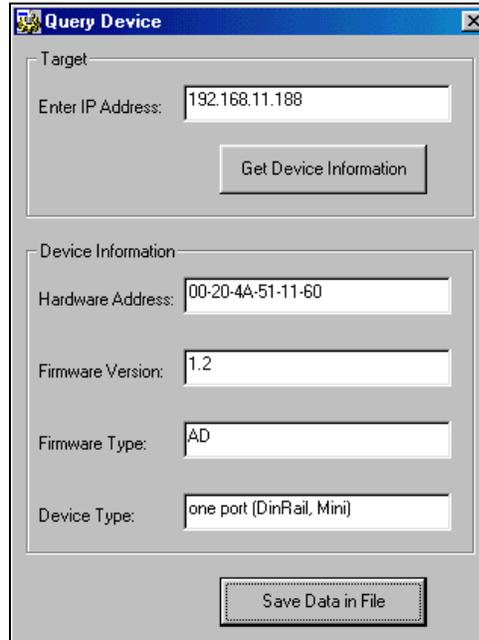
Note: *The communications protocol is an integrated part of the Device Server firmware. When you load the firmware, you are loading the protocol too. (For that reason, in this document we use the terms firmware and protocol interchangeably.)*

The unit comes with the Standard Tunneling protocol installed. If your application requires a different protocol, such as Modbus (Schneider) or DF1 (Allen-Bradley), follow the steps in *Load the Protocol (Firmware)* below to install it. Otherwise, proceed to *Telnet to the Device Server*.

Load the Protocol (Firmware)

1. Click the **Load** icon . The Load Firmware window displays.
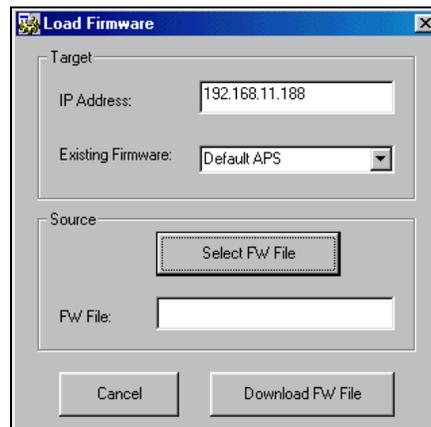
Figure 4-4
Load Firmware Window

2. Click the **Select FW File** button. A list of firmware files displays.
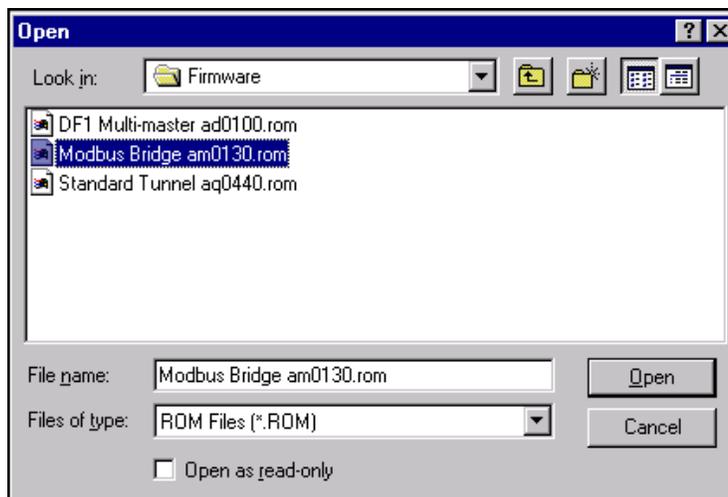
Figure 4-5
Open Firmware Window

3. Select the desired protocol and click **Open**. The selected file displays in the **FW File** field.

4. Click **Download FW File**. The *File download successful* message displays. Click **OK**.

   Note: *You can use the query tool to confirm that the protocol has been installed.*

Configure the Device Server

Before you configure the Device Server, you will generally need to know the communication parameters of the attached serial device. While this information will vary from device to device, it generally includes the following:

- Interface type (RS232, RS-422 or RS-485)
- Communication rate (300 bps to 38,400 bps)
- Number of data bits (7 or 8)
- Parity (none, odd, even)
- Number of stop bits (1 or 2)

Depending upon the communication protocol installed in the Device Server, there may be other parameters. Consult the specific protocol manual included on the APS CD for additional information.

To view or update the configuration of the DR1-IAP, use the Telnet tool within the APS Configuration Utility. This tool allows you to establish a terminal session with the Device Server. Within the terminal session, menus will guide you through the process of configuring the unit.

1. Click the **Telnet** icon [icon] and press **Enter** within **5 seconds**. The Setup (configuration) Mode screen for the protocol displays.

2. Continue with the configuration procedure for the protocol you installed. (Instructions are in the specific protocol manuals on the APS CD.)

3. When you are finished, make sure to save the current configuration and exit. This configuration is stored in non-volatile memory and is retained even if power is removed.

At this point, the Device Server will reset and restart – using the configuration parameters just programmed.

Test the Protocol

To make sure the unit works with a serial device:

1. Connect a serial device to the DR1-IAP's terminal blocks or RJ45 port.

2. If your communications format is RS-232, set the format switch (red switch) to RS-232

   OR

   If your communications format is RS-422/485, set the format switch to RS-485.

3. Confirm proper operation.

Note: *If this is the first time you are connecting your serial device to the Device Server, we suggest that you connect the device to a personal computer to confirm that it is working properly. Then remove the cable from your personal computer and connect it to the Device Server. See the connection diagrams below.*
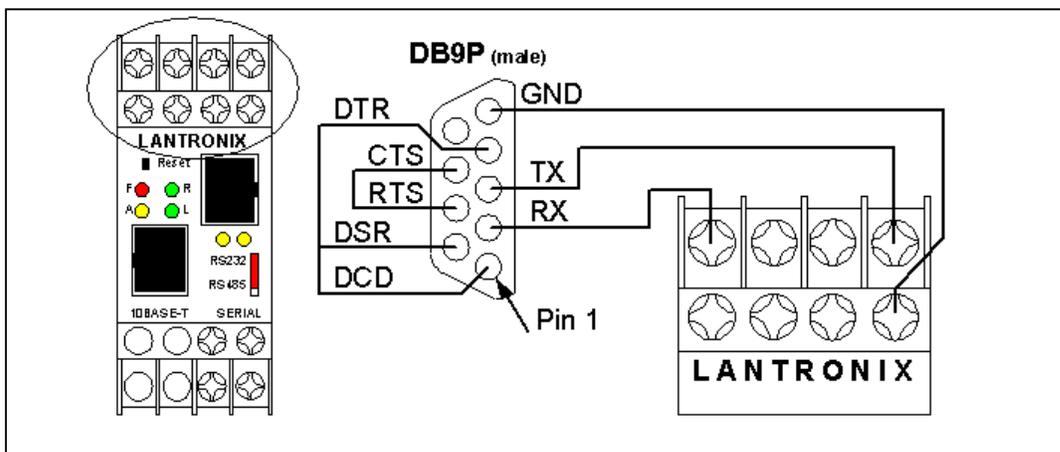
Figure 4-6
Cable configuration for terminal block connection
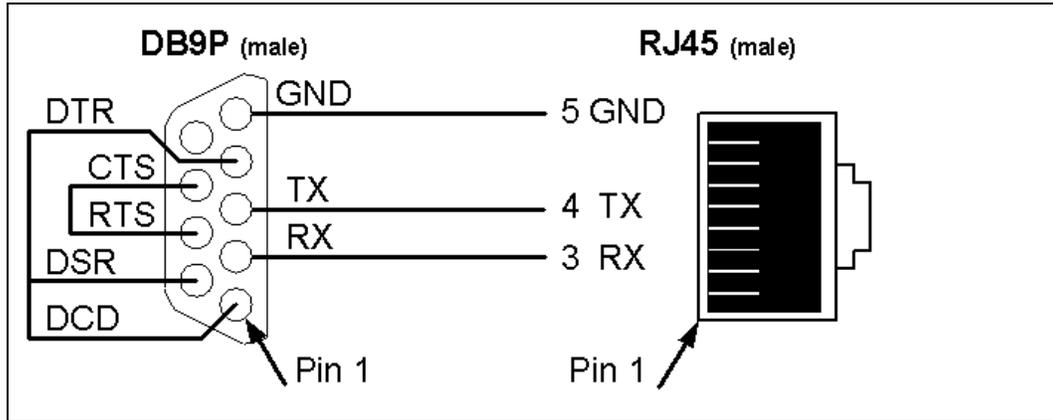
Figure 4-7
Cable configuration for RJ45 connection

Install the Device Server

At this point, if the Device Server has not been installed, now is the time to do so.

1. Disconnect all cables from the unit.

2. Place the unit, or mount it on a DIN rail.

3. Connect the unit to the network.

4. Connect the unit to your serial devices.

5. Connect the unit to power and ground.

Troubleshooting

The unit contains the following LEDs:

♦ Two green (labeled R for ready and L for link)

♦ Three yellow (labeled A for activity, TXD for transmit, and RXD for receive)

♦ One red (labeled F for fault)

LED	Meaning
R Green	Connected to Ethernet
L Green	Socket connection made
A Yellow	Network activity
TXD Yellow	Transmitting serially
RXD Yellow	Receiving serially

Table 4-1
LED Indications

Simultaneously lit F red and R green LEDs mean something is wrong. If the F red LED is lit or blinking, count the number of times the R green LED blinks between its pauses. Six possible blink patterns, detailed in the following table, indicate which fault condition exists.

LED	Error
Steady F Red and Blinking R Green	1 blink = EPROM checksum error 2 blinks = RAM error 3 blinks = Token Ring error 4 blinks = EEPROM checksum error
Blinking F Red and blinking R Green	1 blink = Faulty network connection 2 blinks = No DHCP response

Table 4-2
LED Error Indications

5: 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. Connect a console terminal or PC running a terminal emulation program to the Device Server's first serial port (CH 1). The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.

2. Cycle the Device Server's power (power off and back on). After power-up, the self-test begins and the red Diagnostic LED starts blinking. **You have one second** to do **one** of the following:

   Type **zzz** to enter Monitor Mode **with** valid network connections.

   Type **yyy** to enter Monitor Mode **without** valid network connections.

   Note: *The easiest way to enter Monitor Mode is to hold down the **x** or the **y** key at the terminal while powering up the Device Server.*

   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).

2. When the Lantronix Universal Device Server message appears, type **M** (upper case) immediately.

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

Monitor Commands

The following commands are available in the Monitor Mode. Many commands have an IP address as an optional parameter (x.x.x.x). If the IP address is given, the command is applied to another DR1-IAP with that IP address. If no IP address is given, the command is executed locally.

All commands must be in capital letters; only blanks (spaces) are accepted between parameters.

Command	Action
DL	Firmware download to the DR1-IAP
VS x.x.x.x	Query software header record (16-byte)
GC x.x.x.x	Get configuration as HEX records
SC x.x.x.x	Set configuration from HEX records
PI x.x.x.x	Check with Ping if x.x.x.x is alive and reachable
AT	Show the DR1-IAP's ARP table entries
TT	Show all the incoming and outgoing TCP connections (used only with Monitor Mode from Telnet)
NC	Show the IP configuration of the DR1-IAP
RS	Reset the power on the DR1-IAP
SI x.x.x.x:n.n.n.n	With this command, you can remotely assign an IP address to another DR1-IAP, where x.x.x.x is the new IP address and n.n.n.n is the remote DR1-IAP serial number written twice. For example: SI194.39.78.234:146.138.146.138 IP address = 194.39.78.234 Remote Cobox serial # (146-138) = 146.138.146.138 ***Note:*** *Since this IP assignment is obtained by sending a broadcast packet, it cannot be obtained over the routers.*
G0, G1, ...,GE, GF	Get a memory page of configuration information from the device.
S0, S1,...,SE	Set a memory page of configuration information on the device.
QU	Quit - exit diagnostics mode

Table 5-1
Monitor Mode Commands

Entering any of the commands listed above will generate one of the following command response codes:

Command result codes:

0   OK, no error
1   No answer from remote device
2   Cannot reach remote device or does not answer
8   Wrong parameter(s)
9   Invalid command

6: Updating Firmware

Downloading Firmware

Current firmware files are available on the APS CD. Firmware updates and release notes for Device Servers can be downloaded directly from Lantronix in one of the following ways: via the Lantronix Web site (www.lantronix.com) or using anonymous FTP through the Internet (ftp.lantronix.com).

There are three ways to update the Device Server's internal operational code (CBX*.ROM or CBX*.HEX). Using the APS Configuration Utility is the preferred method. Alternatives are by means of TFTP or through a serial port.

You can also update the Device Server's internal Web interface (CBXW*.COB) via TFTP.

Updating Via the APS Configuration Utility

The procedure for installing updated firmware is basically the same as for installing a protocol. (Since the protocol is an integrated part of the firmware, and you can't get one without the other, in this manual we use the terms interchangeably.) You just need to download the updated firmware to your computer and then use the APS Configuration Utility to install it.

1. Download the updated firmware files from www.lantronix.com or ftp.lantronix.com and store them in the Firmware subfolder of the APSConfig. folder on your computer. If you accept all the defaults when you installed the utility, the folder will be on your hard drive under Program Files.

2. Click the **Start** button and select **Programs-->APS Config-->APS Config** to display the APS Configuration Utility window.
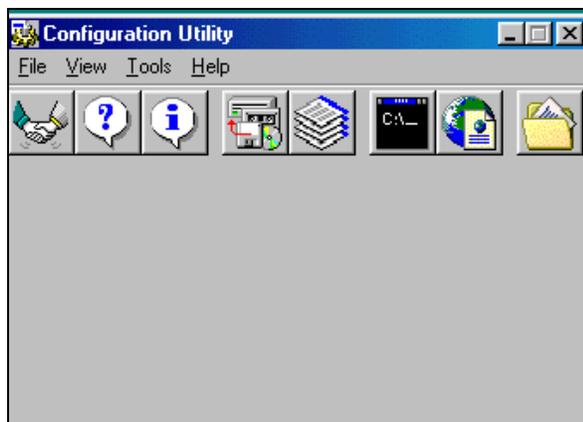
Figure 6-1
APS Configuration Utility Window

3. Click the **Load Firmware** icon. The Load Firmware window displays.
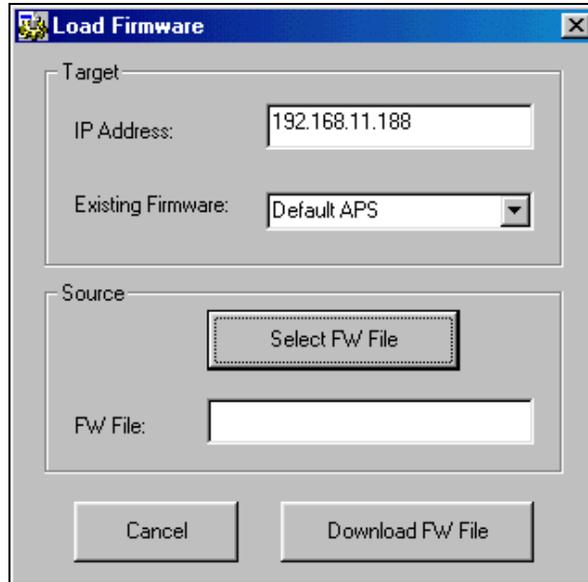
Figure 6-2
Load Firmware Window

4. Type the Device Server's assigned IP address in the **IP Address** field.

5. Click the **Select FW File** button. The list of files in your Firmware folder display. (If the files are stored elsewhere, you can browse until you find them.)
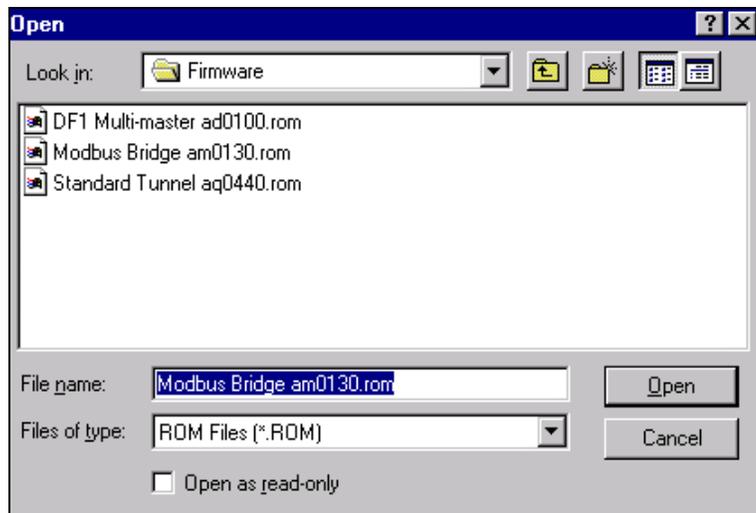
Figure 6-3
Firmware Files

6. Select the file to download and click the **Open** button. The path of the selected file displays in the **FW File** field.

7. Click the **Download FW File** button. When the *File download successful* message displays, click **OK**.

Updating Via TFTP

To download new firmware from a computer:

1. Use a TFTP client to send a binary file to the Device Server (CBX*.ROM to upgrade the Device Server's internal operational code and CBXW*.COB to upgrade its internal Web interface).

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

2. Type the full path in the **Source File** field.

3. Type one of the following internal operational codes in **Destination File**:

   Codes must be upper case.

   AQ - Standard Tunneling

   AM - Modbus

   AD - DF1

   WEB6 for the internal Web interface

   The destination file can also be **ROM** to match any firmware

4. Type the IP address of the unit being upgraded in the **Remote Host** field.

5. Click **Put** to transfer the file to the Device Server.

    The Device Server performs a power reset after the firmware reload process has completed.
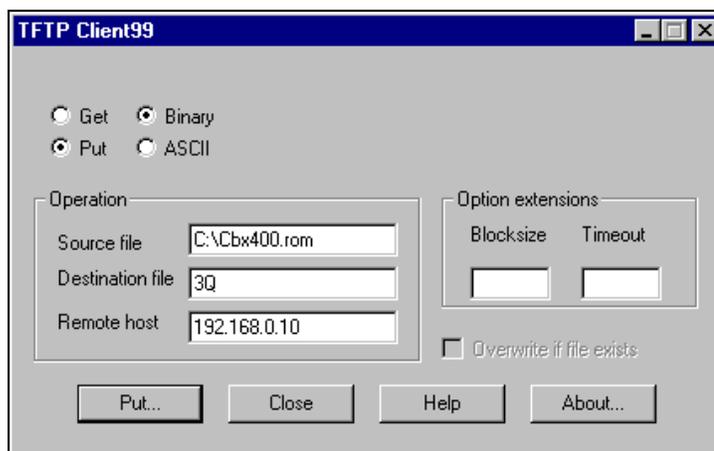
Figure 6-4
TFTP Dialog Box

Updating Via the Serial Port

This procedure takes about 10 minutes. **Do not switch off the power supply during the update.** A loss of power while reprogramming will result in a corrupt program image and a nonfunctional Device Server.

To download firmware from a computer via the Device Server's serial port:

1. Enter Monitor Mode.

2. Download the firmware to the Device Server using the **DL** command.

3. Select **Send Text File** and select the CBX*.HEX file to be downloaded. The downloaded file must be the **.HEX** (ASCII) version.

    After the final record is received, the Device Server checks the integrity of the firmware image before programming the new firmware in the flash ROM. The following message displays when the firmware upgrade is complete.

```
*** NodeSet 2.0 ***
       0>DL
02049 lines loaded.
   Max Address FFE0
Loading EEPROM ...
```

Figure 6-5
Firmware Upgrade Confirmation Message

The Device Server performs a power reset after the firmware load has been completed.

Note: *You can only update the Device Server's internal Web interface using TFTP.*

7: Serial Line Interfaces

CoBox-DR1-IAP has RJ45 and screw block serial ports. The RJ45 port only supports RS-232, whereas the screw block port supports RS-232 and RS-485/422. By setting the switch located on the face of the DR1-IAP, you can select RS-232 or RS-485/422.

Note: *CoBox-DR1-IAP is a one serial port device, meaning that only one port can be used at a time. In the configuration menu, Channel 1 refers to either one of the ports being used. Disregard Channel 2. (Channel 2 applies to another type of product.)*

RJ45 Connector Pinouts (RS-232)

The serial RJ45 connector supports up to 38400 bits per second and has the following signals.

Pin	Direction	Function
1	Not Connected	None
2	Hard-wired output	DSR Data Set Ready
3	To DR1-IAP	RXD Received data
4	From DR1-IAP	TXD Transmitted Data
5		Ground
6	To DR1-IAP	CTS Clear to Send
7	From DR1-IAP	RTS Ready to Send
8	Not Connected	None

Table 7-1
Serial RJ45 (RS-232) Pinout Configuration

Note: *Pin number 1 of the RJ45 serial connector is the first pin from the bottom.*

7-1

Screw Block Connector Pinouts and Other Components

The following figures illustrate and describe the screw block connector pinouts and other components of the DR1-IAP. See the following page for explanations corresponding to the circled numbers.
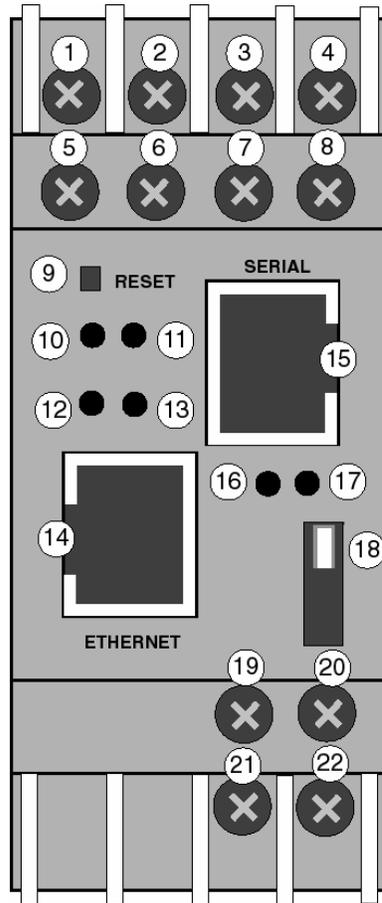
Figure 7-1
Front Panel Layout

Item	Component	Name	Purpose
1	Screw terminal	RXD or RXA	RS-232: RXD (Received Data) RS-422/485:RXA (Received Data -)
2	Screw terminal	CTS or RXB	RS-232: CTS (Clear to Send) RS-422/485: RXB (Received Data +)
3	Screw terminal	RTS or TXB	RS-232: RTS (Request to Send) RS-422/485: TXB (Transmit Data +)
4	Screw terminal	TXD or TXA	RS-232: TXD (Transmit Data) RS-422/485: TXA (Transmit Data -)
5,6,7	Screw terminal	NC	No connection
8	Screw terminal	GND	Signal ground
9	Reset switch	RESET	Push to power reset and initialize
10	LED (Red)	Fault or Configuration	SOLID: Fault in DR1-IAP communication (read error) or DR1-IAP is in Configuration Mode
11	LED (Green)	Ready	SOLID: Connection to network host established
12	LED (Yellow)	Activity	FLASHING: Network traffic
13	LED (Green)	Link	SOLID: DR1-IAP has good Ethernet link
14	Connector (RJ45)	Ethernet port	RJ45 connector for Ethernet 10BaseT
15	Connector (RJ45)	Serial port	RJ45 connector for RS-232
16	LED (Yellow)	Serial TXD	FLASHING: Indicates transmission from the serial port
17	LED (Yellow)	Serial RXD	FLASHING: Indicates reception to the serial port
18	Switch	Switch for screw block	UP: Serial RS-232 DOWN: Serial RS-422/485
19	Screw terminal	DC +	Operating power, positive
20	Screw terminal	Ground	Earth ground
21	Screw terminal	DC -	Operating power, negative
22	Screw terminal	Ground	Earth ground

Table 7-2
Front Panel Components

Note: *For RS-485 2-wire functionality, pins 1 & 4 and 2 & 3 of the screw terminals must be connected together.*

8: Technical Data

CPU, Memory Controllers

V.40 CPU, 10MHz clock

National Semiconductor DP839xx Ethernet Controller

128kByte RAM, 512kByte Flash, and 1024Byte EPROM

256 Byte E²PROM for parameter storage

Serial Interface

RJ45 connector for RS232 interface

Screw terminals for RS232 or RS422/485 interface

Speed software selectable 300 to 38.4k baud

Switch selectable RS-232C or RS-422/485 – screw terminal connector only

Network Interface

Integrated 10BaseT port (RJ45 connector)

Power Supply (not included)

Screw terminals for 9-30 Volt DC

Power Consumption

Maximum 3 Watt

Operating Temperature

0-60 degrees C (32-140 degrees F)

LEDs

Four LEDs for Ethernet channel, link, activities, and error.

Two LEDs for serial channel status.

Case

Plastic case for DIN Rail mounting

Dimensions

90 x 60 x 36 mm

Weight

Approx. 150g (0.33 lb)

A: IP Addresses

An IP address is a 32-bit value, divided into four octets of eight bits each. The standard representation is four decimal numbers (in the range of 0..255) divided by dots.

Example: 192.2.1.123

This is called decimal-dot notation.

The IP address is divided in two parts: network and host. To support different needs, three *network classes* have been defined. Depending on the network class, the last one, two or three bytes define the host, while the remaining part defines the network. In the following explanations, *x* stands for the host part of the IP address:

Class A Network

IP address 1.x.x.x to 127.x.x.x

Only 127 different networks of this class exist. These have a very large number of potential connected devices (up to 16,777,216).

Example: 10.0.0.1, (network 10, host 0.0.1)

Class B Network

IP address 128.0.x.x to 191.255.xxx.xxx

These networks are used for large company networks. Every network can consist of up to 65,534 devices.

Example: 172.1.3.2 (network 172.1, host 3.2)

Class C Network

IP address 192.0.0.xxx to 223.255.255.xxx

These network addresses are most common and are often used in small companies. These networks can consist of a maximum number of 254 hosts.

Example: 192.7.1.9 (network 192.7.1, host 9)

The remaining addresses 224.x.x.x - 239.x.x.x are defined as "class D" and are used as multicast addresses.

The addresses 240.x.x.x. - 254.x.x.x are defined as *class E* and are reserved addresses.

Network Address

The host address with all host bits set to **0** is used to address the network as a whole (in routing entries, for example).

Broadcast Address

The address with the host part bits set to **1** is the broadcast address, meaning *for every station*.

Network and broadcast addresses must not be used as a host address (for example, 192.168.0.0 identifies the entire network and 192.168.0.255 identifies the broadcast address).

IP Netmask

The netmask is used to divide the IP address differently from the standard defined by classes A, B, C. A netmask defines how many bits from the IP address are to be taken as the network section and how many bits are to be taken as the host section. When the number of host bits is entered, the CoBox-DR1-IAP calculates the netmask. The netmask is displayed in standard decimal-dot notation.

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

Table A-1
Standard IP Network Netmask

Netmask	Host bits
255.255.255.252	2
255.255.255.248	3
255.255.255.240	4
255.255.255.224	5
255.255.255.192	6
255.255.255.128	7
255.255.255.0	8
255.255.254.0	9
255.255.252.0	10
255.255.248.0	11
.	.
.	.
255.128.0.0	23
255.0.0.0	24

Table A-2
Netmask Examples

A-2

Private IP Networks and the Internet

If your network is not connected to the Internet, and there are no plans to make such a connection, you may use any IP address you wish.

If your network is not connected to the Internet and you have plans to connect, or you are connected to the Internet and want to operate your CoBox-DR1-IAPs on an intranet, use one of the subnetworks below. These network numbers have been reserved for such networks. If you have any questions about IP assignment, consult your Network Administrator.

Class A   10.x.x.x
Class B   172.16.x.x
Class C   192.168.0.x

Network RFCs

For more information regarding IP addressing see the following documents. These can be located on the World Wide Web using one of the directories or indices:

RFC 950   Internet Standard Subnetting Procedure

RFC 1700   Assigned Numbers

RFC 1117   Internet Numbers

RFC 1597   Address Allocation for Private Internets

B: Binary to Hex Conversion

Hexadecimal digits have values from 0..15, represented as 0...9, A (for 10), B (for 11) ... F (for 15). The following table can serve as a conversion chart binary-to-decimal-to-hex:

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Table B-1
Binary to Hexadecimal Conversion Chart

To convert a binary value to a hexadecimal representation, the upper and lower four bits are treated separately, resulting in a two-digit hexadecimal number.

C: Contact Information

Technical Support

Contact the Industrial Automation Distributor assigned to sell and provide support in your region.

Problem Report Procedure

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

Your name
Your company name, address, and phone number
Product model (for example, CoBox-DR1-IAP-01)
Serial number
Firmware version
Network configuration
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)

Full Contact Information

Corporate Offices

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Fax: (949) 450-7231
E-mail: intsales@lantronix.com

D: Warranty Statement

Lantronix warrants for a period of FIVE YEARS from the date of shipment that each CoBox-DR1-IAP server supplied shall be free from defects in material and workmanship. During this period, if the customer experiences difficulties with a product and is unable to resolve the problem by phone with Lantronix Technical Support, a Return Material Authorization (RMA) will be issued. Following receipt of a RMA number, the customer is responsible for returning the product to Lantronix, freight prepaid. Lantronix, upon verification of warranty will, at its option, repair or replace the product in question, and return it to the customer freight prepaid. No services are handled at the customer's site under this warranty.

Lantronix warrants software for a period of sixty (60) days from the date of shipment that each software package supplied shall be free from defects and shall operate according to Lantronix specifications. Any software revisions required hereunder cover supply of distribution media only and do not cover, or include, any installation. The customer is responsible for return of media to Lantronix and Lantronix for freight associated with replacement media being returned to the customer.

Lantronix shall have no obligation to make repairs or to cause replacement required through normal wear and tear of necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the Product, or use of the Product in such a manner for which it was not designed, or by causes external to the Product, such as, but not limited to, power or failure of air conditioning.

There are no understandings, agreements, representations or warranties, express or implied, including warranties of merchantability or fitness for a particular purpose, other than those specifically set out above or by any existing contract between the parties. Any such contract states the entire obligation of Lantronix. The contents of this document shall not become part of or modify any prior or existing agreement, commitment or relationship

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Warranty claims must be received by Lantronix within the applicable warranty period. A replaced product, or part thereof, shall become the property of Lantronix and shall be returned to Lantronix at the Purchaser's expense. ALL RETURN MATERIAL MUST BE ACCOMPANIED BY A RETURN MATERIAL AUTHORIZATION NUMBER ASSIGNED BY LANTRONIX.

E: Declaration of Conformity

(according to ISO/IEC Guide 22 and BS 7514)

Manufacturer's Name: Lantronix

The manufacturer hereby declares that the product:

Product Name: CoBox DINRail-IAP

Product Number(s):   CoBox-DR1-IAP

Conforms to the following standards or other normative documents:

Electromagnetic Emissions: EN55022: 1998 (CISPR 22, Class A: 1993, A1: 1995, A2: 1996)
IEC 1000-3-2/A14: 2000
IEC 1000-3-3: 1994

Electromagnetic Immunity: EN55024: 1998 Information Technology Equipment-Immunity Characteristics
IEC 6100-4-2: 1995 Electro-Static Discharge Test
IEC 6100-4-3: 1996 Radiated Immunity Field Test
IEC 6100-4-4: 1995 Electrical Fast Transient Test
IEC 6100-4-5: 1995 Power Supply Surge Test
IEC 6100-4-6: 1996 Conducted Immunity Test
IEC 6100-4-8: 1993 Magnetic Field Test
IEC 6100-4-11: 1994 Voltage Dips & Interrupts Test

(L.V.D. Directive 73/23/EEC)

Product Safety: EN60950, 1988 +A1, A2, A3, A4

Supplementary Information:

This product has been verified as being compliant within the class A limits of the FCC Radio Frequency Devices Rules (FCC Part 15, Subpart B), revised as of October 1993.

"The product complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/E."

Manufacturer's Contact:
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F: Disclaimers

The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

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The revision date for this manual is **July 2001**.

Part No. CD-APS-O1
Rev. C

WARNING

This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. 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.

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.

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