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# **TROY XCD External Print Servers for Ethernet Networks**

## **Administrator's Guide**

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## Introduction

### Overview

TROY XCD external print servers allow multiple host computers to share virtually any type of printer or plotter on high-speed local area network. The Pony Print Server Plus is an ultracompact low-cost Ethernet print server for a single printer, while the Pony 100, XConnect II and XConnect II Lite connect up to two printers to an Ethernet network. The XConnect 100 handles up to four printers and works on both Ethernet (10baseT) and Fast Ethernet (100baseT) networks.

Any user can print jobs on a printer or plotter connected to a TROY XCD external print server as if it were directly attached to his computer. No special software is required on the host computers, and application programs run without any

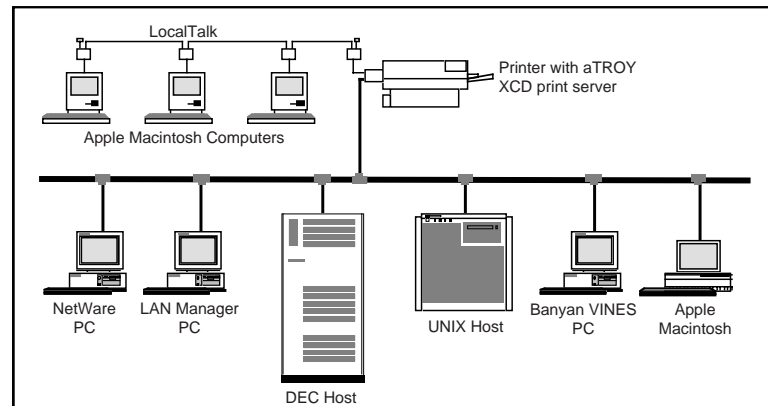


Figure 1-1

XCD External Print Server Concept

modification. Because the TROY XCD external print servers provide multiprotocol capabilities, users on DEC, UNIX, Novell, AppleTalk, LAN Server, Windows NT, Windows 95, LAN Manager, and Banyan VINES computers can simultaneously access the same printer. With the optional XConnect II LocalTalk feature, non-Ethernet Macintosh computers can also access the same printer. Figure 1-1 shows how TROY XCD external print servers are used in a typical network.

## Features

TROY XCD external print servers offer the widest range of features in the industry, including:

- TCP/IP, NetWare, AppleTalk, DLC/LLC, NetBEUI, LAT, and VINES IP protocols (protocols supported depend on model)
- Network Operating System compatibility:
  - Digital Equipment Corporation networks, including PATHWORKS and DECprint Supervisor ((not available on XConnect II Lite)
  - UNIX systems that support either the Berkeley lpr/lpd printing protocol, the HP JetDirect card, or printing to a raw TCP port
  - Novell NetWare V2.15 or above, V3.xx, or V4.xx, including support for bindery mode and Novell Directory Services (NDS)\*
  - AppleTalk Phase 2 (XConnect II and XConnect 100 only)
  - Windows NT and NTAS V3.5 or above
  - IBM OS/2, LAN Server, Warp Server
  - Windows 95 (Peer-to-Peer or client mode; not supported on XConnect II Lite)
  - Windows for Workgroups (Peer-to-Peer or client mode; Peer-to-Peer requires DLC/LLC support on print server)

## Introduction 1-2



\*The NDS support on the XJet III (all models), XJet IV-2, XJet IV-T, plus certain models of the XJet IV-Plus is limited to NPrinter mode only.

- Very high performance DMA operation (XConnect 100 and XConnect II only)
- High-speed Centronics parallel port compatible with IEEE P1284 Bitronics bidirectional parallel interface standard
- Serial port for console terminal or second printer
- Optional LocalTalk support (XConnect II only)
- Superior network and printer management
  - Compatible with Hewlett-Packard JetAdmin and Web JetAdmin printer management software
  - XAdmin Windows-based management utility (NetWare, TCP/IP, or VINES)
  - Web XAdmin browser-based management
  - SNMP MIB I and MIB II over IP or IPX (XConnect II and XConnect 100 only)
  - Remote console management via DEC NCP, TELNET, NetWare, or serial port
- PrintraNet software for transparently sending documents to remote locations over the Internet
- lpd-Plus feature for providing multiple services with custom setup and reset strings, text-to-PostScript conversion, and character substitution
- Flash memory for easy updating of firmware via NetWare, BOOTP, tftp (master or slave mode), DEC MOP, Banyan VINES, or serial port

## Introduction 1-3

- AppleTalk spoofing capabilities for support of non-bidirectional parallel printers
- AppleTalk binary support on printers that support the HP Tagged Binary Communications Protocol
- IP address configuration via DHCP, BOOTP, rarp, arp, serial port, XAdmin, or remote console.
- IP security to restrict printing based on IP address
- Optional DEC LN03 emulation (XConnect II and XConnect 100 only)

## TROY XCD External Print Server Models

The TROY XCD External Print Server family includes the following models:

- **Pony Print Server** The Pony Print Server is the industry's smallest full-featured external print server. It plugs directly into the parallel port of the printer, and supports a 10baseT Ethernet interface. The Pony Print Server is available in the following models:

PPS-8S	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, http
PPS-8	IPX/SPX*, TCP/IP, AppleTalk, Direct Mode IPX/IP, LAT, http
PPS-8N	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, LAT, VINES IP, http

\*PPS-8 NDS support is limited to NPRINTER remote printer mode only

- **XConnect II.** The XConnect II is an external print server that supports the LAT, TCP/IP, NetWare, and AppleTalk

## Introduction 1-4

protocols. It features a high-speed parallel port, a serial port, and both a thin Ethernet and UTP Ethernet connector. The XConnect II is available in the following models:

XConnect II-8S	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, http
XConnect II-8	IPX/SPX*, TCP/IP, AppleTalk, Direct Mode IPX/IP, LAT, http
XConnect II-8N	IPX/SPX*, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, LAT, VINES IP, http
XConnect II-8-LN03	XConnect II-8 with LN03 emulation option

\*XConnect II-8 and XConnect II-8-LN03 NDS support is limited to NPrinter remote printer mode only

- **Pony 100 Print Server** The Pony 100 Print Server is an ultracompact print server that features both 100baseTX and 10baseT operation. It includes one parallel port and one serial port and is available in the following models:

PPS100-8S	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, http
PPS100-8N	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, LAT, VINES IP, http

- **XConnect 100.** The XConnect 100 features 100baseTX capability for operation on 100 megabit/sec Fast Ethernet networks. It can also work on 10baseT networks, so it is ideal for users who plan to upgrade to 100baseTX in the future. The XConnect 100 supports the same protocols as the XConnect II, but has two high-speed parallel ports instead of one. It is available in four models:

XConnect 100-8S	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, http
XConnect 100-8	IPX/SPX*, TCP/IP, AppleTalk, Direct Mode IPX/IP, LAT, http

## Introduction 1-5

XConnect 100-8N	IPX/SPX, TCP/IP, AppleTalk, DLC/LLC, NetBEUI, Direct Mode IPX/IP, LAT, VINES IP, http
XConnect 100-8-LN03	XConnect II-8 with LN03 emulation option

\*XConnect 100-8 and XConnect 100-8-LN03 NDS support is limited to  
NPRINTER remote printer mode only

- **XConnect II Lite** The XConnect II Lite is a low-cost single parallel port print server that offers the same features as the standard XConnect II, but has a single Ethernet connector and supports only the TCP/IP and NetWare protocols (XConnect II Lite Banyan models support VINES and TCP/IP only). Models include:

XConnect IIL-T	10baseT; TCP/IP and IPX/SPX*
XConnect IIL-2	10base2; TCP/IP and IPX/SPX*
XConnect IIL-T-B	10baseT; TCP/IP and VINES IP
XConnect IIL-2-B	10base2; TCP/IP and VINES IP

\*XConnect II Lite NDS support is limited to NPRINTER remote printer mode only

## TROY XCD External Print Server Advantages

Compared to competing products, TROY XCD print servers offer the advantages:

- Support for the most protocols and network operating systems in the industry. This allows TROY XCD print servers to be used on virtually any network.
- Network management. TROY XCD offers more ways to manage the print server, including proprietary Windows and DOS-based utilities, Web browser management, HP JetAdmin compatibility, and a powerful remote console.
- High performance. The TROY XCD print server family has the highest overall throughput capabilities in the industry.

## Introduction 1-6

- More features. Capabilities like multiple services per port, programmable setup/reset strings, IP security, and character substitution allow TROY XCD print servers to handle virtually any network printing situation.

## Terminology

The term "TROY XCD external print server" in this manual covers the Pony Print Server Plus, XConnect II, XConnect 100, and XConnect II Lite. The term "XConnect II" is used to represent either the XConnect II, II-LT, or II-LN03; the term XConnect 100 means either an XConnect 100 or 100-LN03; while the term "XConnect II Lite" designates either an XConnect II Lite-T or XConnect II Lite-2 .

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

The following information applies to the Pony Print Server Plus (PPS-8S, PPS-8, and PPS-8N) only:

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

*equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:*

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

## Installing the Hardware

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### Overview

This chapter describes:

- How to connect a TROY XCD print server to your printer
- How to connect a TROY XCD print server to the Ethernet cable

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### Before You Start

Before attempting to install a TROY XCD print server, first make sure that you have completed installing your printer or plotter as described in the appropriate documentation for the device.

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### Unpacking and Handling

The TROY XCD print server shipping box contains the following items:

- Pony Print Server Plus, XConnect II, Pony 100, XConnect 100, or XConnect II Lite print server
- AC Adapter
- *TROY XCD External Print Servers Administrator's Guide*

**Installation 2-1**

Although TROY XCD external print servers are designed to withstand normal handling procedures, you should exercise reasonable precautions when installing them, particularly with regard to static discharge.

- Make sure that you are adequately grounded by touching a bare metal part of the printer before starting the installation.
- Avoid moving around the work area in order to eliminate static charge buildup.
- If possible, do not work on a carpeted area.

---

## **Step 1-a Setting the Switches (XConnect II and XConnect II Lite)**

**Important Note:** *If you have an XConnect 100, Pony 100, or Pony Print Server Plus, skip to Step 1-b below).*

There are 4 DIP switches on one side of an XConnect II or XConnect II Lite print server (see figure 2-1) that are used for power-up options. As shipped, the two outside switches are in the OFF (up) position and the two middle switches are in the ON (down) position (OFF=0, ON=1) for operation on either a 10baseT or 10base2 network with a printer attached to the parallel port. If you want to configure the print server in a different manner, use a small screwdriver or pen to gently flip the switch as described in the following paragraphs.

### **Switch 1 (Normal/Factory Default/Test)**

Setting this switch ON allows you to restore the print server parameter settings to their original factory settings. The next

## **2-2 Installation**



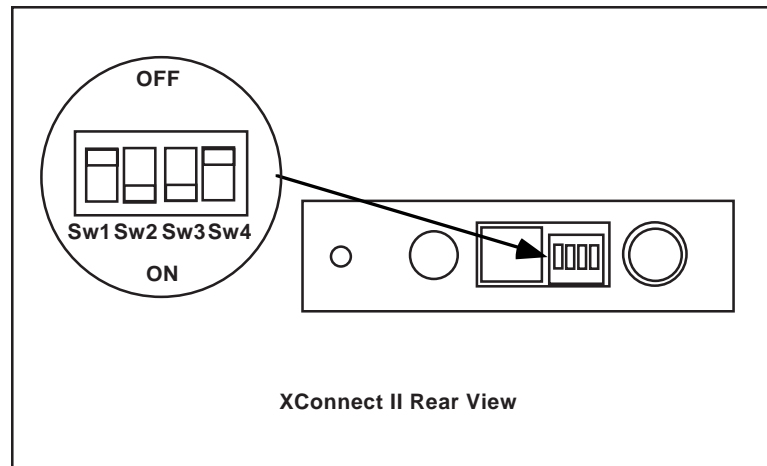


Figure 2-1

#### XConnect II Switches

time the print server is powered on, the print server parameters (for example, node name, serial port speed, etc.) will be returned to the factory defaults. *If you use this switch, don't forget to put it back to the OFF position after the factory default settings have been restored.*

After the print server is powered on and running, this switch can be used to print out a self-test page. This is done by moving the switch to the ON position and then quickly putting it back to the OFF position.

#### **Switches 2 and 3 (10baseT/10base2)**

These switches do not need to be changed from the default ON position with newer versions of the XConnect II or XConnect II Lite print server firmware. However, if you are using 10baseT Ethernet, putting the switches in the OFF

## **Installation 2-3**

position will conserve energy by drawing less power from the printer.

**Note:** With V3.22 or earlier firmware (included with XConnect II and XConnect II Lite print servers shipped from TROY XCD prior to September, 1995), switches 2 and 3 *must* both be in the OFF position for 10baseT operation or in the ON position for 10base2 operation.

### Switch 4 (Console/Serial Printer)

This switch defines whether the serial port will be used for a console terminal or a serial printer. Leave switch 4 in the default OFF position if you want to use the serial port for a console terminal.

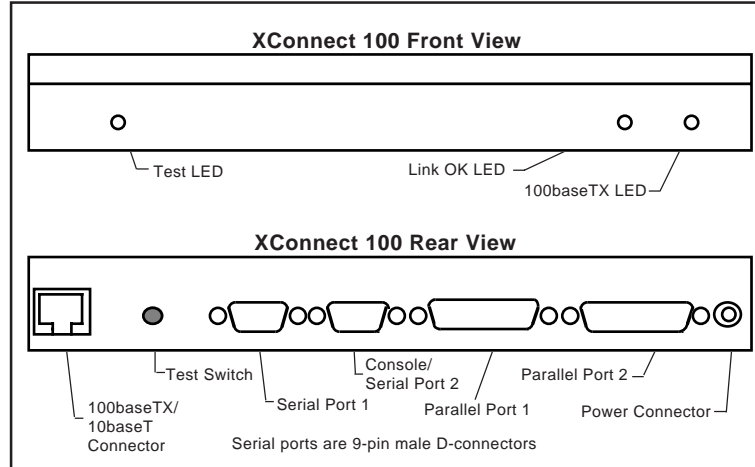


Figure 2-2  
XConnect 100 Switch and LEDs

## 2-4 Installation

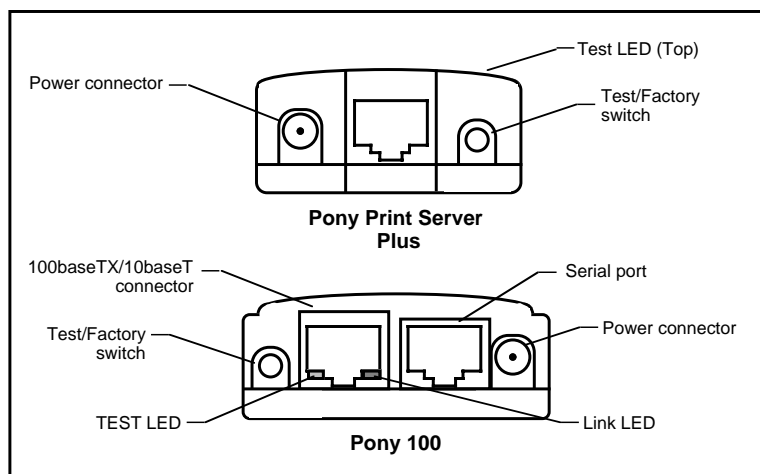


Figure 2-3

Pony Print Server Plus and Pony 100 Switches and LEDs

## Step 1-b XConnect 100, Pony 100, and Pony Print Server Plus Switches

**Important Note:** *Skip this step if you have an XConnect II or XConnect II lite.*

The XConnect 100, Pony 100, and Pony Print Server Plus have a single pushbutton switch test switch (see figures 2-2 and 2-3). This switch does not need to be used during the configuration process. It has the following functions:

- To print a self-test page, press the switch in for at least one-eighth second but less than five seconds.
- To reset the unit back to factory default settings, press the switch and hold it in for at least 5 seconds

## Installation 2-5

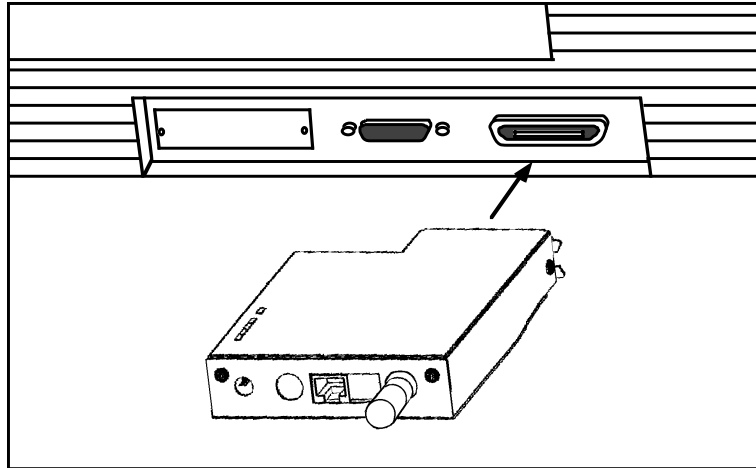


Figure 2-4

Connecting the XConnect II or XConnect II Lite to the parallel port (Pony Print Server Plus and Pony 100 procedure is similar)

---

## Step 2 Connecting to the Printer

TROY XCD print servers can connect to any of the following types of printers:

- Printers with Centronics-compatible parallel interfaces (this interface is by far the most popular type of parallel interface)
- Printers with the new IEEE P1284 bidirectional parallel interface
- Printers with RS-232 compatible serial interfaces (except Pony Print Server Plus)

## 2-6 Installation

## **Connecting the Print Server to a Centronics-compatible printer**

The XConnect II, XConnect II Lite, and Pony Print Server Plus have a 36-pin male connector that is compatible with the 36-pin female connectors found on most printers. Simply plug the print server directly into the connector on the printer as shown in figure 2-4. If necessary, set your printer for parallel port operation. No cable is generally required, but the optional CABLE-CEN2 Centronics male-to-female cable is available as an option in the event you cannot connect the print server directly to the printer's Centronics connector.

The XConnect 100 has two 25-pin female connectors that are compatible with the IBM PC standard 25-to-36 pin Centronics cable. This cable is available at any computer store and most office supply stores, or it can be ordered from TROY XCD (part number CABLE-CEN).

**IMPORTANT NOTE:** *The XConnect II, XConnect II Lite, and XConnect 100 support a maximum parallel cable length of 1.75 meters (six feet). Exceeding this maximum may result in printing problems.*

**NOTE:** *Some new printers, such as the HP LaserJet 8000, have the IEEE 1284C miniature Centronics connector instead of the normal 36-pin Centronics connector. TROY XCD offers the CABLE-C/B adapter cable for the XConnect II, XConnect II Lite, and Pony Print Server Plus, and the CABLE-C/A for the XConnect 100 to accommodate such printers.*

### **Maximizing Performance (Recommended)**

Some printers, such as most HP LaserJets, support a high-speed handshake mode on the parallel port. TROY XCD

print servers support this mode, which can result in up to 50 per cent higher performance. To enable this mode using WebXAdmin, select **Configure Port** from the main menu, select port P1 (or P2 for the second parallel port on the XConnect 100), choose **High Speed** as the **Output Method**, and click **Submit**. If you are using the print server console, enter the command `SET PORT P1 FSTB ENABLED`. WebXAdmin and the print server console are discussed in Chapter 3 and Appendix B of this manual.

## Connecting a TROY XCD Print Server to a Serial Printer

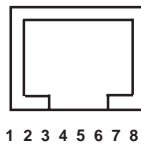
The Pony 100, XConnect II and XConnect II Lite have an RJ45 connector for connecting RS-232-compatible serial printers, while the XConnect 100 has two standard PC-compatible 9-pin D-connectors (there is no serial port on the Pony Print Server Plus). The XConnect II and XConnect II Lite RJ45 connector is marked "Serial"; *do not confuse it with the 10baseT unshielded twisted pair connector, which is also an RJ45*.

Most printers use a DB25 connector for the serial connection. Unfortunately, there are a number of variations as to how this connector is implemented on different printers. For example, some printers have male connectors configured as a DTE (Receive Data on pin 3), while others have DCE female connectors (Receive Data on pin 2). Hewlett-Packard, Lexmark, and Apple printers generally have female DTE connectors. You *must* consult the manual for your printer in order to determine what type of adapter cable you need. TROY XCD sells a variety of adapters for connecting serial devices to the RJ45 connector. In the case of the XConnect 100 9-pin connector, a null modem( a

## 2-8 Installation

device or cable that connects the input signals on one device to the output signals on another device) is often required since both the printer and the print server are usually DTE devices.

The pinouts for the Pony 100, XConnect, and XConnect II Lite RJ45 connector are shown below:

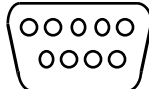


Print Server (RJ45)		Printer (DB25)		
pin	Signal	Signal	DTE pin	DCE pin
1	RTS out*	CTS in	5	4
2	DTR out*	DSR in	6	20
3	Transmit Data	Receive Data	3	2
4	Transmit return	Signal Ground	7	7
5	Receive Return	Signal Ground	7	7
6	Receive Data	Transmit Data	2	3
7	DSR in*	DTR out	20	6
8	CTS in*	RTS out	4	5

\*XConnect II models with serial numbers less than 40500 have RTS on pin 8, DTR on pin 7, DSR on pin 2, and CTS on pin 1.

The XConnect 100 serial ports use PC-compatible 9-pin male D-connectors. Note that the standard off-the-shelf 9-pin female to 25-pin male PC cables will require a null modem in order to connect to most printers or terminals. The pinouts are as follows:

## Installation 2-9



6 7 8 9

**DE9 Male**  
(female pinouts are in reverse order)

<b>XConnect 100 (DE9)</b>		<b>Printer (DB25)</b>		
<b>DE9 pin</b>	<b>Signal</b>	<b>Signal</b>	<b>DTE pin</b>	<b>DCE pin</b>
1	Not used	Not used	-	-
2	Receive Data	Transmit Data	2	3
3	Transmit Data	Receive Data	3	2
4	DTR out	DSR in	6	20
5	Signal Ground	Signal Ground	7	7
6	DSR in	DTR out	20	6
7	RTS out	CTS in	5	4
8	CTS in	RTS out	4	5
9	Not used	Not used	-	-

Basically, the cable must connect input signals (e.g., Receive Data) on the TROY XCD print server to the equivalent output signals (e.g., Transmit Data) on the device and vice-versa.

If you are connecting a printer to the second serial port (S2) on the XConnect 100, you must first disable console mode on that port. This is done by using the console command `SET PORT S2 CONSOLE DISABLED` and then typing the command `EXIT` to exit the console (refer to Chapter 3 and Appendix A for information on using the console). To re-enable the console function, you must either enter the command `SET PORT S2 CONSOLE ENABLED` using TELNET, DEC MOP or the TROY XCD XCONFIG NetWare utility, or reset the unit back to factory defaults.

## 2-10 Installation



The serial ports are factory set at 9600bps, 8-bit data, XON/XOFF flow control, and no parity. If your printer requires different settings, you must use WebXAdmin or the console terminal (refer to Chapter 2 and Appendix A for information on how to use these utilities) to change the settings. With WebXAdmin, select **Configure Port** from the main menu, click on the serial port (s1 for first serial port or s2 for the XConnect 100 second serial port), choose the desired settings, and click **Submit**. With the console terminal, use one or more of the following commands (use s2 instead of s1 if you are using the second serial port on the XConnect 100):

```
SET PORT S1 SPEED baudrate
SET PORT S1 PARITY parity_type
SET PORT S1 FLOW flowctrl
SET PORT S1 CHARACTER charsize
```

Note that the serial port always operates at 9600bps when in console mode. Also, if you are using 115200bps on one port of the XConnect 100, you cannot set the other port to 230400 bps (57600bps and 7200bps are not supported on either port).

**Important:** *The serial ports do not support Direct Memory Access (DMA). Therefore, sustained transfers at high baud rates (115200 or greater) can lock out activity on other ports.*

Don't forget to set your serial port settings on your printer to match the settings of the print server. Also, make sure that the XConnect II or XConnect II Lite switch 4 (console/serial printer) is in the proper position (OFF if you are using the serial port for a console terminal or ON if you are using it to connect a printer).

**IMPORTANT NOTE:** *Early versions of the XConnect 100 do not support the second serial port (the one marked "Console/*

## Installation 2-11

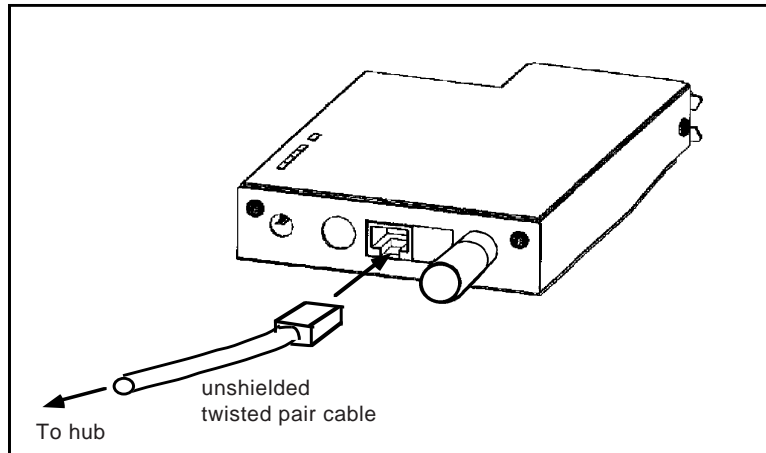


Figure 2-4

Connecting the Print Server to a 10baseT UTP network

*Serial 2) for use with serial printers. This limitation can be fixed by upgrading to a newer version of the firmware.*

---

### Step 3 Ethernet Installation

The XConnect II can connect directly to either a 10baseT unshielded twisted pair Ethernet or a 10base2 thin Ethernet. The XConnect II Lite-2 can connect to a 10base2 thin Ethernet, while the XConnect II Lite-T and the Pony Print Server Plus can connect to a 10baseT Ethernet.

The Pony 100 and XConnect 100 connect to either a 100baseTX Fast Ethernet network or a 10baseT Ethernet network. It automatically senses the type of network, so no configuration is required.

## 2-12 Installation

## Connecting the XConnect II, XConnect 100, XConnect II Lite-T, Pony 100, or Pony Print Server Plus to an Unshielded Twisted Pair Network

To connect an XConnect II, Pony 100, XConnect 100, or XConnect II Lite-T to a 10baseT unshielded twisted pair (UTP) Ethernet network, you will need an unshielded twisted pair Ethernet hub with at least one unused port installed on your network, plus an appropriate length of RJ45 modular cable.

To connect a Pony 100 or XConnect 100 to a 100baseTX Fast Ethernet network, you will need a 100baseTX Fast Ethernet hub with at least one unused port, plus an appropriate length of Category 5 RJ45 modular jack cable.

1. Connect one end of the RJ45 cable to the print server connector labelled "10baseT" on the XConnect II or XConnect II Lite (*not the one labelled "Serial"*), or "100baseTX/10baseT" on the XConnect 100 or Pony 100 and the other end to a port on the twisted pair Ethernet hub as shown in figure 2-4. Note that the XConnect 100 automatically determines whether it is connected to a 10baseT or 100baseTX network.

**Note:** *If you have an older XConnect II or XConnect II Lite with V3.22 or earlier firmware, make sure that switches 2 and 3 are in the OFF position (not required for newer print servers).*

You have now completed the unshielded twisted pair Ethernet installation. Proceed to the *Verifying Successful Hardware Installation* section below to confirm that you have properly installed the print server.

## Installation 2-13

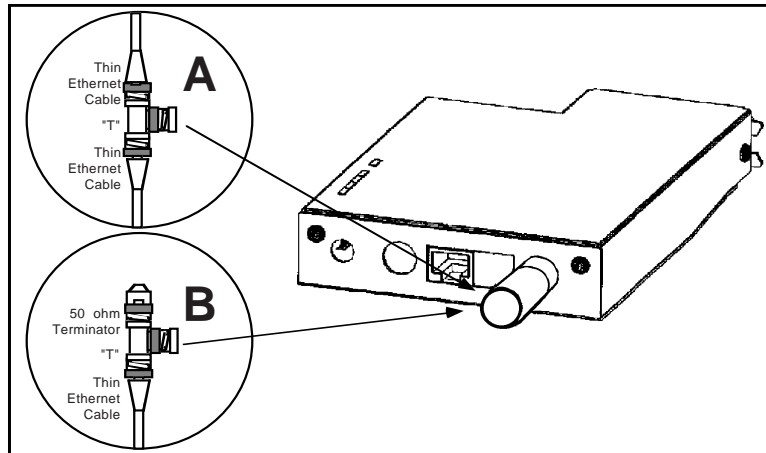


Figure 2-5

Connecting the Print Server to a 10base2 thin Ethernet network

### Connecting the XConnect II or XConnect II Lite-2 to a Thin Ethernet Network

To connect an XConnect II or XConnect II Lite-2 to a thin Ethernet network, first check to see that switches 2 and 3 (10baseT/10base2) are in the ON position.

If you are installing the print server onto an existing network, the "T" connector may already be installed on the cable. If this is the case, simply connect the "T" connector to the BNC connector on the print server's BNC connector as shown in figure 2-5A (if the connection is in the middle of the thin Ethernet segment) or 2-5B (if the connection is at the end of the thin Ethernet segment). This operation can be performed without impacting the operation of the network.

If the "T" connector is not already installed, proceed as follows (caution: if you are connecting to a live network,

## 2-14 Installation

perform the following steps as quickly as possible to minimize disruption of the network):

1. Connect one section of the thin Ethernet cable to one end of the "T" connector as shown in figure 2-5.
2. If you are connecting the print server in the middle of a thin Ethernet segment, attach the second section of thin Ethernet cable to the other end of the "T" connector as shown in figure 2-5A. If you are connecting the print server at the end of a thin Ethernet segment, attach a 50 ohm terminator to the other end of the "T" connector as shown in 2-5B.
3. Connect the "T" connector to the BNC connector on the transceiver.

You have now completed the thin Ethernet installation. Skip to the *Verifying Successful Hardware Installation* section below to confirm that you have correctly installed the print server.

---

## **Step 4 Connecting to the Optional LocalTalk Port (XConnect II only)**

If you have the LocalTalk option, you can connect the XConnect II to an Apple LocalTalk network to allow Macintosh computers on the LocalTalk network to print jobs on a printer attached to the XConnect II. Both the LocalTalk and Ethernet ports can be used simultaneously. To use the LocalTalk feature, plug a LocalTalk-compatible connector (such as the Apple LocalTalk connector or the Farallon PhoneNet connector) into the XConnect II LocalTalk port as shown in figure 2-6. Note this port can only be used for

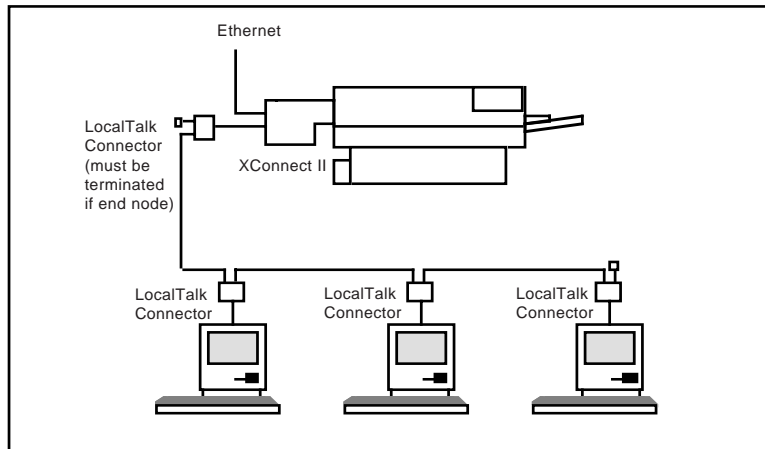


Figure 2-6

Connecting the XConnect II to a LocalTalk network

printing from computers on the LocalTalk to printers attached to the parallel or serial port of the XConnect II; it cannot be used to allow computers on the Ethernet to print to printers connected to the LocalTalk network.

The LocalTalk port is enabled by default. If you are not using this port, you should enter the command `SET LOCALTALK DISABLED` for maximum performance.

## Step 5 Verifying Successful Installation

You are now ready to apply power to the TROY XCD print server. Plug the AC power adapter into a wall outlet and insert the adapter cable into the print server connector labelled "Power". If possible, connect a terminal to the serial port (make sure that Switch 4 is OFF when using the console terminal with the XConnect II or XConnect II Lite).

## 2-16 Installation

The TROY XCD print server will go through the following startup sequence:

1. It will run through a set of power-up diagnostics for a few seconds. If the print server is operating properly, the TEST LED will blink momentarily and then go out. If the TEST LED blinks continuously in a regular pattern, there is a problem. If this is the case, first verify that you have a good Ethernet connection and then try powering the unit off and then on again. If the problem persists, refer to the *Troubleshooting* chapter in this manual.
2. When the test LED goes out, the other LEDs on the print server will come on as follows:
  - On the XConnect II and XConnect II Lite, the **LINK** LED will blink to show activity on the network. The **XMIT** and **RCV** LEDs will come on solid if there is a valid 10baseT connection (they are not used with 10base2).
  - On the XConnect 100, the **Link OK** LED will blink if the print server detects activity on the network. The **100baseTX** LED will come on if a valid 100baseTX connection is detected (this LED will not come on if 10baseT is used).
  - On the Pony 100, the **Link** LED will come on solid if there is a valid 10baseT or 100baseTX connection.
  - On the Pony Print Server Plus, the LED will blink randomly.

If the LEDs do not come on as described, there may be a cabling problem or a bad hub port; if this is the case, try a different cable and/or hub port.

## Installation 2-17

## Verifying the Connection to the Printer

Before attempting to print, it is *very* important to verify the connection between the print server and the printer. *If this connection is not good you will not be able to print!*

To verify this connection, make sure that both the print server and the printer are powered on and ready.

- If you have an XConnect II or XConnect II Lite, push switch 1 (Normal/Factory/Test) on the print server to the ON position and then back to the OFF position.
- If you have an XConnect 100, Pony 100, or Pony Print Server Plus, push the Test button in briefly (more than one-eighth second but less than five seconds).

If the connection is good, a test page will be printed on the printer. If nothing prints out, make sure that the cable is good and that it is securely fastened. If possible, try a different cable. If you have an XConnect II, XConnect II Lite, or XConnect 100, make sure that you are not exceeding the 1.75 meter (6 foot) cable length restriction. If the cable is OK but you still can't print the self-test page, you may need to adjust the parallel port settings as described in the next section.

**Important Note:** *The test page only works with printers that can directly print PCL, PostScript, or text. It will not work with some low-end "Windows" printers like the HP DeskJet 820 (which does the image rasterization in the PC), nor will it work with HP-GL/2 or RTL plotters (unless the PostScript option is installed). For such devices, you must print a job from an appropriate application program in order to test the print server-to-printer connection.*

## 2-18 Installation



If you are using the serial port and the test page does not print, verify that the baud rate, parity, and character size match on the print server and the printer. If you have an XConnect II, make sure that switch 4 is in the ON position. If you have an XConnect 100 and you are using the second serial port, make sure that you have disabled console operation via the `SET PORT S2 CONSOLE DISABLED` command.

If none of the above suggestions work, contact TROY XCD Technical Support (949-399-0820; <http://www.troyxcd.com>; e-mail: [support@troyxcd.com](mailto:support@troyxcd.com)) for additional assistance.

### **Adjusting the Parallel Port Settings for Specific Printers (Recommended)**

The parallel port on all new TROY XCD print server models is set by default to automatically configure itself to work with the printer's parallel port. However, it may sometimes be necessary to adjust the print server's port settings to work with specific printers by using the print server console or WebXAdmin. This is particularly true with older printers. The particular settings include:

1. **pACK handshake.** Older non-1284 printers require this hardware handshake and may not operate with the newer 1284 handshake. Use the console command `SET PORT P1 ACKH ENABLED` to enable the pACK handshake.
2. **DMA (Direct Memory Access).** The XConnect II and XConnect 100 use DMA for maximum performance. However, some printers cannot handle the high data rates. For such printers, use the console command `SET PORT P1 DMA DISABLED`. Alternatively, you may disable DMA using the **Configure Port** option in the WebXAdmin menu,

## **Installation 2-19**

3. Bidirectional. Some printers will not operate properly if bidirectional communications is enabled on the print server. To disable bidirectional, use the console command `SET PORT P1 BID DISABLED`, or disable it from the WebXAdmin
4. Some printers, like most Okidata laser printers, cannot operate fast enough even in 1284 mode to keep up with a TROY XCD print server. On the Pony Print Server Plus you can enable a software handshake to handle such printers via the `SET PORT P1 SWIO ENABLE` console command.

The print server console and WebXAdmin are discussed in Chapter 3, with additional information on console commands in Appendix B. If you are using WebXAdmin, click on **Configure Port** in the main menu, select the desired port, and then select the desired function. After you have made your selections, click on **Submit** to enable them in the print server.

---

## Step 6 Changing the Print Server Reset (Recommended)

The printer reset is a sequence of characters that is sent to the printer after the job is completed. It ensures that the last page of the job is ejected from the printer and that the printer is reset to its default state so that the next job will properly print.

The default printer reset for TROY XCD external print servers is a null, except on the TCP/IP text service, which has `<Formfeed>` as the default (see chapter 4 and Appendix B for information on the TCP/IP text service). A null reset means that some print jobs may not be ejected upon

## 2-20 Installation

completion. Some operating systems, such as NetWare, provide the ability to insert a reset sequence at the end of each job, in which case the TROY XCD print server null reset is adequate. Also, Microsoft Windows printer drivers typically provide a printer reset at the end of each job. But for those operating systems that do not provide this reset capability, TROY XCD print servers provide the ability to customize the printer reset to meet the requirements of virtually any type of printer.

The following predefined reset strings are available.

No.	Definition	Printer
1	Null	(use if no reset is desired)
2	<ESC>E	PCL printer
3	CTRL-D	PostScript printer
4	<ESC>%-12345X	PJL (use with newer HP and Lexmark/IBM printers)
11	<Formfeed>	General

Refer to your printer documentation if you do not know the proper reset string. Use the null string if you are planning to reset the printer from the host software (for example, from a Windows driver). If you want to define a new reset string, refer to Appendix B, *Using Services*.

Note that you can put a printer reset either before or after each job, although generally the reset goes at the end the job. TROY XCD print servers allow you to define multiple services for a given port. This is useful, for example, if you want to use different reset strings with the same printer. For example, you might want to define a service for UNIX jobs that contains a <ESC-E> reset, and a different service for NetWare that has no reset.

Print jobs are normally sent to service 1 (XCD\_XXXXXX\_P1, where "XXXXXX" is the last six digits of Ethernet address, for

## Installation 2-21

all protocols except LAT, TCP/IP, and AppleTalk) or service 2 (BINARY\_P1, for LAT and TCP/IP). Refer to Appendix B and the individual protocol chapters for additional information on services.

To change the printer reset on a TROY XCD print server with XAdmin, double click on the print server name, click on the **Services** tab, double click on the desired service, and then select the appropriate **Printer Control String**. With WebXAdmin, click on **Configure Service**, and select the desired service, choose the appropriate reset string, and then click **Submit**.

Alternatively, you may use the print server console by typing in the following command:

```
SET SERVICE servicename EOT stringno
```

where "*servicename*" is the name of the service (do a SHOW SERVICE command for a list of services) and *stringno* is the number of the string. For example to use string 3 (the PostScript CTRL-D reset) on the default parallel port service, you would enter:

```
SET SERVICE BINARY_P1 EOT 3
```

---

## Changing the Print Server Configuration (Optional)

In addition to changing the printer reset string, you can modify the TROY XCD print server configuration in a number of other ways. The procedure and commands for changing the configuration are described in Appendix A.

## 2-22 Installation

## TROY XCD Print Server Management Methods

---

### Overview

TROY XCD offers a wide variety of ways to configure and monitor the print server. These methods include:

- TROY XCD XAdmin Windows-based utility
- TROY XCD WebXAdmin Web-browser utility
- TROY XCD print server console
- HP JetAdmin Windows-based utility
- HP Web JetAdmin Web-browser utility

This chapter discusses the installation and the basic usage of these utilities. Refer to the various chapters of this manual for specific details on configuring the print server.

### TROY XCD XAdmin

TROY XCD offers two graphical utilities for configuration and management of TROY XCD print servers:

- XAdmin32. This 32-bit version works on either Windows NT 4.xx or Windows 95/98 using the TCP/IP or IPX/SPX protocols. To take full advantage of the capabilities of XAdmin32, you should use the Novell 32-bit client software on the PC workstation that is used for configuring the print queues.
- XAdmin. This 16-bit version works on Windows 3.1 and Windows 95 for NetWare and Banyan VINES.

To install XAdmin32 or XAdmin, insert the appropriate diskette or CD-ROM in the computer, select **Run** from the Windows menu, select **Browse**, choose the appropriate drive (these programs are in the **Utilities** folder if you are using a CD-ROM), and double click on `Setup.exe` and then click **OK**.

**Note:** XAdmin32 and other TROY XCD utilities are available on the TROY XCD web site (<http://www.troyxcd.com>) if you did not receive them on disk.

1. Follow the instructions on the screen to complete the installation.
2. Double click on the XAdmin icon or use the Windows 95/NT 4.x **Start** button to select XAdmin in the XCD folder in the list of **Programs**.
3. A list of configured print servers will appear. If you are running XAdmin or if you are running NetWare with XAdmin32, skip to step 4. If you are running TCP/IP, then you must enter an IP address into the print server as follows (refer to Chapters 4 or 7 for alternate methods for configuring the IP address):

- Make sure that your computer is configured for TCP/IP with a valid IP address configured for LAN operation (not PPP dial-up; refer to your system documentation for additional information).

**Important Note:** Consult your system manager before assigning IP addresses to your computer or to the print server in order to avoid duplications. If your network does not have an officially assigned

## 3-2 Management Methods

block of IP addresses, you may use any unique address between 192.168.254.1 and 192.168.254.254 (this is a reserved range of Class C addresses for private networks that are not connected to the Internet per RFC 1918; note that you must also assign the print server an IP address in this range). You may also use a subnet mask of 255.255.255.0 with no gateway address. If you have more than one LAN adapter card, select the one you want to use for TCP/IP.

- Click on the TCP/IP folder icon under "Filter" on the left side of the XAdmin screen.
- Click on the **Search** button (the leftmost button) or select **Devices** and then **Search Active Devices** from the menu bar.
- If you have a DHCP, BOOTP, or rarp server (or if the print server already has an IP address from some other source), the print server should appear in the list of configured print servers. If this is the case, skip to step 4.
- If the print server does not have an IP address, then click on the **Setup Unconfigured Devices** button (the third from the left) or select **Devices** and then **Setup Unconfigured Devices** from the menu bar. This will display the unconfigured print servers listed by their Ethernet address (MAC Address). Double click on the desired print server to configure it.
- Enter the IP address, subnet mask, and gateway and click **OK**.

## Management Methods 3-3

- The list of unconfigured print servers will again be displayed. Click on **Close** to return to the main screen.
- The print server should show up on the main XAdmin32 screen (the default name will be XCD\_XXXXXX, where "XXXXXX" is the last six digits of the Ethernet address). If the print server does not appear on the main screen, click on the **Search** button to find new print servers.

4. To configure a print server, double click on its name and enter the password (ACCESS is the default password). A series of "index cards" will be displayed. Each of these "cards" represents a protocol or other configurable item. Click on the appropriate tab to configure the item.

## TROY XCD WebXAdmin

WebXAdmin allows the user to configure the print server with a standard web browser like Netscape Navigator or Microsoft Internet Explorer. It can therefore be used on any operating system that supports web browser capabilities. To use WebXAdmin, you must first make sure that you have a web browser installed on your computer and that you have configured an IP address in both the computer and the print server (refer to the previous XAdmin section if you do not know how to put an IP address in the print server). Also make sure that you have configured your TCP/IP stack to communicate over the local area network (rather than via a PPP dial-up connection).

To use WebXAdmin, start your web browser and enter the IP address of the print server as the destination web site. Once

### 3-4 Management Methods



you are connected, enter the password (ACCESS is the default password) and select the protocol or other item that you wish to configure. You will then be connected to the appropriate web page for configuration of that item. You may use the normal browser buttons to move forward and back through the web pages.

## TROY XCD Print Server Console

All TROY XCD print servers support a sophisticated command-line oriented console for configuration and management. This console contains features that are not available through XAdmin or WebXAdmin, including sophisticated diagnostic capabilities. The TROY XCD print server console can be accessed via TELNET, DEC NCP/NCL/ccr, the print server serial port (if present), and the TROY XCD XCONFIG NetWare utility. It also available through one of the web pages using the WebXAdmin facility.

The general configuration procedure is the same regardless of which method is used.

**DEC NCP, NCL, ccr.** To connect to the print server console with the VMS NCP utility, use the following commands:

```
MCR NCP  
CONNECT VIA circuit PHY ADD ethernetaddress
```

where *circuit* is the circuit-ID of the VAX or Alpha (for example, SVA-0 for most DEC workstations, MNA-0 for XMI systems, BNA-0 for BI systems, and QNA-0 for Q-BUS systems) and *ethernetaddress* is the hardware address of the print server (for example, 00-40-17-00-61-35).

Newer OpenVMS systems use NCL instead of NCP. The NCL command to connect to the print server console is:

```
SET HOST/MOP/CIRCUIT=circuit/ADD=ethernetaddress
```

ULTRIX systems use the `addnode` and `ccr` commands as follows:

```
addnode xciiname -c circuit -h ethernetaddress  
ccr xcdname
```

where *xcdname* is an arbitrary name for the print server (each print server on the network needs a unique name).

In all cases, you will get a message like `Console Connected` or `Remote Console Reserved` when you are connected. When you are connected, push **RETURN** or **ENTER** to get the "#" prompt, enter the password `ACCESS` (it will not print), and type anything in response to the `Enter Username>` prompt. When you get the `Local>` prompt, you are ready to enter commands.

**Note:** *The commands available are generally a subset of the ones used on the DECserver terminal server. Note that unlike the DECserver, there is no distinction between the SET and DEFINE commands or between the CLEAR and PURGE commands. Instead, when you type CTRL-D to exit the remote console, any of these commands take effect immediately and the results are stored permanently (for example, it is not necessary to enter both a SET and a DEFINE to execute a command and save the results).*

**TELNET.** To connect to the print server using TELNET on UNIX, Windows NT, or most other TCP/IP systems, type:

```
TELNET ipaddress
```

### 3-6 Management Methods

at the UNIX system prompt, where *ipaddress* is the IP address of the print server. When you are connected, push **RETURN** or **ENTER** to get the "#" prompt, enter the password `ACCESS` (it will not print), and type anything in response to the `Enter Username>` prompt. When you get the `Local>` prompt, you are ready to enter commands.

**XCONFIG.** To connect to the print server using the TROY XCD XCONFIG NetWare utility, insert the TROY XCD Print Server Software diskette in Drive A and type:

```
A:XCONFIG
```

at the DOS system prompt (or choose the appropriate path if you are running XCONFIG from your CD-ROM or hard drive). If you have only one print server, you will be immediately connected. If you have more than one print server, you will be given a list of available print servers. Type the number of the print server to which you want to connect. When you are connected, enter the password `ACCESS` (it will not print) at the "#" prompt, and type anything in response to the `Enter Username>` prompt. When you get the `Local>` prompt, you are ready to enter commands.

**Serial Port.** To connect to the print server using the serial port, refer to Chapter 2 for details on how to use this port. Once you have established a connection, press **RETURN** or **ENTER** to get the `Local>` prompt (no password is required). You are now ready to enter commands.

## HP JetAdmin

TROY XCD print servers work transparently with the HP JetAdmin utility. You can download JetAdmin from the HP web site (<http://www.hp.com>). Use the Windows **Run**

## Management Methods 3-7

command to expand the downloaded file. Then use the **Run** command again to execute the `SETUP.EXE` file in the destination directory that you selected (this file is generally in the `DISK1` subdirectory) and begin the installation. Follow the instructions on the screen to complete the installation.

**Important:** *Windows 98 requires either JetAdmin V2.54 (this version can be installed from the Microsoft Windows 98 CD by running the `SETUP.EXE` file in the `DRIVERS/PRINTERS/JETADMIN/DISK1/` directory) or V3.30 or later (available on the HP web site).*

The TROY XCD print server will appear in the list of configured print servers unless IPX is not running on the computer *and* the print server is not configured with a valid IP address. If this is the case, then select **Device** from the menu bar and click on **New**. Select the desired print server from the list of unconfigured devices and then press **Configure**. Enter the requested information, including the IP address, subnet mask, and gateway. Then click **Close** to return to the list of configured print servers.

You may now select the print server from the list and click on the **Modify** button (or select **Device** and then **Modify** from the menu bar) to change the print server configuration.

---

## HP Web JetAdmin

TROY XCD print servers work transparently with the HP Web JetAdmin utility for Windows NT Advanced Server. You can download this program at no charge from the HP web site (<http://www.hp.com>). Use the Windows NT **Run** command to expand the downloaded file. The files will

### 3-8 Management Methods

be expanded and the installation program will be automatically run. Follow the instructions on the screen to complete the installation.

After you have completed the installation, you may use a web browser on any computer that has access to the Windows NT server to access the TROY XCD print server. Start the browser and connect to the file server. Once you are connected and are at Web JetAdmin home page, click on the **Find Device** tab. Then click on **Find All Devices** to get a list of all Web JetAdmin-compatible print servers (or you may limit your search by using the **Advanced Search** method). Click on the desired TROY XCD print server name, and the **Properties** page will be displayed for that print server. Then click on the **Config** tab to configure the print server.

## **3-10 Management Methods**

# 4

## **TCP/IP Network Configuration**

---

### **Overview**

TROY XCD print servers include the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite. Since virtually all UNIX host computers support TCP/IP, this capability allows a printer to be shared on a UNIX Ethernet network. TCP/IP communications can proceed concurrently with other protocols, which means that UNIX, DEC, NetWare, Apple, and other computers can share the same printer over an Ethernet network using the TROY XCD print server.

---

### **TROY XCD TCP/IP Concepts**

A TROY XCD print server with TCP/IP appears to the network as a UNIX host computer with a unique IP address running the lpd line printer daemon protocol. As a result, any host computer that supports the Berkeley remote-LPR command can spool jobs to the TROY XCD print server without the need for any special software on the host computer. Application programs run transparently and users do not need to learn new procedures in order to use the printer. TROY XCD print servers also support gateways for communications with hosts on remote networks. In addition, raw TCP ports are available for special applications and compatibility with the HP JetDirect print server.

TROY XCD print servers come preconfigured to run on a TCP/IP network with a minimum of setup. The only

## **TCP/IP Network Configuration 4-1**

mandatory configuration in the print server is the entering of an IP address (TROY XCD print servers come with a default IP address of 192.0.0.192 (192.189.207.254 on some models) but this should be changed to meet the addressing requirements of your network).

---

## TCP/IP UNIX Host Configuration

The configuration process for most UNIX systems is described in the following steps. Unfortunately, this process is not very standardized, so refer to your system documentation (or *man* pages) for additional information.

1. Configure the `/etc/hosts` file (or equivalent local host table) on each UNIX host that needs to communicate with the TROY XCD print server, or provide similar information to a name server on the network. Use your favorite editor to add an entry to the `/etc/hosts` file containing the IP address and node name of the TROY XCD print server. For example:

```
192.189.207.3          XCD_00C351
```

The actual format of the entry may vary depending on your system, so check your system documentation and also note the format of other entries in the `etc/hosts` file.

**Note:** *The node name in this file does not necessarily need to be the same as the one that is actually configured into the TROY XCD print server (the name that appears on the printer self-test), but it is good practice to make the names the same (however, some operating systems, such as HP/UX, do not accept the "\_" character in the default name, so for these systems*

## 4-2 TCP/IP Network Configuration



you must use a different name). In any case, the node name in the `/etc/hosts` file **must** match the node name in the `/etc/printcap` file.

**Note:** Some systems, such as HP/UX and AIX allow you to enter the IP address as the host name when setting up the print queue. If this is the case, you do not need to configure the hosts file.

2. Choose which TROY XCD print server service you want to use. There are two types of services available on the TROY XCD print server. Binary services pass data through unmodified and are therefore required for PCL or PostScript rasterized graphics printouts. Text services add a carriage return at the end of each line for proper formatting of UNIX text files (which end in linefeed and do not have carriage returns). The text service can also be used for non-rasterized graphics, such as ASCII PostScript graphics or many types of PCL graphics.

If you are using the first parallel port on the print server, choose one of the available services (this service name will be used in step 3):

BINARY_P1	Binary (parallel port)
TEXT_P1	Text (parallel port)

The XConnect II and Pony 100 also support the following services:

BINARY_S1	Binary (serial port)
TEXT_S1	Text (serial port)

The XConnect 100 supports the following additional services:

## TCP/IP Network Configuration 4-3

BINARY_S1	Binary (serial port)
TEXT_S1	Text (serial port)
BINARY_P2	Binary (second parallel port)
TEXT_P2	Text (second parallel port)
BINARY_S2	Binary (second serial port)
TEXT_S2	Text (second serial port)

You may set up multiple print queues on your UNIX host computer for the same TROY XCD print server, each with a different service name (for example, one queue for binary graphics jobs and one for text jobs). Refer to Appendix B for additional information on using services.

3. **Note:** *This step applies to the majority of UNIX systems, including Sun OS (but not Solaris 2.xx), Silicon Graphics (lpr/lpd option required), DEC ULTRIX, DEC OSF/1, and Digital UNIX. SCO UNIX users should follow these steps, but should also refer to the SCO UNIX Configuration section in section 3-A. Users of RS/6000 AIX, HP/UX, Sun Solaris 2.xx, and other systems that do not use the printcap file should skip to section 3-A.*

Configure the `/etc/printcap` file on each host computer to specify the local print queue, the TROY XCD print server name (also called remote machine or `rm`), and the TROY XCD print server service name (also called remote printer, remote queue, or `rp`), and the spool directory.

An example of a typical `printcap` file is as follows:

```
laser1|Printer on Floor 1:\
:lp=:\
:rm=XCD_003C51:\
:rp=TEXT_P1:\
:sd=/usr/spool/lpd/laser1:
```

## 4-4 TCP/IP Network Configuration

This will create a queue named `laser1` on the host computer that communicates to a TROY XCD print server with a node name (`rm`) of `XCD_003C51` and a service name (`rp`) of `TEXT_P1` for printing text files to the printer through the spool directory `/usr/spool/lpd/laser1`. If you are printing binary graphics files, you would use the service `BINARY_P1` instead of `TEXT_P1`.

**Note:** *The `rm` and `rp` options are not available on all UNIX systems, so if necessary check your documentation (or man pages) to determine the equivalent options.*

Users of Berkeley-compatible UNIX systems can use the `lpc` command to obtain the printer status:

```
%lpc status
laser1:
    queuing is enabled
    printing is enabled
    no entries
    no daemon present
```

Users of AT&T-compatible UNIX systems can generally use the `lpstat` or `rlpstat` commands to obtain similar status information. Because this procedure varies from system to system, refer to your system documentation for the exact usage.

**3-a** **Note:** *Skip this section if you have completed Step 3, unless you have an SCO UNIX system.*

If you have an HP/UX system, IBM RS/6000 AIX computer, or Sun Solaris 2.xx, there is no `printcap` file. This is also true for some other AT&T-based UNIX

## TCP/IP Network Configuration 4-5

systems, as well as many VMS-based TCP/IP software packages (for example, UCX, TGV Multinet, etc.). Such systems generally use a printer setup program to define the service name (remote printer), the TROY XCD print server name (remote machine) or IP address, and the local queue name (spool directory).

### HP/UX Configuration

In the case of HP/UX 10.xx, the *sam* program is used to set up the remote printer. The steps are as follows:

- Execute the *sam* program. When you get a list of options, select **Printers and Plotters**.
- Select **LP Spooler**.
- Select **Printers and Plotters**.
- Select **Actions** and then **Add Remote Printer/Plotter**.
  - Enter any name as the **Printer Name** (this will be the name of the print queue)
  - Enter the IP address of the print server as the **Remote System Name**
  - Enter the desired print server service name as the **Remote Printer Name**.
  - Check the box next to **Remote Printer is on BSD System**.
  - You may accept the default values for the remaining items.
  - Click **OK** to configure the printer.
  - You should now be able to print using the `lp -d` command with the printer name.

If you are using the HP Distributed Print Service, the configuration procedure is slightly different because you are sending the print jobs to a file server, which in turn spools the jobs to the print server. You must

## 4-6 TCP/IP Network Configuration

therefore know the name of the file server (spooler host) in addition to the above information. You will add a physical printer and a remote printer, and then assign a logical printer name to the remote printer (a unique name that does not match any other name). To print, use the `lp -d` command with the logical printer name.

Earlier versions of HP/UX use similar procedures to 10.xx:

- Enter *sam* and select "Peripheral Devices" and then "Add Remote Printer" (not "networked printer")
- Enter the following remote printer settings (the other settings do not matter):
  - Line printer name (user-selectable)
  - Remote system name (the TROY XCD print server name; must match what is in hosts file or use TROY XCD print server IP address)
  - Remote printer queue (TROY XCD print server binary or text service name)
  - Remote Printer is on a BSD System (Yes)

### **IBM RS/6000 AIX Configuration**

The RS/6000 AIX operating system uses the *smit* program to set up the remote printer. The procedure is as follows for AIX 4.0 and later:

1. Enter SMIT and select "devices"
2. Select "Printer/Plotter"
3. Select "Print Spooling"
4. Select "Add a Print Queue"
5. Select "Remote"
6. Enter the following Remote Printer Settings:

## **TCP/IP Network Configuration 4-7**

- Name of queue (user selectable)
- Host Name of Remote Printer (TROY XCD Print server name; must match name /etc/hosts file or use TROY XCD print server IP address)
- Name of queue on remote server (TROY XCD print server binary or text service name)
- Type of print spooler: BSD (press the list button and choose BSD).

The procedure for pre-V4.0 systems is as follows:

1. Enter *smit* and select "Devices"
2. Select "Printer/plotter"
3. Select "Manage remote printer subsystem"
4. Select "Client services"
5. Select "Remote printer queues"
6. Select "Add a remote queue"
7. Enter the following remote queue settings:
  - Name of queue to add (user selectable)
  - Activate the queue (Yes)
  - Destination host (TROY XCD print server name; must match name in /etc/hosts file or use the print server IP address)
  - Name of queue on remote printer (TROY XCD print server binary or text service name)
  - Name of device to add (user selectable; for example lp0)

## Sun Solaris 2.x Configuration

Sun Solaris 2.x uses the *lpsystem* and *lpadmin* programs for remote printer configuration:

### 4-8 TCP/IP Network Configuration

```
lpssystem -t bsd xcdname
lpadmin -p queue -s xcdname!\xcdservice
accept queue
enable queue
```

where *queue* is the name of the local print queue, *xcdname* is the TROY XCD print server name (must match the entry in the `/etc/hosts` file) or IP address and *xcdservice* is the TROY XCD print server binary or text service. If this is the first printer configured, you must also use the `lpsched` command immediately prior to the `accept` command.

As an alternative, you may use **Printer Manager** in the **admintool** utility under OpenWindows. Select **Edit**, **Add**, and **Add Access to Remote Printer**. Then enter the TROY XCD print server name in the format *xcdname!\xcdservice* as described above. Make sure that the Printer Server OS is set to BSD (the default setting), and then click **Add**.

Note that we recommend that use the `/etc/hosts` file for the printer name rather than NIS or other name services. Also note that due to a bug in the Sun `lpd` implementation on Solaris 2.4 and earlier releases, you may experience problems printing very long print jobs. If this is the case, a workaround is to use the raw TCP port with the HP JetDirect software as described later in this chapter.

## SCO UNIX Configuration

SCO UNIX requires TCP/IP V1.2 or later to work with TROY XCD print servers. You must first configure the `/etc/hosts` and `/etc/printcap` files as described in step 2. Then run the `sysadmsh` program as follows:

## TCP/IP Network Configuration 4-9

- Select **Printers**.
- Select **Configure**.
- Select **Add**.
- Enter the name of the print queue you entered in the `/etc/printcap` file as the **Printer name**,
- Enter anything as the **Comment**, and **Class name**.
- For the **Use printer interface** select "Existing".
- Press the F3 key to get a list of available interfaces, and select the desired one as the **Name of interface** using the arrow keys and **Enter** key ("Dumb" is a good choice).
- Select "Direct" as the **Connection**.
- Enter the desired **Device name** (`/dev/lp` generally works).
- Select "Hardwired" as the **Device**.
- Select "No" for the **Require banner** field.

### Other Non-Standard Configurations

With DEC TCP/IP Services for VMS (UCX), you first need to put a name for the TROY XCD print server in the `HOSTS` file using the command `SET HOST name /ADDRESS=ipaddress` at the `UCX>` prompt, where *name* is the desired name for the print server and *ipaddress* is the IP address for the print server. Then use the `sys$system:ucx$lprsetup` command to add a printer (print queue). Enter the desired printer name, and then use the TROY XCD print server name as the remote system name. Specify one of the TROY XCD print server services (see beginning of this section for options) as the remote system printer name (accept the defaults for other questions).

## 4-10 TCP/IP Network Configuration



Process Software's TCPware simply uses the VMS INIT/QUEUE command with their special symbiont in the following format:

```
INIT/QUEUE/PROC=TCPWARE_TSSSYM/ON="host,port" queue
```

where *host* is the IP address or name of the TROY XCD print server, *port* is the TROY XCD print server raw TCP port number (9100 for the parallel port, 9101 for the serial port, 9102 for the XConnect 100 second parallel port, or 9103 for the XConnect 100 second serial port), and *queue* is the VMS queue name.

TGV's Multinet requires you to run the MULTINET CONFIGURE /PRINTERS command, then use the ADD command to add a printer, specifying the TROY XCD print server IP address, a protocol type of LPD, and one of the service options described at the beginning of this section as the remote print queue.

With Wollongong's PATHWAY, first make sure that you have the Access option with lpd enabled. Then enter the print server name and IP address in the TWG\$TCP:[NETDIST.ETC]HOSTS. file, run the LPGEN program, and execute the command `add queue/rmachine=xcdname/rprinter=service`, where *queue* is the name of the queue, *xcdname* is the TROY XCD print server name from the *hosts* file, and *service* is the TROY XCD print server service name.

To use a TROY XCD print server with an IBM AS/400 running IBM's TCP/IP Gateway Services for OS/400 (the OS/400 system must be v3.1 or later):

## TCP/IP Network Configuration 4-11

- Assign a TCP/IP address to the AS/400 and the TROY XCD print server.
- Use the CFGTCP command at your OS/400 prompt to add the print server's TCP/IP address to the AS/400 host table.
- Use the following one-line OS/400 command to create the LPD queue:

```

CRTOUTQ OUTQ(<queuename> RMSTSYS
(*INTNETADR) RMTPRTO(<service>)
AUTOSTRWTR(1) CNNTYPE(*IP) DESTTYPE
(*OTHER) MFRYPMDL (<driver>)
INTNETADR('<ipaddress>') TEXT
('<description>')

```

where <queuename> is the new AS/400 print queue name, <service> is the TROY XCD print server service name, <driver> is the OS/400 printer driver name (\*HP4 is recommended if in doubt), and <ipaddress> is the IP address of the print server. Note that the IP address and description must be enclosed in single quotes.

Other systems use similar procedures to set up the TROY XCD print server. These programs will generally ask for the following information:

<b>Requested information:</b>	<b>You should use:</b>
remote printer or remote binary or text service	TROY XCD print server
remote host computer name	name Any name (must match name in printcap file, if any) or in some cases, you may enter the TROY

## 4-12 TCP/IP Network Configuration

	print server IP address
	here
remote host IP address	TROY XCD print server IP address

Tech support specialists for these companies can usually answer configuration questions if you provide them with the equivalent UNIX configuration information (tell them that the TROY XCD print server looks like a remote UNIX host computer running the lpd line printer daemon).

4. If you have not created a spool directory for the TROY XCD print server on your UNIX host computer, you will need to do so now (the printer setup utilities in HP/UX, AIX, Solaris 2.xx, and other systems will automatically create the spool directory). The lpd spool directory is usually located in the `/usr/spool` directory (check with your system manager to see if the location is different for your system). To create a new spool directory, use the `mkdir` command. For example, to create a spool directory for the queue `laser1`, you would enter:

```
mkdir /usr/spool/lpd/laser1
```

On some systems it is also necessary to start the daemon. This is done on Berkeley-compatible UNIX systems with the `lpc start` command as shown in the following example:

```
lpc start laser1
```

5. The final step before printing is to add the IP address to the TROY XCD print server. Consult with your system

## TCP/IP Network Configuration 4-13

administrator before assigning an IP address to avoid conflicts with other devices. If your network does not have an officially assigned block of IP addresses, you may use any unique address between 192.168.254.1 and 192.168.254.254 (this is a reserved range of Class C addresses for private networks that are not connected to the Internet per RFC 1918; note that you must also assign your host computer an IP address in this range).

The IP address can be set in his can be done in any of the following ways:

1. XAdmin32
2. HP JetAdmin
3. DHCP
4. The UNIX arp and ping commands
5. Reverse Arp (rarp)
6. BOOTP
7. DEC NCP, NCL, or ccr utilities
8. TROY XCD XCONFIG NetWare utility
9. XConnect II or XConnect 100 serial port

The easiest way to configure the IP address is using either XAdmin32 or JetAdmin as described in Chapter 3. The remaining configuration methods are described in the following paragraphs.

**Important Note:** *The IP address you assign to the print server must be on the same logical network as your host computers (e.g., if your host has an IP address of 192.189.207.3, the TROY XCD print server should have an IP of 192.189.207.x, where x is an integer between 1 and 254), or you must properly configure your router to work with the TROY XCD print server.*

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## Using DHCP to Configure the Print Server IP Address

TROY XCD print servers support the DHCP protocol for automatically loading the IP address from a host computer that supports DHCP. By default, the print server will automatically try DHCP, BOOTP, and rarp before using the IP address configured in the server.

**Note:** This procedure may take about a minute, so the print server cannot be accessed via TCP/IP during that time. If a faster IP address load is required, select the desired IP configuration method (AUTO, DHCP, BOOTP, RARP, STATIC) via XAdmin, WebXAdmin, or the print server console `SET IP METHOD` command (STATIC is used when the IP address is manually entered).

## Using arp and ping to Configure the Print Server IP Address

The arp and ping method is one of the simplest ways of configuring the print server IP address (this method requires V3.27 or later firmware). To use arp and ping, enter the following commands at the operating system prompt::

```
arp -s ipaddress ethernetaddress [temp]  
ping ipaddress
```

where *ethernetaddress* is the Ethernet address of the print server and *ipaddress* is the IP address of the print server. The temp parameter should be used with UNIX systems, but is not supported by Microsoft operating systems. For example, a typical UNIX entry would be:

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```
arp -s 192.189.207.2 00:40:17:00:c3:e4 temp
ping 192.189.207.2
```

while a typical Microsoft entry would be:

```
arp -s 192.189.207.2 00-40-17-00-c3-e4
ping 192.189.207.2
```

If everything is OK, you will get a message back on the screen indicating that the print server is alive. If you do not get such a message, first check the note below, and then try entering the commands again.

**Note:** This procedure will not work through a router (gateway) and only works if the print server IP address has never been configured before. If you have previously configured an IP address, then use TELNET as described in Appendix A to change the IP address.

**Note:** This procedure will not work with Windows 95 unless there are already entries in the Windows 95 arp table. If there are no entries, you can add one by pinging a known device on the network (you cannot ping yourself).

### **Using rarp to Configure the TROY XCD Print Server IP Address**

The TROY XCD print server IP address can be configured using the Reverse ARP (rarp) facility on your host computer. This is done by editing the `/etc/ethers` file (if this file does not exist, you can create it) with an entry similar to the following:

```
00:40:17:00:01:07    XCD_000107
```

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where the first entry is the Ethernet address of the TROY XCD print server and the second entry is the name of the TROY XCD print server (the name must be the same as the one you put in the `/etc/hosts` file).

If the rarp daemon is not already running, start it (depending on the system the command can be `rarpd`, `rarpd -a`, `in.rarpd -a` or something else; type `man rarpd` or refer to your system documentation for additional information). To verify that the rarp daemon is running on a Berkeley UNIX-based system, type the following command:

```
ps -ax | grep -v grep | grep rarpd
```

For AT&T UNIX-based systems, type:

```
ps -ef | grep -v grep | grep rarpd
```

The TROY XCD print server will get the IP address from the rarp daemon when it is powered on.

### **Using BOOTP to Configure the TROY XCD print server IP Address**

BOOTP is an alternative to rarp that has the advantage of allowing configuration of the subnet mask and gateway. In order to use BOOTP to configure the IP address into the TROY XCD print server, first make sure that BOOTP is installed and running on your host computer (it should appear in the `/etc/services` file on your host as a real service; type `man bootpd` or refer to your system documentation for information). BOOTP is usually started up via the `/etc/inetd.conf` file, so you may need to enable it by removing the "#" in

front of the bootp entry in that file. For example, a typical bootp entry in the `/etc/inetd.conf` file would be:

```
#bootp dgram udp wait /usr/etc/bootpd bootpd -  
i
```

Depending on the system, this entry might be called "bootps" instead of "bootp". In order to enable BOOTP, simply use an editor to delete the "#" (if there is no "#", then BOOTP is already enabled). Then edit the BOOTP configuration file (usually `/etc/bootptab`) to enter the name, network type (1 for Ethernet), Ethernet address (which can be found on the label on the TROY XCD print server), and the IP address, subnet mask and gateway of the TROY XCD print server. Unfortunately, the exact format for doing this is not standardized, so you will need to refer to your system documentation to determine how to enter this information (many UNIX systems also have template examples in the `bootptab` file that you can use for reference). Some examples of typical `/etc/bootptab` entries include:

```
xcd_000107 1 00:40:17:00:01:07  
192.189.207.3
```

and:

```
xcd_000107:ht=ethernet:ha=004017000107:\  
ip=192.189.207.3:
```

Certain BOOTP host software implementations will not respond to BOOTP requests if you have not included a download filename in the configuration file; if this is the case, simply create a null file on the host and

## 4-18 TCP/IP Network Configuration



specify the name of this file and its path in the configuration file.

As with rarp, the TROY XCD print server will load its IP address from the BOOTP server when the printer is powered on.

### **Configuring the TROY XCD Print Server IP Address with NCP, XCONFIG, or the Serial Port**

Users of DEC and Novell computers have additional alternatives for configuring the TROY XCD print server IP address by using the remote console facility, while XConnect II, Pony 100, and XConnect 100 users can also utilize the serial port. On VMS systems, you will need to have DECNET running in order to use the remote console. The procedure is as follows:

- a. Connect to the remote console or serial port (see chapter 2 for information on the serial port). If you are using the remote console with VMS or ULTRIX, you will need to know the circuit ID (EWA-0 for Alpha PCI systems, QNA-0 for Q-BUS systems, SVA-0 for DEC workstations, UNA-0 for UNIBUS systems, BNA-0 for BI systems, and MNA-0 for XMI systems; you can get the circuit ID by executing the VMS NCP command `SHOW KNOWN CIRCUITS`) and the Ethernet address of the TROY XCD print server (which you can get either from the label on the TROY XCD print server or via the printer self-test). On VMS systems, the connection is made as shown in the following example:

## **TCP/IP Network Configuration 4-19**

```
$ MCR NCP
NCP>CONNECT VIA QNA-0 PHY ADD 00-40-17-00-01-07
```

On ULTRIX systems, you would execute commands similar to the following example:

```
# addnode XCD -c qna-0 -h 00-40-17-00-01-07
# ccr XCD
```

On a NetWare system, you would use the XCONFIG utility included with every TROY XCD print server. Simply type XCONFIG at the DOS prompt and select the desired TROY XCD print server.

- b. If you are using the remote console, you will get the message `Console connected (VMS)` or `Connection established XCONFIG` or `Remote console reserved (ULTRIX)`. Press **RETURN** and enter the password `ACCESS` in response to the "#" prompt (it will not echo).  
**Note:** You will not be asked for a password if you are using the XConnect II or XConnect 100 serial port.
- c. You will be prompted for a user name. Enter anything in response to this prompt (older versions do not ask for the user name).
- d. You will then get the `Local>` prompt. Type `SET IP ADDRESS ipaddress`, where `ipaddress` is the desired IP address you wish to assign to the TROY XCD print server (check with your network manager for the IP address to use). For example:

```
Local> SET IP ADDRESS 192.189.207.3
```

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- e. You will now need to set the subnet mask by typing `SET IP SUBNET subnetmask`, where *subnetmask* is the desired subnet mask you wish to assign to the TROY XCD print server (check with your network manager for the subnet mask to use). For example:

```
Local> SET IP SUBNET 255.255.255.0
```

If you do not have any subnets, use one of the following default subnet masks:

255.255.255.0	for class C networks
255.255.0.0	for class B networks
255.0.0.0	for class A networks

- f. The type of network you have can be identified by the leftmost group of digits in your IP address. The value of this group ranges from 192 through 255 for Class C networks (e.g., 192.189.207.3), 128 through 191 for Class B networks (e.g., 128.10.1.30), and 1 through 127 for Class A networks (e.g., 13.27.7.1).
- g. If you have a gateway (router), enter its address with the command `SET IP ROUTER routeraddress`, where *routeraddress* is the desired IP address of the gateway you wish to assign to the TROY XCD print server. For example:

```
Local> SET IP ROUTER 192.189.207.1
```

- h. To verify that you have entered the IP information correctly, type `SHOW IP`.

## TCP/IP Network Configuration 4-21

- i. Type `EXIT` or `CTRL-D` (i.e., hold down the control key and type "D") to end the remote console session.
- j. With older versions of the firmware (V3.26 or earlier), you must wait about ten second and then power the printer off and then on again to make the IP address take effect (not necessary with newer versions).

6. Before attempting to print, it is **very** important to verify the connection between the host and the TROY XCD print server by using the UNIX ping command with the IP address of the TROY XCD print server. For example:

```
ping 192.189.207.3
```

You should get a message that the TROY XCD print server is alive. If you get an error message or no response, then there is no connection. *You will not be able to print if you cannot ping the TROY XCD print server.* If this is the case, verify that you have set up the host and TROY XCD print server correctly and that the physical connections (e.g., the transceivers and cabling) are good. Refer to the *Troubleshooting* chapter for additional information.

7. To print to the TROY XCD print server from UNIX, use the standard `lpr` command with the `-P` option to specify the queue name. For example, to print the file `TEST` on the queue `laser1`, you would type:

```
lpr -Plaser1 TEST
```

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Some AT&T-based UNIX systems, such as SCO and HP/UX, use the standard `lp` command instead of `lpr`. In these cases, use the `-d` option instead of `-P` to specify the queue name as shown in the following example:

```
lp -dlaser1 TEST
```

Note that TROY XCD print servers implement only a subset of the `lpr` options. If you want to utilize printing options such as landscape mode, language switching, etc., refer to Appendix B for information on using services.

For non-UNIX systems such as VMS, the TCP/IP printing process is normally transparent, so you use the same commands or procedures as you would for a local printer.

---

## IP Security

TROY XCD print servers provide a means of allowing only host computers with authorized IP addresses to access the print server. This is very useful for applications like check printing, where general access to the printer is not allowed. The console command `SET IP ACCESS ENABLED ipaddress` enters a host computer IP address into the access table of the print server (where *ipaddress* is the IP address of the host computer; refer to Appendix A for information on using the print server console). To remove an IP address, use the command `SET IP ACCESS DISABLED ipaddress`. To reenable general access, use the command `SET IP ACCESS ALL`.

---

## Raw TCP Ports

TROY XCD print servers provide a raw TCP port capability that can be used by any application that can open and send data to a TCP port. The port number is 9100 (238C hex) for the parallel port, or 9101 for the XConnect II and XConnect 100 first serial port, and 9102 for XConnect 100 second parallel port. The ports pass data through unmodified, so there is no TELNET interpretation provided. When using the raw TCP ports, make sure that TELNET interpretation is disabled in your software or else you may get distorted printouts.

The raw TCP port is compatible with many popular software packages, including HP's JetDirect software for UNIX, TGV Multinet (streams mode), IBM AIX for the RS/6000 (V3.25 or later), and any TCP/IP-based software that supports HP's JetDirect Ethernet network interface card.

The HP JetDirect software for UNIX is available for Sun Solaris, SunOS, and HP/UX. HP printer users can download these utilities from HP's web site (<http://www.hp.com>) or FTP site (<ftp.hp.com>).

To use an TROY XCD print server with the HP host printing utilities on an HP/UX or Sun system:

1. Download the software from the HP web site or FTP site.
2. If the download file is in tar format, use the `tar xvf filename` command to extract the software, where `filename` is the name of the software that you downloaded (you must be logged in as root). If the file is in `pkgadd` format, use the `pkgadd -d filename all`

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command to extract the software. Accept the default directory to store the files. Follow the instructions in the README files to install the software.

3. Run JetAdmin by typing `jetadmin` at the UNIX prompt (on SunOS 4.xx systems, you use the `hpnpcfg` program instead of JetAdmin, but the configuration steps are similar).
4. Select item 1 (Configuration) and then select item 3 (Add printer to local spooler).
5. Enter the desired name for the TROY XCD print server or IP address at the `Enter the network printer name/IP Name` prompt.

**Note:** With versions of firmware earlier than 3.46, you must enter the name (do *not* enter the IP address) before configuring the print server name in the `/etc/hosts` file, or in NIS or DNS. You will get a message `Unknown printer. Do you wish to continue?`. Enter "Y" to continue.

6. Select the printer type (for example, "HP LaserJet IIISi Printers").
7. If desired, change any of the configurable parameters (note that the default queue name is the name of the printer plus an "\_" and a number (e.g., `laser_1`)). Then enter 0 to configure the queue.
8. Answer "Y" at the "OK to Continue?" prompt. Exit the JetAdmin utility by pressing RETURN and then "q" twice.

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9. Print a job using the lp command. For example,

```
lp -dlaser_1 /etc/hosts
```

If you need a different TCP port number or if you want additional TCP ports, you may define a TCP port number on any TROY XCD print server service by using the

```
SET SERVICE servicename TCP nn
```

where *servicename* is the name of the service, and *nn* is the desired port number (must be greater than 1023). Refer to Appendix A for information on using the console.

---

## Changing the Configuration (Optional)

You may use TELNET, the DEC NCP utility, the XCONFIG NetWare utility, or the XConnect II/Pony 100/XConnect 100 serial port to connect to the TROY XCD print server remote console and change the configuration or view the status. The procedure and configuration commands are described in Appendix A.

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### **Overview**

TROY XCD print servers allow NetWare client PCs to print jobs on the same printer as DEC, UNIX, AppleTalk, LAN Manager, and Banyan users. All NetWare jobs are spooled through the Novell server, so NetWare utilities and application programs can use the printer transparently.

---

### **NetWare Concepts**

Novell NetWare is a sophisticated network operating system that allows PC clients (and other nodes) to access network resources such as disk drives and printers as if they were directly connected. NetWare networks require at least one file server, and users must log into this server to take advantage of the NetWare capabilities.

To handle printing over the network, the file server provides print spooling for the clients. It holds print jobs locally until contacted by a print server on the network, which in turn sends the job to appropriate printer. In the past, a NetWare print server was typically either a PC dedicated to handling printers or a Network Loadable Module (NLM) or Value Added Process (VAP) running on the file server. Today, NetWare print servers are often special-purpose networking hardware like a TROY XCD print server.

TROY XCD print servers can operate in two different modes to service NetWare print queues:

- Remote Printer mode (also known as NPRINT mode on NetWare 4.xx or RPRINTER mode on NetWare 2.xx or 3.xx networks)
- Queue Server mode (also called print server or PSERVER mode)

In remote printer mode (see figure 5-1), the client PC sends the print job to the file server, which in turn spools it to a

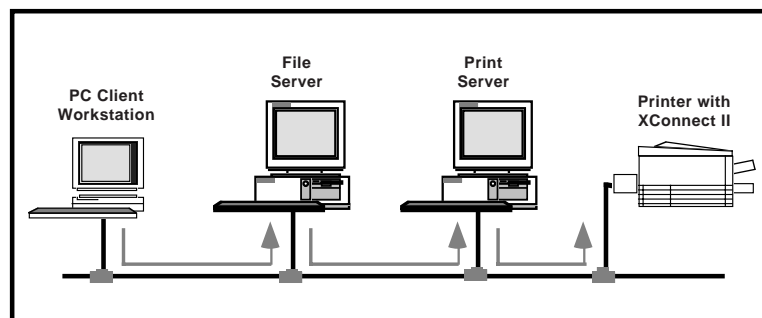


Figure 5-1

TROY XCD Print Server Operating as a NetWare Remote Printer

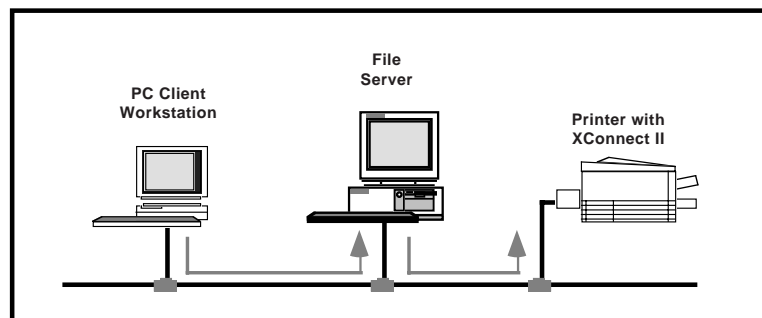


Figure 5-2

TROY XCD Print Server Operating as a NetWare Queue Server

## 5-2 Novell Network Configuration

print server (the print server may be a physical device like a PC or a software NLM or VAP on the file server), which in turn sends it to the printer. This approach provides good performance, and has the advantage of not consuming a user slot on the file server.

A TROY XCD print server can also act as a NetWare print server (queue server) with an attached printer, which therefore eliminates the need for a dedicated PC print server or for an NLM or VAP on the file server. As shown in figure 5-2, this means that jobs from the client PC are spooled to the file server, which in turn spools the job directly to the TROY XCD print server. The advantage of this approach is higher performance, but it has the drawback of requiring a user slot on the file server.

Generally speaking, TROY XCD recommends that you use queue server mode instead of remote printer mode because the performance will be much higher. The exception to this recommendation is if you have a limited number of available user slots (for example, if you have a 5-user NetWare license and you have five active users).

TROY XCD print servers will work with NetWare Directory Services (NDS) or bindery emulation mode on NetWare 4.xx and later networks (not all TROY XCD print servers support NDS queue server mode; refer to chapter 2 for specific protocol support information).

---

## General Information

In order to use a TROY XCD print server on a NetWare network, one or more file servers must be configured with a

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print queue that the TROY XCD print server can service. Users send their print requests to the file server's print queue, and the jobs are then spooled (either directly, or in the case of remote printer mode, via an intermediate print server) to the TROY XCD print server.

TROY XCD print servers can be configured under Windows using Hewlett-Packard's JetAdmin utility or TROY XCD's XAdmin32 and XAdmin utilities. Alternatively, they can be configured using the NetWare PCONSOLE utility in conjunction with TROY XCD's DOS XCONFIG utility.

**Important Note:** *Not all TROY XCD print server models support queue server mode with Novell Directory Services (refer to chapter 2 for protocol support information). You must enable bindery emulation in order to use queue server mode with these products.*

---

## Before You Begin

Before you can configure a NetWare print queue, you must have sufficient privileges. With NetWare 3.xx and earlier, you **MUST** be logged in as SUPERVISOR (not someone with Supervisor privileges). With NetWare 4.xx and later, make sure that you have sufficient administrator privileges to create a print queue in the desired context.

---

## Default Print Server Names (Service Names)

TROY XCD print servers automatically make themselves known on a NetWare network. Each print server port has an associated default NetWare name; these names are used

## 5-4 Novell Network Configuration

extensively during the configuration process, so be sure to remember them. The names are as follows:

**XConnect II**

XCD_XXXXXX_P1	(parallel port)
XCD_XXXXXX_S1	(serial port, if enabled)
XCD_XXXXXX_LN	(parallel port if LN03 option is installed)

**XConnect II**

XCD_XXXXXX_P1	(parallel port)
XCD_XXXXXX_S1	(serial port, if enabled)
XCD_XXXXXX_LN	(parallel port if LN03 option is installed)

**XConnect II Lite**

XCD_XXXXXX_P1	(parallel port)
XCD_XXXXXX_S1	(serial port, if enabled)

**Pony Print Server Plus**

XCD_XXXXXX_P1	(parallel port)
---------------	-----------------

The default NetWare print server names are actually the names of the print server's NetWare services (refer to Appendix B for more information on services). The "XXXXXX" in all of the above cases is the last six digits of the Ethernet address (for example, XCD\_034578\_P1). Refer to the label on the print server or to the print server self-test for the Ethernet address. If desired, you may change the default names to something more meaningful by using XAdmin32, XAdmin, WebXAdmin, JetAdmin, or the print server console.

---

## Configuring the Print Server and Adding the Print Queue in Queue Server Mode

TROY XCD print servers can be configured in Queue Server mode for either bindery or NDS mode operation. The simplest way to do this is with TROY XCD's XAdmin32 or HP's JetAdmin utilities. XAdmin32 is a Windows 95/98 and Windows NT 4.xx-based utility that allows you to configure the print server and create NetWare print queues without using NetWare utilities like PCONSOLE or NWAdmin (if you have Windows 3.xx, you must use XAdmin as described later in this chapter). JetAdmin is a Hewlett-Packard utility that provides similar capabilities. Other methods include TROY XCD's XAdmin or XCONFIG utilities in conjunction with Novell's NWAdmin or PCONSOLE.

### Configuring the Print Server and Print Queue with XAdmin32 (Queue Server Mode)

**NOTE:** *TROY XCD recommends you use the Novell 32-bit client on your Windows 95/98/NT workstation instead of the Microsoft NetWare client, because it allows direct configuration of print queues without the need for a Novell utility like NWAdmin or PCONSOLE.*

**NOTE:** *If you have a Windows 3.xx system, you must use XAdmin as described later in this chapter.*

**NOTE:** *NDS Queue Server mode is only supported by "S" and "N" Series models (for example, PPS-8S and XConnect II-8N; refer to Chapter 2 for specific mode information).*

1. Make sure that you are logged in as ADMIN or equivalent (NetWare 4.xx and above) or SUPERVISOR (NetWare 2.xx and 3.xx). Install the XAdmin32

## 5-6 Novell Network Configuration

software from the *TROY XCD Print Server Software* CD-ROM by clicking on the **Start** button and selecting **Run**. Click on **Browse and** select the CD-ROM drive. Open the Utilities folder, open the XAdmin32 folder, and click on `SETUP . EXE`, Click **OK** twice and follow the instructions on the screen.

2. Click on **Start**, select **Programs**, select the **XAdmin32** folder, and then select **XAdmin32**.
3. Click on the IPX/SPX icon under Filters to set the operating mode to IPX/SPX (TCP/IP mode will not allow you to configure NetWare print queues directly). The TROY XCD external print server should appear in the list of available printers (the name will one of the ones listed in the *Default Print Server Names* section at the beginning of this chapter). If it does not, try going to the menu bar and selecting **Devices** and then **Search Active Devices**.

**Important Note:** *V3.59 and earlier firmware do not support more than one service and one port (the firmware version is listed on the self-test page). If you have an XConnect II or XConnect 100 and need to use the serial port for printing, you must upgrade to a newer revision of the firmware.*

4. Double click on the printer that you wish to configure, enter the configuration password (ACCESS is the default), and press **OK**.
5. A series of index card tabs will be displayed. Click on the **NetWare P1** tab to configure the first parallel port, the **NetWare S1** tab to configure the serial port, the

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**NetWare P2** tab to configure the XConnect 100 second parallel port, or the **NetWare S2** tab to configure the XConnect 100 second serial port.

- If it is not already selected, select **Queue Server** as the operating mode.
- Click on the ▼ button and select the NDS tree (if you are using the Microsoft NetWare client, you must type in the name of the tree)..
- Click **Change...** button to select the NDS context where the queue will reside (if you are using the Microsoft client, you must type in the name of the context).
- If desired, you may change the print server name (do this with caution, because it changes the print server service name and will therefore affect any other protocols that use this service).

If you are using the Microsoft Client for NetWare, **STOP HERE**. Go to the *Adding NetWare Print Queues Using NWAdmin* section to complete the configuration.

6. Click on the **Change NDS Queues...** button to configure an NDS print queue or click the **Change Bindery Queues...** to configure a bindery mode queue.
7. Two windows will appear, **Available Print Queues** and **Serviced Print Queues**. First go to the **Available Print Queues** window:
  - If you are configuring an NDS queue, click on the context where the print queue will reside.

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- If you are configuring a bindery queue, click on the volume where the queue will reside (a volume name will have a file server icon next to it).

8. Click on **New Queue**.

- Enter any unique name for the Queue name. If you are configuring a bindery queue, click **OK** and proceed to step 8.
- If you are configuring an NDS queue, click **Browse**, select the file server volume where you want the queue to reside (a volume name will have a file server icon next to it), and click **OK**.

9. The queue name will now appear in the **Available Print Queues** under the selected volume (for bindery mode) or in the selected context (for NDS mode).

- Click on the desired queue.
- Click on **Add>>**

The name will now appear in the **Serviced Print Queues** window.

10. Click **Close** and then **OK**. You can now use the print queue from your NetWare workstation.

### **Configuring the Print Server and Print Queue with HP JetAdmin 3.XX (Queue Server Mode)**

**NOTE:** *JetAdmin 1.xx and 2.xx do not allow direct configuration of NetWare print queues. If you are using these versions, you may configure the print server with*

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*JetAdmin and then use NWAdmin or PCONSOLE to add the print queue. If possible, TROY XCD recommends that you upgrade to JetAdmin 3.xx (available on the HP web site at <http://www.hp.com>).*

1. Make sure that JetAdmin 3.xx is running on your system and that you have sufficient privileges to use it to create print queues. If you are using the Microsoft NetWare client on your workstation, make sure that you have installed **Services for NetWare Directory Services** in the **Network** control panel.
2. Click on **Start**, select **Programs**, select the **HP JetAdmin Utilities 3.0** folder, and then select **HP JetAdmin**.
3. One or more TROY XCD print server NetWare services will show up in the list of printers (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter). Single click on the one that you wish to configure and then go the menu bar, select **File** and then **Modify**.

**Important Note:** *V3.59 and earlier firmware do not support more than one service and one port (the firmware version is listed on the self-test page). If you have an XConnect II or XConnect 100 and need to use more than one port for printing, you must upgrade to a newer revision of the firmware.*

4. If desired, change the print server name and description. Click **Next**. Do this with caution because this will change the print server service name, and will therefore affect any other protocols that use this service.

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5. Make sure that **NetWare Directory Services** is selected in the window on the left side of the display.
  - Click on the ▼ button and select the NDS tree.
  - Click **Change...** button to select the NDS context.
6. Click on the **Operating Mode** button and select **Queue Server Mode**.
7. Click on the **Queues** button and then click on the **Change...** button. Two windows will appear, **Available Print Queues** and **Serviced Print Queues**. Go to the **Available Print Queues** window:
  - If you are configuring an NDS queue, click on the context where the print queue will reside.
  - If you are configuring a bindery queue, click on the volume where the queue will reside.
8. Click on **Create** and enter any unique name for the Queue name.
  - If you are configuring an NDS queue, the default file server on which the print queue will reside will be listed.. You may optionally change this by clicking on the ▼ button and selecting a different server. You may also optionally change the context that you selected in the previous step by clicking on the **Browse...** button. Click **OK** and proceed to step 9.
  - If you are configuring a bindery queue, you may optionally click on the ▼ button to change the file

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server volume that you selected in the previous step.  
Click **OK** to continue and go to step 9.

9. Click **Yes** when asked if you want to add the queue to the list of serviced queues. The queue name will now appear in the **Available Print Queues** in the selected context (for NDS mode) or under the selected volume (for bindery mode).
10. Click **OK** and then **Next**. If applicable, enter the IP address and click **Next**.
11. If desired you can enable users that will be notified in the event of printer problems. Click **Finish**. You can now use the print queue from your NetWare workstation.

### **Configuring the Print Server using XAdmin Version 2.0 or WebXAdmin (Queue Server Mode):**

**Important Note:** *Although XAdmin runs on Windows 95/98, TROY XCD recommends that you use XAdmin32 on these operating systems.*

1. If you are using XAdmin 2.0, install the XAdmin software. On Windows 3.xx systems, go the menu bar in the Program Manager, select **File**, and then **Run**. Click **Browse** to locate the Setup file (either on floppy disk or in the \Utilities\XAdmin folder on CD-ROM. On Windows 95, go the **Start** button, select **Run**, and then **Browse** for the Setup file.

Click **OK** to start the installation.

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2. If you are using XAdmin, start it up by double clicking on the icon.

If you are using WebXAdmin, start up your web browser (you must have a valid IP address configured in the PC and in the print server).

3. If you are using XAdmin, one or more TROY XCD print server NetWare services will show up in the list of printers (the default services names are listed in the *Default Print Server Names* section at the beginning of this chapter). Double click on the one that you wish to configure.

If you are using WebXAdmin, enter the IP address of the print server as the destination address in your browser and press **ENTER** or **RETURN**.

4. Enter the configuration password (ACCESS is the default) and press **OK** (XAdmin) or **Submit** (WebXAdmin).

5. If you have XAdmin, click on the **NetWare** tab.

If you are using WebXAdmin, click on **Configure NetWare**. You will see one or more enabled services (the default service names are listed in the *Default Print Server Names* section at the beginning of this manual). Click on the desired service.

6. If you are using NDS, type in the tree and context (the context may be entered in either the form `printers.mytree` or `OU=printers.O=mytree`). If you are using XAdmin, click **OK**, **Yes**, and **OK** to save the

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configuration changes. If you are using WebXAdmin, click **Submit** and exit the browser. Proceed to the next section, *Adding NetWare Print Queues using NWAdmin*.

If you are using bindery mode with XAdmin (not available with WebXAdmin), you may click on the **Add Queue** button to directly add a NetWare bindery queue:

- Click **Create**. Use the ▼ button to change the file server volume and then enter any unique name for the print and click **OK**.
- Click **Yes** when asked if you want to add the queue to the service list, click **OK** and **Close**. The queue will appear in the **Bindery Print Queues** window. Click **OK** and then **Yes**. You can now use the print queue from a NetWare workstation. Skip to the *Configuring the Windows Printer* section.

If you are using bindery mode with WebXAdmin, click **Configure NetWare** from the main menu, type in the name of the file server where the print queue will reside, and click **Add**. Proceed to the next section, *Configuring NetWare Print Queues using NWAdmin*.

### **Adding NetWare Print Queues Using NWAdmin (Queue Server Mode)**

If you are using XAdmin32 with the Microsoft NetWare client, or you are using XAdmin, WebXAdmin, or JetAdmin 1.xx or 2.xx, you need to use NWAdmin to configure the actual NetWare print queue. This is because these utilities only allow you to define the print server context and tree (or file server, if you are using bindery mode). The following steps are required:

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1. Start the Novell NWAdmin program by double clicking on the icon.
2. Create a printer object:
  - Click on the container where the object will reside.- Select **Object** from the menu bar and then **Create**.
  - When you get the **New Object** menu, select **Printer** and then **OK**.
  - Enter any desired name for the printer and select **Create**.
3. Create a print queue object:
  - Click on the container where the object will reside. Select **Object** from the menu bar and then **Create**.
  - When you get the **New Object** menu, select **Print Queue** and then **OK**.
  - Enter any desired name for the print queue
  - Click on the **Print Queue Volume** button and select the volume on which the print queue will reside.
  - Press **OK** and then **Create**.
4. Create a print server object:
  - Click on the container where the object will reside.
  - Select **Object** from the menu bar and then **Create**.
  - When you get the **New Object** menu, select **Print Server** and then **OK**.
  - Enter the name of the TROY XCD print server and select **Create**. Use the default print server name (the default names are listed in the *Default Print Server Names* section at the beginning of this chapter) unless you specifically changed it with XAdmin32, Admin, JetAdmin, or the print server console.

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5. Associate the printer with the print queue:
  - Change context if required and then double click on the name of the printer you created in step 3.
  - Click on **Assignments** and then **Add...**
  - Change context if necessary and select the print queue you created in step 4. Click **OK** and then **OK** again
  
6. Associate the print server with the printer:
  - Change context if required and then double click on the name of the print server you created in step 5.
  - Click on **Assignments** and then **Add...**
  - Change context if necessary and select the printer you created in step 3. Click **OK** and then **OK** again.
  
7. Exit NWAdmin. You are now ready to use the print queue from a NetWare workstation.

### **Configuring the Print Server and Print Queue Using PCONSOLE and XCONFIG (Queue Server Mode)**

As an alternative to JetAdmin and XAdmin, you can use the standard Novell PCONSOLE utility in conjunction with TROY XCD's XCONFIG program to set up your print queues (note that if desired, you may use TELNET, the DEC NCP utility, or the serial port instead of XCONFIG). The procedure is basically as follows:

1. Use XCONFIG to connect to the print server. Enter the password (ACCESS is the default) and type anything in response to the `Enter Username>` prompt.

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2. If you are configuring an NDS queue, enter the commands:

```
SET SERVICE servicename TREE treename  
SET SERVICE servicename CONTEXT contextname
```

where *servicename* is the service that you want to configure (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter), *treename* is the name of your NDS tree, and *contextname* is the NDS context where the print server will reside. Now skip to step 3.

If you are configuring a bindery queue, enter the command:

```
SET NETW QSERVER fileserver ON servicename
```

where *fileserver* is the name of the file server where the queue will reside (note that this is not necessarily the same as the volume name), and *servicename* is the name of the print server service (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter).

**Note:** The SET NETWARE SERVER command, which enables file servers on a global basis, is available for compatibility with older firmware releases, but is not recommended for new applications.

3. Start PCONSOLE

- If necessary, change to the desired context if you are using NDS.

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- Go to **Print Queues**, press **Insert** to create a new print queue, and enter the name of the print queue. If you are configuring an NDS queue, you will also need to enter a volume name (press **Insert** to browse for available volumes).
- Select **Print Servers** (NetWare 4.xx and later) or **Queue Servers** (NetWare 2.xx and 3.xx), press **Insert** and enter the name of the TROY XCD print server (the default print server names are discussed in the *Default Print Server Names* section at the beginning of this manual).
- **Go to Print Queues**, select the desired print queue, then select **Print Servers** and press **Insert** to select the name of the TROY XCD print server.
- Exit PCONSOLE.

4. Go back to XCONFIG and enter the command:

```
SET NETWARE RESCAN
```

After a few seconds, do a `SHOW NETWARE` command; you should see the queue you created being serviced by the file server. You are now ready to use the queue.

---

## Configuring the Print Server and Adding the Print Queue in Remote Printer Mode

To configure a TROY XCD print server for remote printer mode, there are two basic steps required. First, you must use

### 5-18 Novell Network Configuration

Novell's NWAdmin or PCONSOLE to add the print queue to the NetWare server. Then you must configure the print server for remote printer operation using XAdmin32, XAdmin, JetAdmin, WebXAdmin, or the print server console.

**Important Note:** *You cannot configure both Queue Server and Remote Printer mode on the same print server port. It is possible, however, to configure a multiport print server (such as the XConnect 100) with one port running in Queue Server mode and the other in Remote Printer mode.*

### **Configuring the Print Server and Print Queue using NWADMIN and XAdmin32, XAdmin, WebXAdmin, or JetAdmin (NDS Remote Printer Mode):**

To configure an TROY XCD print server for remote printer mode with NWADMIN (NetWare Administrator utility) and XAdmin32, XAdmin, WebXAdmin, or JetAdmin, first make sure that you have V3.28 or later firmware (refer to the self-test page or do a SHOW VERSION command from the console). Then perform the following steps:

1. Make sure that the PSERVER NLM (NetWare Loadable Module) is loaded on your file server and that you are logged in as ADMIN in NDS mode on the NetWare 4.xx file server.
2. Start NWADMIN by double clicking on the icon. Select the desired Container Object (Organizational Unit) that will contain the new printer.
3. Select **O**bject from the menu bar and then **C**reate. When you get the **N**ew **O**bject menu, select **P**rinter and then **O**K.

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4. Enter the name of the printer and select **C**reate.
5. Double click on the name of your PSERVER NLM. Click on **A**ssignments and then **A**dd...
6. If necessary, change the directory context. Select the printer you created and click **O**K. Note the number of the printer, as you will use this later, then click **O**K.
7. Select the desired Container Object (Organizational Unit) that will contain the default print queue, and then click on **O**bject and **C**reate to get **N**ew **O**bject menu.
8. Select **P**rint **Q**ueue and then **O**K. Make sure that **D**irectory **S**ervice **Q**ueue is selected, and then type in a name for the default print queue.
9. Click on the button to select the print queue volume. Change the directory context if necessary, then select the desired volume (**O**bjects) and click **O**K. Click **C**reate to create the print queue.
10. Change context if required and then double click the name of the printer you created previously.
11. Click **A**ssignments and then **A**dd..
12. Change context if necessary and select the print queue you created. Click **O**K and then **O**K again, and then exit NWADMIN.
13. Select the print server and service that you wish to configure:

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- If you have XAdmin32, double click on the print server name and then click on the appropriate NetWare tab (**NetWare P1** for the first parallel port, **NetWare S1** for the first serial port, **NetWare P2** for the XConnect 100 second parallel port or **NetWare S2** for the XConnect 100 second serial port).
- If you are using XAdmin, one or more TROY XCD print server NetWare services will show up in the list of printers (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter). Double click on the one that you wish to configure and then click on the **NetWare** tab.
- If you are using WebXAdmin, start your web browser, enter the IP address of the print server as the destination address, and then push **ENTER** or **RETURN**. Click on **Configure NetWare**, and then click on the Enabled Service that you wish to configure (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter).
- If you are using JetAdmin, one or more TROY XCD print server NetWare services will show up in the list of printers (the default service names are listed in the *Default Print Server Names* section at the beginning of this chapter; note that JetAdmin supports a maximum of three ports per print server). Single click on the one you want to configure, go to the menu bar and select **Device** and then **Modify**. Then click **Next** and select **Operating Mode**.

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**NOTE:** *If you want to enable remote printer capabilities on services other than the default NetWare services, you must define new services that are enabled for NetWare and for the desired port (only one service per port can be defined for NetWare). Refer to Appendix B in this manual for information on how to do this.*

14. Select the Remote Printer as the **Operating Mode**, enter the name of your PSERVER NLM as the **Print Server Name**, and select the number of the printer from step 6 as the **Printer Number** (XAdmin32 and JetAdmin allow you to choose from a list of available print server NLMs rather than typing in the name).
15. If you have XAdmin 32 or XAdmin, click **OK**. If you have JetAdmin, click Next two times, and then click **Finish**. If you have WebXAdmin, click **Submit**.
16. Exit the configuration utility. You must now unload the PSERVER NLM from your NetWare file server console and then reload it in order for the changes to take effect.

### **Configuring the Print Server and Print Queue using PCONSOLE and XCONFIG (Remote Printer Mode)**

To configure an TROY XCD print server for remote printer mode operation using PCONSOLE and XCONFIG, first make sure that you have V3.27 or later firmware (refer to the self-test page or do a `SHOW VERSION` command from the console). Then perform the following steps:

1. Make sure that the PSERVER NLM (NetWare Loadable Module) is loaded on your file server.

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2. Log into the file server from your PC workstation as ADMIN if you are using NetWare 4.xx (if you want NDS support, do not login under bindery mode). If you are using NetWare 2.XX or 3.xx, login as SUPERVISOR.
3. Run the PCONSOLE utility from your PC workstation.
4. If you are creating a new print queue, select **Print Queue Information** (NetWare 3.xx) or **Print Queues** (NetWare 4.xx) from the **Available Options** menu. Press **INSERT**, type in the desired print queue name (with NetWare 4.xx, you will also be asked for a volume name; press **INSERT** and select the appropriate volume), and press **ESCAPE** to return to the main menu.

*The following steps apply to configuring a remote printer with NDS support on NetWare 4.xx systems:*

- a. Select **Print Servers** from the PCONSOLE menu and then select the name of the PSERVER NLM on your host computer.
- b. Select **Printers**.
- c. Press **INSERT** to get **Object, Class** menu.
- d. Press **INSERT** and enter the **Printer Name** (any unique name is OK).
- e. Highlight the printer name and press **ENTER** twice to get **Printer Configuration Menu**.

## Novell Network Configuration 5-23

- f. PCONSOLE will assign a **Printer Number**. Remember this number, since it will be used later.
- g. Highlight **Print Queues Assigned** and press **ENTER** and then **INSERT** to get a list of available queues.
- h. Highlight the name of the print queue you wish to assign to the remote printer and press **ENTER**.
- i. The other settings in the menu are not required. Push **ESCAPE** several times to exit PCONSOLE.
- j. Skip to step 5 below.

*The following steps apply to configuring a remote printer on NetWare 3.xx systems:*

- a. Select **Print Server Information** from the PCONSOLE main menu and choose the name of the PSERVER NLM.
- b. Select **Print Server Configuration** and then **Printer Configuration**. Select any "Not Installed" printer and press **Enter**. Remember the number of this printer, since it will be used later in the configuration process.
- c. If desired, type in a new name for the printer.
- d. Go to **Type**, press **ENTER**, highlight **Remote Other/Unknown** and press **ENTER** again. The other settings in this menu are not required.

## 5-24 Novell Network Configuration



- e. Push **ESCAPE** and save the changes.
- f. Push **ESCAPE** and select **Queues Serviced by Printer.**
- g. Highlight the printer name that you just configured and press **ENTER.**
- h. Press **INSERT**, choose the desired print queue, and press **ENTER** (you can accept the default priority).
- i. Press **ESCAPE** several times to exit PCONSOLE.

5. Insert the *TROY XCD Print Server Software* diskette or CD-ROM into your PC and run the XCONFIG utility (in the `\utilities` directory on the CD-ROM)

Select the TROY XCD print server from the list of print servers. When you get the message that the print server is connected, press the ENTER key and type the password ACCESS in response to the "#" prompt (the password will not echo), and then press the ENTER key again in response to the `Enter Username>` prompt. When you get the `Local>` prompt, type:

```
SET NET NPRINT nlm number ON service
SET NET RESCAN
EXIT
```

where *nlm* is the name of the PSERVER NLM on your file server, *number* is the printer number (must match the printer number you selected during the PCONSOLE configuration in the previous steps) and *service* is the name of the service (the default service names are listed in the *Default Print Server Names* section of this chapter).

## Novell Network Configuration 5-25

For example, to set up remote printer 3 for an HP printer with the TROY XCD print server XCD\_00C3E4 using the PSERVER NLM called XCD1PS, you would type:

```
SET NET NPrinter XCD1PS 3 ON XCD_00C3E4_P1
SET NET RESCAN
EXIT
```

**NOTE:** *The same service cannot be used for both queue server mode and remote printer mode.*

**NOTE:** *If you want to enable remote printer capabilities on services other than the default NetWare services, you must define new services that are enabled for NetWare and for the desired port. Refer to Appendix B in this manual for information on how to do this.*

6. You must now unload the PSERVER NLM from your NetWare file server console and then reload it in order for the changes to take effect.

---

## Configuring the Workstation

The final step is to configure the workstation(s) to print to the TROY XCD print server. The TROY XCD print server can be used with any workstation that supports either the Novell or Microsoft client software.

### Configuring the Workstation (Windows 95/98)

To use a NetWare print queue from a Windows 95 workstation, first make sure that the appropriate NetWare drivers are installed. Then go to the **Start** button, choose **Settings**, and then select **Printers**. Double click on the **Add**

## 5-26 Novell Network Configuration

**Printer** icon and then execute the following steps when you get to the **Add Printer** Wizard.

1. Click on **Next**, Select **Network Printer** and click on **Next** again.
2. Select **Browse**, double click on the appropriate file server name, select the print queue, and click **OK**. If you used JetAdmin to configure the queue, you should double click on the **HP\_Network\_Printers** icon instead of the file server icon, and then select the TROY XCD print server name. Click on **Next**.
3. Select the desired printer manufacturer and model (click **Have Disk** if your printer is not listed), and click on **Next**.
4. If the driver already exists, select **Keep Existing Driver** (if it does not, this step will be skipped), and then click on **Next**.
5. If desired, change the name of the printer and/or make it the default, and then click on **Next**.
6. Select **Yes** when you are asked "Would you like to print a test page?" Click on **Finish**.

### **Configuring the Workstation (Windows NT 4.xx)**

To add a queue from a Windows NT 4.xx workstation, execute the following steps: NetWare Windows VLM drivers and utilities installed. Then go to the **Start** button, choose **Settings**, and then select **Printers**. Double click on the **Add Printer** icon and then execute the following steps when you get to the **Add Printer** Wizard:

## **Novell Network Configuration 5-27**

1. Select **Network Printer Server** and click on **Next**.
2. Select the desired print queue and click **OK**. Answer **OK** when asked if you want to install the printer driver.
3. Select the desired printer manufacturer and model, and click on **Next**.
4. If desired, make the printer the default, and then click on **Next**.
5. Click on **Finish**.

### **Configuring the Workstation (Windows 3.xx)**

To use a NetWare print queue from a Windows 3.xx workstation, first make sure that you have the appropriate NetWare Windows VLM drivers and utilities installed. Then execute the following steps:

1. Open the **Main** window of the Windows Program Manager and start the Print Manager.
2. Select **Options** (or **Printer**) from the menu bar and then **Network Connections**.
3. Select the desired port (for example, LPT1:) under **Ports:** and the desired print queue under **Resources**. If you have configured the TROY XCD print server for NDS mode, you may alternatively select the printer name instead of the print queue name.
4. Click **Capture** and **Permanent**.
5. Close the window and select **Options** and then **Printer Setup**.

## **5-28 Novell Network Configuration**

6. Choose the desired printer under **Installed Printers**. If the desired printer does not exist, select **Add>>** and select the printer from the **List of Printers**, and click on **Install** (normally you will need either the original Windows diskette distribution or the printer manufacturer's driver diskette).
7. If the desired printer is not on the correct port, click on **Connect**, select the port, and click **OK**.
8. If desired, click **Set as Default Printer** to make the printer your default printer.
9. Exit the Print Manager.

### **Configuring the Workstation (DOS-based NetWare drivers)**

To configure the PC workstation so that DOS applications can print transparently to the TROY XCD print server (you may also use this procedure if you do not have Windows-specific NetWare drivers), use the DOS editor to add a command with the following format to the AUTOEXEC.BAT file on your PC:

```
capture l=n q=queuename ti=timeout
```

where *n* is the number of the parallel port you wish to redirect, *queuename* is the name of the queue you created (if you using NetWare 4.xx in NDS mode, you may specify *p=printername* instead of the queue, where *printername* is the name of the NDS printer; be sure to enter the entire directory context of the printer), and *timeout* is a the number of seconds the file server will send data to the printer after the application last writes to a file (use at least 5 seconds for DOS applications and at least 50 seconds for Windows

## **Novell Network Configuration 5-29**

applications, and you may need to increase the values if you are unable to print). For example, if your queue is called *myqueue* and you wish to use LPT1 with a timeout of 5 seconds, you would enter:

```
capture l=1 q=myqueue ti=5
```

After the workstation is restarted, you will be able to print from applications programs as if the printer were directly connected to the LPT1 parallel port.

### **Testing the Print Queue**

Test the queue by printing a small job from an application program like the Windows 95 Paint Accessory program (make sure that the program is set up to print to the correct print queue if the TROY XCD print server is not assigned to service the default queue). The file will be spooled to the TROY XCD print server for printing and should print on the printer within a short period of time. If it does not, double check your configuration, and if necessary, refer to the *Troubleshooting* chapter of this manual for additional information.

---

## **Changing the Print Server Configuration (Optional)**

The TROY XCD print server default parameters can be changed via the XCONFIG utility to meet a wide variety of user needs. The procedure for doing this is described in detail in Appendix A of this manual.

### **5-30 Novell Network Configuration**

# 6

## **AppleTalk Network Configuration**

---

### **Overview**

All TROY XCD print servers except the XConnect II Lite support the AppleTalk protocol running over Ethernet (also known as EtherTalk). This capability allows Macintosh computers to print jobs to a printer simultaneously with jobs from DEC, UNIX, NetWare, and other computers.

If you have the XConnect II LocalTalk option, LocalTalk-based Macintosh computers can also share the same printer with Ethernet-based systems.

---

### **AppleTalk Concepts**

TROY XCD print server AppleTalk capabilities allow a printer to appear as a shareable printer node on an AppleTalk Phase 2 network. The TROY XCD print server broadcasts information to Macintoshes on the network, and automatically appears in the Chooser on each Macintosh. Application programs (such as Microsoft Word, Excel, PageMaker, etc.) can print without modification or special software on the Macintosh.

---

## Step 1 Macintosh Configuration

TROY XCD print servers are compatible with the Apple LaserWriter 8 drivers as well as drivers supplied by many printer manufacturers (earlier versions of the LaserWriter drivers may crash or cause PostScript errors on large networks). If none of these drivers is installed on your Macintosh, you must install one of them from diskette following the instructions of the manufacturer.

Before using a TROY XCD print server, you must first enable Ethernet or LocalTalk (if you want to use the XConnect II LocalTalk option) from the Network Control Panel on the Macintosh. If Ethernet is not selectable or the Network Control Panel does not exist, you must use Apple's Network Installer software to add these capabilities.

---

## Step 2 Printing

Once the print server is installed powered on, the print server service name (default is XCD\_XXXXX\_pp\_AT, where "XXXXXX" is the last six digits of the Ethernet address and "pp" is P1 for the parallel port, S1 for the serial port, and P2 or S2 for the XConnect 100 second parallel and serial ports; for example, XCD\_009C53\_P1\_AT) should appear in the Chooser. Note that the serial ports will not appear if they are set for console mode operation.

To select the TROY XCD print server, open the Chooser from the Apple Menu on the Macintosh, and then click on the LaserWriter icon (if necessary, select the appropriate AppleTalk zone from the Network Control Panel). Then click on the TROY XCD print server name and close the

## 6-2 AppleTalk Network Configuration



Chooser. You should now be able to print from the Macintosh.

If you cannot see the print server, first make sure that your cabling is correct and that you have enabled EtherTalk or (if applicable) LocalTalk from your Macintosh Network Control Panel. You may also need to force the TROY XCD print server into the correct AppleTalk zone using the SET APPLETTALK ZONE command described in Appendix A.

**Important:** *AppleTalk requires a PostScript printer.*

**Important:** *If you are using the parallel port, your printer must either support the IEEE P1284 Bitronics bidirectional standard (refer to your printer documentation) or you must enable AppleTalk spoofing by using the following command from the print server console (refer to Appendix A if you do not know how to use the console):*

```
SET SERVICE servicename RECEIVE ENABLED
```

*where servicename is the name of the AppleTalk service (XCD\_XXXXXX\_P1\_AT by default, where "XXXXXX" is the last six digits of the print server Ethernet address and "pp" is the port name).*

---

## Printing Binary Graphics

Scanned images and other types of graphics are frequently saved in a format known as *binary PostScript*. Hewlett-Packard and some other printers require that the printer be set in a special binary mode, which is unfortunately not always possible with an external print server. However, a TROY XCD external print server can print binary files under the following circumstances:

## AppleTalk Network Configuration 6-3

- If the printer supports printing binary files through the parallel or serial port. This option is sometimes selectable through the front panel of the printer.
- If the printer supports the HP Tagged Binary Communications Protocol. If this is the case, you must enable filter 4 on the print server AppleTalk service via the console as described in Appendix B.

Refer to your printer's documentation for additional information. If neither of the above is true, the solution is to print the files in ASCII mode, a mode that is supported in the PRINT menu of most graphics programs including QuarkXpress, Adobe Photoshop, and others. The only drawback of ASCII mode is that print times will be longer due to the increased file sizes.

---

## Changing the Configuration (Optional)

You may use the Apple LaserWriter Utility or Apple Printer Utility (or equivalent utility from your printer manufacturer) to change the AppleTalk name of the TROY XCD print server. You may also use NCP, TELNET, XCONFIG, or the serial port to access the print server remote console to change TROY XCD print server AppleTalk name and default zone name, and to disable AppleTalk broadcasts. The exact procedure and configuration commands are described in Appendix A.

**Note:** A free unsupported version of TELNET is available on the National Center for Supercomputer Applications (NCSA) FTP site (<ftp.ncsa.edu/Mac/Telnet/Telnet2.7>). This TELNET requires Mac TCP, which is standard with all new versions of the Mac OS.

## 6-4 AppleTalk Network Configuration

# 7

## Windows NT/LAN Server/Warp Server Network Configuration

---

### Overview

Users of Windows NT V3.5 or later (including Windows NT Advanced Server) can print directly using the TCP/IP protocol to printers that are equipped with a TROY XCD print server. No special software is required on the Windows NT system, and the printing operates transparently with any application program.

TROY XCD print servers also support transparent printing from IBM LAN Server and Warp Server file server, as well as from OS/2 Warp Connect workstations, using the TCP/IP protocol. TCP/IP is included standard with Warp Server and with LAN Server V4.0, and is optional on LAN Server V3.x systems. It is also included standard with OS/2 Warp Connect, and is optional on earlier versions of OS/2.

In addition, client PCs connected to a Windows NT Advanced Server or to an IBM LAN Server file server can print transparently to the TROY XCD print server. In this case, the client PCs typically use the NetBEUI protocol to print jobs to the file server, which in turn spools the job to the TROY XCD print server via TCP/IP. The advantage of TCP/IP compared to other approaches is that it is a high-performance routable industry-standard protocol.

**Important:** *TROY XCD recommends TCP/IP for Windows NT and OS/2 printing because it is routable and provides*

*higher performance. Some TROY XCD print server models also support printing using the NetBEUI or DLC/LLC protocols (refer to Chapter 1 for specific protocol support information). Windows NT and OS/2 configuration using these protocols is described in Chapters 9 and 10 of this manual.*

---

## Windows NT IP Configuration

To configure a print queue from a Windows NT computer, you must first configure an IP address in both the computer and in the print server as follows:

1. If you have not already done so, install TCP/IP on your Windows NT system. This is done via the **Network** icon in the **Control Panel** window of the Windows NT system (the Control Panel is in the Main window on NT V3.5x systems, or use the **Start** button on NT V4.xx to access the **Settings** menu).
  - a. On NT V3.5x systems, select **Add Software** and add **TCP/IP Protocol and related components**. Click on **Continue** and choose the options **TCP/IP Network Printing Support** and **Connectivity Options**, and click on **Continue** again. Insert the requested disk(s) to copy the required files.
  - b. On NT V4.xx systems, click on the **Protocols** tab, select **Add**, and double click on **TCP/IP protocol**. Insert the requested disk(s) to copy the required files. Then click on the **Services** tab and double click on **Microsoft TCP/IP Printing**. Again insert the requested disk(s). Click on the **Protocols** tab when then copying is finished.

## 7-2 Windows NT/LAN Server Configuration

Double click on the **TCP/IP Protocol** option and add the host IP address, subnet mask, and gateway address. Consult your system manager for these addresses. If you are not directly connected to the Internet, you may assign any arbitrary Class C address of the form *aaa.bbb.ccc.ddd*, where *aaa* is any number from 192 to 222, *bbb* and *ccc* are any number from 0 to 255, and *ddd* is any number from 0 to 254; for example, 192.189.207.3. You may also use a subnet mask of 255.255.255.0 with no gateway address. If you have more than one LAN adapter card, select the one you want to use for TCP/IP.

If you have more than one LAN adapter card, select the one you want to use with TCP/IP. Click **OK** twice to exit (you may need to restart the system).

2. If you have not already configured the print server IP address, you will need to do so now. The simplest way to do this with Windows NT 4.x is to use XAdmin-32 as described in Chapter 3.

As an alternative, or if you have Windows NT 3.5x, you may go to the MS-DOS Command Prompt and use the `arp -s` command to enter the IP address into the TROY XCD print server as shown in the following example:

```
arp -s 192.189.207.77 00-40-17-00-ed-d6
ping 192.189.207.77
```

Again, substitute your actual IP address for *192.189.207.77*, and replace the *00-40-17-00-ed-d6* with the actual Ethernet hardware address of the TROY XCD print server (which can be found on the label affixed to the bottom of the box or via the printer self-

## Windows NT/LAN Server Configuration 7-3

test). If you get the message "The arp entry addition failed: 3", try pinging a known device on the network using the command `ping ipaddress`, where *ipaddress* is the IP address of that device.

**Important:** *You must be on the same Ethernet segment (that is, there cannot be a router between the TROY XCD print server and the Windows NT system) to use the `arp -s` command. If there is a router, you may use BOOTP or other methods described in Chapter 4 to enter the IP address. Also, this method only works the first time the TROY XCD print server is configured. If the TROY XCD print server already has an IP address, you may use TELNET to access it and change the IP address using the `SET IP ADDRESS` command described in Appendix A.*

**Important:** *The TROY XCD print server has a default IP address of 192.0.0.192 (192.189.207.254 on older firmware versions). You must change this address to a unique value to avoid having duplicate IP addresses.*

---

## Windows NT V4.xx Configuration

**Note:** *If you have Windows NT V3.5 or V3.51, skip to the next section.*

1. Go to the **Start** button, choose **S**ettings, and then select **P**rinter. Double click on the **A**dd **P**rinter icon to get the Add Printer Wizard. Click. Select **M**y **C**omputer (*Not Network Printer*) and click on **N**ext.
2. Select **A**dd **P**ort, select **L**PR **P**ort from the list of available ports, and click on **N**ew **P**ort.

### 7-4 Windows NT/LAN Server Configuration

3. Type in the IP address that you wish to assign to the print server in the **Name or address of server providing lpd:** box. If you do not have a router on the network, this IP address *must* match the first three bytes of the IP address of your computer. For example, if your computer has an IP address of 192.189.207.53, your print server must have an address like 192.189.207.27.
4. Type in the print server service name in the **Name of printer of print queue on that server:** box. If you do not know which service name to use, enter `BINARY_P1` for the first parallel port, `BINARY_S1` for the first serial port, `BINARY_P2` for the XConnect 100 second parallel port, or `BINARY_S2` for XConnect 100 second serial port and then click on **OK**:
5. Click on **Close**. The new print server IP address should be listed and highlighted as an available port. Click on **Next**.
6. Select the desired printer manufacturer and model (click **Have Disk** if your printer is not listed), and click on **Next**.
7. If the driver already exists, select **Keep Existing Driver** (if it does not, this step will be skipped), and then click on **Next**.
8. If desired, change the name of the printer and/or make it the default, and then click on **Next**.
9. If desired, make the printer shared (so other users can access it), and select the operating system(s) that these other computers will be running. Click on **Next**.

## Windows NT/LAN Server Configuration 7-5

10. Select **Yes** when you are asked "Would you like to print a test page?" Click on **Finish** to complete the installation.

You may now print to the printer as if it were a local printer.

---

## Windows NT V3.5x Configuration

If you have Windows NT or NT AS V3.5 or V3.51, use the following procedure to configure the TROY XCD print server:

1. Go to the **Main** window and elect **Print Manager** icon.
2. Select **Printer** menu.
3. Select **Create Printer**
4. Enter any name for the printer for the **Printer Name**.
5. Select **Driver**. Choose appropriate driver.
6. Select **Description**. Enter anything.
7. Select **Print to**.
8. Select **Other**.
9. Select **LPR Port**.
10. Enter the TROY XCD print server IP address or name (from `HOSTS` file) as the **Name or Address of Host Providing LPD**.
11. Enter the TROY XCD print server service name as the **Name of Printer on That Machine**. Generally

## 7-6 Windows NT/LAN Server Configuration



speaking, you should use the service `BINARY_xx` (where "xx" is the P1 for the first parallel port, S1 for the first serial port, P2 for the XConnect 100 second parallel port, and S2 for the XConnect 100 second serial port) to pass the data through unmodified.

---

## LAN Server/Warp Server Configuration

TROY XCD print servers will work with IBM LAN Server/Warp Server networks that have IBM TCP/IP V2.0 or later software installed on the file server (TCP/IP is standard with LAN Server V4.0 and later, and on Warp Server). Use the following procedure to configure the TROY XCD print server on an OS/2 LAN Server or Warp Server file server, or on a OS/2 Warp Connect workstation:

**Important:** *TROY XCD recommends TCP/IP for OS/2 printing because it is routable and provides higher performance. Some TROY XCD print server models also support OS/2 printing using the NetBEUI or DLC/LLC protocols (refer to Chapter 1 for specific protocol support information). OS/2 configuration using these protocols is described in Chapters 9 and 10 of this manual.*

1. Make sure that TCP/IP software is installed on your OS/2 file server. If you have not already done so, open the **TCP/IP** folder on the desktop, and double click on the **TCP/IP Configuration** icon to add the IP address to the OS/2 file server (consult your system manager for this address).
2. Add the TROY XCD print server name to the `HOSTS` file (usually located in the `\tcpip\etc` directory; this step is not required if you use the TROY XCD print server IP

## Windows NT/LAN Server Configuration 7-7

address as the name). To do this, go to the OS/2 System icon, open the **Command Prompts** folder, and double click on the OS/2 Window icon. Use the OS/2 editor and add the an entry similar to the following:

```
192.189.207.77 xps
```

Substitute the name of the TROY XCD print server (any unique name will do) and the desired IP address in place of `xps` and `192.189.207.77` in the above example.

3. While still at the OS/2 prompt, use the following command to enter the IP address into the TROY XCD print server:

```
arp -s xps 00:40:17:00:ed:d6 temp
```

Again, substitute your actual name and IP address for `xps` and `192.189.207.77`, and replace the `00:40:17:00:ed:d6` with the actual Ethernet hardware address of the TROY XCD print server (which can be found on the label affixed to the TROY XCD print server box or via the printer self-test; note that you should use colons rather than hyphens to separate the bytes of the hardware address). The IP address will be set when you ping the print server in the next step.

**Important:** *You must be on the same Ethernet segment (that is, there cannot be a router between the TROY XCD print server and the OS/2 system). If there is a router, you may use BOOTP or other methods described in Chapter 4 to enter the IP address. Also, this method only works the first time the TROY XCD print server is configured. If the TROY XCD print server already has an IP address, you may use*

## 7-8 Windows NT/LAN Server Configuration

*TELNET to access it and change the IP address using the SET IP ADDRESS command described in Appendix A.*

4. Set the IP address and verify the connection by using the ping command with the address or name of the TROY XCD print server. For example:

```
ping 192.189.207.77           or  
ping xps
```

Again, substitute your actual name and IP address in place of *xps* and *192.189.207.77* in the above examples. You should get a response back from the TROY XCD print server if the IP address has been set and the print server is alive on the network. If you do not, run the printer self-test as described in Chapter 2 and verify that you have entered the correct IP address.

5. From the OS/2 desktop open the **Templates** folder. Use the right mouse button to drag the Printer icon (not the **Network Printer** icon) onto the desktop.
6. The **Create a Printer** window should be open (if it is not, double click on the printer icon).
  - Type in any name for the printer.
  - Select the default printer driver. If the desired printer driver is not listed, click on the **Install new Printer Driver** button and add the driver.
  - Choose the output port. IBM TCP/IP automatically creates 8 named pipes called \PIPE\LPD0 through

## Windows NT/LAN Server Configuration 7-9

`\PIPE\LPD7`. Pick an unused one and double click on it.

**Important Note:** *Early versions of Warp Server have a bug in which the named pipes do not appear (the problem does not affect Warp Connect or LAN Server). This problem is fixed via a patch available from IBM.*

You will get the **Settings** window. Enter the following:

<b>LPD server</b>	The TROY XCD print server name (from <code>HOSTS</code> file) or IP address.
<b>LPD printer</b>	For most applications, use the TROY XCD print server binary service BINARY_P1 (for the first parallel port), BINARY_S1 (for the serial port), BINARY_P2 (for the XConnect 100 second parallel port), and BINARY_S2 (for the XConnect 100 second serial port) to pass data through unmodified.

However, if you are printing text files from the DOS or OS/2 command prompt, you should use the text service `TEXT_P1`, which will add

## 7-10 Windows NT/LAN Server Configuration

	carriage returns for proper formatting of the data (but will potentially distort graphics printouts).
<b>Host name</b>	The IP name of the OS/2 file server
<b>User</b>	The IP address of the OS/2 file server

You may leave the other entries blank. Click on the **OK** button. The pipe should be highlighted; if not click on it.

- Click on the **Create** button to create the printer.

7. Open the **LAN Services** folder and execute the **LAN Requester** program:

- Select **Definitions**
- Select **Aliases**
- Select **Printers**
- Select **Create**. Enter the following:

<b>Alias</b>	Should be same as the printer name previously defined
<b>Description</b>	Anything you want
<b>Server name</b>	Name of OS/2 server
<b>Spooler queue</b>	Name of printer as defined previously
<b>Maximum number of users</b>	Leave blank unless you want to limit the number of users

- Exit the **LAN Requester** program.

## Windows NT/LAN Server Configuration 7-11

8. You should now be able to print. To test the queue, type the following from either the OS/2 command prompt or from a DOS workstation:

```
COPY C:\CONFIG.SYS \\servername\alias
```

where *servername* is the name of the file server and *alias* is the alias name that you specified during this configuration process. This should print the `CONFIG.SYS` file on the printer. Note that if you selected a binary service as the LPD printer name, the lines will be staggered; don't worry about this because normal DOS, Windows, and OS/2 applications will print OK.

9. The TROY XCD print server will appear as a standard OS/2 printer to application programs. To make the TROY XCD print server operate transparently with DOS programs, execute the following command on each workstation:

```
NET USE LPT1: \\servername\alias
```

This will make the printer and the TROY XCD print server appear to the software as a printer that is directly connected to the parallel port of the workstation.

## 7-12 Windows NT/LAN Server Configuration

## Windows 95/98 Peer-to-Peer Configuration

---

### Overview

The Windows 95 and Windows 98 operating systems feature a built-in peer-to-peer networking capability that allows network printing without a central file server. TROY XCD print servers support this capability using either the Direct Mode IPX or TCP/IP protocols.

**Note:** *TROY XCD recommends using Direct Mode IPX or TCP/IP for Windows 95/98 Peer-to-Peer printing because these protocols are routable and provide the highest performance. Some TROY XCD print server models also support the NetBEUI protocol for printing from Windows 95 computers (refer to Chapter 1 for protocol support information). Refer to Chapter 9 for information on using NetBEUI.*

---

### Configuring the Windows 95/98 PC

To use a peer-to-peer print queue from a Windows 95/98 workstation, first make sure that the following items are configured in the Network Control Panel:

- **Client for Microsoft Networks**
- **IPX/SPX-Compatible Protocol** or **TCP/IP Protocol** (TCP/IP requires V3.46 or later firmware and is not supported on older versions of JetAdmin; if you are using TCP/IP, both your PC and print server must be configured with a valid IP address; refer to chapter 3 for

### Windows 95 Peer-to-Peer Configuration 8-1

information on setting the print server IP address with XAdmin32)

- **HP JetAdmin** (only required in the Control Panel if you have a version of JetAdmin earlier than V2.33)
- The appropriate network adapter driver (for example, 3Com EtherLink III)

If you want to use a version of JetAdmin later than 2.0, you must install JetAdmin on your PC. JetAdmin is included on the Windows 95 distribution CD, or it can be downloaded from the HP web site. The JetAdmin setup program provides a step-by-step guide through the installation process.

**Important:** *JetAdmin 3.3 or later requires XJet firmware version 3.58 or higher.*

**Important:** *Windows 98 requires either JetAdmin V2.54 (this version can be installed from the Microsoft Windows 98 CD by running the SETUP . EXE file in the DRIVERS / PRINTERS / JETADMIN / DISK1 / directory) or V3.30 or later (available on the HP web site).*

### **Configuring Windows 95/98 Peer-to-Peer (JetAdmin V3.0 and above)**

1. Go to the Start button, choose **Programs, HP JetAdmin Utilities** and then **Add HP JetDirect Printers**. Select **Custom Setup** and press **Next**.
2. Select either IPX/SPX or TCP/IP printer, depending on which protocol you want to use. Click on **Printer List** to get a list of available printers (or you may manually enter the information).

## **8-2 Windows 95 Peer-to-Peer Configuration**



3. Click on the print server name (XCD\_XXXXXX\_P1 is the default name for IPX/SPX and XCD\_XXXXXX is the default for TCP/IP, where "XXXXXX" is the last six digits of the Ethernet address) and press **OK** and then **Next**. Note that if you have an multiple ports enabled, the print server name will show up twice in the list; you may click on either name to configure it.
4. Select the desired port (port #1 for the first parallel port, and if present, port #2 for the first serial port, and port #3 for the second parallel port (the XConnect 100 second serial port is not supported). Press **Next**.
5. If you need to print from DOS, type in LPT2 or LPT3 as the port name (do not put in the colon). Do not use LPT1 or any other physical port on the PC. If you do not need to print from DOS, you may enter any name. Click **Next** for TCP/IP or **Finish** for IPX/SPX.

**Note:** If you specify LPT2 or LPT3 you can ignore the message about potential hardware conflicts if you do not have physical ports with these names.

If you are using IPX/SPX, click **Finish** and skip to step 7. If you are using TCP/IP, click **Next**.

6. If you are using TCP/IP, you can change the desired IP address. Click on **Finish** to continue.
7. Click **OK** when you get the message that the port has been successfully created.
8. Select the appropriate printer driver and click **Next**.

## Windows 95 Peer-to-Peer Configuration 8-3

9. Choose the port you created in step 5 and then click **Next**.
10. Pick any name for the printer and click **Next**. Print a test page if desired, and then press **Finish**.

### **Configuring Windows 95 Peer-to-Peer (JetAdmin V2.33 to 2.53)**

1. Go to the **Start** button, choose **Settings**, and then select **Printers**. Click on the **Add Printer** icon, click **Next**, select **Local printer**, and click **Next** again.
2. Select the appropriate printer driver and click **Next**. Choose LPT1: as the port and click **Next**. Pick any name for the printer and click **Next**. Do *not* print a test page. Click **Finish** to complete the preliminary printer installation.
3. Click on the printer icon of the printer you just created. From the **File** menu, choose the **Properties** and then select the **Details** tab.
4. Choose **Add Port**.
5. Select **Other**.
6. Choose **HP JetDirect port, OK**.
7. Select **IPX/SPX Printer** (if you are using the IP/SPX compatible protocol) or **TCP/IP Printer** (if you are using TCP/IP) and click on **Search**. Select the desired print server from the list and click **OK** (it is also possible to manually type in the print server address,

## **8-4 Windows 95 Peer-to-Peer Configuration**

name, and IP address). The print server information will now be displayed. Click **Next** to continue.

8. You will get the message that "The network device you have selected has more than one port. Please select the port used in your printer." Select port 1 or the first parallel port, and if present, port 2 for the first serial port, port 3 for the second parallel port, (the XConnect 100 second serial port is not supported), and then click **OK**.
9. If you need to print from DOS, type in LPT2 or LPT3 as the port name (do not put in the colon). Do not use LPT1 or any other physical port on the PC. If you do not need to print from DOS, you may enter any name. Click **Finish** if you are using the IPX/SPX protocol or **Next** if you are using TCP/IP.
10. If you are using TCP/IP, the IP address, subnet mask, and gateway of the print server should be displayed. Click **Finish**.
11. At the **Details** tab, the section "Print to the following port" should read something similar to "LPT2 (HP Direct Port)."
12. Click **Apply** and then **OK** to exit the **Properties** menu.

You should now be able to print to the new printer from either Windows 95 or DOS applications.

### **Configuring Windows 95 Peer-to-Peer (pre-V2.33)**

1. Click on **Next**, Select **Network Printer** and click on **Next** again.

## **Windows 95 Peer-to-Peer Configuration 8-5**

2. Select **Browse**, double click the **HP\_Network\_Printers** icon, and then select the print server name server name (default name is XCD\_XXXXXX\_pp , where "XXXXXX" is the last six digits of the Ethernet address and "pp" is P1 for the first parallel port, and if present, S1 for the first serial port, P2 for the second parallel port; the XConnect 100 second serial port is not supported). Click on **Next**.

Please note pre-V2.33 versions of JetAdmin do not support Peer-to-Peer printing from DOS applications (this is a Microsoft/HP bug).

3. Select the desired printer manufacturer and model (click **Have Disk** if your printer is not listed), and click on **Next**.
4. If the driver already exists, select **Keep Existing Driver** (if it does not, this step will be skipped), and then click on **Next**.
5. If desired, change the name of the printer and/or make it the default, and then click on **Next**.
6. If desired, you may print a test page (this may take a few minutes to print). Click on **Finish** to complete the installation. You may now print to the printer as if it were a local printer

## 8-6 Windows 95 Peer-to-Peer Configuration

## Microsoft Network Configuration (NetBEUI or NetBIOS/IP with Windows 95/98, Windows NT, OS/2 Warp/LAN Server)

---

### Overview

Certain TROY XCD external print server models support the NetBEUI and NetBIOS/IP protocols for printing on Microsoft-compatible networks (refer to chapter 1 for specific protocol support information). Because they also support the SMB protocol, TROY XCD print servers automatically appear in the Windows Network Neighborhood and can be managed using standard operating system utilities.

**Note:** *The workstation will automatically use NetBIOS/IP if TCP/IP is enabled on it. It will use NetBEUI only if TCP/IP is not available.*

**Note:** *NetBIOS/IP operation and support for more than one port requires V3.62 or later firmware. The latest firmware is available on the Internet at <http://www.troyxcd.com>.*

**Important:** *If you are using NetBIOS/IP, you must first configure the print server with a valid IP address using the XAdmin32 utility as described in Chapter 3. You may also*

### NetBEUI Configuration 9-1

*need to set the WINS primary and secondary servers using the commands SET NETBIOS METHOD, SET NETBIOS PRIMARY, and SET NETBIOS SECONDARY commands from the print server console as described in Appendix A. This is not required if you are using NetBEUI only.*

---

## Print Server Configuration

To use the print server with a Microsoft network, you must know which domain it resides on. By default, Microsoft networks use the domain name WORKGROUP, so if you have not specifically configured a domain name for your network, you may use the name WORKGROUP and skip the remainder of this section.

If you have a different domain name, then you must configure this name into the print server. To do this, you may use XAdmin32, XAdmin, WebXAdmin, or the print server console to connect to the print server (refer to Chapter 3 for information on installing and using these utilities):

- With XAdmin32, double click on the print server name and then click on the **Microsoft** tab. Then enter the desired domain name.
- With WebXAdmin, click on **Configure Microsoft** and then enter the desired domain name.
- With the print server console, enter the command:

```
SET NETB DOMAIN domainname,
```

where *domainname* is the desired domain name.

## 9-2 NetBEUI Configuration

---

## Windows 95/98 and Windows NT Port Monitor Installation

Although it is possible to install the TROY XCD print server as a network printer on Windows 95/98 or Windows NT, this procedure is not recommended unless you have a very simple network. The reason is that these operating systems do not adequately support queuing print jobs from multiple host computers to a diskless print server (the queues may stop).

To get around this problem, TROY XCD provides a port monitor that installs on the Windows 95/98 or NT computer. This port monitor acts like a local printer port, and therefore operates transparently with all Windows software. If you did not receive this software on CD-ROM or diskette, you may download it from the TROY XCD web site (<http://www.troyxcd.com>).

To install the port monitor, go the **Start** button, select **Run** and click **Browse..** Choose the appropriate drive, and if you are installing from CD-ROM, open the **Monitors** folder. Double click on the **SETUP** program. Follow the instructions on the screen to complete the installation.

1. Click **Next** at the welcome screen.
2. Select **Next** at the **Choose Destination Location** screen (or **Browse** to choose a different folder).
3. Select **Next** at the **Select Program Folder** screen (or select an existing folder from the list).
4. Click **Yes** when asked if you would like to configure a NetBIOS Port.

5. You will be asked to enter a port name, which must begin with "NB" (for example NB23). Enter the desired name or accept the default NB1. Click **OK**.
6. Select Browse when asked for the Remote Print Server.
  - Choose the desired workgroup and click **Next**.
  - Choose the TROY XCD print server from the list of available devices. The default name of the print server is XCD\_XXXXXX, where "XXXXXX" is the last six digits of the Ethernet address (for example, XCD\_035893).
  - Choose the desired printer (service) from the list. The default service is BINARY\_P1 for the parallel port, BINARY\_S1 for the serial port, BINARY\_P2 for the XConnect 100 second parallel port, and BINARY\_S2 for the second serial port..
  - Click **Finish** and then **OK**.
7. Click **Finish** to restart the computer.

**Note:** *Print servers with firmware versions 3.58 and earlier use an address of the form \\XCD\_XXXXXX\_pp\pp, where "XXXXXX" is the last six digits of the Ethernet address and "pp" is the port name (P1 for the parallel port, S1 for the serial port, P2 for the second parallel port, and S2 for the second serial port).*

You must then create a local (*not* network) printer on your system that uses this port. First go the Networks icon in the Control Panel on your workstation and make sure that you have the following enabled:

- TCP/IP or NetBEUI protocol
- Client for Microsoft Network
- Appropriate Ethernet LAN adapter card

## 9-4 NetBEUI Configuration



The procedures for doing this are as follows:

### **Windows 95/98 Printer Installation**

1. Go to the **Start** button, choose **Settings**, and then select **Printer**. Click on the **Add Printer** icon, click **Next**, select **Local printer**, and click **Next** again.
2. Select the appropriate printer driver and click **Next**. Choose NB1 as the port (unless you changed the name to something else) and click **Next**. Pick any name for the printer and click **Next**. If desired, print a test page. Click **Finish** to complete the preliminary printer installation.

### **Windows NT 4.x Printer Installation**

1. Go to the **Start** button, choose **Settings**, and then select **Printer**. Click on the **Add Printer** icon, select **My Computer**, and click **Next** again.
2. Choose NB1 as the port (unless you changed the name to something else) and click **Next**. Select the appropriate printer driver and click **Next**. Pick any name for the printer and click **Next**. Selected **Shared** or **Not Shared**, depending on whether you want other computers to access the printer. If desired, print a test page. Click **Finish** to complete the preliminary printer installation.

---

## **LAN SERVER/WARP SERVER CONFIGURATION**

### **OS/2 File Server Configuration:**

1. Open the **Templates** folder on the OS/2 desktop.

2. Using the right mouse button, drag the **Printer** template onto the desktop.
3. Type in any desired name for the printer from the **Create a Printer** window.
4. Choose an unused port (for example, LPT3) to connect to the printer.
5. Choose the appropriate printer driver from the list.
6. Click **Create** and then **OK**.
7. If desired, indicate whether you want to share the printer.

#### **OS/2 Workstation Configuration:**

On each workstation that you wish to print from, execute the following step:

1. Go to the DOS or OS/2 command prompt and enter the command:

```
NET USE LPTx: \\servername\servicename
```

where “x” is the LPT port number (1 through 9), *servername* is the print server name (XCD\_XXXXXX) by default, where “XXXXXX” is the last six digits of Ethernet address and *servicename* is the service name, (BINARY\_P1, BINARY\_S1, BINARY\_P2, or BINARY\_S2)

```
NET USE LPT2: \\XCD_002477\BINARY_P1
```

## **9-6 NetBEUI Configuration**

## DLC/LLC Configuration

---

### Overview

Certain TROY XCD external print server models support the DLC/LLC protocol, a simple protocol that is supported on a wide range of network operating systems (refer to chapter 1 for specific print server protocol support information). DLC/LLC is included as a standard part of Windows NT and Windows NT AS. It can be used on other systems with the addition of vendor supplied software that supports the Hewlett-Packard JetDirect card.

**Important Note:** *The DLC protocol cannot be enabled on more than one print server service, and is therefore limited to a single port. By default, print jobs will go the first parallel port. Because DLC is a non-routable protocol, there cannot be a router between the print server and the sending computer.*

---

### Configuring DLC/LLC on Windows NT

To use DLC/LLC on Windows NT, you must first install the DLC protocol:

1. Go to the NT Control Panel and double click on the Network icon.
2. Click **Add Software**
3. On Windows NT 3.xx systems, select **Add Software**. On Windows NT 4.xx systems, click on the Protocols tab, and click **Add**.

4. Select **DLC Protocol**. Click **Continue** (for 3.xx systems) or **Close** (for 4.xx systems).
5. Reboot your system to make the change take effect.

### Windows NT 4.xx Printer Setup

1. From the Start menu, select **S**ettings and then **P**rinters. Double click on **Add Printer**.
2. Select **My Computer** and then click **Next**.
3. Select **Add a Port**.
4. Select **Hewlett-Packard Network Port** and then click **New Port**
5. A list of available print server Ethernet addresses appears in the larger box under **Card Address**. Select the address of the desired print server (the address is on the label affixed to the print server, or it can be gotten through the self-test page). The selected print server address will then appear in the smaller box under **Card Address**.
6. Type in any desired name for the port (the name must not be the name of an existing port or DOS device, such as LPT1) and click **OK** and **Close**.
7. The **Printer Ports** menu will appear. The name you selected in step 6 will appear as a checked port in the list of available ports. Click **Next**.
8. Select the desired printer manufacturer and model and click **Next**.

## 10-2 DLC Configuration

9. Give a name to the printer. If desired, select the printer as the default.
10. Select **Shared** or **Not Shared**. If shared, select the type of operating systems that will be printing to it.
11. Select whether or not you want a test page, and then select **Finish**.
12. You will need to reboot your system in order to make the change take effect.

### Windows NT 3.xx Printer Setup

1. From the Windows NT **Main** group, double click on the **Print Manager** icon.
2. Select **Printer** from the menu bar and click on **Create Printer**.
3. Enter any desired name for the printer in the **Printer Name** box.
4. Select the printer model in the **Driver** menu.
5. Choose **Other** (or **Network Printer** for V3.1 systems) from the **Print to** menu.
6. Click on **Hewlett-Packard Network Port**.
7. Type in your desired name for the port (this name must not be an existing port or DOS device, such as LPT1).
8. The Ethernet addresses of available print servers will appear in the **Card Address** menu. Select the desired

### DLC Configuration 10-3

address (the address is on the label affixed to the print server, or it can be gotten through the self-test page) and then click **OK**.

9. If you want to share the printer, click **Share the Printer on the Network**.
10. Click **OK**.
11. If necessary, select the appropriate printer options and then click **OK**.

## Configuring DLC/LLC on Other Systems

To use DLC/LLC on other network systems, you will generally need vendor supplied software. Typically such software is designed to support the HP JetDirect print server. Follow the vendor's instructions to install the DLC protocol on your system.

Once the protocol is installed, you create a network port in a manner similar to the Windows NT procedure described in the previous sections. The Ethernet address of the print server should automatically appear during the configuration process.

The final step is to create a printer using the normal operating system printer setup method. The only difference is that instead of connecting the printer to the LPT1 parallel port, you point it to the network port you just created.

Note: TROY XCD does not recommend using the DLC protocol with Windows for Workgroups 3.11 in a peer-to-peer configuration if the printer will be heavily used. This is because jobs may be rejected due to print spooler timeouts.

## 10-4 DLC Configuration

The best solution in these situations is to set up one PC as a server for handling network print jobs. All of the other PCs send their print jobs to the server PC using NetBEUI or TCP/IP, and the server PC then uses DLC to send the print jobs to the TROY XCD print server.

## **DLC Configuration 10-5**

## **10-6 DLC Configuration**



## LAT Network Configuration

---

### Overview

TROY XCD print servers equipped with the LAT protocol are compatible with the Digital Equipment DECserver family of terminal servers. This means that if you are already familiar with configuring DECservers or compatible terminal servers in your network, you can use similar procedures to configure the TROY XCD print server.

---

### TROY XCD Print Server LAT Concepts

The TROY XCD print server is a node on the Ethernet that offers a printing service to other nodes on the network. A node is simply a device, such as a host computer, terminal server, or print server. Every node on the network has a unique name, so the TROY XCD print server comes preconfigured with the name "XCD\_" followed by the last six digits of the Ethernet address (for example, "XCD\_00C351").

The TROY print server comes preconfigured to run on a LAT network without any additional setup. The configuration can be changed if necessary by using the NCP, NCL, or ccr facility on your host computer, or via the XConnect II or XConnect 100 serial port; this procedure is described in Appendix A of this manual. *Note that in most cases it is not necessary to change the configuration.*

To use the TROY XCD print server with a VMS host computer, you will first need to create a LAT application port on the host. A LAT application port allows a program to send and receive data over a LAT connection as if it were communicating with a directly-connected physical port. You will then need to associate a print queue with this port.

---

## VMS LAT Host Configuration

The configuration process requires that you have system manager privileges. Before beginning the LAT configuration process, you must first make sure that LAT has been started on your system. If you are currently using terminal servers on your network, then LAT has probably already been activated. If LAT is not started, then you need to execute the following command before proceeding with configuration of the TROY XCD print server:

```
@SYS$STARTUP:LAT$STARTUP
```

1. Before creating print queue, you will need to determine the following:
  - **The VMS queue name.** This can be any unique name (do a `SHOW QUEUE` command at the VMS prompt to list the existing queues).
  - **The LAT application port.** This name of this port is `LTAXxx`, where "xxx" is any unused number (do a `SHOW PORT` command in the VMS LATCP program to see the existing ports).
  - **The TROY XCD print server node name and port name .** The default node name is `XCD_XXXXXX`, where "XXXXXX" is the last six digits

## 11-2 LAT Network Configuration

of the Ethernet address (for example, XCD\_00C3E4). You can get the name of your print server by running the TROY XCD print server self-test (refer to Chapter 2 for information on running the self-test), or with the SHOW SERVER command from the TROY XCD print server console. The port name is P1 for the first parallel port. If you have an XConnect II or XConnect 100, the names of the additional ports are as follows:

XConnect II serial port	S1
XConnect II parallel port with LN03 option	LN
XConnect 100 first serial port	S1
XConnect 100 second parallel port	P2
XConnect 100 second serial port	S2

Please note that the name of the XConnect 100 parallel port is P1, even if the LN03 option is installed.

**Important:** *If you wish to use a different node name, you must change the print server name as described in as described in Appendix A.*

2. Use the VMS editor to create a text file with the necessary configuration commands (alternatively, you may edit the file LAT\$SYSTARTUP.COM for VMS 5.5-x and later systems or LTLOAD.COM for earlier VMS systems). For instance, the following sample command file creates a queue named XCD on LAT port 33 for a TROY print server with a default node name of XCD\_00C351 using the LATSYS processor and the default VMS form:

```

$MCR LATCP
CREATE PORT LTA33:/APPLICATION
SET PORT LTA33:/NODE=XCD_003C51/PORT=P1
SHOW PORT LTA33:
EXIT
$SET TERM LTA33:/PASTHRU/TAB/NOBROADCAST-
/PERM
$SET DEVICE/SPOOL LTA33:
$INIT/QUEUE/START/ON=LTA33:/PROC=LATSYM XCD

```

Substitute your actual node name, port name (P1, S1, P2, S2, or LN), LAT port and queue name for the ones in the example. If you are using a service name, specify

`/SERVICE= servicename` instead of `/PORT=P1`.

**Important:** Use the default names unless you have specifically changed the names via the TROY XCD print server remote console.

**Important:** Be sure to specify `PROC=LATSYM` or the queue will not service requests from multiple host computers.

3. Execute the command file you have just created by typing "@" plus the file name in response to the VMS "\$" prompt (for example, @LATSTART.COM). For additional convenience, you may want to include the "@filename" command in your system startup file so that the procedure is executed automatically when the system is booted.
4. Define or modify a form for use with the TROY XCD print server. VMS uses forms to define the page layout. If you are printing graphics or PostScript jobs, you *must* define your form for NOTRUNCATE and

## 11-4 LAT Network Configuration

NOWRAP to prevent printer errors. For example, to redefine the VMS default form DEFAULT, you would type the following at the "\$" prompt:

```
DEFINE /FORM DEFAULT /NOTRUNCATE /NOWRAP
```

If you are defining a new form, be sure to specify STOCK=DEFAULT (unless you are using a special stock) and initialize the queue with the DEFAULT=FORM option. For example, to create a form called PCL for the queue XCD on LAT port LTA33:, you would type:

```
DEFINE /FORM PCL /NOTRUNC /NOWRAP /STOCK=DEFAULT  
INIT /QUEUE /START /ON=LTA33 : /PROC=LATSYM /-  
DEFAULT=FORM=PCL XCD
```

5. You are now ready to print. Use the PRINT command with the name of the queue and the file you wish to print as shown in the following example:

```
PRINT /QUEUE=XCD MYFILE.TXT
```

If the file does not print, recheck the hardware and software configuration, and then try printing again. If the file still does not print, refer to the Chapter 10, *Troubleshooting*, for further assistance.

---

## Eliminating Blank Pages (Optional)

When Hewlett-Packard printers are used with VMS, a blank page is often printed after each job. To eliminate this blank page, first create a text file with the following contents:

```
<ESC> ]VMS ; 2<ESC> \
```

where <ESC> is the escape character (ASCII 27) and the "VMS" *must* be in uppercase characters. Then insert this file into your default library (normally SYSDEVCTL.TLB), and specify it as a setup module in your form (stop and reset all queues that use the library before doing this procedure). For example:

```
$LIB/INS SYS$SYSROOT:[SYSLIB]SYSDEVCTL.TLB NOBL
$DEF/FORM PCL/SETUP=NOBL
```

The above example inserts the file NOBL.TXT into the default library and then redefines the form PCL (previously defined in step 4) to eliminate blank pages.

**Note:** *This procedure is not required for DECprint Supervisor (DCPS).*

---

## PATHWORKS for DOS Configuration

The instructions for configuring a PATHWORKS print queue depend on whether you have V4.X or V5.X.

### PATHWORKS V5.X Server Setup Instructions:

To print from PATHWORKS V5.X, you must first create a LAN Manager printer destination, and then you must make it shareable. The procedure is as follows:

1. To create a LAN Manager printer destination, use one of the following methods (note that by default the printer name you supply also identifies the printer destination, a default LAN Manager print queue, and a VMS print queue):

## 11-6 LAT Network Configuration

- Type `ADMINISTRATE/PATHWORKS` from the VMS prompt to enter the Server Admin interface. Then select **Printer Destinations** option from the View Menu and enter the required information.

OR

- Use the `MANAGEWORKS` program on a `PATHWORKS` PC. Select the desired server, choose the **Create** option from the Actions menu, and then choose the **LAN Manager Printer Queue** option (the **Create LM Print Queue** dialog box will be displayed). In the **Print Destinations** section of the dialog box, choose **ADD**.

These two methods will automatically create a VMS print queue and a default LAN Manager print queue associated with the printer destination.

2. To share a LAN Manager print queue:

- From the Server Admin interface, choose the **Shared resources** option from the View menu.
- From the `MANAGEWORKS` interface, select the desired server, choose the **Create** option from the Actions menu, and choose **LAN Manager Shared Printer**.
- At the VMS Command line, type the command:

```
NET SHARE sharename=printername
```

## LAT Network Configuration 11-7

where *sharename* is the share name associated with the print queue and *printername* is the name of the printer from Step 1.

### **PATHWORKS V4.X Server Setup Instructions:**

1. Create a VMS queue as described in previous sections.
2. Run PCSA\_MANAGER on the VMS system.
  - a. Type MENU to get the PCSA menu.
  - b. Select SERVICE OPTIONS
  - c. Select ADD SERVICE (do not use the ADD PRINTER QUEUE option, as this will add a PCL printer reset that will affect PostScript printing.
  - d. Select PRINTER SERVICE
  - e. Enter service name (pick any name)
  - f. Enter VMS queue name (previously defined)
  - g. Enter VMS form name (use the default if you do not have a specific form defined)

### **PC Setup Instructions (All Versions):**

1. Perform the following steps on the PC to connect to the print service you created in the previous steps:
  - a. If you are using DOS, type the command `USE LPTx:\\node\service` at the DOS prompt, where *x* is the PC parallel port number, *node* is the DECnet node name and *service* is the service name picked previously. For example:

```
USE LPT1:\\VAX\LASER
```

## **11-8 LAT Network Configuration**



You may delete this print service by typing `LATCP` at the `C:>` prompt and then entering the command `DELETE LPT1:`

- b. If you are using WINDOWS, first make sure that you have selected DEC PATHWORKS as the network under the Windows Setup icon. Then:
  - Click on the **Print Manager** icon and select **Options** and then **Printer Setup**
  - Click **Add**, go to the **List of Printers**, select the desired printer type, and click **Install**. If desired, click **Set as Default Printer**.
  - Click **Connect** and select the desired port (e.g., LPT1)
  - Click **Network** and select the port you chose above and type in the network path (`\\node\service`, where *node* is the DECnet node name and *service* is the service name picked previously; for example, `\\VAX\LASER`)
  - Click **Connect** (the **Current Printer Connection** should show the port and the network path that you selected)
  - Click **Close**, **OK**, **Close**, and **Exit** to get out of the Print Manager

---

## PATHWORKS for Macintosh Configuration

If you are using PATHWORKS for Macintosh, you will need to make sure that you have a bidirectional channel (in other words, you did NOT enter the command `SET SERVICE servicename RECEIVE ENABLED` from the TROY XCD print server remote console). Then create a LAT port using LATCP as shown in the following example (substitute your actual node name and LAT port number):

## LAT Network Configuration 11-9

```
CREATE PORT LTA53:/APPLICATION
SET PORT LTA53:/NODE=XCD_009C53/PORT=P1
```

Do *not* set the LAT port as a spooled device. Now go into ADMIN/MSA and enter the command :

```
ADD PRINTER name/QUEUE=queuename/DEST=LTA53 :
```

where *name* is the name of the printer, and *queuename* is the queue name.

---

## DECprint Supervisor Configuration Notes

If you want to use a TROY XCD print server with the DECprint Supervisor software, you must have the DCPS-Open option in order to support Hewlett-Packard printers (you may also need to modify the DCPS device control modules and queue setup to handle "unrecognized" printers). Do *not* use the print server console command SET SERVICE RECEIVE, because bidirectional communications is required for DCPS.

**Important:** *DCPS requires that the printer be forced into PostScript mode. It will NOT work if the printer is set to autosense between PCL and PostScript.*

---

**Important:** *If you are using the parallel port on the printer, the port must be compatible with the IEEE P1284 bitronics bidirectional standard.*

## Installation on Other Host Computers

Installation procedures differ somewhat for other DEC

### 11-10 LAT Network Configuration

operating systems (e.g., RSTS/E and RSX-11M-PLUS). Refer to the appropriate DEC documentation for information on setting up LAT print queues on these systems.

---

## **Changing the Configuration (Optional)**

The print server default configuration is adequate for most applications. However, if you wish to change the configuration, you may access the print server console via the NCP or NCL utilities on a VMS system, the ccr or TELNET commands on an ULTRIX computer, or through the serial port using DECserver-style commands. The configuration procedure is described in detail in Appendix A.

## **11-12 LAT Network Configuration**

## Banyan VINES Network Configuration

---

### Overview

TROY XCD print servers that include the Banyan VINES IP protocol (refer to chapter 1 for specific protocol support information) allow printers to be shared on a Banyan VINES network. Users on client PCs send their jobs to any VINES file server running the Banyan PCPrint software, which in turn spools the jobs to the TROY XCD print server and the printer. Printing is transparent to user applications, and the print server can be managed using standard VINES utilities like MANAGE, MSERVICE, MUSER, and the Operator Console printer control. In addition, VINES users can print concurrently with users of NetWare, TCP/IP, and AppleTalk.

In order to use a TROY XCD print server on a VINES network, you will need the following:

- Banyan's PCPrint software (a Banyan-supplied software option that is installed on the VINES file server)
- Optional Banyan firmware on the TROY XCD external print server
- TROY XCD XAdmin 16-bit utility software (on *TROY XCD Print Server Software* diskette or CD-ROM) or access to print server console via serial port, or through TELNET, DEC NCP or NCL, or TROY XCD XCONFIG

NetWare utilities (refer to Appendix A of the TROY XCD print server manual for information on using the console).

**Note:** *The new XAdmin32 32-bit utility does not currently work on a Banyan VINES workstation unless the workstation is also running TCP/IP or NetWare.*

---

## A. File Server User Configuration

The first step in the configuration process is to configure the file server so that the TROY XCD print server can log into the Banyan VINES network. To do this, you will need to configure a StreetTalk user name for the print server (all VINES print servers log into the file server as users).

1. From any VINES workstation log in as a supervisor and execute the **MANAGE** program by typing **MANAGE** at the DOS prompt.
2. At the main menu, select **2 - Users** and press **ENTER**.
3. You will get the **Manage Users** screen. Select **ADD a user** to get the **Add A User** screen. Type in a StreetTalk name for the desired TROY XCD print server service. You may optionally type in a description, nickname, and a password. Press the **F10** key when you are finished.
4. You will then get the **Add User Profile** screen. Select a blank user profile and then press **ENTER**. If there is no existing blank profile, the select the Sample Profile.

## 12-2 Banyan VINES Installation

5. You will get the message "Do you want to force the user to change passwords on the next login?". Select **No** and press **ENTER**.
6. You will then get the **Manage A User** screen. If you selected a blank user profile in step 4, you can skip to step 8. Otherwise, use the arrow keys to select **MANAGE User Profile** and press **ENTER**.
7. You will get the **Manage User Profile** screen. Execute the following steps to create a blank user profile:
  - Select **EDIT profile**
  - When the profile appears on the screen, press **CTRL-X** multiple times to delete every line in the profile, and press **F10** when you have finished. You may then use this newly created blank profile as a template when configuring additional TROY XCD print servers. Then press **ESCAPE** to return to the **Manage a User** screen.
8. Press **ESCAPE** twice to return to the main menu.

---

## B. File Server Queue Configuration

You must now configure the queue(s) on the Banyan VINES file servers. Print queues are one of several different types of services that are available on a VINES file server. You may configure several print queues for a single TROY XCD print server. For example, one print queue could be for printing jobs to the print server parallel port, while another would be for the serial port. To configure a print queue, use the **MANAGE** utility as follows:

1. From the main menu, select **1 - Services** and press **ENTER**.
2. You will get the **Manage Services** menu. Select **ADD a server-based service** and press **ENTER**.
3. From the **Add A Service** screen type the desired StreetTalk name for the print queue, press **ENTER**, and then type in a description of the print server followed by **ENTER**.
4. Select the desired file server (if there is more than one) and press **ENTER**.
5. When you get the **Select Type Of Service** screen, select **3 - VINES print service** (for VINES 5.xx) or **2 - Banyan Print Service** (for VINES 6.xx) and press **ENTER**.
6. Use the arrow keys to select the disk where the print queue service will reside and press **ENTER**.
7. You will get the message "The service is running but not yet available to users." Press **F10**.
8. If desired, type in the maximum number of jobs and maximum size of job for the queue when you get the **Configure Queue** screen. Otherwise press **F10** for unlimited number and size.
9. If desired, choose a default paper format when you get the **Configure Paper Formats** screen. Otherwise, press **F10** to select the defaults.

## 12-4 Banyan VINES Installation



10. If desired, enter the user names who are authorized to use the printer when you get the **Access Lists** screen. Otherwise, press **F10** to accept the defaults.
11. If you have a VINES 5.xx system, you may optionally enter the users to be notified in the event of printer problems when you get the **Alert list** screen. Otherwise, press **F10** to accept the defaults (not applicable for VINES 6.xx).
12. When you get the **Add A Destination** screen, use the arrow keys to select **PCPrint** and press **ENTER**.

**IMPORTANT NOTE:** If the PCPrint option is not installed, PCPrint will not appear on this screen. You *must* have PCPrint installed in order to use a TROY XCD print server.

13. When you get the **Destination Attributes** screen, enter the StreetTalk name of the TROY XCD print server (from step A-3) and an optional description. Press **F10**.
14. You will get the **Output strings** menu. This screen allows you to define strings of characters that can be sent before and after the print job to put the printer in a particular state (for example, duplex mode). The default values work OK for most applications. However, if you are printing text files directly from the DOS prompt, you should define a Post-job string such as \f (formfeed) to insure that the paper is ejected (this is generally not needed with DOS or Windows application programs, since the program or drivers reset the printer after each job, and it may cause problems with binary graphics files). Press **F10** to accept the output string values.

## Banyan VINES Installation 12-5

15. You will then get the **Enable strings** menu. This menu allows you to select whether or not a banner page is printed, whether or not to use the setup and reset strings, and other options. Choose the desired options or press F10 to select the defaults.
16. You will be asked "Would you like to add another destination at this time?" Select **No**.
17. You will then get the **Print Queue Status** screen, which will show that the queue is not accepting jobs or printing jobs. Change both values to **Yes** and then press **F10**. You will get the message that the queue is now ready to accept and print jobs. Press **F10** again.
18. If you are configuring more than one queue on the file server, repeat steps 1 through 17 of this section. Otherwise, press ESCAPE multiple times to exit the MANAGE utility.

---

## C. Print Server Configuration Using XAdmin

The last step is to add the StreetTalk login name to the TROY XCD print server and to associate the file server queue with one of the services on the print server. The procedure is as follows:

1. Install the software from the *TROY XCD Print Server Software* diskette or CD-ROM by selecting **F**ile from the Windows Program Manager menu bar. Then select **R**un, enter `A:SETUP.EXE` as the command line (or select the `\Utilities\Xadmin\Setup.exe`

## 12-6 Banyan VINES Installation

path on the CD-ROM), click **OK**, and follow the instructions on the screen.

2. Double click on the XAdmin icon to start the program under Windows.
3. The print server name (XCD\_XXXXXX\_P1, where "XXXXXX" is the last six digits of the Ethernet address) will show up in the list. If it does not, double check your Ethernet cabling and (if applicable) hub connection. Click on this name with the mouse button.
4. Click on the **Configure** button.
5. Click on the **Banyan** tab.
6. The Banyan hop count is set by default to two hops, which is adequate for most networks. However, if the file server is located more than two hops from the print server, you must set the hop count to the appropriate value.
7. Enter the StreetTalk name of the TROY XCD print server (this must *exactly* match the name you entered in Step A-3). If the StreetTalk name has spaces in it, you must enclose the name in double quotation marks (for example, "john smith@uc engineering@irvine"). If you entered a password in step A-3, you should also enter the same password here.
8. Click on the **Services** tab.
9. Double click on the service you wish to enable for VINES. If in doubt, use BINARY\_P1 (for the parallel

## Banyan VINES Installation 12-7

port), BINARY\_S1 (for the serial port), and BINARY\_P2 or BINARY\_S2 for the XConnect 100 second parallel and serial ports. Refer to Appendix B of the manual for additional information on using services.

10. Type in the StreetTalk name of the print queue you defined in step B-3.
11. Click on **OK**, and then click **OK** again to save the configuration.
12. Click **OK** and then **OK** again to exit XAdmin

---

## D. Print Server Configuration Using the Print Server Console (Optional)

As an alternative to XAdmin, you may use the print server console to configure an TROY XCD print server. The steps are as follows:

1. Connect to the print server console using TELNET, NCP, XCONFIG, or the serial port (refer to Appendix A for information on using the console).
2. Execute the following commands:

```
SET BANyan LOgin loginname  
Purpose: Sets StreetTalk login name of print server.
```

```
SET BANyan PAssword password  
Purpose: Sets login password of print server. The password (if any) must match the password you set in step A-3. This command is not required if you did not
```

## 12-8 Banyan VINES Installation

assign a password to the print server with the MANAGE program.

```
SET SERVICE service STreettalk queuename
```

Purpose: Enables the Banyan protocol on the specified TROY XCD print server service and associates this service with the StreetTalk name of a given print queue the VINES file server. Type SHOW SERVICE to see a list of the available services (if in doubt, use BINARY\_P1 for the parallel port , BINARY\_S1 for serial port, BINARY\_P2 for the XConnect 100 second parallel port, and BINARY\_S2 for the XConnect 100 second serial port).

3. If required, the following additional commands are available:

```
SET BANyan HOp nn
```

Purpose: Sets number of hops between the TROY XCD print server and the Banyan file server. The default value is 2, which is adequate for most sites, but you will need to change this value if the file server is more than two hops away from the print server.

```
SET BANyan [ENable|DISable]
```

Purpose: Enables or disables Banyan protocol on the TROY XCD print server. Banyan is enabled by default.

```
SET BANyan TImeout nn
```

Purpose: Sets job timeout (in seconds).

```
CLEAR SERVICE service STreettalk
```

Purpose: Disables the Banyan protocol on the specified service.

## Banyan VINES Installation 12-9

SHow BANyan

Purpose: Shows Banyan protocol settings and statistics.

4. When you have finished entering commands, type EXIT to exit the remote console and cause the commands to take effect.

---

## E. Testing the Print Queue

To test the queue, use the Banyan BPRINT command from the DOS prompt on your workstation. For example:

```
BPRINT TEST.TXT /P:MYQUEUE
```

prints the file TEST.TXT to the file server queue MYQUEUE.

## 12-10 Banyan VINES Installation

## PrintraNet Remote Internet Printing

---

### Overview

TROY XCD's PrintraNet product is a software driver for Windows™ 95, Windows 98, or Windows NT that allows a PC user at one location to send a print job to a printer connected to an TROY XCD print server at a remote location across the Internet in a simple and transparent manner. For example, a user on a PC in New York could print a document directly from his Microsoft Excel application program to a printer in Chicago. The PC may be attached to a Local Area Network, or it may be connected via a dial-up PPP link to an Internet Service Provider. Because of the low cost of accessing the Internet, the PrintraNet software can save the user a significant amount of money in toll charges, particularly when international communications is involved.

If you did not receive the PrintraNet software on diskette or CD-ROM, you may download it from the TROY XCD web site (<http://www.troyxcd.com>).

---

### PrintraNet Concepts

The PrintraNet software is installed using a standard Windows Installation Wizard. It creates a virtual port on the Windows 95, Windows 98, or Windows NT PC that operates similar to the standard LPT1 printer port from the applications program point of view. The user can use the Windows

95/98/NT Print Manager to create a printer that uses this port along with a standard Windows 95/98/NT-compatible printer driver (for example, the Hewlett-Packard LaserJet 5 or Lexmark Optra drivers). Any Windows 95/98/NT applications program can therefore print to this printer (and hence to the virtual port) without modification or change in operational procedure.

When a job is printed to the PrintraNet virtual port, it is actually MIME-encoded, converted to a standard Internet E-mail message, and sent out to a TROY XCD print server at the remote location using either the Messaging API (MAPI) or WINSOCK. This means that PrintraNet is compatible with most common E-mail software packages, and there is no requirement to install a TCP/IP stack on the PC. The only requirement is that the E-mail server be capable of sending E-mail messages over the Internet.

In more detail, the procedure is as follows:

- If you are connected to a Local Area Network, the E-mail message gets passed to the E-mail server, which in turn sends it out over the Internet using the SMTP protocol (Simple Mail Transport Protocol) to the remote TROY XCD print server.
- If you are connecting via a modem directly to an Internet Service Provider (ISP), the ISP handles the routing of the E-mail to the remote TROY XCD print server.

At the remote site, an E-mail server receives the E-mail message. The remote print server, which has its own E-mail address, uses the POP3 protocol (Post Office Protocol 3) to download the E-mail message from the E-mail server. It then decodes the

## **13-2 PrintraNet Internet Printing**



attachment and prints it out on the printer. As a configurable option, the remote print server can send an E-mail message back to notify the sending PC that the job was successfully printed.

The remote print server must be running Version 3.38 or later firmware. This firmware is available at no charge on the TROY XCD web site (<http://www.troyxcd.com> directory). PrintraNet is supported by all TROY XCD print servers except the XConnect II Lite and XJet III.

A new feature of PrintraNet is its Address Book capability. This capability allows the Windows user to have a pre-defined list of remote printers. A print job can be sent to any of these remote printers by simply clicking on the appropriate address book entry. In addition, groups of remote printers can be defined, so that a single print job can be sent to multiple printers.

Another new feature of PrintraNet is direct E-mail printing. This feature allows ordinary text E-mail messages to be sent to the print server and then printed out on the printer. No special software (other than an E-mail program) is required on the sending computer.

This chapter covers the following topics:

- Installation of the PrintraNet software on a Windows 95/98/NT PC at the local site
- Enabling the PrintraNet capability on the TROY XCD print server at the remote site.

The manual assumes that you have already installed the TROY XCD print server at the remote site with a valid IP address per the instructions in the appropriate print server

## **PrintraNet Internet Printing 13-3**

Administrator's Guide. It also assumes that you have the capability of configuring E-mail services on your PC and E-mail server, or that you have access to a network administrator who can perform these tasks for you.

---

## Step 1 Installing the Software on a Windows 95/98/NT PC

To install the PrintraNet software on a Windows 95/98/NT PC, execute the following steps:

1. Make sure that the PC is running an E-mail program (for example, Microsoft Exchange) that is capable of sending E-mail messages using either MAPI or WINSOCK. MAPI (Messaging Applications Program Interface) is used by most popular Windows 95/98/NT E-mail packages, while WINSOCK is used by TCP/IP-based mail packages.
2. Make sure that your E-mail server is capable of sending messages across the Internet. Alternatively, if you are communicating directly from the PC via a modem to an Internet Service Provider, make sure that you have an Internet mail account on the ISP, and that the PC is configured to send E-mail using this account.
3. Make a backup copy of the PrintraNet software, and use this backup for the installation process. Store the original diskette in a safe place.
4. Insert the backup installation diskette into the PC. From the Windows 95/98/NT **Start** button, select **R**un. Then enter `A : SETUP` and press **Enter** to start the PrintraNet installation program.

### 13-4 PrintraNet Internet Printing

5. Push the **N**ext button in response to the *Welcome* message.
6. Select the desired directory to install the PrintraNet files (the default directory is C:\Program Files\XCD\PrintraNet\), and then push **N**ext.
7. Select either MAPI (the default) or WINSOCK as the mail transport and press **N**ext. Most mail programs, include the Microsoft Exchange program that is included with Windows 95/98/NT, use MAPI. The installation program will then begin installing the files.
8. You will then be asked for a port name. The default port name is PNET1. If you want to select a different port name (for example, if you have more than one PrintraNet remote printer), then enter the name of the port. The port name must begin with PNET and end with a number, for example, PNET3.

Press **OK** to continue.

9. You will now get the Port Settings dialog box for the remote print server. Enter the following information:
  - **E-Mail Address:** Enter any unique legal Internet E-mail address for the remote TROY XCD print server (for example, *emailprinter@xyz.com*).

**Note:** *Internet E-mail addresses cannot have spaces in them.*

You may also click on the **Address Book** button. This allows you to add E-mail addresses of other

## PrintraNet Internet Printing 13-5

printers. To add addresses, go to the menu bar, select **File** and then **New Address** (or click on the **New Address** icon, which is the one with a single person). Enter a description, an E-mail address, and an optional memo for the remote TROY XCD print server. Click on **OK** to add it to the address book. The address book allows you to send print job to any of the remote print servers without having to type in its E-mail address.

In addition, the Address Book allows you to create groups of remote printers. To do this, select **File** and then **New Group** (or click on the **New Group** icon, which is the one with three people) to add users. The Group capability allows you to send a single print job to more than one remote printer.

The **Partial E-mail Print** option breaks the print job into several smaller E-mail messages, which the print server reassembles at the remote end into a single print job. It is useful if you are sending print jobs through E-mail servers that limit the size of print jobs. If you check this option, you can enter a partition value or use the default value of 1024K bytes.

The **Port Settings** dialog box will be displayed each time you print, thereby allowing you to select a remote print server from the address book or to manually enter an address. The **Show this dialog for each Print Job** box should be checked unless you plan to send jobs to only a single TROY XCD remote print server and therefore do not need to change the destination E-mail address.

## 13-6 PrintraNet Internet Printing

- **Service Name:** Enter the service name on the remote TROY XCD print server that you wish to use for printing. This is normally BINARY\_P1 for the first parallel port, BINARY\_S1 for the serial port, BINARY\_P2 for the second parallel port, or BINARY\_S2 for the second serial port. If you do not know the service name, you may leave this field blank and the default binary service will be used. Refer to Appendix B of the appropriate TROY XCD print server Administrator's Guide for information on how to use services.
- **Your E-Mail Address:** *If you are using MAPI, skip this step.* If you are using WINSOCK, enter your E-mail address (for example, *shari@abc.com*).
- **SMTP E-Mail Server:** *If you are using MAPI, skip this step.* If you are using WINSOCK, enter the IP address of your SMTP E-mail server (consult your network administrator if you do not know this address).
- **Select Desired Notification:** You may optionally have the remote TROY XCD print server notify you when the job is complete or when the job fails or both when the job is complete and if it fails. Select the desired option and then enter the E-mail address where you want the notification sent (generally you would want the notification sent to your own E-mail address).
- Press **OK** to continue.

10. If desired, you can read the README file for release note information regarding PrintraNet. The PrintraNet driver installation is now complete.
11. You must now create a printer on your Windows 95/98/NT system using the standard Windows 95/98/NT printer setup procedure. To do this, go the **Start** button, select **S**ettings and then **P**rinters.
12. Select **Add Printer** to begin the printer installation.
13. Click **Next** when you get the **Add Printer Wizard** window.
14. Select **L**ocal **P**rinter when you are asked how the printer is connected to your computer, and push **Next**.
15. Select the desired manufacturer and model of the remote printer (for example, Hewlett-Packard LaserJet 5). If necessary click **H**ave **D**isk to load the driver off of the printer's installation diskette. Click **Next** when you are done.
16. If you have picked a printer driver that is already being used, you have the option of either keeping the existing driver (recommended) or replacing it. Select the desired option and press **Next**.
17. Select the PrintraNet E-mail port (PNET1 by default) and press **Next**.
18. Enter any desired name for the PrintraNet remote printer and press **Next**. For example, you could call the printer "E-mail Printer". Note that this name does not need to match the E-mail address that you assigned in step 9.

## 13-8 PrintraNet Internet Printing

19. Select **N**o when asked if you want to print a test page, unless you have already configured the remote TROY XCD print server to receive PrintraNet print jobs.

You have now finished installing the PrintraNet software. If you have only one E-mail printer, go to Step 2, *Configuring the Remote TROY XCD Print Server*.

---

## Adding a Second E-Mail Printer Port

You should *not* rerun the install program to add a new E-Mail printer port. Instead, press the **S**tart button, select **S**ettings, and open the **P**rinters window. Click on the icon of a PrintraNet printer, select **F**ile from the menu bar, and then choose **P**roperties. Click on the **D**etails tab and push the **A**dd **P**ort button.

In the **A**dd **P**ort dialog, select the **O**ther radio button and then "PrintraNet Port". Click on **O**K and it will give you the Port Name dialog (like in the install program). Any unique name can be given here as long as it starts with "PNET" and another port does not already exist with the same name. Then enter the port settings as described in step 9 of the *Installing the PrintraNet Software on a Windows 95/98/NT PC* section.

---

## Step 2 Configuring the Remote TROY XCD Print Server

The next step is to configure the remote TROY XCD print server. The remote print server can be configured with TROY XCD's XAdmin or XAdmin32 Windows 95/98/NT configuration utility, WebXAdmin browser-based utility, or

by accessing the print server console through the print server serial port or via TELNET, DEC NCP, or XCD's XCONFIG utilities. Refer to Appendix A for information on how to use the serial port, TELNET, NCP, or XCONFIG to access the print server console.

### **Print Server Configuration Checklist**

Before configuring the print server to receive PrintraNet print jobs, check the following:

1. Make sure that the E-mail server at the remote site (the receiving end) is configured to handle the TCP/IP POP3, and SMTP protocols (SMTP is only required if the notification feature is enabled).
2. Configure the POP3 server on the E-mail server at the remote site with a mail account and password for the remote printer (generally, the mail account name will be the first part of the name that you assigned in step 9 of the previous section; for example, if you assigned the name *emailprinter@xyz.com*, the account name would be *emailprinter*). The procedure for configuring a POP3 server varies depending on the operating system of the E-mail server, so consult your operating system documentation for details.
3. Make sure that the TROY XCD print server is installed and running with TCP/IP enabled and has a valid IP address assigned to it.

Because access to the E-mail server on most networks is usually restricted, you may need to have your network administrator check the configuration and add the mail account.

## **13-10 PrintraNet Internet Printing**



## Using XAdmin, XAdmin32, or WebXAdmin to Configure the Print Server

**NOTE:** *Skip this section if you wish to use the print server console to configure the print server.*

Two graphical user configuration programs are included on the *TROY XCD Print Server Software* diskette or CD-ROM that is shipped with every TROY XCD print server. XAdmin runs on Windows 3.11 or Windows 95/98, while XAdmin32 runs on Windows 95/98 and Windows NT. To use XAdmin or XAdmin32, you must be running either NetWare or Banyan VINES client software, and the PC must be on the same network as the TROY XCD remote print server.

WebXAdmin allows the print server to be managed by any standard web browser using the TCP/IP protocol. Refer to Chapter 3 for additional information on XAdmin, XAdmin32, and WebXAdmin.

The steps required to configure the print server to receive print jobs from a Windows 95/98/NT PC running the PrintraNet software are as follows:

1. Select the name of the desired TROY XCD print server from the list by double clicking on it (XAdmin or XAdmin32) or entering its IP address (WebXAdmin).
4. Click on the **Internet** tab or button.
5. Enter the IP address of the POP3 server (consult your network administrator if you do not know this address).
6. Enter the mailbox name for the remote TROY XCD print

server. Usually this will be the first part of the E-mail address that you entered in step 9 (for example, if the E-mail address of the remote print server is *emailprinter@xyz*, then the mailbox name would be *emailprinter*).

7. Enter the password for the mailbox, if any.
8. The print server is configured by default to poll the POP3 server every 30 seconds. You may change this value, if desired.
9. If you have enabled notification, enter the IP address of your SMTP server (consult your network administrator if you do not know this address).
10. Press the **OK** button., and exit XAdmin or XAdmin32.  
You have now configured the print server to receive print jobs. Skip to the *Printing to the Remote TROY Print Server* section later in this manual.

## Using the Console to Configure the Print Server

**NOTE:** *Skip this section if you used XAdmin, Admin32, or WebXAdmin to configure the remote TROY XCD print server.*

As an alternative to the TROY XCD graphical configuration utilities, you can use the print server console to configure the remote TROY XCD print server. The console can be accessed via the print server serial port, TELNET, DEC NCP, or the TROY XCD XCONFIG utility. Refer to Appendix A if you do not know how to use the console.

## 13-12 PrintraNet Internet Printing

1. When you get the "Local>" prompt after connecting to the console, enter the command

```
SET POP3 ADDRESS ipaddress
```

where *ipaddress* is the IP address of your POP3 server (consult with your network administrator if you do not know this address).

2. Enter the commands:

```
SET POP3 NAME mailboxname  
SET POP3 PASSWORD emailpassword
```

where *mailboxname* is the name of the remote TROY XCD print server mailbox and *emailpassword* is the password associated with this mailbox. Usually the mailbox name is the same as the first part of the E-mail address that you defined previously (for example, if the E-mail address is *emailprinter@xyz.com*, then the mailbox name is *emailprinter*).

3. The print server is set by default to poll the POP3 server every 30 seconds. If you wish to change this value, enter the command:

```
SET POP3 POLLING rate
```

where *rate* is the polling rate in seconds.

4. If you have enabled notification, enter the command:

```
SET SMTP ADDRESS ipaddress
```

where *ipaddress* is the IP address of your SMTP server (usually the same as the IP address of your POP3 server).

5. Type `EXIT` to exit the console and save the changes. You have now completed configuring the remote TROY XCD print server.

---

### Step 3 Printing to the Remote TROY XCD Print Server

To print to the remote TROY XCD print server from the local Windows 95/98/NT PC, you simply use select the printer that you created in Step 1 and print to it the normal manner. For example, to print the remote printer named *Email Printer*, you would select **P**rint from the menu bar, push the **Printer Setup** button, click on the name *Email Printer*, and then click OK twice.

You will then get the Port Settings dialog box (assuming that you have not unchecked the **Show this dialog for each Print Job** box). You can now use the address book, manually change the E-mail address of the destination, or modify other parameters. Click **OK** when you are ready to print.

The job will then be sent over the Internet to the remote TROY XCD print server.

---

### Troubleshooting

The first step in troubleshooting is to make sure that you have a valid E-mail connection on both the sending PC and the receiving print server. Try sending an E-mail message from the PC to a user at the remote site who can receive mail

## 13-14 PrintraNet Internet Printing

via the POP3 server. If this does not work, there may be an E-mail configuration problem on the PC, on the local E-mail server, or on the remote POP3 server. Double check to make sure that the E-mail parameters that you configured on the PC and on the remote print server match those that are configured on the E-mail servers.

If you can print small files OK but are having trouble printing large files, the problem may be in the E-mail system. Some E-Mail systems have difficulties printing files that are larger than about 400KB in length. To verify this, try sending the large file as an attachment to an E-mail message. If the file does not reach its destination intact, then the problem is with the E-Mail system.

If you get an SMTP error when using a WINSOCK connection, you may need to configure the hosts file on your Windows 95/98/NT system. To do this create a file named HOSTS in the \WINDOWS\SYSTEM directory (or edit this file if it already exists) and add an entry for your mail server similar to the following using the DOS editor (substitute the actual IP address and name of your SMTP mail server):

```
192.189.207.222          mail.troyxcd.com
```

If you require additional support, contact TROY XCD  
Technical support at (949) 399-0820, FAX: (949) 399-0825,  
E-mail: support@troyxcd.com.

---

## **Print Server Console Command Summary**

The following PrintraNet-related configuration and status commands are available from the TROY XCD print server

console (for a complete list of commands, refer to Appendix A in the appropriate print server Administrator's Guide):

SET POP3 Address aa.bb.cc.dd  
Purpose: Sets POP3 Server IP address

SET POP3 ENable/DISable  
Enables or disables POP3 protocol

POP3 POLLing nn  
Sets POP3 server polling frequency in seconds

POP3 NAmE <name>  
Sets POP3 mailbox name for print server

POP3 PASSword <password>  
Sets the POP3 Mailbox password

SET SMTP Address aa.bb.cc.dd  
Sets the SMTP server IP address

SET SMTP ENable/DISable  
Enables or disables SMTP capabilities

SHOW POP3  
Shows POP3 parameter settings

SHOW SMTP  
Shows SMTP parameter settings

## 13-16 PrintraNet Internet Printing

## Troubleshooting

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### Overview

This chapter describes procedures for troubleshooting problems you may encounter with TROY XCD external print servers, and is divided into the following sections:

1. Installation Problems
2. Intermittent Problems
3. Protocol-Specific Troubleshooting

If you have followed the steps in this chapter and you believe that you have a bad board, then please refer to the *Customer Support and Warranty* chapter for information on returning defective products.

---

### Installation Problems (Printer Does Not Come Up Ready)

If you cannot print to the TROY XCD external print server after you install it, check the following:

1. Make sure that the printer are powered on, that all cables are securely plugged in, and that the printer is on-line.

2. If you have an XConnect II, XConnect II Lite, or XConnect 100, make sure that the parallel cable length is less than 1.8 meters (6 feet), which is the limit of the Centronics standard. The Pony Print Server Plus will support longer lengths up to 25 feet, depending on environmental conditions.
3. If possible, connect a terminal to the serial port. If you see the `boot>` prompt, the print server firmware has not been loaded properly. Refer to Appendix C for instructions on reloading the firmware. If reloading does not fix the problem, try setting switch 1 to ON (factory defaults) and powering the print server off and then on again; if the problem persists, the product may be defective.

---

## **Installation Problems (Printer Comes up Ready but You Cannot Print)**

If the printer starts up OK but you cannot print, the problem could be one of the following:

- There is a problem with the interface between the print server and the printer
- There is a problem with the network connection or cabling.
- There is a queue setup problem, a print server setup problem, or other protocol-related problem.

## **14-2 Troubleshooting**



## Checking the Interface between the Print Server and the Printer

First make sure that the cable between the print server and the printer is securely plugged in at both sides. Then:

1. Wait about two minutes after the printer is powered on and then run a printer self-test (see chapter 2 for information on how to run the self-test).
  - a. If the self-test does not print, then there is possibly a hardware problem. Double check the connections. If you still cannot print, then make sure that your printer is capable of printing text, PCL or PostScript (the self-test will not work unless one of these is possible). Some examples of printers that do not support direct printing of text files:
    - So-called Windows printers, usually low-end inkjet printers, perform all the image rasterization in the printer driver, so the printer only understands a raw image file.
    - Many plotters only support HP-GL/2, RTL, or proprietary languages.

The only way to test such printers is to use an application program with the correct printer drivers.

2. It may be necessary to adjust the parallel port default settings in order to accommodate certain printers, especially older ones, by using console commands (refer to Appendix A for information on how to use the console). Do a `SHOW PORT` command to see the current port settings. In particular:

## Troubleshooting 14-3

- Some printers are not fast enough to keep up with the XConnect II and XConnect 100. For these printers, try disabling DMA with the command `SET PORT P1 DMA DISABLED` (not on Pony Print Server Plus or XConnect II Lite).
  - Some printers require the pACKH hardware handshake. For these printers, use the command `SET PORT P1 ACKH ENABLED`.
  - Some printers and applications do not work well if bidirectional communications are enabled. Use the command `SET PORT P1 BID DISABLED` to disable bidirectional.
  - If you are using ECP mode with Okidata printers and a Pony Print Server Plus, you will need to enable software handshaking with the command `SET PORT P1 SWIO ENABLED`.
  - Not all printers support Fast Strobe mode, so make sure that FSTB is not enabled on the port if you are having problems printing (Fast Strobe is disabled by default; use the command `SET PORT P1 FSTB DISABLED` to disable it).
  - In some rare instances, disabling NBUF with the command `SET PORT P1 NBUF DISABLED` will solve port compatibility issues.
3. If the self-test prints OK but you cannot print or you get garbage printouts, make sure that the printer is set for the correct Page Description Language. Most new printers support AUTO mode, which means that they will

## 14-4 Troubleshooting

automatically switch between PCL and PostScript. However, older printers like the LaserJet II, LaserJet III, and LaserJet IIISi require that the printer be set to the desired language through the printer front panel.

Also, verify that you have set up the drivers correctly on the workstation. Some printers, like the Epson Stylus, require special drivers and will not print if standard PCL or PostScript drivers are used.

### **Checking the Network Connection and Cabling**

If the self-test page prints but you cannot print documents, first check the network connection and cabling.

1. If you are connecting to a 10baseT network, verify that the XConnect II and XConnect II Lite **RECV** and **XMIT** LEDs are **BOTH** lit. If you have an XConnect 100, the **Link OK** LED should be on. If the appropriate LEDs are not on, there is probably a bad 10baseT or 100baseTX cable or the hub port is bad. If possible, try a different cable and hub port, or try connecting a different device (such as a PC) to the cable.
2. If you have an old XConnect II (V3.19 firmware or earlier), make sure that you have set switches 2 and 3 for the correct type of Ethernet.
3. If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub (this is the default setting for most hubs). Also, if you have a hub or multiport repeater, verify that the hub or repeater port is good by trying the print server on a different port.

## **Troubleshooting 14-5**

4. If you have a bridge or router located between the TROY XCD print server and the host computer, make sure that the device is set up to allow the print server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow TROY XCD print server addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the TROY XCD print server. In the case of routers, also make sure that the protocol is routable (LAT, NetBEUI, and DLC/LLC are not routable).
5. If the job exits the queue but does not print, make sure that you are not trying to print a text job to a PostScript printer. If you have a printer that is capable of automatic language switching, make sure that the printer is not forced into PostScript mode.
6. Make sure that you are not trying to perform an illegal operation, such as attempting to print a legal-size form when the printer only supports 8.5" x 11" paper.
7. If you are using the serial port for printing, make sure that the baud rate, parity, stop bits, and character size on the print server exactly match those on the printer.
8. Older HP plotters require a specially-wired cable to connect to the print server serial port. Contact TROY XCD Tech Support for details regarding this cable.
9. Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

## **14-6 Troubleshooting**

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## Intermittent Problems

If the print server and the printer start up OK, but you intermittently have problems printing, check the following:

1. Excessive NetWare polling can be a big cause of intermittent problems. Make sure that you have only enabled the NetWare file servers that you need for printing (do a `SHOW NETWARE` command from the print server console to see the enabled file servers). If you have V3.21 or earlier firmware, make sure that NetWare polling is disabled by using the console command `SET NETWARE RANGE 0`. If you are not using NetWare, you can disable NetWare entirely with the command `SET NETWARE DISABLED`.
2. If you can print small jobs OK but large graphics jobs are distorted or incomplete, make sure that you have adequate memory in your printer.
3. There is a problem with V3.34 and earlier versions of firmware when printing long jobs over the serial port. The solution is to upgrade the print server to the latest firmware.
4. Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

---

## TCP/IP Troubleshooting

If you are using TCP/IP and cannot print to the print server and you have checked the hardware and network as described in the previous steps, then check the following (*note that it is*

*always a good idea to try creating a another print queue to eliminate the possibility of setup errors):*

1. The problem may be the result of mismatched or duplicate IP addresses. Verify that the IP address is correctly loaded into the TROY XCD print server (via the self-test page or through the remote console) and make sure that no other nodes on the network have this address (DUPLICATE IP ADDRESSES ARE THE BIGGEST CAUSE OF TCP/IP PRINTING PROBLEMS). If the address is not correct, then check whether the loading procedure was properly executed.
2. If you used NCP, XCONFIG, or ccr to enter the IP address, make sure that you exited the remote console properly with a CTRL-D or EXIT command.
3. If you used rarp, make sure that you started the rarp daemon using the `rarpd`, `rarpd -a`, `in.rarpd -a`, or equivalent command. Verify that the `/etc/ethers` file contains the correct Ethernet address and that the TROY XCD print server name matches the name in the `/etc/hosts` file.
4. If you used bootp, make sure that bootp is enabled (i.e., the “#” is removed from the bootp entry) in the `/etc/inetd.conf` file. Verify that `/etc/bootptab` file is correctly configured.
5. Also verify that the host computer and the print server are either on the same subnet (for example, if the print server has a subnet mask of 255.255.255.0, the host must have the same subnet mask) or that the router is properly configured to pass data between the two devices.

## **14-8 Troubleshooting**

6. Make sure that the `/etc/printcap` file (if applicable) is typed in correctly. In particular, look for missing ":" and "\" characters, because a small error *anywhere* in the file can have *major* consequences. Also check the `/usr/spool` directory to make sure that you have created a valid spool directory.
7. If you are using a Berkeley-based UNIX, make sure that the daemon is started on Berkeley based systems with the command `lpc start printer`, where `printer` is the name of the local print queue.
8. If you are using an AT&T-based UNIX, make sure the printer is enabled (`enable printer`, where `printer` is the name of the local print queue).
9. Make sure that the `lpr/lpd` remote line printer service are running on the host computer (refer to your host computer documentation for information on how to do this).
10. If you cannot print from DEC TCP/IP Services for VMS (UCX), make sure that you have version 2.0B or later of this software, because earlier versions will not work with the TROY XCD print servers.
11. If jobs are run together or do not eject from the printer, try setting the service (remote printer) with EOT set to the appropriate printer reset string. This string is number 4 (`<ESC>%-12345X`) for all newer HP printers. For example:

```
SET SERVICE BINARY_P1 EOT 4
```

## Troubleshooting 14-9

**Important:** Do not use the above command if you have a LaserJet II, IID, III, or IIID printer. Instead, use an EOT 2 for PCL jobs or 3 for PostScript jobs.

12. If the lines of a text file are staggered, make sure that you have specified a remote printer (rp) name of TEXT in your /etc/printcap file.
13. If you are having trouble printing long jobs (over 1MB), add the line mx#0 to your /etc/printcap file entry. **Important:** *Sun Solaris has a bug with lpr/lpd printing and long jobs. This bug affects any diskless print server, not just TROY XCD. The solution is to use the HP JetDirect UNIX host printing utilities as described in the Raw TCP Port section at the end of Chapter 4.*
14. If you are using the raw TCP port and are experiencing intermittent queue stalling problems, make sure that queueing is enabled on the service (do a SHOW SERVICE command from the remote console, and note if "Q" is listed in the OPT column for the desired service). If it is not, enable queueing with the command SET SERVICE servicename QUE ENA command.
15. If the wrong IP address is loaded, check your network for file servers that have DHCP, BOOTP, or rarp enabled, and make sure that these file servers are not set up to load IP addresses into the print server. Also, make sure that you do not use the command SET IP BOOT 0 to disable TCP/IP broadcasts; instead, you should use the command SET IP METHOD STATIC (unpredictable results will occur otherwise).

## 14-10 Troubleshooting



16. If you have problems with queues locking up when the active print job is deleted, try setting the IP timeout to one minute with the console command `SET IP TIMEOUT 1`.
17. There were a number of lpr/lpd-related problems fixed in the V3.46 firmware. Therefore, if you are experiencing intermittent queue problems and you have an older version of firmware, TROY XCD recommends that you upgrade to 3.46 or later.

---

## NetWare Troubleshooting

If you cannot print from NetWare and you have checked the hardware and network as described in the previous steps, first verify that the print server is attached to the server queue by going to PCONSOLE, selecting PRINT QUEUE INFORMATION, and then CURRENTLY ATTACHED SERVERS. If the TROY XCD print server does not appear in the list of attached servers, then check the following (*note that it is always a good idea to try deleting and recreating the print server and creating a new print queue in order to eliminate the possibility of setup errors*):

1. If you cannot create a print queue, make sure that you have sufficient NetWare privileges. With NetWare 3.12 and earlier, you **MUST** be logged in as SUPERVISOR (not someone with Supervisor privileges). If you are having problems creating queues with NetWare 4.xx and later, try logging in as ADMIN. Also, make sure that you are not trying to run XAdmin32 with the Microsoft NetWare client (you must use the Novell 32-bit client).
2. If you changed the login password, you must change the password in *both* the TROY XCD print server (using the

## Troubleshooting 14-11

SET NETWARE PASSWORD command) and in the file server (using the PCONSOLE Print Server Information Change Password command).

3. Make sure that you have enabled at least one NetWare file server using the SET NETWARE SERVER *servername* ENABLED command.
4. Have you exceeded your NetWare user limit?
5. If you have V3.00 or earlier firmware, make sure that you enabled either 802.3 or Ethernet II frames on your file server, particularly if you have a NetWare 3.12 or 4.xx file server (since these NetWare versions default to 802.2), since these versions of firmware do not support 802.2 or SNAP frames. Also, if you are using NetWare 4.xx, make sure that you have enabled bindery emulation on the file server.
6. Make sure that the print server name you used in PCONSOLE *exactly* matches the name that is configured in the print server, and make sure it is defined as a Queue Server for the print queue.
7. If you are running both 802.3 and Ethernet II frames on different file servers on your network, there is a possibility that the print server may not make a connection to the desired file server. Try forcing the frame type to the desired one using the SET NETWARE FRAME command from the TROY XCD print server remote console.
8. If you are losing portions of your print job and you are using the DOS NetWare drivers, try setting the

## 14-12 Troubleshooting

TIMEOUT parameter in your CAPTURE statement to a higher value (at least 50 seconds for Windows).

9. Because of a bug in the vendor's software driver, file servers equipped with certain models of SMC Ethernet controllers may crash when a TROY XCD print server is connected to the network. This problem, which primarily affects EISA-based controllers made in 1993 or earlier, is not specific to TROY XCD print servers, and can be fixed by upgrading the file server with the latest SMC drivers. Contact SMC technical support at (516) 435-6250 for additional information and instructions on how to download the new drivers from the SMC *bulletin board*.

---

## AppleTalk and PATHWORKS for Macintosh Troubleshooting

If you cannot print from an AppleTalk or PATHWORKS for Macintosh computer, you have checked the hardware and network as described in the previous steps, then check:

1. Make sure that you are running Phase 2 AppleTalk and that you have selected the correct network interface from the Network Control Panel on the Macintosh.
2. If you have a large network, make sure that you have the Laser Writer V8.2 or later drivers (or equivalent driver such as the HP LaserJet 8.2), since earlier versions may cause PostScript errors. Also, verify that you get the correct printer information when you select **Printer Info** from the **Setup** button in the Chooser.

## Troubleshooting 14-13

3. If you are using the LaserWriter 8.4 (or above) drivers and the print server is at firmware revision 3.34 or earlier, then upgrade the print server to the latest firmware.
4. Make sure that you have selected the correct Printer Description File (PPD) from the Chooser (otherwise PostScript errors may result)
5. If you are running PATHWORKS FOR Macintosh verify that you can print directly from VMS and that you have V1.1 or later of PATHWORKS.
6. Verify that you have selected the correct AppleTalk zone. Because the TROY XCD print server gets its zone information from router broadcasts, it may not be in the zone you expect, and will therefore not show up in the Chooser. If this is the case, you may need to force the zone name with the `SET APPLLETALK ZONE` command described in Appendix A.
7. Verify that you have a PostScript printer, because AppleTalk and PATHWORKS for Macintosh require PostScript. If you have a printer with automatic language switching, the printer may need to be manually forced into PostScript mode via the printer front panel.
8. If you are using PATHWORKS for Macintosh, make sure that you specified the LAT port (not the normal `name@zone`) as the destination.
9. Make sure that PATHWORKS for Macintosh software has been upgraded for support of the Macintosh System 7 finder (a patch is required; the easiest way to determine this is to find out if you have Macintosh computers with

## 14-14 Troubleshooting

System 7 that are successfully printing to other printers via PATHWORKS for Macintosh).

10. If you are using older versions of the LaserWriter drivers, verify that the Laser Prep versions on all Macintosh computers that need to print to the TROY XCD print server are the same (not required with LaserWriter 8.xx drivers).
11. Make sure that printer supports bidirectional communications. If it does not, use the console command `SET SERVICE servicename RECEIVE ENABLED` to enable AppleTalk spoofing (spoofing is *not* supported with PATHWORKS FOR MACINTOSH).

If you have PATHWORKS for Macintosh, you can verify bidirectional communications from the VMS system as follows:

- Stop the queue (`STOP/QUEUE/RESET queuename`)
- Connect to the device (`SET HOST/DTE LTAxxx:`)
- When you get the message that you are connected, type a `<CTRL-T>` to query the printer
- You should get a response back similar to `%%[ status: idle ]%%`. If you do not get this response back, make sure that the printer is forced into PostScript mode; if necessary, do a `SET SERVICE servicename RECEIVE DISABLED` to put the TROY XCD print server back into bidirectional mode.
- To exit the `SET HOST/DTE` mode, type a `<CTRL-\\>`. Then try printing again.

If the above does not work, verify that the printer supports bidirectional communications over the parallel port.

## Troubleshooting 14-15

12. If you get an error message when printing from PATHWORKS for MACINTOSH that indicates that the name cannot be found, the probably cause is that the LAT port is set as spooled (i.e., the queue was set up using the `SET DEVICE/SPOOL LTAxxx` command). If this is the case execute the `STOP/QUEUE/RESET queuename` followed by the `SET DEVICE/NOSPOOL LTAxxx` command.
13. If you are having problems printing scanned images, bitmapped graphics, or other binary graphics, you will need to enable binary graphics support on the AppleTalk service using the command `SET SERVICE servicename FILTER 4`. The printer must support the HP Tagged Binary Communications Protocol.
14. There is a problem with HP printers introduced 1998 or later that use Xionics PostScript rather than Adobe PostScript. With these printers, which include the LaserJet 4000, 5000, and 8000, jobs will print OK but the printer will be busy for several more minutes. The solution is to upgrade to V3.56 or later firmware (make sure that an EOT of 4 or 3 is enabled on the AppleTalk service).

---

## Windows NT/LAN Server Troubleshooting

If you are having trouble printing with Windows NT or LAN Server, check the following:

1. Make sure that you can ping the TROY XCD print server using the DOS or OS/2 command `PING ipaddress`, where `ipaddress` is the IP address of the TROY XCD

### 14-16 Troubleshooting

print server. If you cannot ping the print server, you will not be able to print.

2. Make sure that TCP/IP and lpr printing are installed and running on the Windows NT system or the LAN Server file server.
3. If you are having problems printing to the TROY XCD print server from a client PC that is connected to a Windows NTAS or LAN Server file server, verify that you can print a job directly from the DOS or OS/2 prompt on the file server. If you can print from the file server but not from the client, then the problem is probably with the NetBEUI communications rather than with the TCP/IP link to the TROY XCD print server. Check your file server network setup (for example, make sure that you can print from the client to other printers on the network.
4. If you have problems with Windows NT queues locking up when the active print job is deleted, try setting the IP timeout to one minute with the console command `SET IP TIMEOUT 1`.
5. There were a number of lpr/lpd-related problems fixed in the V3.46 firmware. Therefore, if you are experiencing intermittent queue problems and you have an older version of firmware, TROY XCD recommends that you upgrade to 3.46 or later.

---

## **Windows 95/98 Peer-to-Peer Troubleshooting**

If you are having trouble printing on a Windows 95 Peer-to-Peer network, check the following:

### **Troubleshooting 14-17**

1. If the print server does not show up under JetAdmin on a Windows 95/98 Peer-to-Peer network, try removing all of the Windows 95 network software from the Network Control panel and then reinstalling them as follows:
  - First install the **IPX/SPX-Compatible Protocol**, the **Client for Microsoft Networks**, and the network adapter card driver.
  - Restart the system, and then add the **HP JetAdmin** service.
2. Because of the many changes that have been incorporated in Windows 95/98 Peer-to-Peer printing since its introduction, it is a good idea to upgrade to the latest version of JetAdmin (available on the HP web site at <http://www.hp.com>).

---

## LAT Troubleshooting

If you cannot print from a VMS system and you have checked the hardware and network as described in the previous steps, then check the following (*note that it is always a good idea to try creating a new queue with a different LAT port to reduce the possibility of setup errors*):

1. If the queue pauses (Dataset Hangup or Error Writing As) when you try to print, check that the TROY XCD print server node name and port name (or service name) agree with the names defined for the VMS print queue in LATCP or for ULTRIX print queue in the `/etc/printcap` file (`ts` parameter) and `lcp -h` command. The names **MUST EXACTLY** agree in order for printing

## 14-18 Troubleshooting



to work (in the case of ULTRIX, the case of the letters must also match exactly).

2. If you are using DECprint Supervisor (DCPS) make sure that the printer is forced into PostScript mode (DCPS will not work with printers in auto language switching mode and will not work with PCL-only printers).
3. Make sure LAT is enabled for outgoing connections. For VMS, enter LATCP and type `SHOW NODE` at the `Latcp>` prompt. The display should show `Outgoing Connections Enabled`. If it does not, you should type `SET NODE/CONNECTIONS=BOTH`. If you are using ULTRIX, make sure that you have started LAT with the `lcp -s` command and that you have enabled host-initiated connections with the `lcp -h` command.
4. Make sure that there are no duplicate LAT node names or LAT port numbers. Try changing the node name to a different name and/or creating a different LAT port to fix the problem. Also avoid having multiple print queues that use the same LAT port.
5. If you are running ULTRIX, make sure that the `/etc/printcap` file is typed in correctly. In particular, look for missing ":" and "\" characters, because a small error *anywhere* in the file can have *major* consequences. Also check the `/usr/spool` directory to make sure that you have created a valid spool directory.
6. If you are running ULTRIX, check your tty device to make sure that :

## Troubleshooting 14-19

- The tty is a valid LAT tty (execute the command `file /dev/tty* | grep LAT` and observe if the device has a "39" in its description).
  - The device is in the `/etc/ttys` file and in the `/dev` directory.
  - The same tty number was entered throughout the configuration process.
7. Intermittent random queue pauses can be caused if the VMS LAT port is not set up as spooled device. Type `SHOW DEVICE LTAxxx` from the VMS console; if the device is not spooled, type `SET DEVICE/SPOOL LTAxxx` command. (One exception: PATHWORKS for MACINTOSH queues should not be set up with the LTA device set as spooled).
  8. Make sure that `PROCESSOR=LATSYM` is enabled on your VMS print queue if you get any of the following symptoms:
    - The queue pauses when you power off the print server for no apparent reason.
    - The print server generates excessive LAT traffic on the network
    - Only one host computer can access the print server and others are locked out
  9. If the VMS LAT symbiont abruptly terminates and shuts down one or more queues, the problem may be the result of the inability of the LAT symbiont to handle the load

## 14-20 Troubleshooting

(particularly if you are printing heavy graphics). Try creating multiple LAT processors (copy the LATSYSM.EXE file) and splitting the load among these processors.

10. If your VMS graphics printouts are distorted, make sure that you have the LTA port set for PASSALL, PASTHRU, and TAB.
11. If you are having trouble printing PostScript files with VMS (PostScript errors or no printout), make sure that you have the form set for NOTRUNCATE and NOWRAP. Also, make sure you are not trying to print a flag page (unless you are using DCPS) since the flag page in the LAT symbiont is a non-PostScript text file.
12. WordPerfect for VMS will cause problems printing to any network printer, not just TROY XCD. Specifically:
  - If WordPerfect for VMS is installed on VMS 6.xx, you will not be able to print to the print server from more than one VMS system, even for non-WordPerfect print jobs. This is because WordPerfect does not properly break the circuit at the end of each job. The only solution is to de-integrate the WordPerfect and VMS print queues on the host computer, which often means removing WordPerfect entirely from the system. This is a known bug with WordPerfect; contact WordPerfect for possible fixes.
  - If you have V6.1 of VMS and you are experiencing consistent queue pauses, you need to upgrade to V3.21 or later firmware. This problem is generally associated with a WordPerfect for VMS bug.

## **Troubleshooting 14-21**

13. If DECprint Supervisor jobs print very slowly, you need to upgrade the print server to V3.23E or later firmware.
14. If you are printing across a wide area network bridge (for example, Vitalink) and you get paused or stalled queues, increase the TROY XCD print server circuit timer to 120 milliseconds with the command SET SERVER TRANSMIT 120.
15. If you can print successfully from PATHWORKS using DOS but have problems printing from Windows, try increasing the Device Not Selected and Transmission Retry timeouts from the Windows Printer Manager (select **Printer Setup**, select the desired printer, and press the **Connect** button).

---

## Banyan VINES Troubleshooting

If you are having trouble printing with Banyan VINES, check the following:

1. Make sure that you have the Banyan VINES PCPrint software option installed.
2. If there are more than two hops (i.e., more than two routers) between the print server and the file server, make sure that you have changed the hop count to the appropriate number via XAdmin or the print server console.
3. Use the VINES MUSER or MANAGE utility to verify that the print server has logged in. If it has not, make sure that the StreetTalk login name configured in the print server *exactly* matches the login name that was

### 14-22 Troubleshooting

configured using the MUSER or MANAGE utility on the file server.

4. Verify that the StreetTalk name associated with the print server service name *exactly* matches the name of the print queue that was configured using the MSERVICE or MANAGE utility on the file server.
5. Check to see that you have not exceeded the user limit on your Banyan file server (because the print server must login as a user), that printing is enabled on the queue, and that there are no security restrictions on the file server that would prevent the print server from logging in.
6. There is a problem with Banyan 7.1 and diskless print servers (not just TROY XCD) which causes the print server to intermittently go into a logged out state. This problem was fixed in V3.40E firmware, so upgrade the print server to this firmware version or later.
7. There was a problem with firmware versions 3.40B and earlier in which the print server would not log into very large networks. If you are experiencing this problem, upgrade the print server to the latest firmware.
8. Print servers with version 3.37 or earlier firmware will not log into VINES 7.0 or later file servers. The solution is to upgrade the print server to the latest firmware.
9. If you are running both NetWare and VINES on your client PC, XAdmin will default to NetWare. To force XAdmin to look at Banyan-enabled print servers, select **Run** from the Windows 95 **Start** menu. Enter the appropriate

## Troubleshooting 14-23

path plus the command `xadmin -b` (for example, "`\program files\TROY XCD\xadmin\xadmin -b`") to start XAdmin in Banyan mode (alternatively, you may modify the Target in the **Properties** of the XAdmin shortcut with this command).

## 14-24 Troubleshooting

## Customer Support and Warranty

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### Customer Support

TROY XCD, Inc. offers several customer support options to assist you in the event you experience difficulties with your TROY XCD print server, including telephone support, repair services, extended warranty, and advance replacement.

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### Worldwide Web Support

The TROY XCD worldwide web site provides a quick and easy way to answer many common technical questions. It includes a wide variety of technical support tips, as well as copies of product manuals, product literature, and firmware load images.

The web site is located at <http://www.troyxcd.com>.

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### Whom to Call

Your first point of contact for technical support is the Distributor or Dealer from whom you bought your TROY XCD print server. They are familiar with your needs, and will generally be able to provide you with the fastest and most comprehensive support.

If your Distributor or Dealer is unable to answer your questions or is for some reason not available, then contact TROY XCD directly at 949-399-0820 (fax: 949-399-0825; e-mail support@troyxcd.com). Our technical support line is open weekdays 8 AM to 5 PM Pacific Time.

Before contacting Technical support, please check the *Troubleshooting* chapter of this manual or the TROY XCD web site to isolate any problems and be sure to write down any error messages. Also, make sure that you have the serial number of the product (located on the product label on the card).

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## Returning Products

If you need to return an TROY XCD product for any reason (failures, incorrect shipments, etc.), **first contact TROY XCD at (949) 399-0820 and request a Return Authorization Number.** Make sure that you put this number on the outside of the shipping container you use to return the product and (if out-of-warranty) on your purchase order. You will also be asked for the serial number of the defective print server. Ship the unit freight prepaid to:

**TROY XCD, Inc.**  
**Returns Department**  
**1692 Browning**  
**Irvine, CA 92606-4809 USA**

(Adequate insurance is recommended)

If the unit is not in warranty, you will be billed for the standard repair charges. If you do not have a valid TROY XCD account number, you may be asked for payment in advance (Mastercard, Visa, American Express, check, or money order).

## 15-2 Customer Support and Warranty



The TROY XCD Advance Replacement Program is now included at no extra cost during the warranty period. This program allows you to get an immediate replacement for a defective unit during the warranty period rather than waiting until TROY XCD has received the defective unit. To take advantage of this program you will need to fill out an Advance Replacement form (available from TROY XCD Technical Support) with details about the defective product and the problem, and then fax this form back to TROY XCD at (949) 399-0825.

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## **Warranty**

To obtain the benefits of the Advance Replacement Program after the warranty period has expired, the Extended Service Program is available. This Program provides the same features as the Advance Replacement program but also adds an extended warranty period. This program is also available for an annual fee; contact your distributor or TROY XCD for ordering information.

With the Advance Replacement or Extended Services Programs, you simply call TROY XCD at (949) 399-0820 and give the Order Representative your account number. A new card will be shipped to you immediately by express freight. You will be invoiced for the list price of a new unit. Ship the defective unit back prepaid to TROY XCD per the "Returning Products" section of this chapter. Upon receipt of the defective unit, TROY XCD will credit your account.

Units returned after 30 days will not qualify for a refund and will be returned to you.

TROY XCD print servers are warranted to be free of defects in materials and workmanship for a period of one year . This period begins upon the date of shipment if the Hardware is installed by the Purchaser, or upon installation if the Hardware is installed by TROY XCD. During the warranty period, TROY XCD will repair or replace the unit at no charge provided it is returned to TROY XCD freight prepaid as described in the "Returning Products" section of this chapter. To ensure prompt service, please fill out the enclosed warranty card.

The warranty on repaired products or replacement products is 30 days or the last day of the warranty of the original defective product, whichever is longer.

This warranty does not apply if the Product has been damaged by accident, misuse, natural catastrophe, modification, improper service, or conditions resulting from causes external to the Product. The warranty shall be void if the TROY XCD serial numbers have been removed.

DISCLAIMER OF WARRANTIES. THE ABOVE WARRANTIES ARE THE EXCLUSIVE WARRANTIES, AND NO OTHER WARRANTY, EXPRESSED OR IMPLIED, SHALL APPLY. TROY XCD SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF THIS WARRANTY, REGARDLESS OF THE FORM OF ACTION, WHETHER CONTRACT, TORT, OR OTHERWISE, SHALL BE TROY XCD'S OBLIGATION TO REPAIR OR REPLACE AS SET FORTH ABOVE.

## **15-4 Customer Support and Warranty**

# Appendix A

## Command Summary

---

### General Commands

Although it is not normally necessary to change the print server default parameters, you can change the configuration through any following methods:

- DEC NCP or NCL Utility
- TELNET
- TROY XCD XCONFIG NetWare Utility
- Serial Port

The general configuration procedure is the same regardless of which method is used.

Certain print server NetWare parameters (such as the NetWare service name) can also be changed by using the Hewlett-Packard JetAdmin utility or TROY XCD XAdmin utility.

**DEC NCP, NCL, ccr.** To connect to the print server console with the VMS NCP utility, use the following commands:

```
MCR NCP  
CONNECT VIA circuit PHY ADD ethernetaddress
```

where *circuit* is the circuit-ID of the VAX or Alpha (for example, SVA-0 for most DEC workstations, MNA-0 for XMI systems, BNA-0 for BI systems, and QNA-0 for Q-BUS systems) and *ethernetaddress* is the hardware address of the

print server (for example, 00-40-17-00-61-35). Type the command `SHOW KNOW CIRCUITS` at the `NCP>` prompt if you do not know the circuit ID.

Newer OpenVMS systems use NCL instead of NCP. The NCL command to connect to the print server console is:

```
SET HOST/MOP/CIRCUIT=circuit/ADD=ethernetaddress
```

ULTRIX systems use the `addnode` and `ccr` commands as follows:

```
addnode xcdname -c circuit -h ethernetaddress  
ccr xcdname
```

where *xcdname* is an arbitrary name for the print server (each print server on the network needs a unique name).

In all cases, you will get a message like `Console Connected Or Remote Console Reserved` when you are connected. When you are connected, push **RETURN** or **ENTER** to get the "#" prompt, enter the password `ACCESS` (it will not print), and type anything in response to the `Enter Username>` prompt. When you get the `Local>` prompt, you are ready to enter commands.

**Note:** *The commands available are generally a subset of the ones used on the DECserver terminal server. Note that unlike the DECserver, there is no distinction between the SET and DEFINE commands or between the CLEAR and PURGE commands. Instead, when you type CTRL-D to exit the remote console, any of these commands take effect immediately and the results are stored permanently (for example, it is not necessary to enter both a SET and a DEFINE to execute a command and save the results).*

## A-2 Command Summary

**TELNET.** To connect to the print server using TELNET on UNIX, Windows NT, or most other TCP/IP systems, type:

```
TELNET ipaddress
```

at the UNIX system prompt, where *ipaddress* is the IP address of the print server. When you are connected, push **RETURN** or **ENTER** to get the "#" prompt, enter the password ACCESS (it will not print), and type anything in response to the Enter Username> prompt. When you get the Local> prompt, you are ready to enter commands.

**XCONFIG.** To connect to the print server using the TROY XCD XCONFIG NetWare utility, insert the TROY XCD Print Server Software diskette in Drive A and type:

```
A:XCONFIG
```

at the DOS system prompt. If you have only one print server, you will be immediately connected. If you have more than one print server, you will be given a list of available print servers. Type the number of the print server to which you want to connect. When you are connected, When you are connected, enter the password ACCESS (it will not print) at the "#" prompt, and type anything in response to the Enter Username> prompt. When you get the Local> prompt, you are ready to enter commands.

## GENERAL SERVER COMMANDS

```
CLear FAtal  
Deletes fatal error log
```

```
CLear PAssword  
Remove console password
```

## Command Summary A-3

`CLear PORT portname JOB`  
Clears current entry in the print server's internal queue for the specified portname (P1 for the first parallel port, S1 for the first serial port, P2 for the second parallel port, and S2 for the second serial port)

`CLear SERVER STRing n`  
Remove BOT/EOT string (see Appendix B)

`EXIT/^D`  
Exits print server console

`HElp`  
Provides information on available commands

`SET DEFAULT`  
Sets print server parameters to factory defaults

`SET LOAD DIisable`  
Disables firmware reload after exit

`SET LOAD ENable`  
Enables firmware reload after exit

`SET LOAD HOst <name>`  
Sets node name of boot host for (NetWare firmware load)

`SET LOAD IP aa.bb.cc.dd`  
Sets IP address of load host (TCP/IP firmware load)

`SET LOAD Software <filename>`  
Sets host filename of firmware to load

`SET LOAD XModem`  
Begins XModem serial download of new firmware

`SET PASSword <password>`  
Sets console password (default password is ACCESS)

`SET PORT <parallelportname> BIdir [EN|DIS]`  
Enables/disables bidirectional communications on parallel port, where <portname> is P1 for first parallel port or P2 for second parallel port

## A-4 Command Summary

SET PORT <parallelportname> DMA [EN|DIS]  
 Enables/disables DMA support on parallel port (not available on Pony Print Server Plus or XConnect II Lite)

SET PORT <parallelportname> FSTB [EN|DIS]  
 Enables/disables fast strobe mode support on parallel port

SET PORT <parallelportname> NBUF [EN|DIS]  
 Enables/disables no buffer support on parallel port

SET PORT <serialportname> FLOW [NO|XON|CT|DS]  
 Set serial port flow control to NONE, XON/XOFF, CTS, or DSR

SET PORT <serialportname> PARity <parity>  
 Set serial port parity to NONE, EVEN, ODD, MARK, or SPACE

SET PORT <serialportname> SIGNAL [EN|DIS]  
 Enables/disables DTR signal check on serial port

SET PORT <serialportname> SPEED <baudrate>  
 Sets serial port baud rate from 300 - 57600 bits per second

SET PORT <serialportname> STOP [1|2]  
 Sets serial port stop bits per character

SET PROTECT <password>  
 Set console protection password to prevent access to SET commands (use UNPROTECT command to access SET commands)

SET SERVER DESCRIPTION  
 Sets node description string displayed with SHOW SERVER command

SET SERVER STRING n "..."  
 Defines server BOT/EOT string (see Appendix B)

SET SERVICE <servicename> <protocol> [EN|DIS]  
 Enable or disables specified protocol on the specified service.

SET SERVICE <servicename> BOT nn  
 Set service BOT string to nn (see Appendix B)

## Command Summary A-5

SET SERVICE <servicename> EOT nn  
Set service EOT string to nn (see Appendix B)

SET SERVICE <servicename> Filter nn  
Set service filter to nn (see Appendix B)

SET SERVICE <servicename> FMS nn  
Sets filter 1 match string to nn

SET SERVICE <servicename> FRS nn  
Sets filter 1 replace string to nn

SET SERVICE <servicename> NAME <newname>  
Changes service name

SET SERVICE <servicename> PORT <portname>  
Change service port (<portname> is P1 for the first parallel port, S1 for the first serial port, P2 for second parallel port, and S2 for the second serial port)

SET SERVICE <servicename> RECEIVE [EN|DIS]  
Set receive only mode on specified service

SET SERVICE <servicename> TCP nn  
Sets TCP port number of service

SHOW FATAL  
Show fatal error log

SHOW FREE  
Shows memory available

SHOW LOAD  
Shows firmware update parameters

SHOW POP3  
Shows POP3 parameters

SHOW PORT  
Shows port parameters

SHOW PORT <name> STA  
Shows current port status.

## A-6 Command Summary



SHoW SERVEr  
Shows server and LAT parameters

SHoW SERVEr COunters  
Shows server statistics

SHoW SERVEr QUeue  
Shows print server internal queue

SHoW SERVIce  
Shows service Parameters

SHoW SMTP  
Shows SMTP parameters

SHoW SNMP  
Shows SNMP variables

SHoW TEStpage  
Prints test page

SHoW VERsion  
Shows server firmware version

UNPRoTect  
Allows system manager to temporarily access SET commands when remote console is in protected mode (See SET PROTECTION command). The SET DEFAULT command can be used to permanently disable the protected mode.

ZERo  
Zeroes statistical counts

## **AppleTalk Commands**

SET APpletalk [EN|DIS]  
Enables or Disables Appletalk Processing

SET APpletalk ZONE "<name>"  
Set Appletalk zone name

## **Command Summary A-7**

SET LOcaltalk [EN|DIS]  
Enables/disables LocalTalk port

SET APpletalk [EN|DIS]  
Enables/disables Appletalk processing

SET SERVICE <servicename> APP [EN|DIS]  
Enables or disables AppleTalk jobs on specified service

SET SERVICE <servicename> RECEIVE [EN|DIS]  
Enables or Disables bidirectional communications on service.

SHoW APpletalk  
Shows AppleTalk parameters

SHoW LOcaltalk  
Shows LocalTalk parameters

## **Banyan VINES Commands**

CLEAR BANYAN PAssword <password>  
Clears Banyan login password

CLEAR SERVICE <servicename> STreettalk  
Disables the Banyan protocol on the specified service.

SET BANYan LOgin <loginname>  
Sets StreetTalk login name of print server.

SET BANYan PAssword <password>  
Sets login password of print server.

SET SERVICE <servicename> STreettalk <queuename>  
Enables the Banyan protocol on the specified print server service and associates this service with the StreetTalk name of a given print queue the VINES file server.

SET BANYan HOp nn  
Sets number of hops between the print server and the Banyan file server (default value is 2).

## **A-8 Command Summary**

SET BANyan [EN|DIS]

Purpose: Enables or disables Banyan protocol on print server. Banyan is enabled by default.

SET BANyan TImeout *nn*

Sets job timeout (in seconds).

SHow BANyan

Shows Banyan protocol settings and statistics.

## DLC/LLC Commands

SET DLC [EN|DIS]

Enables/disables DLC/LLC protocol

SHow DLC [EN|DIS]

Shows DLC/LLC parameters

## LAT Commands

CLear/PURge/DElete SERVEr GRoup *number*

Removes LAT group membership

SET LAT RB *nn*

Sets LAT receive buffer size (0-5)

SET LAT TB *nn*

Sets LAT transmit buffer size (0-5)

SET/DEFine/CHange SERVEr GRoup *mm[-nn]*

Add to current LAT group membership

SET/DEFine/CHange SERVEr KEePalive *nn*

LAT keepalive timer (sec)

SET/DEFine/CHange SERVEr NAmE <name>

Sets LAT Node name

SET/DEFine/CHange SERVEr TImeout *nn*

LAT inactivity timeout (sec)

## Command Summary A-9

SET/DEFine/CHange SERVER TRAnsmit nn  
LAT transmit interval (msec)

SET/DEFine/CHange SERVICE <servicename> LAT  
[EN|DIS]  
Enables/disables LAT jobs on specified service

SHow LAT  
Shows LAT parameters

## NetBEUI Commands

CLear NETBeui DOMain <domainname>  
Clears domain name

Set NETBeui DOMain <domainname>  
Sets NetBEUI domain name

Set NETBeui [EN|DIS]  
Enables or disables NetBEUI

Set SERVICE <servicename> NETBeui [EN|DIS]  
Enables or disables NetBEUI on service

SHow NETBeui  
Shows NetBEUI parameters

## NetWare Commands

CLear NETWare SERVER <server>  
Removes specified NetWare file server from print server access list.

CLear NETWare QServer <fileserver> ON <servicename>  
Removes queue server mode on service

CLear SERVICE <servicename> CONTEXT  
Remove NDS context

CLear SERVICE <servicename> TREE  
Remove NDS tree

## A-10 Command Summary

SET NETWare ADvertise n  
 Sets advertising frequency of print server

SET NETWare [EN|DIS] Enables/  
 Disables Netware protocol on print server

SET NETWare FRame [802.2|802.3|ETH|AL|AU|SNA]  
 Sets Netware frame type to 802.2, 802.3, Ethernet II, ALL, AUTO, or SNAP

SET NETWare Network n  
 Sets Netware internal network number

SET NETWare NPrinter <pserver> n ON <service>  
 Set NPrinter mode on service

SET NETWare PAssword <psw>  
 Sets print server login password for file server

SET NETWare POLLing n  
 Sets queue polling time in seconds

SET NETWare QServer <fileserver> ON <service>  
 Sets Queue Server mode on service

SET NETWare REscan  
 Rescans file servers for new queues

SET NETWare Server <name> [EN|DIS]  
 Enables file server

SET SERVICE <servicename> CONTEXT <string>  
 Sets NDS context

SET SERVICE <servicename> NETW [EN|DIS]  
 Enables or disables NetWare jobs on specified service

SET SERVICE <servicename> TREE <string>  
 Sets NDS tree

SHOW NETWare  
 Shows NetWare parameters

## Command Summary A-11

## PrintraNet Commands

SET POP3 Address aa.bb.cc.dd  
Sets POP3 server IP address

SET POP3 [ENable|DISable]  
Enables/disables POP3

SET POP3 POLLing nn  
Sets POP3 server polling frequency

SET POP3 NAME <name>  
Sets POP3 mailbox

SET POP3 PASSWORD <password>  
Sets POP3 mailbox password

SET POP3 TIMEOUT nn  
Sets POP3 message timeout

SET SMTP Address aa.bb.cc.dd  
Set SMTP server IP address

SET SMTP [ENA|DIS]  
Enables or disables SMTP protocol

## SNMP Commands

CLear SNMP CONTACT <string>  
Removes SNMP SysLocation

CLear SNMP CONTACT <string>  
Removes SNMP SysContact

SET SNMP CONTACT <string>  
Set SNMP SysContact

SET SNMP LOCATION <string>  
Removes SNMP Syscontact

## A-12 Command Summary

## TCP/IP Commands

SET IP ACcess [EN|DI|ALL] aa.bb.cc.dd {MAsk  
ee.ff.gg.hh}

Allows or prevents specified IP address from accessing print server.

SET IP ADdress aa.bb.cc.dd

Sets IP address of print server

SET IP BAnner [EN|DIS]

Enables or Disables trailing banner page for lpr/lpd jobs

SET IP BOot n

Number of DHCP/BOOTP/RARP tries

SET IP [EN|DIS]

Enables or Disables IP Processing

SET IP MEthod [AUTO|BOOTP|RARP|STATIC]

Sets method of getting IP address

SET IP PIng aa.bb.cc.dd

Test connection to IP host

SET IP RArp nn

Sets procedure used by print server when obtaining its IP address. By default the IP address is set along with a default subnet mask and a router address that is the same as the address of the load host. By setting nn to 1, the subnet mask is not set. If nn is set to 2, the router address is not set. If nn is set to 3, neither the subnet mask nor the router address is set.

SET IP ROuter aa.bb.cc.dd

Sets default router address

SET IP SUBnet aa.bb.cc.dd

Sets subnet mask

SET IP TImeout n

Sets inactivity timeout (minutes)

SET IP WIndow nn

Sets LPD/TCP maximum window size

## Command Summary A-13

SET SERVICE <servicename> IP [EN|DIS]  
Enables or disables TCP/IP jobs on specified service

SET SERVICE <servicename> TCP *nn*  
Sets TCP port number (>1023) on service

SHOW IP  
Shows LPD/TCP/TELNET Parameters

SHOW IP ACCESS  
Shows IP addresses that are allowed to access print server

## A-14 Command Summary



# Appendix B

## Using Services (Ipd-Plus)

---

### Overview

A service is a resource that can be accessed by computers that wish to print the print server. TROY XCD external print servers provide the following predefined services (do a `SHOW SERVICE` command in the print server remote console to get a list of available services; note that the serial port services will only be displayed if the serial port has been enabled for printing; the XConnect 100 will also display additional similar services for the second parallel and serial ports):

<b>Service</b>	<b>Definition</b>
XCD_XXXXXX_P1	Parallel port binary service
BINARY_P1	Parallel port binary service
TEXT_P1_TX	Parallel port TCP/IP text service (adds carriage return after each line feed)
POSTSCRIPT_P1	Parallel port PostScript service (switches PJI-compatible printer to PostScript mode)
PCL_P1	Parallel port PCL service (switches PJI-compatible printer to PCL mode)
XCD_XXXXXX_P1_AT	Parallel port AppleTalk service
XCD_XXXXXX_S1	Serial port binary service
BINARY_S1	Serial port binary service
TEXT_S1	Serial port TCP/IP text service (adds carriage return after each line feed)
POSTSCRIPT_S1	Serial port PostScript service (switches PJI-compatible printer to PostScript mode)
PCL_S1	Serial port PCL service (switches PJI-compatible printer to PCL mode)
XCD_XXXXXX_S1_AT	Serial port AppleTalk service

### Using Services B-1

where "xxxxxx" is the last six digits of the Ethernet address (for example, XCD\_009C53\_P1). If the LN03 option is installed on an XConnect II (this is *not* applicable to the XConnect 100), the service names for the parallel port service ends in "LN" instead of "P1" (for example, XCD\_033355\_LN). Note that any of the services, not just the user-defined ones, can be modified to meet a user's particular requirements.

TROY XCD print servers provide the powerful capability to customize any of the services to meet specific user requirements through the use of setup and reset strings. Such strings are printer command sequences that are sent to the printer before or after the print job. For example, you could define one of the services to provide landscape mode printing by defining a setup string that contains the appropriate command to put the printer into landscape mode.

The print server provides several predefined strings for popular PCL, PostScript, and PJP (the Page Job Language used by new Hewlett-Packard and other printers) commands. These include (do a `SHOW SERVER STRING` command in the remote console to see the available strings):

No.	String	Definition
0	(special)	Using this number causes printer not to be automatically reset at the end of each job.
1	NULL	Null string
2	\1BE	PCL reset (<ESC>E )
3	\04	PostScript reset (CTRL-D)
4	\1B%-12345X	PJP UEL
5	@PJP	Enter PJP mode
6	Enter Language=	PJP language switch
7	PCL\0A	PJP PCL command
8	Postscript\0A	PJP PostScript command
9	\FF\04\FF\05\FF\06\FF\07	Enter Language=PCL

## B-2 Using Services

```
10  \FF\04\FF\05\FF\06\FF\08      Enter Language=PostScript
11  \0C                               Formfeed
```

To define a new string, use the command:

```
SET SERVER STRING number "string"
```

where *number* is the number of the string (12 through 31) and *string* is the desired string (must be enclosed in quotation marks).

A given string can include hexadecimal characters by preceding the value with a “\” character. The next two characters after the “\” will then be interpreted as the hexadecimal value of a character. For example, to specify <ESC>E as string number 12, you would enter:

```
SET SERVER STRING 12 "\1BE"
```

Please note that when you associate a string number with a service, the new string number completely replaces any previous string numbers. Also, if you are using one of the predefined PostScript or PCL services, the new string will nullify the language switching function of these services.

However, you can combine several string numbers together by preceding the string number with “\FF”. For example, if you defined string number 21 as “\1B” (<ESC>), and string number 22 as “&l1O”, you can create a new string number 23 that contains <ESC>&l1O (the PCL landscape mode command) by entering:

```
SET SERVER STRING 23 "\FF\15\FF\16"
```

## Using Services B-3

Note that the string numbers within the quotation marks are expressed in hexadecimal when used with this command.

To associate a string with the service, use the following commands:

```
SET SERVICE servicename BOT stringnumber
SET SERVICE servicename EOT stringnumber
```

where *servicename* is the name or number of the service and *stringnumber* is the number of the string as defined above. The first command (BOT) adds the specified string to the beginning of the job, while the second command (EOT) adds the specified string to the end of the job. A given service can have both a setup and reset string associated with it.

To clear a string number, type:

```
CLEAR SERVER STRING stringnumber
```

To clear a setup or reset string, set the string number to 1 (the null string):

```
SET SERVICE servicename BOT 1
SET SERVICE servicename EOT 1
```

---

## Enabling Protocols on a Service

You may enable or disable protocols that can access a given service with the following commands:

```
SET SERVICE name LAT ENABLED
SET SERVICE name IP ENABLED
SET SERVICE name NETWARE ENABLED
```

## B-4 Using Services

```
SET SERVICE name APPLE ENABLED
SET SERVICE name NETBEUI ENABLED
SET SERVICE name DLC ENABLED
```

where *name* is the name or number of the service (Banyan VINES services are slightly more complex to configure; refer to the Banyan chapter in this manual for details). Do a `SHOW SERVICE` command to see the enabled protocols. Note that a given service must have at least one protocol enabled.

---

## Adding Filters to a Service

A filter is a program built into the print server that performs a specific function. The following filters are available:

<u>filter no.</u>	<u>Description</u>
1	This filter substitutes one user-specified character string for another character string. By default, it substitutes a carriage return character plus a linefeed character every time a linefeed character is encountered in the data stream. It is useful for printing UNIX text files, because such files do not have carriage returns at the end at the end of lines.
2	This filter species that AppleTalk can be used on the service.
3	This filter converts a text file to PostScript for use with PostScript-only printers

**filter no.**    **Description**

4            This filter enables the HP Tagged Binary Communications Protocol to allow AppleTalk binary jobs to be printed via the parallel port.

**filter no.**    **Description**

5            This filter enables LN03 emulation on the specified service (XConnect 100 models only)

The service TEXT\_pp is predefined with the text filter, while the service XCD\_XXXXXX\_pp\_AT has the AppleTalk filter enabled. To use a filter with other services, use the following command:

```
SET SERVICE name FILTER fltrno ENABLED
```

where *name* is the name of the service and *fltrno* is the number of the filter (e.g., 1 for the text filter).

---

## Changing the Service Name

The default service names are rather long and difficult to remember. If you want to change a service name to something more meaningful, execute the following command from the print server remote console:

```
SET SERVICE oldname NAME newname
```

---

## Using Service Names with LAT, TCP/IP, or NetWare

To use a service in LAT, specify the /SERVICE option instead of the /PORT option when defining the LATCP port. For example:

### B-6 Using Services

```
LATCP> CREATE PORT LTA555
LATCP> SET PORT LTA555/NODE=XCD_0009C3-
/SERVICE=BINARY_P1
```

To use services from TCP/IP, specify the service name as the remote printer or "rp" parameter in the printcap file or the printer setup program (e.g., SAM or SMIT). Remember that if you want to print text files to a UNIX service, you should enable the TEXT filter (filter number 1).

To use a service with NetWare, use PCONSOLE to specify the default NetWare service name as one of the print servers for the queue (this service is XCD\_XXXXXX\_P1 by default, where "XXXXXX" is the last six digits of the Ethernet address). If you want to use a different service, you must also specify this service as one of the print servers for the print queue.

---

## Using the Character Substitution Filter

The character substitution filter (filter 1) allows a user to substitute any text string for any other text string (strings may be up to 64 characters, and the two strings may have different lengths). To use this filter:

1. Define the desired strings using the `SET SERVER STRING stringnumber string` command (the same command used to define EOT and BOT strings). For example:

```
SET SERVER STRING 15 "\01"
SET SERVER STRING 16 "This is a test\0D"
```

sets string 15 as <CONTROL-A> and string 16 as "This is a test"<RETURN>. The command `SHOW SERVER STRINGS` shows the string settings.

## Using Services B-7

2. Enable filter 1 on the desired service with the `SET SERVICE servicename FILTER 1` command. The command `SHOW SERVICE` displays which filters are enabled on the services, and the `SHOW SERVICE FILTER` displays the filter settings.
3. Define the service with the desired match string and replacement string with the following commands:

```
SET SERVICE servicename FMS matchnumber
SET SERVICE servicename FRS replacenumber
```

where *matchnumber* and *replacenumber* are the numbers of the strings defined in step 1. Note that if the match string is set to 00, the default match string `<LINEFEED>` and replacement string `<CARRIAGE RETURN><LINEFEED>` will be used. If the replacement string is set to 00 (and the match string is not zero), then the replacement is NULL, and any matches are just deleted from the input stream.

4. As an example of the use of filter 1, in certain types of IBM CICS print jobs, pages end with a `<CONTROL-A>`. By using filter 1, you can substitute each occurrence of `<CONTROL-A>` with `<FORMFEED>`. This would be implemented as follows on a service called "CICS":

```
SET SERVER STRING 12 "\01"
SET SERVICE CICS FILTER 1
SET SERVICE CICS FMS 12
SET SERVICE CICS FRS 11
```

When jobs are printed to the CICS service, all occurrences of `<CONTROL-A>` will be replaced with `<FORMFEED>`. Note that filter 11 is predefined as `<FORMFEED>`.

## B-8 Using Services



# Appendix C

## Reloading the Firmware

### General

---

The firmware on TROY XCD external print servers is stored in flash memory. This means that you can upgrade the firmware by downloading the appropriate update file. Such update files are available from TROY XCD on floppy disk (DOS format), CD-ROM, or Internet access.

### Downloading from a DEC VMS Host Computer

The download procedure for DEC computers is basically identical to the procedure for downloading a DEC terminal server. If MOP is not running on your host computer, enter the following VMS commands to enable it:

```
$ RUN SYS$SYSTEM:NCP
NCP> SHOW CIRCUIT QNA-0 CHARACTERISTIC
NCP> SET CIRCUIT QNA-0 STATE OFF
NCP> SET CIRCUIT QNA-0 SERVICE ENABLE
NCP> SET CIRCUIT QNA-0 STATE ON
NCP> DEFINE CIRCUIT QNA-0 SERVICE ENABLE
NCP> SHOW CIRCUIT QNA-0 CHARACTERISTIC
NCP> EXIT
```

Refer to the documentation included with your VMS system and/or your terminal server if you need additional information on starting MOP.

The file XJET.BIN must be installed in the directory SYS\$SYSROOT:[MOM\$SYSTEM]. The best way to copy

this file from diskette is to use the NFT (Network File Transfer) utility included with PATHWORKS, making sure that you copy in image mode with a maximum record size (MRS) of 512 bytes as shown in the following example:

```
COPY/IMAGE/MRS=512 A:XJET.BIN host::directory
```

where host is the name of the VAX host computer and directory is the VMS load directory (for example, VAX: :SYS\$SYSROOT:[MOM\$SYSTEM]). Note that you must specify both /IMAGE and /MRS=512 because the copy command defaults to DOS stream mode and 128 byte records.

Make sure that the system logical MOM\$LOAD is set correctly by verifying that the following line is in your site startup file:

```
$DEF/SYSTEM/EXEC/NOLOG MOM$LOAD -  
SYS$SYSROOT:[MOM$SYSTEM]
```

If there are other directories listed in the same command, add the server directory (if necessary) to the list separated by commas. If this command does not exist, type it in at the VMS "\$" prompt and also add it to the startup file using the VMS editor.

Now use NCP or the serial port to access the print server remote console (refer to Appendix A if you do not know how to do this), and type:

```
SET LOAD SOFTWARE XJET.BIN  
SET LOAD ENABLE
```

in response to the Local> prompt.

## C-2 Reloading the Firmware

When you type a CTRL-D to exit the remote console, the file XJET.BIN will then be loaded into the print server. The red TEST LED will blink during the load process and will go out when the process is complete.

If the red LED does not go out after about two minutes, check to make sure that you correctly entered all parameters and that your network connections are good. Then power the print server off and then on again, enter the SET LOAD ENABLE command, and exit the remote console to retry the download.

## Downloading from a Windows NT or UNIX Host Computer using Master Mode tftp

To download the print server firmware from a Windows NT or UNIX system using master mode tftp, first copy the file XJET.BIN to that host. Make sure that tftp is started by checking the appropriate files on your system (on Windows NT, TCP/IP and Simple TCP/IP Services must be enabled in the Network Control Panel); with UNIX, tftp must be enabled in your /etc/services file and possibly in another configuration file, such as /etc/inetd.conf. Refer to your system documentation or the UNIX man pages for additional information.

**Important Note:** *Master mode tftp requires V3.46 or later firmware plus 4.6 or later boot firmware. Do a SHOW VERSION command in the print server console to verify which version you are using.*

To download the firmware from Windows NT, enter the following command:

```
tftp - i ipaddr put file password
```

## Reloading the Firmware C-3

where *ipaddr* is the IP address of the TROY XCD print server, *file* is the name of the load file, and *password* is the print server password (ACCESS is the default password).

To download the file from most UNIX systems, enter the following commands from the UNIX system prompt:

```
tftp ipaddress
tftp> binary
tftp> put file password
```

where *ipaddress* is the IP address of the TROY XCD print server, *file* is the name of the load file, and *password* is the print server password (ACCESS is the default password).

## Downloading from a UNIX Host Computer using Slave Mode tftp

To download the print server firmware from a UNIX host using slave mode tftp, first copy the file XJET.BIN to that host. Make sure that tftp is started by checking the appropriate files on your system (generally speaking, tftp must be enabled in your `/etc/services` file and possibly in another configuration file, such as `/etc/inetd.conf`). Refer to your UNIX system documentation or man pages for additional information.

Now log into the print server remote console using TELNET or the serial port (see Appendix A if you do not know how to do this), and execute the following commands:

```
SET LOAD IP unixhost-ipaddress
SET LOAD SOFTWARE "pathname"
SET LOAD ENABLE
```

### C-4 Reloading the Firmware

where *unixhost-ip address* is the IP address of the UNIX load host and *pathname* is the full path name for the XJET.BIN file (e.g., /tftpboot/XJET.BIN). Note that some tftp implementations require that the load file be located in the /tftpboot directory. Be sure to put the path name in quotes and remember that UNIX names are case-sensitive. Also, make sure that your file protection allows general access to the boot directory.

When you type a CTRL-D to exit the remote console, the file XJET.BIN will then be loaded into the print server. The red TEST LED will blink about during the load process and will go out when the process is complete.

If the red LED does not go out after about two minutes, check to make sure that you correctly entered all parameters and that your network connections are good. Then power the print server off and then on again, enter the SET LOAD ENABLE command, and exit the remote console to retry the download.

## **Downloading from a UNIX Host Computer using BOOTP**

To download the print server firmware from a UNIX host using BOOTP, first copy the file XJET.BIN to that host. Make sure that BOOTP and tftp are started by checking the appropriate files on your system (generally speaking, BOOTP must be enabled in the /etc/inetd.conf file, while tftp must be enabled in your /etc/services file and possibly in another configuration file, such as the /etc/inetd.conf file). Refer to your UNIX system documentation or man pages for additional information.

## **Reloading the Firmware C-5**

Configure your `/etc/bootptab` file to specify the Ethernet address of the print server and the name of the load file (`XJET.BIN`). Make sure that your file protection allows general access to the directory that contains the load file. The exact format of the file `/etc/bootptab` varies widely, so you will need to refer to your UNIX system documentation for details. A typical `/etc/bootptab` file entry might be:

```
xc2:ht=ethernet:ha=00401700c953:\
ip=192.189.207.3:bf=/usr/XJET.BIN:
```

Now log into the print server remote console using TELNET or the serial port (see Appendix A if you do not know how to do this), and execute the following commands:

```
SET LOAD SOFTWARE "pathname"
SET LOAD ENABLE
```

where *unixhost-ip address* is the IP address of the UNIX load host and *pathname* is the full path name for the `XJET.BIN` file (e.g., `/tftpboot/XJET.BIN`). Be sure to put the path name in quotes and remember that UNIX names are case-sensitive. Also, make sure that your file protection allows general access to the boot directory.

When you type a CTRL-D to exit the remote console, the file `XJET.BIN` will then be loaded into the print server. The red TEST LED will blink during the load process and will go out when the process is complete.

If the red LED does not go out after about two minutes, check to make sure that you correctly entered all parameters and that your network connections are good.

## C-6 Reloading the Firmware

Power the printer off and then on again, enter the `SET LOAD ENABLE` command, and then type `EXIT` to exit the remote console and retry the download.

## Downloading from a NetWare Server

To download from a NetWare server, first copy the file `XJET.BIN` into the `\login` directory on your `SYS` partition (`SYS:\LOGIN`). Using the `\login` directory will eliminate any potential file protection problems.

Connect to the print server remote console using `XCONFIG` or the serial port (refer to Appendix A if you do not know how to do this) and enter the following commands in response to `Local>` prompt.

```
SET LOAD HOST fileservname
SET LOAD SOFTWARE SYS:\LOGIN\XJET.BIN
SET LOAD ENABLE
```

where *fileservname* is the name of the file server. When you type a `CTRL-D` to exit the remote console, the file `XJET.BIN` will then be loaded into the print server. The red diagnostic LED will blink during the load process and will go out when the process is complete.

If the red LED does not go out after about two minutes, check to make sure that you correctly entered all parameters and that your network connections are good. Then power the print server off and then on again, enter the `SET LOAD ENABLE` command, and exit the remote console to retry the download.

## Reloading the Firmware C-7

## Downloading through the Serial Port (All Models Except Pony Print Server Plus)

The print server can be downloaded from a PC connected to the serial port via the XMODEM protocol. To do this, first make sure that you have Switch 1 in Console mode (OFF) and that the PC can communicate successfully with the print server using terminal emulation mode (for example, through a program like QLII or PCTERM). Then type in the following commands in response to the `Local>` prompt:

```
SET LOAD ENABLE
```

Type `EXIT` to exit console mode. The print server will then reboot. You will get a series of messages displayed on the terminal; press **RETURN** at any time and then type:

```
SET LOAD XMODEM
```

in response to the `Boot>` prompt. You will get the message "You may begin your XModem transfer now." Set your PC terminal emulation program to send a file using the XMODEM protocol with the file name `XJET.BIN`. The print server will then download the `XJET.BIN` file.

## Obtaining Firmware Updates

To get the latest firmware updates, go to the Tech Support pages of the TROY XCD web site (<http://www.troyxcd.com>). Alternatively, you may obtain the firmware from the TROY XCD FTP server (<ftp.troyxcd.com>) in the `firmware` directory. Log in under the user name *anonymous* with your e-mail address as the password.

## C-8 Reloading the Firmware



If you do not have Internet access, you may contact TROY XCD Tech Support at (949) 399-0820, fax (949) 399-0825 or e-mail [support@troyxcd.com](mailto:support@troyxcd.com). The firmware can be mailed to you on diskette or electronically sent to you.

## **Reloading the Firmware C-9**

## **C-10 Reloading the Firmware**

# Appendix D

## Glossary/Index

---

**10base2** A type of Ethernet that uses RG58 coaxial cable. Also called Thin Ethernet, ThinNet, and CheaperNet. *pp. 1-4, 1-5, 2-7, 2-15 to 2-16.*

**10base5** The original Ethernet standard that uses a thick coaxial cable. Also called thick Ethernet or standard Ethernet. *pp. 1-4, 1-6, 2-3, 2-14 to 2-15.*

**10baseT** A type of Ethernet that uses unshielded twisted pair cable. *pp. 1-4 to 1-6, 2-7, 2-12 to 2-13.*

**100baseT4** A 100 megabit/second networking standard based on Ethernet technology that uses four pairs on a Category 3 twisted pair cable. Not widely used.

**100baseTX** The most popular 100 megabit/second networking standard based on Ethernet technology. It uses two pairs on a Category 5 twisted pair cable. *1-5, 2-12 to 2-13.*

**802.2** 1. The IEEE standard for the Logical Link Control layer of the Ethernet protocol. The LLC layer is implemented as special fields containing control information within an IEEE compatible Ethernet frame. 2. The NetWare Ethernet frame type that includes both the IEEE 802.3 and 802.2 fields. *p. A-11.*

**802.3** 1. The IEEE standard for Ethernet. 2. The default Ethernet frame type for NetWare 3.xx and 2.xx (also called 802.3 raw; the NetWare 802.3 is technically not IEEE compatible because it does not have the 802.2 fields). *p. A-11.*

**A4** The international standard paper size (210 x 297mm).

**Address** An identifier. Every device on a network has a unique address.

**AIX** The variation of UNIX that runs on IBM computers. *pp. 4-7 to 4-8.*

**Anonymous FTP** A method by which any user on a network can access certain files on a given host computer by logging in under the name *anonymous* after connecting to that computer with the FTP protocol. *pp. C-8.*

**AppleTalk** A protocol developed by Apple Computer for file sharing and print sharing. AppleTalk runs over Ethernet, LocalTalk, and Token Ring. *pp. 1-1 to 1-2, 6-1 to 6-4, 14-13 to 14-16, A-7 to A-8.*

**arp** The standard TCP/IP method for determining a device's actual network address based on its IP address. Also used by TROY XCD print servers to set the IP address. *pp. 4-15, 4-16.*

**ASCII** A standard for the binary representation of characters.

**AT&T UNIX** One of two major variants of UNIX on which operating systems like HP/UX, Solaris, and SCO UNIX are based. Originally developed by AT&T.

**AUI** Attachment Unit Interface; the 15-pin Ethernet connector that is used to connect to a transceiver. Also called a DIX connector or a thick Ethernet port. *See also 10base5.*

**Batch File** A file containing a number of system-level commands. When this file is run, each of the commands in the file are executed, thereby eliminating the need to type in each command individually.

**Berkeley UNIX** One of two major variants of UNIX on which operating systems like Digital UNIX and SunOS are based. Originally developed by the University of California-Berkeley.

**Bidirectional** Capable of communications in two directions. With printers, this usually means that the printer is capable of receiving data and sending back status information to the host computer. *p. 1-3, 2-6, 2-20, A-4, A-6.*

**Binary File** 1. A file that contains data that is not in a standard format like ASCII. In printing, binary files typically contain graphical information such as scanned photographs. 2. A special type of PostScript file that contains compressed binary information. *pp. 1-4, 4-3, 6-3, 6-4, 14-16.*

## D-2 Glossary and Index

**Bindery** In NetWare 2.xx and 3.xx, a database containing definitions for network entities, including users, file servers, print servers, etc., along with the properties associated with such entities. In NetWare 4.xx, bindery emulation is available for compatibility with older versions. *p. 5-8, 5-11.*

**Bitronics** Refers to a bidirectional P1284-compatible parallel port.

**BOOTP** A standard TCP/IP method for downloading information such as the IP address into a network device. *pp. 4-17 to 4-18, C-5 to C-7.*

**Bridge** A device that connects two local area network segments together. A bridge operates at level 2 of the OSI Reference model, which means that it operates transparently with higher level protocols like NetWare and LAT. *p. 14-15.*

**Broadcast** In a network, a situation in which all destinations on the network receive a copy of a given packet.

**Centronics** The de facto standard for parallel printer ports that is used on the vast majority of all printers.

**Chooser** A Macintosh program that allows a user to select a printer on a network. *p. 6-1, 6-3.*

**Circuit** A logical connection between two or more devices on a network.

**Client** A computer on a local area network that obtains services from a server on the network.

**Command File** The VMS equivalent of a batch file. *See batch file.*

**Console** A program running on a device (such as print server) that allows a user to configure and monitor that device. *Appendix A.*

**DCPS** Abbreviation for DECprint Supervisor. *p. 1-2, 11-8.*

**Data Link Layer.** Layer 2 of the OSI Reference Model that assembles and disassembles frames, handles synchronization, and detects errors.

**Dataproducts** A standard for parallel printer ports that was originally developed by Dataproducts Corporation for its line printers and is

## Glossary and Index D-3

common on older Digital Equipment corporation printers. Rarely used today. Can be handled with TROY XCD external print servers via a third-party adapter.

**DECNET** A network operating system and the corresponding protocol developed by Digital Equipment Corporation. Not to be confused with LAT, which is a different DEC protocol.

**DECprint Supervisor** Sophisticated PostScript-based printing software for VMS that handles job queueing, error and status reporting, and translation of PCL, Tektronix 4014, and LN03 page description languages. *pp. 1-2, 11-10.*

**Digital UNIX** The latest Digital Equipment Corporation version of UNIX. It replaces OSF/1 and ULTRIX, and uses standard Berkeley UNIX TCP/IP and lpr/lpd for printing. *p. 4-4.*

**Direct Mode IPX** The protocol used by Windows 95 for peer-to-peer communications. *Chapter 8.*

**DLC/LLC** A protocol used for printing on Windows for Workgroups, LAN Manager, and other network operating systems; being phased out in favor of newer protocols like Windows 95 Peer-to-Peer direct mode IPX and TCP/IP. *Chapter 10.*

**DMA** Direct Memory Access. A high performance computer architecture in which data is transferred in large blocks between the processor's memory and an external device without any processor intervention. *p. 1-3, 2-11, 2-19, 2-20, A-5*

**DOS** Disk Operating System; now commonly refers to the PC operating system developed by Microsoft that is officially called MS-DOS.

**Download** The process of copying firmware or software from a computer to another computer or other device on the network (such as a print server). *Appendix C.*

**Driver** Low-level software that interfaces a hardware device such as a printer to the computer's operating system. The driver allows programs running on the computer to access the hardware device in a relatively simple manner.

## D-4 Glossary and Index

**Duplex Printing** Printing on both sides of a sheet of paper.

**EIO** The internal bus used by the latest HP printers like the HP LaserJet 4000, 5000, and 8000.

**Escape Sequence** A series of characters, usually starting with the ESCAPE character (ASCII 27), that is used to control a printer or print job.

**Ethernet** The most popular Local Area Network standard, which was developed originally by Xerox, Intel, and Digital Equipment Corporation. It operates at a speed of 10 million bits per second.

**Ethernet II** 1. The second generation of Ethernet, which was developed before the IEEE 802.3 standard. 2. A frame that is compatible with the Ethernet II standard. *p. A-11.*

**Ethernet\_SNAP** Ethernet Sub-Network Access Protocol, an Ethernet frame type that is derived from the 802.2 standard. *p. A-11.*

**FTP** File Transfer Protocol, a TCP/IP-related protocol for transferring files between devices on a network. *pp. C-8 to C-9.*

**File Server** A device on a local area network that provides services to client computers on the network, such as file sharing, print services, etc.

**Firmware** The program that operates a microprocessor-based device like a print server. Essentially the same as software, but the term "software" usually applies to general-purpose computers. *Appendix C.*

**Flash Memory** A type of memory which allows read and write operations, but permanently stores data when the power is turned off. Useful for storing firmware, because it can be easily updated by downloading new code. *pp. 1-2, Appendix C.*

**Font** A set of characters (usually the alphabet plus numbers punctuation, and special characters) that have a particular style.

**Form** A template describing the way a page will appear when printed. *pp. 11-4 to 11-5, 14-22.*

**Frame** A group of data and control information that is sent over a network. Often used interchangeably with *packet*, although *frame* is

## Glossary and Index D-5

normally used with lower-layer protocols like Ethernet, while *packet* is associated with higher layer protocols like IP and IPX. *p. A-11.*

**Gateway** 1. In TCP/IP jargon, a gateway is the same as a router (see *Router*). 2. A device that converts one higher-level network protocol to a different higher level protocol (for example, a LAT-to-TCP/IP gateway). *pp. 4-18, 4-21*

**Hops** The number of routers that are located between two devices, such as the print server and the file server. *pp. 12-7, 12-9.*

**Host Computer** A computer that provides services to one or more users.

**Hosts File** The file on a UNIX host computer (usually in the /etc directory) that contains a list of host computers on the network). *pp. 4-2 to 4-3.*

**HP/UX** The variation of UNIX that runs on Hewlett-Packard computers. *pp. 4-4, 4-6, 4-7.*

**Hub** 1. A multiport repeater for connecting several network segments together; this term is usually associated with 10baseT networks. 2. A sophisticated network device consisting of a chassis plus several plug-in boards, including bridges, routers, 10baseT hubs, and other devices. *p. 2-13.*

**IEEE** International Electronics and Electrical Engineers, a standards body that controls the specifications for Ethernet and other networking-related standards.

**IETF** Internet Engineering Task Force; the group that defines the de facto standards for TCP/IP.

**I/O Slot** Input/Output slot; in printers, a place where network interface cards like the TROY XCD XJet are mounted.

**IOP** Internal Option Port; the bus used on Lexmark 4039 and Optra Series printers to connect network interface cards like the TROY XCD XMark.

## D-6 Glossary and Index



**IP** Internet Protocol, one of the core protocols of the TCP/IP protocol suite. *Chapter 4.*

**IP Address** A network address used by the TCP/IP protocol. *pp. 3-2 to 3-3, 4-13 to 4-21, 7-3, 7-7 to 7-8.*

**IPX** Internetwork Packet Exchange, one of the NetWare core protocols. Used in conjunction with SPX for printing and other applications. *1-2; chapter 5.*

**JetAdmin** A Hewlett-Packard printer management program available for NetWare and TCP/IP. *pp. 1-2, 4-24, 5-9 to 5-12, 5-18, 5-19, 5-20, 5-21, 8-2, 8-3.*

**JetStatus** A feature of TROY XCD print servers that allows a user to view the status of the printer. The `SHOW SERVER QUEUE` command invokes JetStatus; on XJet IV print servers, more detailed information is available via the `SHOW PORT P1 STATUS` command. *p A-7.*

**Job** In printing, a document that is sent to the printer from a computer. *p. 1-1.*

**LAN** Local Area Network; a high-speed method of interconnecting devices in a local or campus environment.

**LAN Manager** A network operating system developed by Microsoft Corporation. *pp 1-1 to 1-2.*

**LAN Server** A network operating system based on Microsoft's LAN Manager; developed by IBM Corporation. *pp 1-1 to 1-2; pp 7-7 to 7-12.*

**Landscape mode** Printing a document with the long edge of the paper at the top. *p. B-3.*

**LAT** Local Area Transport, a protocol originally developed by Digital Equipment Corporation. *pp 1-1 to 1-2, chapter 11, 14-18 to 14-22, A-9, 1-10.*

**LAT port** A logical port through which LAT devices can send data to other LAT devices. A LAT application port is the default type of LAT port that is used for printing applications (the other type of LAT port is a dedicated port that always accesses a single service on the host computer). *Chapter 11.*

## Glossary and Index D-7

**LATCP** A VMS utility program used to configure LAT ports. *pp. 11-2, 11-4.*

**LAT Symbiont (LATSYM)** A VMS program that controls the printing of jobs via LAT ports. *pp. 11-3 to 11-5.*

**Legal Size** The U.S. long paper size (8.5 x 14 inches).

**Letter Size** The U.S. standard paper size (8.5 x 11 inches).

**LLC** Logical Link Control, one of two Ethernet protocol layers that combined correspond to the OSI data link layer. The LLC layer provides a hardware-independent interface to higher level protocols.

**LN03** An older Digital Equipment Corporation laser printer. The LN03 used the ANSI PPL page description language, while its successor the LN03-Plus added Sixel graphics capabilities. *pp. 1-4.*

**LocalTalk** A low-speed (230.4Kbps) local area network standard developed by Apple Computer. Normally used with the AppleTalk protocol. *pp. 1-1, 2-15 to 2-16, A-8.*

**Logical** Refers to conceptual rather than physical. For example, a computer may have a single physical connection to the network (an Ethernet adapter card), but may have logical connections to many different devices on the network.

**lpd** **L**ine **P**rinter **D**aemon, a program that runs on a host computer or a dedicated print server that allows other host computers to print jobs on that computer or print server. TROY XCD print servers use lpd to allow printing from computers on the network. *p. 1-2, Chapter 4.*

**lpd-Plus** A feature of TROY XCD print servers that allows the user to define multiple services, each with a different setup and reset string. For example, a user could have one service for landscape printing and another for duplex printing. Also called *logical printers*. *p. 1-3, Appendix B.*

**lpr** **L**ine **P**rinter **R**emote, the program that runs on a client computer to request print services from an lpd host computer or print server. *p. 4-22.*

**lpq** A Berkeley UNIX command for obtaining the status of printers.

## D-8 Glossary and Index

**lpstat** An AT&T UNIX command for obtaining the status of printers.

**LPT1** The primary parallel port on a PC. Many networking programs allow transparent printing to network printers by accepting output intended for LPT1 and redirecting it over the network. *pp. 5-28, 5-29, 7-12, 11-8.*

**MAC** Medium Access Control, one of two Ethernet protocol layers that together correspond to the Data Link layer of the OSI model. The MAC layer interfaces to the Ethernet hardware. A MAC address is the same as an Ethernet address.

**man page** In UNIX systems, the man pages are an on-line help facility that provide information on various topics.

**MAPI** Messaging Applications Program Interface, a popular method for applications programs to send E-mail messages through Windows operating systems. *pp. 13-2 through 13-5.*

**MIO** Modular I/O, the internal bus on newer HP printers that connects to network interface cards like the TROY XCD XJet IV.

**MOP** Maintenance-Oriented Protocol, the protocol used by the VMS NCP and NCL utilities and for downloading files. *pp. A-1 to A-2, C-1 to C-3.*

**multiprotocol** Refers to the ability to handle multiple protocols simultaneously. In a print server, this means that multiple computers can concurrently send print jobs to the same printer.

**Name Server** A node on a TCP/IP network that provides a list of all nodes on the network. The name server is accessible from any node, and eliminates the need to have separate hosts files on each node.

**NCL** Network Control Language, the method in OpenVMS V6.1 and later for accessing and maintaining remote devices. Replaces NCP. *pp. 11-1, A-1 to A-2.*

**NCP** Network Control Program, a VMS utility for accessing and maintaining remote devices. *pp. 11-1, A-1 to A-2.*

**NDS** NetWare Directory Services, a database of network entities in NetWare 4.xx, such as users, file servers, print servers, etc. NDS is a global directory service, which means that users anywhere on a network

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can access a service such as a printer by name without being logged into the file server that offers that service. *p. 1-2, Chapter 5.*

**NetBEUI** A networking protocol that is used on Microsoft network operating systems. Although NetBEUI can be used for printing, it is being replaced by newer printing protocols like the Windows 95 Peer-to-Peer direct mode IPX and TCP/IP. *Chapter 9.*

**NetWare** A network operating system developed by Novell. *pp. 1-1 to 1-2, Chapter 5, 14-11 to 14-13, A-8 to A-9.*

**Network Layer** Layer 3 of the OSI Reference Model; establishes paths to allow packets to be routed throughout the network. IP and IPX are examples of this layer.

**Network Operating System** A program that controls the operation of a network. *pp 1-2.*

**NLM (NetWare Loadable Module)** In NetWare 3.xx or 4.xx, a program that runs on the file server that performs a specific function such as communications. *pp. 5-1, 5-19, 5-21, 5-22*

**Node** A device connected to a network, such as a computer or print server.

**NPRINT** The method for connecting a remote printer to a print server in NetWare V4.xx. *pp. 5-2, 5-3, 5-18 to 5-25.*

**NWADMIN** The Windows-based NetWare Administrator utility that is used to manage NetWare file servers from a client workstation. *pp. 5-14 to 5-16; 5-18 to 5-20.*

**OpenVMS** DEC's latest name for the VMS operating system, which was originally called VAX/VMS. *Chapter 11.*

**OS/2** IBM's PC operating system. Primarily significant because it is used as the file server operating system on LAN Manager and LAN Server networks. *Chapter 7.*

**OS/400** The operating system used on IBM AS/400 minicomputers. *p 4-12.*

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**OSF/1** DEC's version of UNIX that was originally called ULTRIX and is now called Digital UNIX. OSF/1 uses the standard Berkeley lpr/lpd procedures for printing to remote host computers and print servers.

**OSI Reference Model** A seven-layer model developed by the International Standards Organization which is used as a reference for developing protocols. Since each layer performs a different function, development and debugging are simplified, and there is greater flexibility (for example, this approach allows TCP/IP to run over both Ethernet and Token Ring).

**P1284** An IEEE standard that defines a high-speed bidirectional parallel printer port. P1284 ports are also compatible with the Centronics standard. There are three types of physical connectors associated with the 1284 standard: 1284A (25-pin DB25), 1284B (36-pin standard Centronics), and 1284C (miniature Centronics). *pp. 1-3, 1-6, , 2-20.*

**Packet** A group of data and control information that is sent over a network. Often used interchangeably with *frame*, although *frame* is normally used with lower-layer protocols like Ethernet, while *packet* is associated with higher layer protocols like IP and IPX.

**Page Description Language** A control language usually consisting of commands embedded within a document that control the way the document will look when printed. Such commands would set the type of fonts, page margins, colors, graphics, etc. within the document.

**Parallel Port** On a printer, a port that transfers data 8 bits at a time for maximum performance. The parallel port usually has a 36-pin Centronics connector. *p. 1-3 through 1-6, 2-7, 2-8, 1-19, 2-20, A-4, A-5.*

**PATHWORKS** The Digital Equipment Corporation network operating system for PCs and Macintosh computers. *pp. 1-2; 11-6 to 11-9, 14-20, 14-21, 14-22.*

**PCL** A page description language originally developed by Hewlett-Packard for its LaserJet printers.

**PCONSOLE** A NetWare utility program for configuring and managing printers. *pp. 5-16 through 5-17; 5-22 through 5-24.*

**PDL** An abbreviation for Page Description Language.

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**Peer-to-Peer** 1. A LAN in which nodes communicate with each other without the need for a file server. 2. A new protocol for peer-to-peer communications that is included with Windows 95 (also known as Direct Mode IPX). *Chapter 8.*

**Physical Layer** Layer 1 of the OSI Reference Model; defines the physical and electrical connection to the network.

**PJL** Page Job Language, a Hewlett-Packard printer control language that is independent of the page description language.

**Ping** A TCP/IP command that determines whether a device is alive on the network. *pp. 4-15 through 4-16, 4-22, 7-3, 7-6, 7-9.*

**POP3** Post Office Protocol, the protocol used to retrieve E-mail from the server. *pp. 13-2, 13-8, 13-9, 13-11, 13-12, 13-14, A-12.*

**Port** 1. A physical connector, such as the parallel port. 2. A logical connection to a device.

**Portrait mode** Printing a document with the short edge of the paper at the top (the normal method of printing).

**PostScript** A page description language originally developed by Adobe that is widely used in graphics arts applications. *pp. 6-2, 6-3, 14-16, 14-20, B-3, B-5, B-6.*

**PPD** See Printer Description File.

**PPL** An ANSI-standard page description language originally used in the DEC LN03 laser printer.

**Printcap File** The file on a UNIX host computer (usually in the /etc directory) that contains a list of printers. *p. 4-4.*

**PRINTCON** A NetWare utility program for defining the characteristics of the print job.

**PRINTDEF** A NetWare utility program for defining the characteristics of a printer or form. These characteristics are associated with the print job via the PRINTCON utility.

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**Printer Description File** A file used in PostScript printing that describes the features available on the printer. Commonly used with Apple Macintosh computers. Also called a PPD.

**Print Server** 1. A device that allows multiple host computers to share a printer over a local area network. 2. In Novell NetWare, a logical device that services print queues on a file server. *Chapter 1, 5.*

**Protocol** A method of sending and receiving data between two or more nodes on a network, and insuring that the data is received without errors.

**Queue** A region on the computer or file server's disk where files are temporarily stored before printing. Since the queue can store multiple files, it effectively allows users to send their jobs to the printer even if the printer is busy (a procedure called *spooling*). *Chapters 4 through 12.*

**Queue Server** In Novell NetWare, a queue server is basically the same as a NetWare print server. Queue Server mode is a NetWare printing method in which the printer is directly connected to the print server with no PSERVER NLM installed on the file server. *Chapter 5.*

**rarp** Reverse Arp, a standard TCP/IP method of determining a devices IP address based on its Ethernet address. *pp. 4-14, 4-16, 4-17, A-13.*

**Raw TCP port** A type of TCP port (see *TCP port*) in which data is passed unmodified to the receiving node. *pp. 1-2, 4-23 through 4-25.*

**RCONSOLE** A NetWare utility program that allows a workstation user to access the file server console.

**Remote Console** A method of accessing the print server console remotely via protocols like TELNET or NCP for configuration and management purposes. *pp. 1-3; A-1 to A-3.*

**Remote Printer** In Novell NetWare, a remote printer is a device that connects a printer to a NetWare print server via a network connection rather than through the parallel or serial port of the print server. *pp. 5-2, 5-3; 5-18 to 5-25.*

**Repeater** A network devices that connects two or more network segments together and provides the additional function of strengthening and reshaping the electrical signals, thereby allowing the network to be extended over greater distances.

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**Reset** In printing, a reset is a one or more characters sent after a print job. Usually, the purpose of a reset is to restore the printer back to its normal state. *pp. B-2 through B-4.*

**RJ45** A type of modular jack connector similar to a telephone connector but with 8 wires. Used for 10baseT Ethernet connections and for serial port connections. *pp. 2-9, 2-13.*

**Router** A device that connects networks together. A router operates at level 3 of the OSI Reference model. A router is called a *gateway* in TCP/IP terminology. *pp. 4-18, 4-21, A-13.*

**RPRINTER** The method for connecting a remote printer to a print server in NetWare V3.xx and V2.xx. Replaced by NPRINT in NetWare V4.xx. *pp. 5-18 to 5-25.*

**RS-232** The most common serial interface electrical standard. *p. 2-8.*

**RS/6000** IBM's RISC-based family of computers. *pp 4-5; 4-7 to 4-8.*

**SCO UNIX** A PC-based UNIX developed by the Santa Cruz Operation. *pp. 4-4, 4-9, 4-10.*

**Segment** A physically or logically separate part of a network, usually a different cable, that is joined with other segments of the network via a repeater, bridge, or router to form the complete network.

**Serial Port** On a printer or print server, a port that transfers data one bit at a time. Serial ports usually have either 25-pin, 9-pin "D", or RJ45 connectors. *pp. 1-3; 2-8 to 2-11.*

**Server** A device on a local area network that provides services to client computers on the network. See *File Server, Print Server.*

**Service** A capability offered by a node on a network. A single node can have multiple services available. *Appendix B.*

**Setup string.** A series of characters that is sent before a print job. Usually the purpose of a setup string is to put the printer in a special state (for example, landscape mode). *pp. 11-6; Appendix B.*

**Shell Script** The UNIX equivalent of a batch file. See *batch file.*

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**SMTP** Simple Mail Transfer Protocol, a protocol used to send E-mail messages over the Internet. pp. 13-2, 13-5, 13-6, 13-8, 13-10, 13-12, A-12.

**SNAP** See *Ethernet\_SNAP*.

**SNMP** Simple Network Management Protocol, a protocol for monitoring and controlling devices on a network. pp. 1-3, A-12.

**Solaris** A UNIX operating system developed by Sun Microsystems that runs on Sun computers and Intel-based PCs. pp. 4-4, 4-8.

**Spooling** A method normally associated with AppleTalk in which the print server simulates a bidirectional communications link by sending back control information to the printer rather than relying on the printer to send back this information. p. 6-3, A-8.

**Spool Directory** On UNIX systems, a directory that contains the names of files being spooled to a printer. p. 4-5, 4-13.

**Spooling** In printing applications, spooling is the transfer of data to a temporary storage area on disk (the print queue) prior to printing. Spooling allows many jobs to be queued to a single printer. Since printers are relatively slow devices compared to disk drives, spooling allows a user to submit a job to the printer and then perform other tasks while the job is being printed.

**SPX** Sequenced Packet Exchange, one of the NetWare core protocols. Used in conjunction with IPX for printing and other applications. Chapter 5.

**StreetTalk Name** The Banyan VINES naming convention used to identify all items on the network. Chapter 12.

**Subnetwork** One of several small networks that are joined together into a single large network.

**Subnet Mask** A TCP/IP method of dividing a network into several smaller subnetworks. pp. 4-18, 4-20, 4-21.

**Symbiont** Software that handles job queuing and printing on an operating system.

**SYSCON** A NetWare utility for managing file servers from a client workstation.

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**TCP/IP** Transmission Control Protocol/Internet Protocol, the de facto standard for Internet communications that is widely used on local area networks. Technically, this means the TCP and IP protocols, but the term has come to encompass all of the related protocols, such as TELNET, FTP, lpd, etc. *pp. 1-1 to 1-2, Chapter 4, Chapter 7, 14-7 to 14-11, A-13 to A-14.*

**TCP Port** A method of accessing a TCP/IP service, where a device with a single IP address can have multiple TCP ports. For example, TELNET is port 23, lpd is port 515, etc.; to access a service, you would specify the IP address of the device plus the TCP port number of the service. *p. 4-23 through 4-25.*

**TCPware** A popular VMS TCP/IP software package sold by Process Software. *p. 4-10.*

**TELNET** A TCP/IP protocol that allows two devices to communicate over a LAN. One of the devices appears as if it were a dumb serial terminal that is hardwired to the other device. TELNET is used by TROY XCD print servers to allow devices like PCs to access the print server remote console. *pp. 6-3, A-1 to A-3.*

**TELNET interpretation** In the TELNET protocol, certain characters are intercepted and handled in a special manner, rather than being sent directly to the device. *p. 4-23.*

**Text file** A file that contains ASCII formatted information, with each line of text usually separated by a line feed and/or carriage return.

**fttp** Trivial File Transfer Protocol, a simple method of transferring information between two TCP/IP devices. *pp. C-3 to C-5.*

**TGV Multinet** A TCP/IP software package that runs on VMS. *pp. 4-11.*

**Thin Ethernet** *See 10base2.*

**Transport layer** Layer 4 of the OSI Reference Model; provides end-to-end data integrity. TCP is an example of this layer.

**Transceiver** In Ethernet networks, a small box that plugs into the AUI port of a device to allow that device to connect to the Ethernet cable. Many Ethernet devices have one or more built-in transceivers, which eliminate need for the AUI port.

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**UCX** The old name for DEC's TCP/IP services for VMS. *pp. 4-10.*

**ULTRIX** The original DEC UNIX. ULTRIX supports both TCP/IP and LAT printing. *4-4; 14-18, 14-19.*

**UNIX** A general-purpose computer operating system used on many different kinds of computers. *pp. 1-1 to 1-2; Chapter 4.*

**VAP** Value Added Process, a program that runs on a NetWare 2.xx file server and performs a specific function such as communications.

**VAX** Digital Equipment Corporation's family of 32-bit computers that runs either VMS or some variation of UNIX (ULTRIX, OSF/1, or Digital UNIX). *Chapter 11.*

**VINES** An network operating system developed by Banyan Systems Incorporated. *pp. 1-1 to 1-2; Chapter 12; 14-22, 14-23, A-8, A-9.*

**VINES IP** The protocol used with Banyan VINES. *Chapter 12.*

**VMS** An operating system used on Digital Equipment Corporation computers. *pp. 1-1 to 1-2, Chapter 11*

**WAN** Wide Area Network, a network that interconnects computers and other devices over large distances, most often via telephone company facilities but also via private networks, public data networks, and satellites.

**Warp** IBM's latest version of the OS/2 operating system.

**Web JetAdmin** A Hewlett-Packard software program for Windows NT that allows HP, TROY XCD, and other print servers to be configured and managed over the network using a web browser. *pp. 1-2, 3-8.*

**WebXAdmin** A feature of new TROY XCD print servers that allows configuration and management via a web browser. *pp. 1-2, 3-4, 3-5, 5-12, 5-13, 5-18, 5-20*

**Windows 95 and Windows 98** Microsoft's PC operating systems that feature built-in peer-to-peer networking. *pp. 1-1 to 1-2; Chapter 8.*

**Windows NT** Microsoft's multitasking operating system that can be used either as a client or as a server (Windows NT Advanced Server). *pp. 1-1 to 1-2; chapter 7.*

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**WINSOCK** A popular applications program interface for TCP/IP networking using Windows operating systems. *pp. 13-2 through 13-5.*

**Wollongong PATHWAY** A TCP/IP software package for VMS. *pp. 4-11.*

**XAdmin** TROY XCD's Windows-based utility for managing and configuring print servers. *pp. 1-2; pp. 3-1 through 3-4; 5-12 through 5-14; 5-18 through 5-21, 12-6 to 12-8.*

**XAdmin32** The 32-bit version of TROY XCD's Windows configuration utility. *pp. 1-2; pp. 3-1 through 3-4; 4-14; 5-6 through 5-9; 5-18 through 5-21, 7-3.*

**XIO** Expanded I/O; the internal bus on HP LaserJet II and III printers that connects to network interface cards like the TROY XCD XJet III.

**Zone** In AppleTalk, a zone is a subnetwork; that is, a given network can be subdivided into multiple zones. *pp. 6-3, A-7.*

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