

CoBox DinRail

Universal Thin Server

Installation Guide

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Introduction

1 Introduction

The CoBox DinRail Universal Thin Server brings network connectivity to factory floors. It is designed to connect industrial devices with serial interfaces to an Ethernet network using the TCP/IP protocol family (TCP for transparent stream- and UDP for datagram applications). Various devices can be interfaced, for example:

- **terminals**
- **time/attendance and data collection devices**
- **CNC controllers**
- **industrial robots**
- **data display units**
- **instruments**

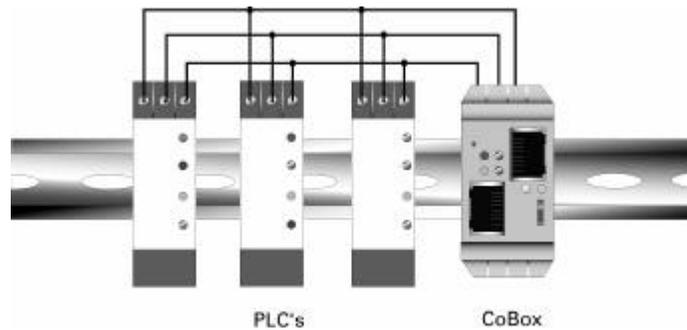


Figure 1-1
RS-485 Multidrop with CoBox DinRail

2 DinRail's Interfaces

2.1 Serial Interface

CoBox DinRail 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 DinRail, RS232 or RS485/422 can be selected.

NOTE: *CoBox DinRail is a single serial port device, meaning that only one port can be used at a time. In the configuration menu, channel one refers to either one of the ports being used. Channel two should be disregarded (this channel applies to another type of product.)*

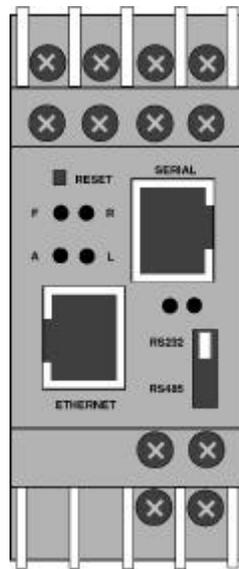


Figure 2-1
The CoBox DinRail Front Panel

2.2 Network Interface

CoBox DinRail supports 10 Mbit Ethernet through its RJ45 (10BaseT) connector.

DinRail Interfaces

2.3 Hardware Address

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

2.4 Power Requirements

The CoBox DinRail is not shipped with a power supply. The required input voltage can vary between 9VDC and 30VDC with a maximum of 3 Watts.

3 Network Protocols

The DinRail product 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 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.

3.1 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 DinRail 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.

3.2 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 DinRail's serial port. See Appendix A for a complete description of IP Addressing.

3.3 Port Number

Every TCP connection and every UDP datagram are defined by a destination IP address and a port number. 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.

Network Protocols

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 combination must be different.

In the DinRail, a port number can be configured on the channel (port). The DinRail 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 Configuration

The DinRail can be configured using remote or local methods. Either use an ASCII terminal or a terminal emulation program to locally access the serial port, or use a Telnet connection to configure the unit over the network.

The DinRail configuration is stored in nonvolatile memory and is retained without power. The configuration can be changed any time. The DinRail performs a reset after the configuration has been changed and stored.

4.1 Network Configuration

To configure over the network, a Telnet connection to port 9999 must be established.

If you know the assigned IP address you can establish a Telnet connection to port 9999. Under Windows 95/98/NT, open an MS-DOS command window and type the command “telnet x.x.x.x 9999”, where x.x.x.x is an IP address already configured in the DinRail and 9999 is the desired TCP/IP port. Make sure you put a space between the x.x.x.x and 9999.

4.2 DinRail’s IP Address

4.2.1 Default IP Address

The CoBox DinRail is shipped with a default IP address of 0.0.0.0, which automatically enables the DHCP within the CoBox DinRail.

With DHCP-enabled DinRail, If there is a DHCP server to respond to DinRail’s request when it’s booting up, the DinRail will then get an IP address, a gateway address, and a subnet mask from the DHCP server. These addresses will not be shown in the DinRail’s configuration screens (you will still see 0.0.0.0), however if you enter the “monitor mode” (see Section 5.1) and from 0> prompt type NC (upper case) you will be able to see the IP configuration of the DinRail.

NOTE: *Using the ARP command (see below) you can always override the IP address given to the DinRail by your DHCP server.*

Configuration

With DHCP enabled DinRail, If there is no DHCP server on the network, then the DinRail's request will eventually time out and the unit will boot up with no IP address. As soon as a static IP address is assigned to the DinRail, the DHCP support will be disabled within the product. To re-enable DHCP support, the IP address should be set back to 0.0.0.0.

4.2.2 Assigning a New IP Address

If the IP Address of the DinRail is unknown or undefined, the following steps outline how to assign a temporary IP address over the network.

Set a static ARP with the desired IP address using the hardware address of the CoBox DinRail, which is printed on the product label. The following example shows the use of ARP in Win95/98/NT, (from the DOS prompt) and UNIX environments when the hardware address of the CoBox DinRail is 00-20-4A-01-64-0B.

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 command prompt to verify that there is at least one entry in the ARP table. If there is no other entry beside 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 CoBox DinRail.*

arp -s 191.12.3.77 00-20-4A-01-64-0B

The command example for most Unix systems is:

arp -s 191.12.3.77 00:20:4A:01:64:0B

- b) Open a Telnet connection to port number 1. This connection will fail, but the CoBox DinRail will change its IP address to the one designated in the arp command line.

telnet 191.12.3.77 1

- c) Open a Telnet connection to port 9999 and set all required parameters.

telnet 191.12.3.77 9999

NOTE: *The temporary IP address by arp is reverted after every power reset of the CoBox DinRail. Be sure to log into CoBox DinRail and store the parameters to make the changes permanent.*

Configuration

4.3 Serial Configuration

An ASCII terminal or a PC with a terminal emulation program can be connected to one of the serial ports on the DinRail. The terminal (or PC) should be configured for 9600 baud, no parity, 8-bit, and 1 stop bit.

To enter configuration mode, the power on the DinRail must be cycled (powered off and back on). After power-up, the self-test begins. About a second later, three lowercase 'x' characters must be sent to the DinRail. These characters must all be sent within approximately one second to start the configuration mode.

NOTE: *The easiest way to enter the configuration is to hold down the 'x' key at the terminal (emulation) and then power up the DinRail. This will ensure that the x characters will arrive in time.*

4.4 Configuration Parameters

After configuration mode is entered (confirm with <ENTER>), the parameters can be changed; default values can be confirmed with the ENTER key. The parameters must be stored, and the DinRail performs a power reset.

```
Serial Number 179- 035  Software Version V03.5 (990525)

Press Enter to go into Setup Mode

*** basic parameters
Hardware: Ethernet  Autodetect TPI
IP addr 045.032.040.091, gateway 045.032.000.001,netmask
255.255.000.000

***** Channel 1 *****
Baudrate 09600, I/F Mode 7C, Flow 80
Port 02050
Remote IP Adr: 172.016.002.011, Port 02048
Connect Mode: 01  Disconn Mode: 01
Flush  Mode: 02  SendChars : AC 10

Change Setup : 0 Server configurations
                1 Channel 1 configurations
                2 Channel 2 configurations
                7 Set to factory defaults
                8 Exit without save
                9 Save and  exit                Your choice
```

Figure 4-1
DinRail Configuration Screen

Configuration

4.5 Basic Parameters

To change the basic parameters, press '0'. The following values can be set/changed:

4.5.1 IP Address

The IP address must be set to a unique value in your network. If you are not familiar with IP addresses, please refer to Appendix A.

If the DinRail is given an address that is already in use it will not connect to the network.

4.5.2 Gateway IP Address

The router/gateway address is needed to communicate to other LAN segments. The default gateway must be set to the IP address of the router that connects these segments. This address must be within the local network.

4.5.3 Netmask

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 (re class A: 8/24 (net/host), class B: 16/16, class C: 24/8 bits). If set to 0, the standard netmask for the actual IP address is used. Appendix A covers the calculation of the right value in detail.

The DinRail prompts for the number of host bits, and then calculates the netmask. It is shown in standard format "255.255.xxx.xxx" when saved parameters are displayed.

4.5.4 Telnet Configuration Password

The telnet configuration password can be set to disable unauthorized access to the setup menu via a Telnet connection to port 9999. To access the setup menu through the serial port, it is not necessary to enter the password.

4.6 Channel Specific Parameters

4.6.1 Baud Rate

The baud rate can be set within the defined limits from 300 to 38400 bits per second.

Configuration

4.6.2 Interface Mode

The line interface (I/F) mode is a bit-coded byte with the following meanings. It is entered in hexadecimal notation:

Function	7	6	5	4	3	2	1	0
RS-232C							0	0
RS-422/485							0	1
RS-485 2-wire							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 bit	1	1						

Figure 4-2
Interface Mode Options

Common settings:

RS-232C, 8-bit, No Parity, 1 stop = 0x4C

RS-232C, 7-bit, Even Parity, 1 stop = 0x78

RS-485 2-Wire, 8-bit, No Parity, 1 stop = 0x4F

RS-422, 8-bit, Odd Parity, 2 stop = 0xDD

The bit combination can be easily converted to hexadecimal notation for input. See Appendix B for conversion tables.

4.6.3 Flow Control

This parameter sets the local handshake method for stopping and starting output. Generally, flow control is not required if the connection is used to pass a blocked protocol with block sizes <1k (ACK/NAK).

No flow control: 00

XON/XOFF flow control in both directions: 01

Hardware handshake with RTS/CTS lines: 02

XON/XOFF, pass characters to host: 05

Configuration

4.6.4 Port Number

This setting is the source port number in TCP connections, and is the number used to identify the channel for remote initiating connections. The port number may not be set to 0 or 9999 (range: 1-65535). In general the port numbers 0..1023 are reserved in UNIX systems for specific applications. It is advisable to use numbers in the range 2000-30000 to avoid potential conflicts.

If the UDP Datagram mode is selected, the port number is used as the UDP source port number for outgoing datagrams; datagrams sent to the DinRail with this port number are received to this channel.

4.6.5 Remote IP Address

When automatic connection mode is selected, a connection is made to this IP address on the network.

4.6.6 Remote TCP Port

The remote TCP port number must be set to use automatic connections and can also be configured for manual connect mode. This parameter defines the port number on the target host to which a connection is attempted.

NOTE: *To connect an ASCII terminal to a host using a DinRail for login purposes, use the remote port number 23 (This is the Internet standard port number for Telnet services).*

This port number is also used as the UDP destination port number for transmitted datagrams, provided the DinRail is used in UDP mode.

Configuration

4.6.7 Connect Mode

This parameter defines how the DinRail makes a connection and how it reacts to incoming connections over the network.

Function	7	6	5	4	3	2	1	0
Connection Acceptance								
-never accept incoming	0	0	0					
-accept incoming with active DTR only	0	1	0					
-accept unconditional (if not busy)	1	1	0					
Response on Serial to Connect								
-nothing (quiet)				0				
-character response: (C=conn., D=disc., N=not available/unreachable)				1				
Active Connection Startup								
-no active connection startup					0	0	0	0
-start connection with any character on the serial line					0	0	0	1
-start connection with active-going DTR line					0	0	1	0
-start connection with CR (0x0d) only					0	0	1	1
-manual connection startup ('C' + address)					0	1	0	0
Datagram Mode					1	1	0	0
Modem Emulation Mode					0	1	1	0

Figure 4-3
Connect Mode Options

Please refer to Appendix B on converting values to hexadecimal format.

4.6.7.a Automatic Connection Address

Using either of the serial ports, an automatic TCP connection to a network node can be configured by setting the remote IP address and the TCP port number parameters.

If automatic connection is selected, all parameters must be supplied in full.

If manual connection startup is configured (with "C" + address/port), only the part not supplied in the command string is used. In manual mode, the last byte of the address must be supplied.

Configuration

Example: The configured remote IP address within the DinRail is 129.1.2.3 and the TCP port number is 1234 :

C121.2.4.5/1<ENTER>

complete override - connection is started with host 121.2.4.5, port 1.

C5< ENTER >

This means connect to 129.1.2.5, port 1234.

C28.10/12< ENTER >

This means connect to 129.1.28.10, port 12.

4.6.7.b Datagram Mode

When selecting this option you will be prompted for Datagram type

Datagram type: 01 (Directed UDP)

4.6.7.c Modem Emulation Mode

In modem emulation mode, the DinRail presents a modem interface to the attached serial device by accepting AT-style modem commands and wiggles the modem signals correctly. Normally there is a modem connected to a PC and a modem connected to some other remote machine. A user must dial from his/her PC to the remote machine and accumulate phone charges for each connection. With the DinRail in modem mode, you can replace your modems with DinRail and use an Ethernet connection instead of a phone call all without having to change communications applications and making potentially-expensive phone calls.

Modem mode is selected by setting the “connect mode” to 0x06 (no echo & acknowledgments) or 0x16 (with echo & acknowledgments.) In modem mode the following strings can be used:

ATDTx.x.x.x,pppp or ATDTx.x.x.x/pppp

This is used to make a connection to an IP address (x.x.x.x) and a remote port number (pppp.)

ATDTx.x.x.x

Without a port number, this will make a connection to the remote port number defined within the DinRail.

ATD

If no remote IP address and port number are defined within the DinRail, this command will force the DinRail into “monitor mode”.

Configuration

ATD0.0.0.0

If a remote IP address and port number are defined within the DinRail, this command will force the DinRail into “monitor mode”.

ATDx.x.x.x

Without a port number, this will make a connection to the given IP address (x.x.x.x) and the remote port number configured within the DinRail.

All other 'AT' commands with “connect mode” set to 0x16 will acknowledge with an OK, but will not be acted upon.

If the DinRail is in modem emulation mode and the serial port is idle, the DinRail can still accept network TCP connections to the serial ports if the “connect mode” is set to 0xC6 (with no echo) or 0xD6 (with echo).

4.6.8 Disconnect Mode

In disconnect mode, DTR drop can be activated or ignored to end a connection:

- Disconnect with DTR drop: 80
- Ignore DTR: 00

4.6.9 Force Telnet Mode

With another bit in the disconnect mode, the DinRail can be forced into Telnet (terminal) mode and the setup for the terminal name can be enabled:

- activate Telnet mode and terminal type setup: 40

Configuration

4.6.10 Buffer Flushing

With this parameter it is possible to control line handling and network buffers with connection startup and disconnect. Also, selection between two different packing algorithms is possible.

Function	7	6	5	4	3	2	1	0
Clear input buffer (line to network)								
- with active connection:				1				
- with passive connection:			1					
- at time of disconnect:		1						
Clear output buffer (network to line)								
- with active connection:								1
- with passive connection:							1	
- at time of disconnect:						1		
Alternate packing algorithm	1							

Figure 4-4
Buffer Flushing Options

4.6.11 Inactivity Timeout

With this parameter an inactivity time can be set. If the set time expires without an activity on the serial line, the connection is dropped.

4.6.12 Pack Control

Alternative pack algorithm settings are controlled here. Set this value to 00 if specific functions are not needed.

Configuration

Function	7	6	5	4	3	2	1	0
Idle time to force transmit: 12ms (avg.)							0	0
Idle time to force transmit: 52ms (avg.)							0	1
Idle time to force transmit: 250ms (avg.)							1	0
Idle time to force transmit: 5 secs (!)							1	1
No trailing chars after sendchar(s)					0	0		
One trailing char after sendchar(s)					0	1		
Two trailing chars after sendchar(s)					1	0		
Sendchars define 2-Byte sequence				1				
Send immediate after Sendchar			1					

Figure 4-5
Pack Control Options

“Idle time to force transmit” defines the time period after which all accumulated characters are sent, regardless of the recognition of send characters.

In some applications, CRC, Checksum or other trailers follow the end-of-sequence character. In these cases, this option helps to adapt frame transmission to the frame boundary.

If bit 4 is set, DinRail interprets the Sendchars as a 2-byte sequence, if reset, they will be interpreted independently.

If bit 5 is not set, any other characters already in the serial buffer will be included in the transmission after a “transmit” condition is found. If the bit is set, the DinRail will immediately send after recognizing the transmit condition (sendchar or timeout).

NOTE: *A transmission might occur if status information has to be exchanged or an acknowledgement has to be sent.*

4.6.13 Send Characters

Up to two characters can be entered in hexadecimal representation in the parameter “sendchar.” If a character received on the serial line matches one of these characters, it is immediately sent together with any awaiting characters to the TCP connection. This is specially useful to minimize the response time for specific protocol characters on the serial line (i.e. ETX, EOT etc.). Setting the first Sendchar to “00” disables the recognition of the characters.

Configuration

Alternatively, the two characters can be interpreted as a sequence (see Pack Control section).

4.6.14 Telnet Terminal Type

This parameter appears only if the terminal type option is enabled by setting bit 6 in the disconnect mode. If set, the terminal name can be used for the Telnet terminal type. Only one name can be entered.

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

4.7 Exit Configuration Mode

To leave the configuration program and save all changes, press '9'. All values will be stored in nonvolatile (E²PROM) memory, and DinRail will reset.

4.8 Factory Default Settings

By selecting this option all the serial port settings within the DinRail will be changed back to factory default values (the "Server Configurations" stay unchanged).

4.9 COM Port Redirector

The Lantronix COM Port Redirector software allows PCs' communication applications, within Microsoft Windows or DOS, to connect to serial devices attached to the DinRail product. The Redirector intercepts communications to specified COM ports and sends them over an IP network connection to the DinRail serial port. This enables the PC to use the DinRail serial port as if it were one of the PC COM ports.

If you are already familiar with installing and using the Redirector application with other Lantronix products, please skip down to the 'Redirector setup for DinRail' section below.

4.9.1 Installing the Redirector from the Lantronix CD

If autorun is configured on your Windows 9x machine, click on 'Install Utilities' and then '32 Bit Redirector' from the initialization screen. Follow the installation prompts until you get an 'Installation Successful' message and then click 'OK'. Next, close the help window that pops-up and open the 'Lantronix Redirector' icon in the start menu.

Configuration

If autorun is not configured on your Windows 9x machine, run the RED32BIT.EXE program found on the Lantronix CD in the D:\utility\redirect\win_32 directory, where D is the letter of your CD-ROM drive. Follow the installation prompts until you get an 'Installation Successful' message and then click 'OK'. Next, close the help window that pops-up and open the 'Lantronix Redirector' icon in the start menu.

The Redirector software can also be downloaded from our FTP site at

ftp://ftp.lantronix.com/pub/redirect/win_32

4.9.2 Redirector Setup for DinRail

In the Redirector configuration screen, click on 'Port Setup' and add as many COM ports as you need (one for each DinRail). Under each port, click on 'Add IP' and put the IP address of the DinRail in the "Host" prompt and a number between 3000 and 3009 in the "TCPPort" prompt. After all of the COM ports are configured, save the configurations and reboot your PC.

Note: *Remember the number you insert into the "TCPPort" prompt, you will need it to configure the DinRail.*

4.9.3 DinRail Configuration

Enter the DinRail setup mode either by using its serial port or via a Telnet connection. To configure the network port, type 0 and follow the prompts to configure the DinRail's network parameters (See section 4.5, Basic Parameters).

When you get back to the 'Change Setup' screen, select option 1 to configure the serial port. Follow the prompts according to section 4.6, Channel Specific Parameters, until you get to the "Port Number" field. The port number needs to be 11000 higher than the "TCPPort" selected in the Redirector setup. For example, if you chose 3005 in the Redirector setup then the DinRail port number will be 14005. Follow the rest of the prompts to configure the DinRail to communicate with your serial device. After you complete the serial setup, select option 9 to save and exit.

You are now ready to use the Redirector to communicate with your serial device connected to the DinRail.

When using the Redirector, unlike the Lantronix ETS, MSS, and LRS products, the CoBox DinRail does not change its serial port configuration to match the PC application's serial settings. You have to make sure that the

Configuration

DinRail serial port's configuration matches the configuration of your serial device.

Both RJ45 and screw block ports can be configured for, and used by the Redirector one at a time, but not by the same redirected COM port.

5 Monitor Mode and Firmware Upgrade

To enter monitor mode, the same principal as setting the parameters is used (see Section 4.3) Instead of entering three “x ” keys, key in “xx1”. Within one second of power-up, the DinRail will respond with a special prompt. To start the monitor mode without network functions (no network connections), enter “xx2”. To enter the monitor mode, in addition to “xx1” and “xx2” you can also type “yyy” and log in.

To enter the monitor mode using a Telnet connection, after the Telnet session is established, you will see the following messages:

Lantronix UTS Snr 222-195 V3.5

Press Enter to go into Setup Mode

At this point, type M (upper case.) If you see 0> prompt, it means that you have entered the monitor mode successfully.

5.1 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 it is given, the command is applied to another DinRail with that IP address. If no IP address is given, the command is executed locally.

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

DL	Firmware download to the DinRail
SF x.x.x.x	Send firmware to DinRail with IP x.x.x.x
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 DinRail’s ARP table entries

Monitor Mode and Firmware Upgrade

TT	Shows all the incoming and outgoing TCP connections (used only with “monitor mode” from Telnet)
NC	Shows the IP configuration of the DinRail
RS	Resets the power on the DinRail
SI x.x.x.x:n.n.n.n	With this command, you can remotely assign an IP address to another DinRail, where x.x.x.x is the new IP address and n.n.n.n is the remote DinRail 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 is obtained by sending broadcast packets, this IP assignment cannot be done over the routers.*

QU Quit - exit diagnostics mode

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

5.2 Firmware Download Using Serial Port

Downloading is done in monitor mode. Once the DinRail is in monitor mode, by using “DL” command, the DinRail will wait for the firmware image in Intel Hex format. This must only be sent through the serial interface. When the end record is received, the DinRail checks the integrity of the firmware image and then programs the new firmware in the flash ROM. Do not switch off the power supply at this time. A loss of power while reprogramming will result in a corrupt program image and a nonfunctional DinRail.

Monitor Mode and Firmware Upgrade

The following figure displays a typical screen while programming the new firmware. After a complete reprogramming, the DinRail restarts.

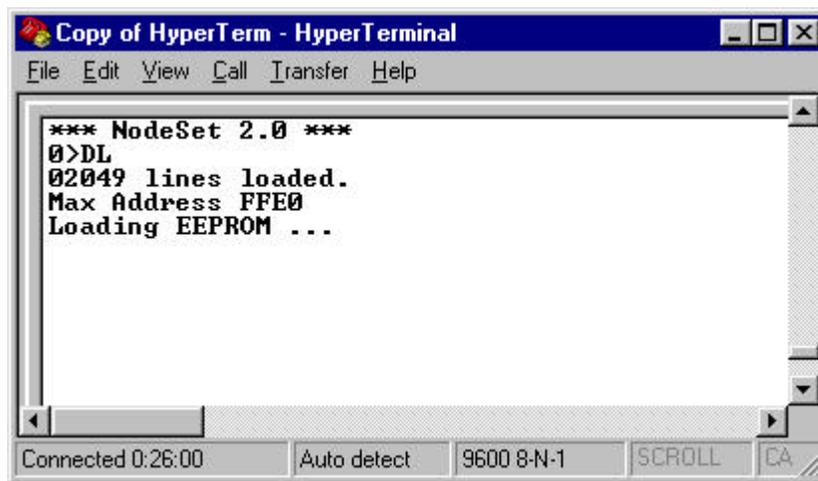


Figure 5-1
HyperTerminal Dialog Box

5.3 Firmware Distribution

To distribute the firmware of one DinRail to others, the "SF" command is used. After entering monitor mode on the DinRail, simply send the firmware with the "SF" command to the other devices.

5.4 Firmware Download Using a Network Host

To download new firmware from a computer to a DinRail, it is necessary to have a TFTP client sending a binary file. The parameters to send the binary firmware are shown in figure 5-2.

NOTE: *The file to be downloaded must be the .ROM (binary) image and not the .HEX (ASCII) version.*

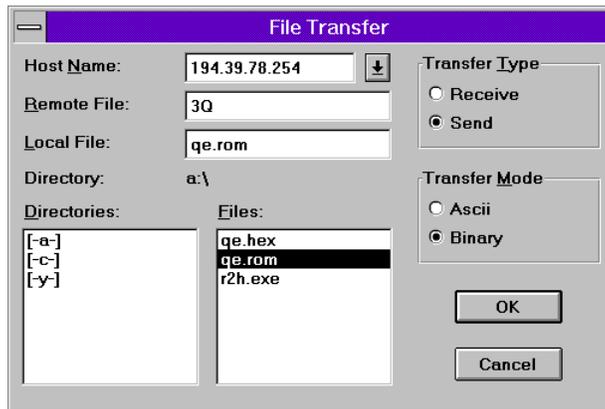


Figure 5-2
A TFTP Dialog Box

6 Serial Line Interfaces

CoBox DinRail 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 DinRail RS-232 or RS-485/422 can be selected.

NOTE: *CoBox DinRail is a one serial port device, meaning that only one port can be used at a time. In the configuration menu, channel one refers to either one of the ports being used. Channel two should be disregarded (This channel applies to another type of product.)*

6.1 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 DinRail	RXD Received data
4	From DinRail	TXD Transmitted Data
5		Ground
6	To DinRail	CTS Clear to Send
7	From DinRail	RTS Ready to Send
8	Not Connected	None

Figure 6-1
Serial RJ45 (RS-232) Pinout Configuration

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

6.2 Screw Block Connector Pinouts and Other Components

The following figures illustrate and describe the screw block connector pinouts and other components of the DinRail.

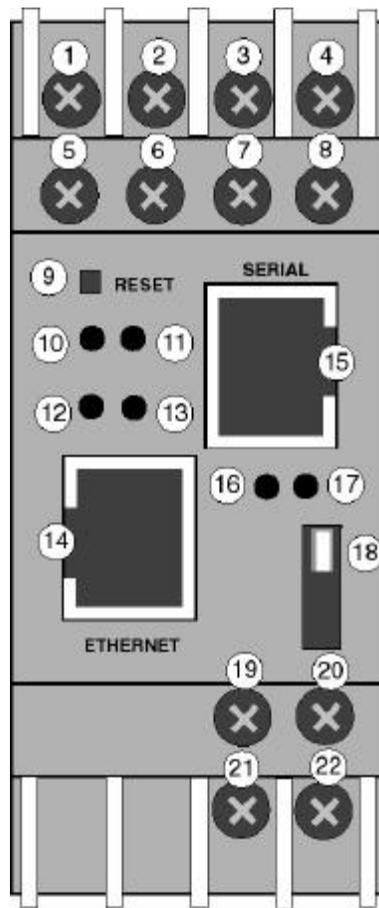


Figure 6-2
Front Panel Layout

Serial Line Interfaces

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 DinRail communication (read error) or DinRail 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: DinRail 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

Figure 6-5
Front Panel Components

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

7 Technical Data

CPU, Memory Controllers

V.40 CPU, 10MHz clock

National Semiconductor DP839xx Ethernet Controller

128kByte RAM, 128 kByte Flash 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)

Technical Data

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, Netmask etc.

A.1 IP Addressing

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, 'x' stands for the host part of the IP address:

A.2 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)

A.3 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)

A.4 Class C Network

IP address 192.0.0.xxx to 223.255.255.xxx

Appendix A

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 a multicast addresses.

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

A.5 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).

A.6 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 (e.g. 192.168.0.0 identifies the entire network, 192.168.0.255 identifies the broadcast address).

A.7 IP Netmask

The netmask is used to divide the IP address differently from the standard defined by the 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 DinRail 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

Figure A-1
Standard IP Network Netmask

Appendix A

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

Figure A-2
Netmask Examples

A.8 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 you are not connected to the Internet and have plans to connect, or you are connected to the Internet and want to operate your CoBox DinRails on an Intranet you should use one of the sub-networks 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

Appendix A

A.9 Network RFC's

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

Appendix B

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:

Decim	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

Figure B-1

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.

Warranty

Warranty Statement

Lantronix warrants for a period of FIVE YEARS from the date of shipment that each CoBox DinRail 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.

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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.

Declaration of Conformity

according to ISO/IEC Guide 22 and BS 7514

Manufacturer's Name: Lantronix
Manufacturer's Address: 15353 Barranca Parkway
Irvine, CA 92618
USA

The manufacturer hereby declares that the product:

Product Name: CoBox DinRail
Product Number(s): CoBox-DR1

Conforms to the following standards or other normative documents:

Electromagnetic Emissions: C1SPR22: 1993 Class "A"
EN55022, 1995 Class "A"
Electromagnetic Immunity: EN50082-1, 1992
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